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Regional Implementation of Tribal Transportation Safety Program:
Yankton Sioux Tribe Roadway Safety Improvement Program

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Regional Implementation of Tribal Transportation Safety Program: Yankton Sioux Tribe Roadway Safety Improvement Program

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Disclaimer

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ABSTRACT

Tribal communities recognize the need to improve roadway safety. A five-step methodology has been developed by the Wyoming Technology Transfer Center (WYT^2/LTAP) to improve roadway safety on reservations. This methodology was initially implemented on the Wind River Indian Reservation (WRIR), which led to the Wyoming Department of Transportation's funding of three system-wide, low-cost safety improvement projects. Due to the success of the program on the WRIR, tribes across the country have become interested in implementing the program. WYT^2/LTAP and the Northern Plains Tribal Technical Assistance Program (NPTTAP) are helping tribes implement this program on their reservations in the Great Plains region, and have developed criteria to identify tribes for participation.

Reservations in North Dakota and South Dakota applied to TTAP to participate, and three tribes were accepted for implementation: the Standing Rock Sioux Tribe (SRST), the Sisseton Wahpeton Oyate Tribe and the Yankton Sioux Tribe (YST). This study describes the implementation on YST.

Many challenges and differences were identified through the analysis, demonstrating that a single procedure would not work for different reservations. Through extensive coordination and collaboration with the tribes and government agencies, WYT^2/LTAP, along with the TTAP, centers can provide the technical assistance the tribes need to develop their own road safety improvement program.

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1. INTRODUCTION

The Native American community has suffered greatly with higher fatality rates on their reservation roadways than the general U.S. population. (National Center for Statistics & Analysis, 2004). State and national tribal transportation safety summits have been held to identify problem areas and to develop strategies to reduce fatal and serious injury crashes (Herbel & Kleiner, 2010). In order to address the high fatal and serious injury crashes on reservations, a methodology has been developed by the Wyoming Technology Transfer Center (WYT^2/LTAP) to improve roadway safety. This methodology provides tools for tribes to utilize in prioritizing safety improvements on their reservations. It was first implemented on the Wind River Indian Reservation (WRIR) in Wyoming, and three system-wide low-cost safety improvement projects were funded by the Wyoming Department of Transportation in 2013 (Shinstine & Ksaibati, 2013).

WYT^2/LTAP, along with the Northern Plains Tribal Technical Assistance Program (NPTTAP), is helping tribes implement this program on their reservations in the Great Plains region. Tribes interested in developing a safety improvement program for their reservation were notified and encouraged to participate in the spring of 2014. The Yankton Sioux Tribe was accepted for implementation.

1.1 Background

A five-step methodology has been developed by WYT^2/LTAP, which identifies high-risk crash locations and provides low-cost safety improvements to address the hazards on reservations. This methodology was first implemented on the WRIR in Wyoming (Shinstine & Ksaibati, 2013).

A combination of field verification and trend analysis, backed by data is utilized. The five-step procedure is as follows:

1. Crash data analysis.
2. Level I field evaluation of roadway conditions.
3. Combined ranking to identify potential high risk locations based on steps 1 and 2.
4. Level II field evaluation to identify countermeasures.
5. Benefit-cost analysis.

Depending on available data, preference by the tribes, and other factors, this process can be altered to meet the tribes' needs, and is intended for low-cost safety improvements. However, other improvements can be identified and presented to the tribes for other funding consideration. Part of this process includes looking at trends in crash data and developing a systemic approach.

Due to the success of the program on the WRIR, tribes across the country have become interested in implementing the program. The NPTTAP, along with WYT^2/LTAP, developed criteria to identify and help interested tribes participate. In order to qualify for the program, a tribe was required to provide at least three years of crash data and be willing to dedicate the resources to the project; the tribal leadership must also be committed to follow through on the program's implementation. The success of the programs on the WRIR was due to the cooperation and collaboration among the various stakeholders and WRIR members' commitment to improve safety on their roadways (Shinstine & Ksaibati, 2013).

As sovereign nations, tribes face different challenges than other communities to address their transportation and roadway safety needs (Martinez, Migliaccio, Albert, & Holt, 2009). Collaboration, communication, and cooperation are essential among the different jurisdictions responsible for the roadways on tribal lands. Federal, state, county, township, and tribal governments, and the Bureau of

Indian Affairs (BIA) are some of the many agencies involved in the decision-making process faced by the tribes.

Tribal communities recognize that crash reporting is inadequate among the many reservations (Herbel & Kleiner, 2010). Crash reports are either incomplete or non-existent. Many factors contribute to this issue. A South Dakota study of reservations in the state determined that approximately 64% of crashes on tribal lands are under-reported (Bailey & Huft, 2008). The study also indicated that the main problems were either the tribal law enforcement's ability to report the crashes or the relationship between the tribes and the state.

The Indian Reservation Road Safety Improvement Program was developed with these challenges in mind. Through implementation, the tribes have the opportunity to address these issues to their satisfaction and realize an effective program for their reservation.

1.2 Objectives

The purpose of this report is to present the results of the implementation of a roadway safety improvement program on the Yankton Sioux Indian Reservation.

1.3 Report Organization

This report consists of five sections. Chapter 2 discusses the criteria developed for the regional implementation of the Indian Reservation Safety Improvement Program in the Northern Plains region. Chapter 3 lays out the methodology developed for the program. Chapter 4 is a discussion of crash trends identified on the Yankton Sioux Tribe (YST) reservation. Chapter 5 discusses the results of the implementation of the program on the YST. Chapter 6 provides conclusions and recommendations to the objectives laid out in this report.

2. REGIONAL IMPLEMENTATION

Due to the success of the safety improvement program implemented on the Wind River Indian Reservation, tribes across the country became interested in implementing their own program. WYT^2/LTAP and the Northern Plains Tribal Technical Assistance Program (NPTTAP) collaborated to develop a regional implementation for the Northern Plains. They developed criteria for the tribes in the region to apply for implementation of a roadway safety improvement program on their reservation.

2.1 Criteria

Coordination efforts between WYT^2/LTAP and NPTTAP resulted in the development of criteria to identify tribes willing and able to participate in the implementation of a road safety program. The following criteria were used to determine a Tribe's eligibility to participate:

1. The tribe should be willing to invest the energy necessary to work with WYT^2/LTAP and NPTTAP throughout the process and commit the needed resources. The main resources needed are individuals willing to spend the time to meet with WYT^2/LTAP, provide personnel to assist with field reviews, and provide feedback.
2. Crash data are critical to addressing safety improvements. The interested reservation needs to have the ability to provide at least three years of crash data and provide WYT^2/LTAP and NPTTAP access to that data. WYT^2/LTAP can work with limited crash data, but needs enough to determine problem areas and trends.
3. Collaboration is essential to the success of this program. The tribe needs to have the ability to work with the state DOT, law enforcement (state, county, and tribal), reservation road and transportation office or designated tribal member able to make decisions on behalf of the tribe concerning roadway matters.
4. The tribe would need to provide information about any existing strategic plan or initiatives in place to address roadway safety.
5. Most of all, the tribe must have a desire to improve roadway safety on their reservation.

A one-page application was sent to interested tribes addressing these criteria. The completed application, along with a commitment letter from the tribal leadership, was required for a tribe to be considered for implementation.

2.2 Selection

Reservations in North Dakota and South Dakota applied to TTAP to participate. Applications were received from three tribes: the Standing Rock Sioux Tribe (SRST), the Sisseton Wahpeton Oyate Tribe, and the Yankton Sioux Tribe. Initial meetings were held between WYT^2/LTAP and the transportation contact from each to initiate communications and begin the process.

All three tribes are located in South Dakota. However, SRST is located in both North Dakota and South Dakota. This presented an interesting challenge regarding crash data collection and coordination with the state agencies. WYT^2/LTAP met with the respective state offices to determine how their safety programs are managed and who would be responsible for the crash data.

2.3 Yankton Sioux Tribe

Initial meetings established the contacts and processes involved in the transportation program with the YST. Its transportation department consists of a transportation director and a transportation safety officer along with maintenance and administrative personnel. The transportation safety officer is the contact for

this project. The Yankton Sioux Reservation (YSR) is located in south-central South Dakota, in the eastern portion of Charles Mix County, and has a land area of approximately 40,000 acres. There are about 4,500 enrolled members residing on the reservation along with many non-tribal members owning land within the reservation boundaries. The safety improvement program implementation on YSR is discussed in detail in Chapter 5.

2.4 Chapter Summary

In this chapter, the regional implementation of the Indian Reservation Roadway Safety Improvement Program was discussed. WYT^2/LTAP and NPTTAP collaborated to develop criteria for tribes in the Northern Plains region to participate. The main criteria require the tribe to have a desire to improve the safety of their roadways with the leadership's willingness to commit to supporting the implementation. Three tribes were selected for participation: the Standing Rock Sioux Tribe, Sisseton Wahpeton Oyate, and Yankton Sioux Tribe. YSR, located in in south-central South Dakota, has a land area of about 40,000 acres. They have identified their transportation safety officer as the contact for this project.

3. METHODOLOGY

The methodology developed and previously implemented on the Wind River Indian Reservation was used for this project. The methodology allows for flexibility depending on available data, preference by the tribe, and other factors. Part of this process includes looking at trends in crash data and developing a systemic approach. A combination of field verification and trend analysis, backed by crash data is utilized. The five-step procedure is as follows:

1. Crash data analysis.
2. Level I field evaluation.
3. Combined ranking to identify potential high risk locations based on steps 1 and 2.
4. Level II field evaluation to identify countermeasures.
5. Benefit-cost analysis.

This procedure is shown graphically in Figure 3.1. Crash data are analyzed and a ranking is established based on the high-crash locations. From this ranking, a list of roadways is proposed for field evaluation. From the field evaluation, a ranking of the conditions of the roadway is developed. The two rankings are combined to provide a list of proposed roadways considered for safety improvements. Another field evaluation is performed to identify safety improvements. Cost estimates are developed and a benefit-cost analysis is performed. The combination of historical crash data and field evaluations provides a substantive basis for identifying high-risk locations. The benefit-cost analysis gives the tribe a measure to prioritize the projects.

Other processes within the methodology are intended to give the tribe the ability to make changes and identify other factors involved in the high-risk locations, such as behavioral factors. These can then be included in their strategic highway safety plan and addressed in other funding requests. A final step in the process is the evaluation of the effectiveness of those improvements. Once projects have been established, funded, and implemented, an after study will need to be performed to determine actual crash reduction resulting from the safety improvement.

This program is intended for low-cost safety improvements, but other improvements can be identified and presented to the tribe to consider for other funding opportunities. The methodology provides flexibility for the tribe to utilize the results the way they consider best to address.

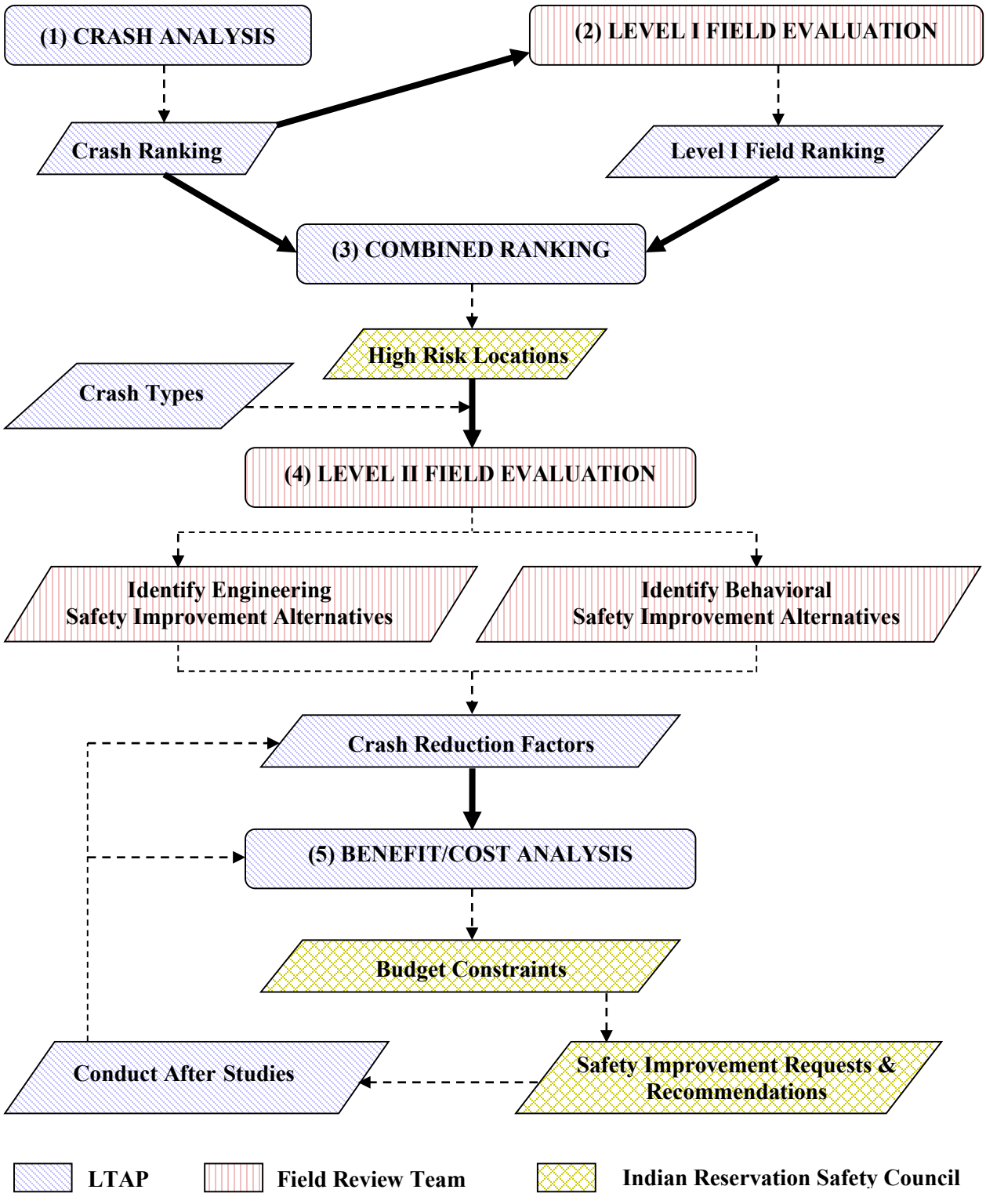

Figure 3.1 Five-Step Process for Indian Reservation Safety Improvement Program

3.1 Crash Data Analysis

The first step in determining high-risk crash locations is the analysis of crash data. All states have some form of crash data analysis capabilities. These data are maintained by either the state DOT, law enforcement, or some other state agency or consultant. An analysis should be done for a recent period of time. Five to 10 years provides enough data to identify trends or hotspots depending on the state and volume of traffic experienced on the local tribal roads. However, as little as three years of data can be used. Typically, they are very low volume because of their rural nature. Crash rates are difficult to quantify because of the lack of traffic data and challenges in maintaining accurate and updated crash data. As discussed previously, tribes often lack complete and accurate crash data.

The crash history obtained will provide the basis for initial ranking of the sites. Based on the number of crashes for a given hotspot, the highest number would receive the highest rank. If traffic volume is available, these crashes can be converted to a crash rate, which provides for a more accurate assessment of high crash occurrence.

Besides the total number of crashes and crash rate, several other factors are analyzed to determine causal effects and severity to identify ways to reduce fatal and serious injury crashes. The following criteria are considered for this analysis:

- Total number of crashes
- Total number of crashes per mile
- Severity of crashes – fatal, injury or property damage only (PDO)
- Road conditions
- Lighting conditions
- First harmful event
- Driver's gender
- Driver's age
- Alcohol-drug related crashes
- Safety device use
- Speed

The first six criteria above identify physical aspects of the crashes along with the severity. These will provide a basis for determining high-risk locations. Based on direction from the tribes, several factors being analyzed are behavioral in nature. The last five criteria are intended more for the behavioral analysis of the crash data. Behavioral improvements are reviewed along with physical improvements.

The crash analysis includes the number of crashes per one-mile segment, which are known as hotspots. Each segment is ranked from the largest number of crashes per hotspot to the least number of crashes. Based on this ranking, the top high-crash routes are selected and proposed for a Level I field evaluation as the tribes determine.

3.2 Level I Field Evaluation

With the high-crash locations identified, a Level I field evaluation is performed on the selected routes. A team of tribal members and transportation experts such, as LTAP, TTAP and/or the BIA, should perform this evaluation. This team should be selected by the tribes. Tribal personnel are essential in providing the site expertise because they have first-hand knowledge of the problem areas.

The roadways are reviewed at one-mile segments, and each segment is rated from 0 to 10, with 0 being the worst and 10 the best. All segments should begin with a 5 rating as the average. These ratings are applied to five categories as follows:

1. General:
   - Presence of sharp horizontal or vertical curve
   - Visibility
   - Pavement defects that could result in safety problems
   - Ponding or sheet flow areas that could result in safety problems
   - Presence of loose aggregate/gravel that could cause safety problems

2. Intersection and Railroad Crossings:
   - Intersections free of sight restrictions that could result in safety problems
   - Intersections free of abrupt changes in grade or conditions
   - Presence of advanced warning signs when intersection traffic control sight restrictions exist
   - Presence of railroad crossing signs at RR crossing approach
   - Presence of railroad advanced warning signs when crossing sight restrictions exist
   - Vegetation and other obstructions restricting sight distance at railroad crossing
   - Roadway approach grade at railroad crossing level enough to prevent snagging

3. Signage and Pavement Markings:
   - Signing present at needed locations to improve safety
   - Presence of unnecessary signage that may cause a safety problem
   - Effective signage for existing conditions
   - Presence of pavement markings
   - Presence of ineffective pavement markings for present conditions
   - Presence of old or faded pavement markings affecting the safety of the roadway
   - Presence of needed delineators
   - Presence of improper or unsuitable delineators

4. Fixed Objects and Clear Zone:
   - Clear zones free of hazards, non-traversable side slopes without safety barriers
   - Presence of narrow bridges or cattle guards
   - Presence of culverts with inadequate extensions

5. Shoulder and right-of-way:
   - Standard shoulder width
   - Slope greater than 3:1
   - Presence of hazards along shoulder
   - High rollover potential

For a team of evaluators, either discussion could be ensued to determine one score or each member could score independently. Then these scores would be averaged for each segment of each roadway. Maintaining the same team throughout the evaluation period would ensure consistency in results. Each segment receives a total score as the sum of the score for each category. All segments from all evaluated routes are then ranked from lowest to highest score. The lowest score value is considered to have the highest risk. Similar to the crash ranking, a Level I rank is assigned.

3.3 Combined Ranking

The third step in the process is to combine the crash ranking with the Level I ranking. Crash ranking and Level I ranking are tabulated and combined to develop a final ranking for the Level II field evaluation. These rankings are tabulated by road name and/or number, beginning and ending milepost, crash ranking, Level I ranking and, finally, combined ranking. To combine the ranking, the crash ranking and Level I ranking are added.

The segments are then sorted by the combined rank value, smallest to largest. The segments with the smallest numbers are considered the most hazardous. From these segments, the roads with the smallest combined ranking value are considered for Level II field evaluation for determining countermeasures. Although other segments of the same road may have a much lower rank, each road is looked at in its entirety for safety improvements. Ten to 15 roads should be selected for the Level II evaluation.

The rankings, along with the selected roads, are provided to the tribe for their review and approval to proceed with the Level II evaluation. The tribes have the option of including more sites or adjusting the rankings based on their insights.

3.4 Level II Field Evaluation

Once the tribe has identified their priority sites, a Level II evaluation is performed on each of the routes selected. This should consist of a team determined by the tribe and should include tribal personnel and transportation experts. Additional data may need to be collected, such as traffic counts and review of behavioral factors, as well as other causal factors to guide decisions on safety improvements. The team reviews each road and revisits the sites as needed to determine the proper countermeasures.

A list of countermeasures is developed for typical applications on rural roadways and crash reduction factors (CRFs) assigned. Information on proven safety countermeasures and CRFs can be obtained from the FHWA Safety website (FHWA, 2008). The FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads (Atkinson, et al., 2014) was developed specifically for identifying appropriate countermeasures. The Crash Modification Factors Clearinghouse (FHWA) is a repository of CMFs that is regularly updated and provides extensive information on the proper applications. Individual states may also have developed their own countermeasures and crash reduction factors. Tribal lands in the states they are located typically have similar conditions unique to that area, thus they can utilize those informational resources. Included are behavioral countermeasures the tribes can apply.

Typical countermeasures that are considered low-cost safety improvements include the installation of advanced warning signs, chevrons at curves, delineators, and pavement markings. Others that may require more design and resources would be culvert widening, guardrail installation, and flashing warning beacons. Countermeasures should be applied based on the type of crashes. For run-off-the-road crashes, countermeasures, such as advanced curve warning signs, pavement marking, and chevrons, are effective and low cost.

Each route is evaluated and proposed countermeasures identified. Once all routes have been evaluated and improvements identified, a cost to implement is estimated. This information is used to perform the benefit-cost analysis.

3.5 Benefit-Cost Analysis

Based on the selected countermeasures and associated costs, a benefit-cost analysis is performed for each project. If the project is set up for each road, then all the improvements identified for that road are included in the estimate. This provides the tribe information on the most effective safety improvements. Construction costs are estimated for the safety improvements.

A benefit value associated with each improvement is calculated based on CRFs and societal costs of crashes. The CRF is an estimation of the percent reduction of crashes expected from the implementation of the associated countermeasure. The resources cited in the previous section for identifying countermeasures and crash modification factors should be used to identify the proper CRF for each countermeasure.
This is only an estimate and a general application. Other factors that apply specifically to the site must be considered. The benefit is calculated using the CRF assigned to the particular countermeasure and the cost of that type of crash being avoided. Values for fatal, injury, and PDO crashes are assigned and can be obtained from federal or state sources. When two or more countermeasures are applied to a site, then a weighted combined value is calculated.

The ratio of calculated benefit of the countermeasure to the estimated construction cost is then calculated. Any ratio less than 1.0 should not be considered because the benefit is actually decreased by the countermeasure. In other words, the countermeasure increases the hazard.

Once the benefit-cost analysis is completed for each site, a recommended prioritized list of improvements is provided to the tribe for their review and approval. When the tribe decides what improvements they desire, they can determine what resources they want to allocate to these projects. For the low-cost improvements, the state can provide HSIP funds under the HRRRP.

3.6 Chapter Summary

This chapter lays out the five-step methodology designed to assist tribal governments with developing a safety improvement program. Knowing that tribes have unique challenges and cultural differences, collaboration among their members, government agencies, and other safety stakeholders is essential to successfully implementing such programs. Starting with a review of crash data provides the trends attributed to the crashes, and identification of hotspots is necessary to know where to first look to improve their roadways. A priority ranking is determined based on the high-crash locations.

The top locations are considered for field evaluation. The field evaluation provides a scoring of the locations based on the roadway conditions. These locations are then ranked from the worst condition to the best. Then the crash rank and the Level I field evaluation rank are combined, providing a new list of priority locations.

The entire road is considered for a Level II evaluation to determine countermeasures for the hotspot locations. Countermeasures are identified and tabulated for each road. Construction cost estimates are calculated for the safety improvement projects determined from the countermeasures. Low-cost improvements include pavement markings, signage, and delineators. Other improvements, such as culvert widening and guardrail installation, should also be considered. The tribes can determine whether to pursue all or part of the proposed improvements.

The benefit of installing each countermeasure is calculated based on CRFs and crash costs. A benefit-cost ratio is then calculated. Projects with large benefit-to-cost ratios should be considered first for implementation. A high benefit-to-cost ratio indicates that for a small investment of funds, there is a potential for great reduction in fatal and injury crashes.

4. CRASH ANALYSIS AND TRENDS

In South Dakota, the Department of Public Safety (SDDPS) manages the crash data. The SDDPS claims it receives very little data from tribal and BIA law enforcement for the various tribes around the state. South Dakota publishes its crash data, which contain personal information on individuals involved in the crashes. This presents a problem with many tribes who feel that they do not want such personal information publicized.

Initial analysis has been performed for YST. South Dakota provided access to the raw crash data for 2004 through 2013, and included information on injury severity, road conditions, lighting conditions, first harmful event (FHE), and FHE location, and personal data that included gender, age, alcohol and drug involvement, safety equipment use, as well as personal data about each individual such as name and address. Because the personal data includes information on every person involved in the crash, some simplifications and assumptions were made to link it to a specific crash. Typically, the first person listed in the personal data was the driver. If the crash involved more than one vehicle, only the first driver's information was used.

The crash analysis compared crashes within the reservation boundaries with all state rural roads in the state for a 10-year period (2004-2013). This analysis compared severity, alcohol involvement, driver gender and age, safety equipment use, FHE, and FHE location.

4.1 Results

There were 591 crashes recorded for YST from 2004 through 2013. Overall, the trend shows that crashes have increased over the 10-year period. At closer observation, property damage only (PDO) crashes have increased, injury crashes have decreased, and fatal crashes have remained relatively constant. The crash trends can be observed in Figure 4.1. Further study should be done to determine if the increase in PDO crashes is due to better reporting or if they are in fact increasing.

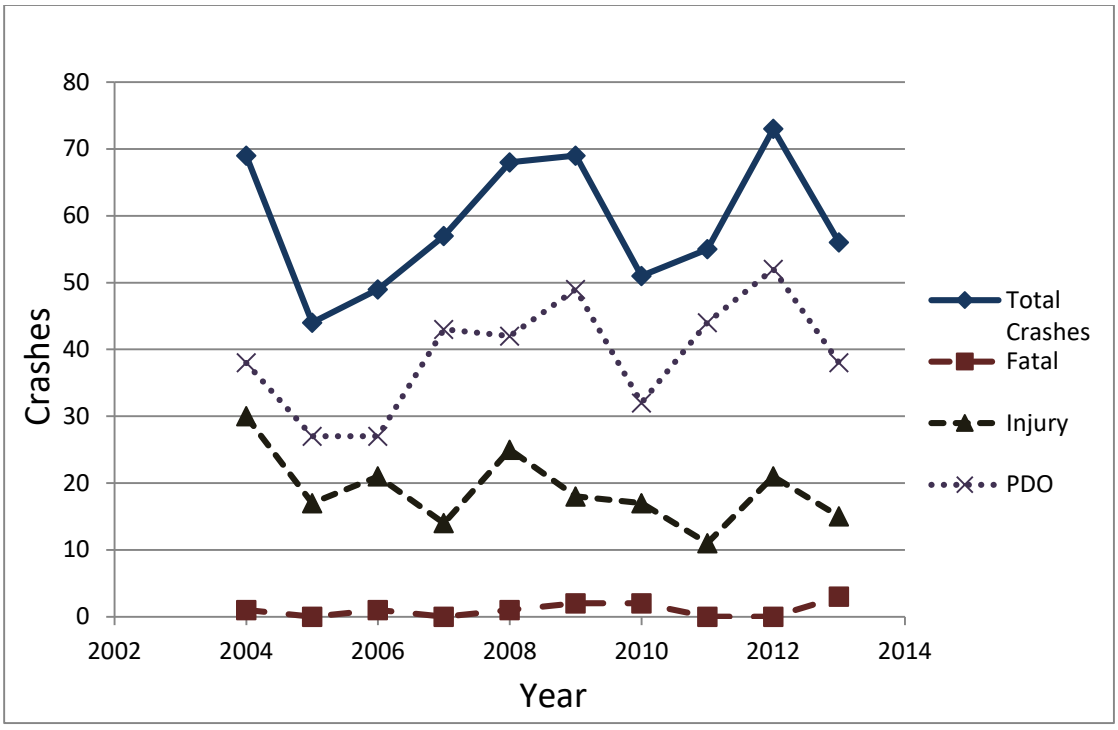

Figure 4.1 YST Crashes 2004-2013

Crash severity was divided into fatal, injury, and PDO. As seen in Figure 4.2, fatal crashes were slightly higher on YST at 2%, compared with South Dakota at 1%. Injury crashes on the reservation were more than 10% higher than statewide at 32% and 21%, respectively.

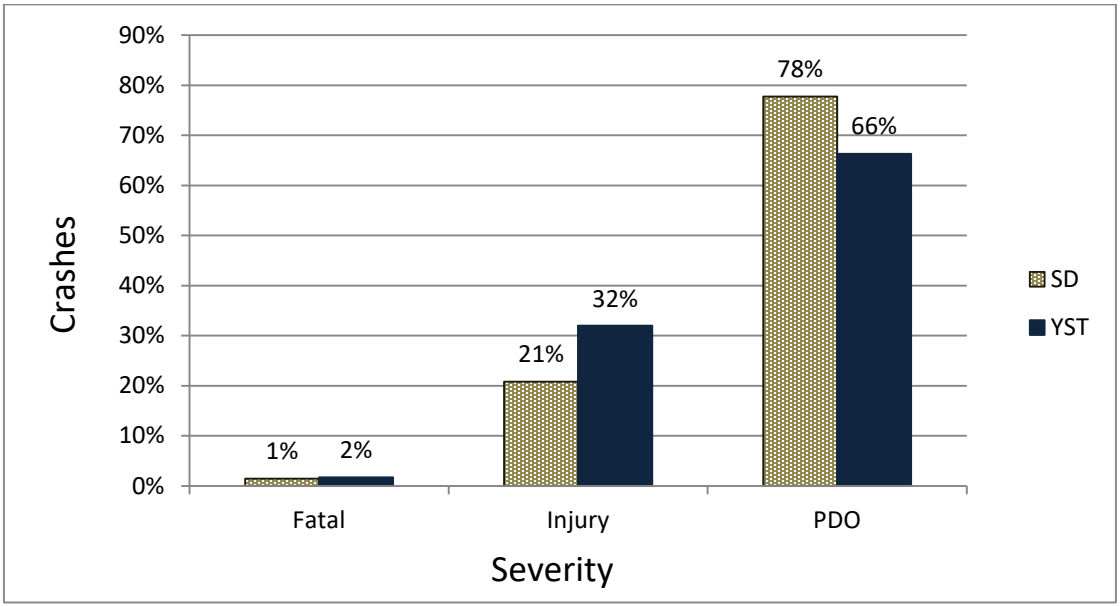

Figure 4.2 Crash Severity in SD and YST 2004-2013

The FHE revealed that animal crashes were lower than those across the state at 37%, compared with 52%. Non-collisions were much higher at 26% compared with 12% for the state. Non-collision crashes include rollover crashes. Motor vehicle crashes (crashes involving more than one vehicle) were lower, and fixed object crashes were higher. Crashes involving pedestrians were the same for YST and the state at 0.2% percent. The FHE results are located in Figure 4.3.

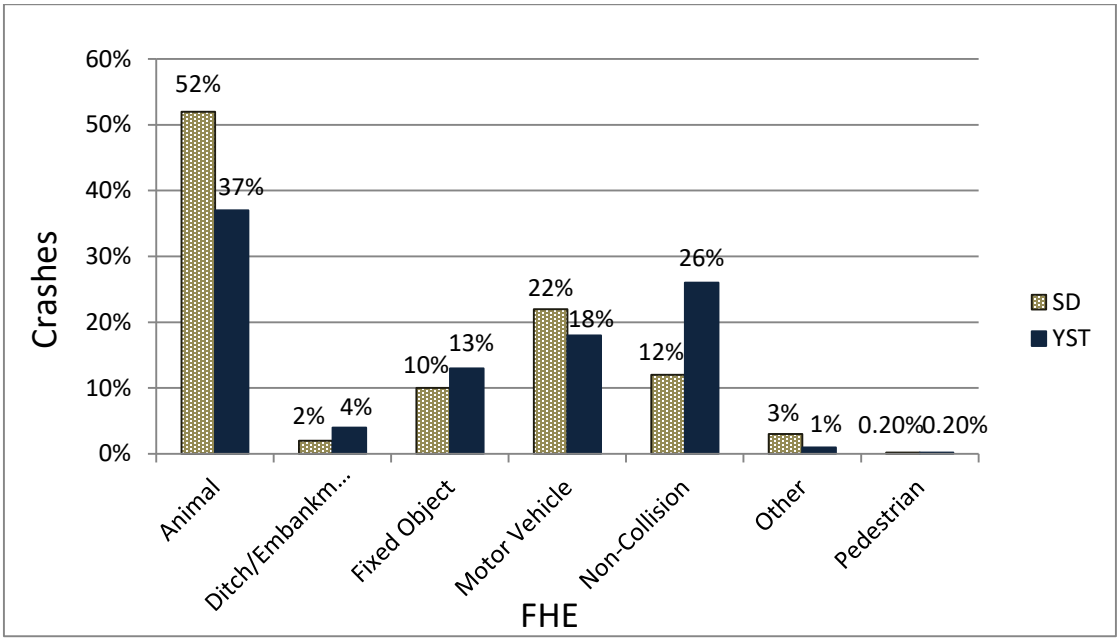

Figure 4.3 First Harmful Event for Crashes in SD and YST 2004-2013

Almost two times as many crashes occurred off the roadway on YST as compared with the state at 42% and 23%, respectively. With 58% occurring on the roadway, on-road and off-road crashes are of equal concern. See Figure 4.4.

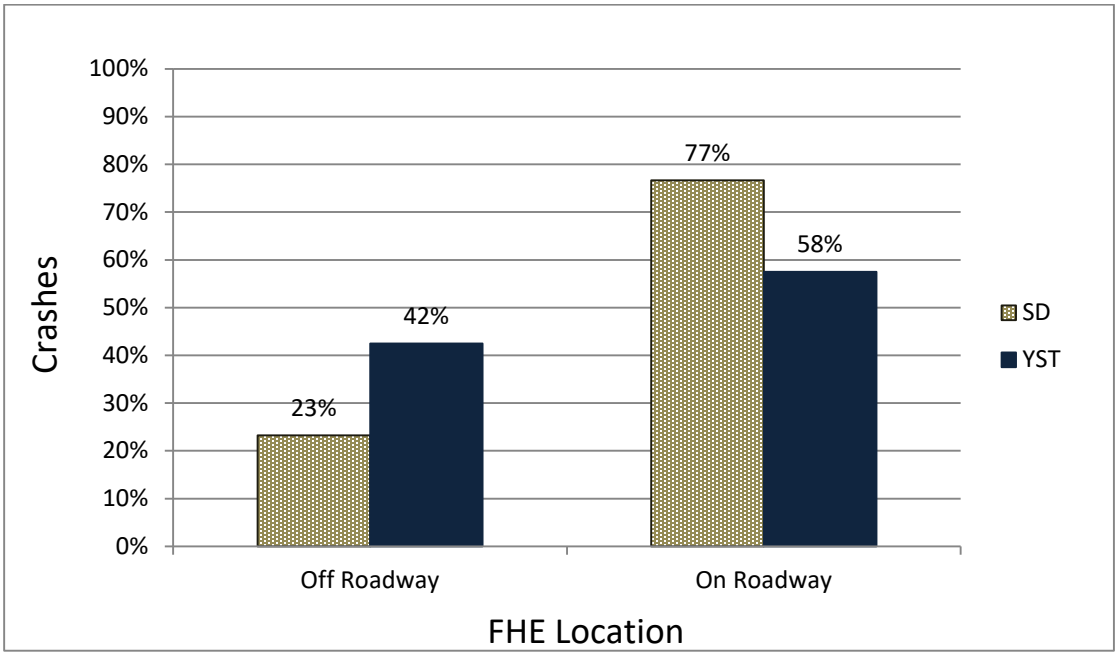

Figure 4.4 FHE Location for SD and YST 2004-2013

Road conditions were reported as dry for 79% of the crashes, and as ice, snow, frost, or slush for 11%. Wet roads accounted for only 4% of all crashes. Other road conditions, such as sand, mud, dirt and gravel, accounted for 6% of all crashes. See Figure 4.5.

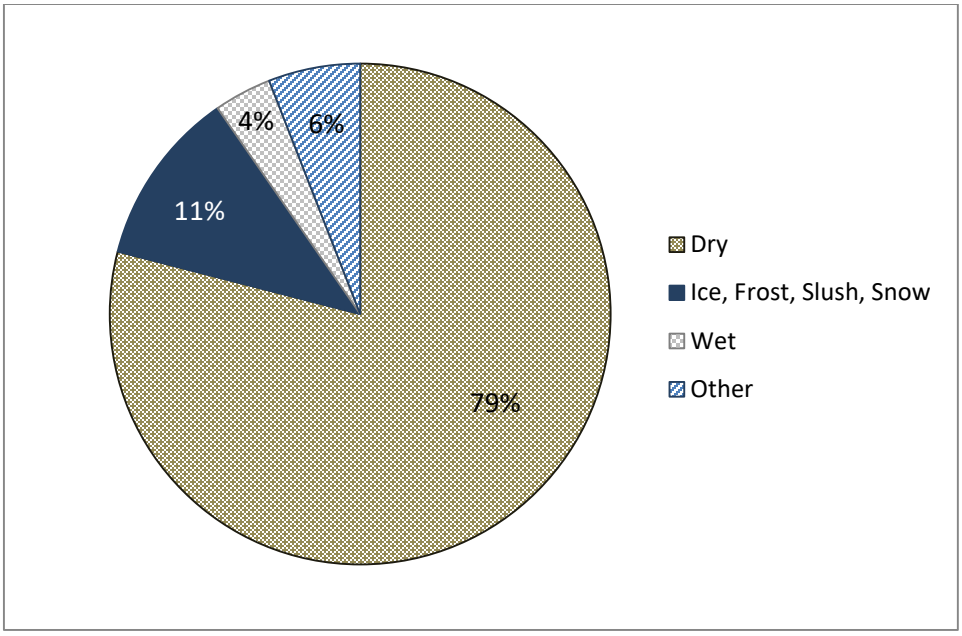

Figure 4.5 YST Road Conditions 2004-2013

Lighting conditions showed that crashes were evenly distributed between daylight and dark at 46% for both (Figure 4.6).

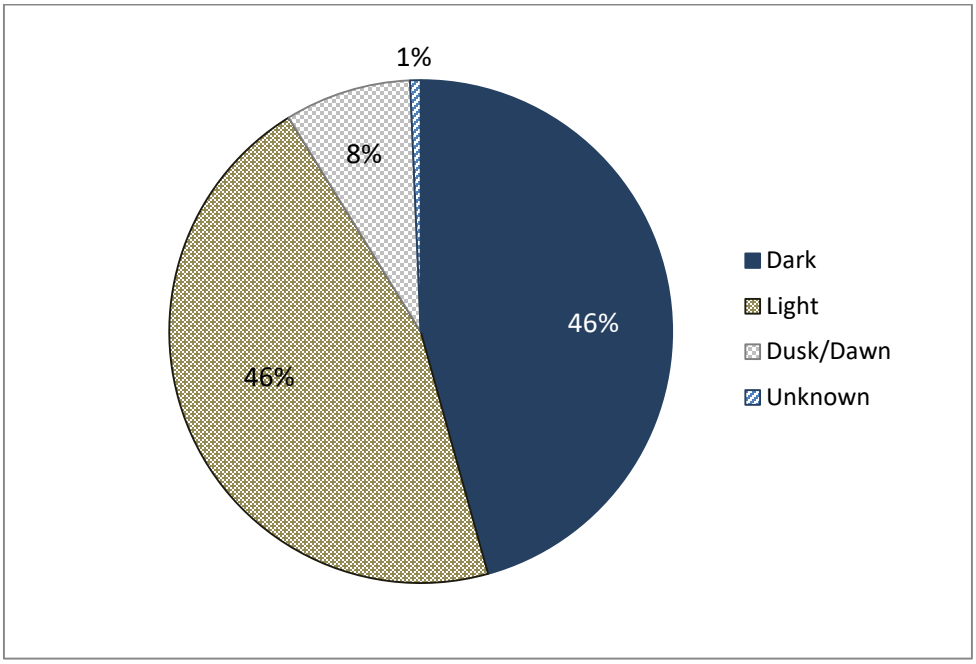

Figure 4.6 YST Lighting Conditions 2004-2013

There was a slightly higher percentage of young drivers involved in crashes on YST compared with statewide. The analysis showed 25% were between the ages of 15 and 24, and 19% were between 25 and 34. For statewide, these values were 21% and 17%, respectively. For the 45 to 54 and 55 to 64 age groups, the statewide percentage of drivers was higher than YST. See Figure 4.7.

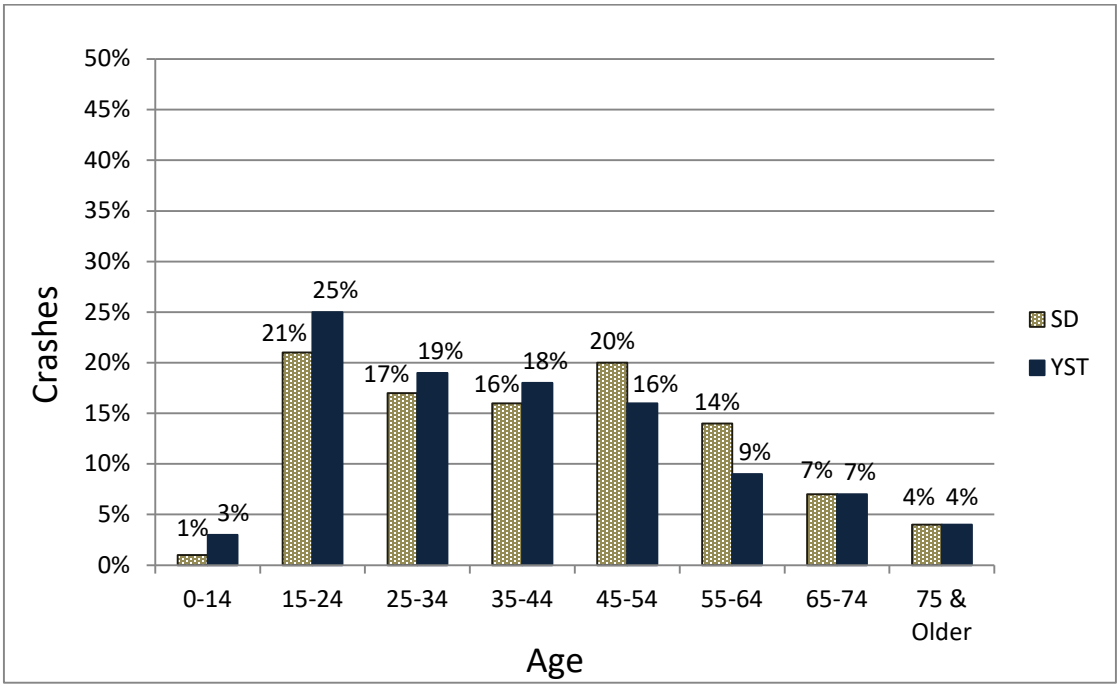

Figure 4.7 Driver Age for SD and YST 2004-2013

Of all crashes reported, alcohol was involved with 16% statewide, showing only 4% impaired. However, it should be noted that the statewide also shows 50% as unknown or not reported impairment, as compared with YST at 36% unreported. See Figure 4.8.

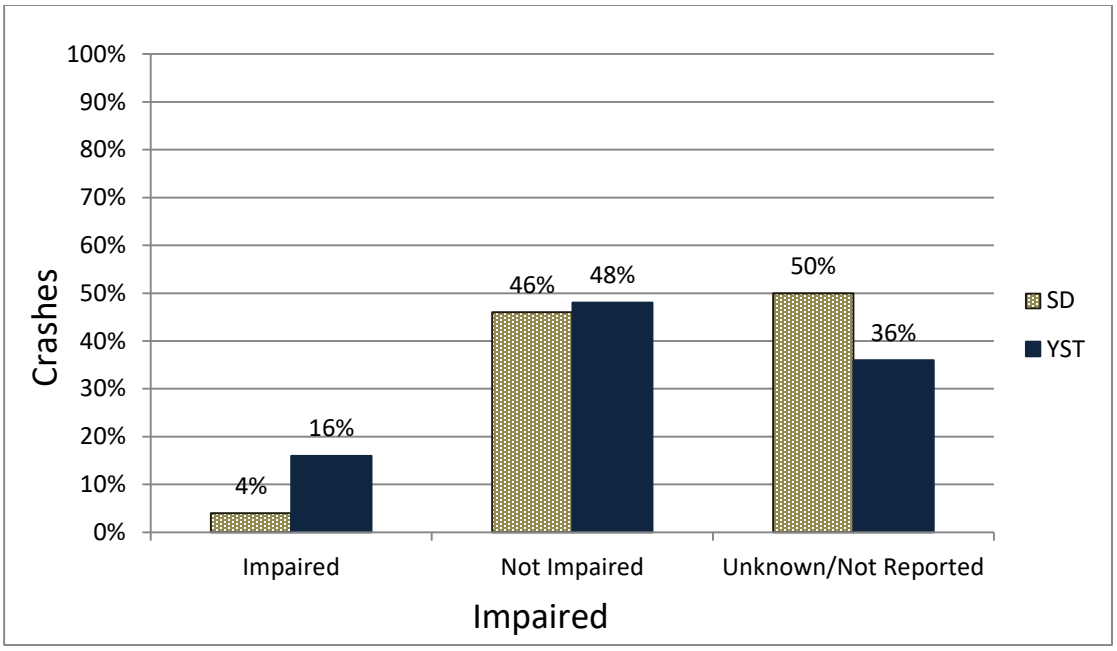

Figure 4.8 Crashes Involving Alcohol in SD and YST 2004-2013

Safety equipment use is reported as slightly higher on the reservation at 41%, compared with 37% across the state. However, non-use of safety equipment was three times higher for YST compared with the state (Figure 4.9).

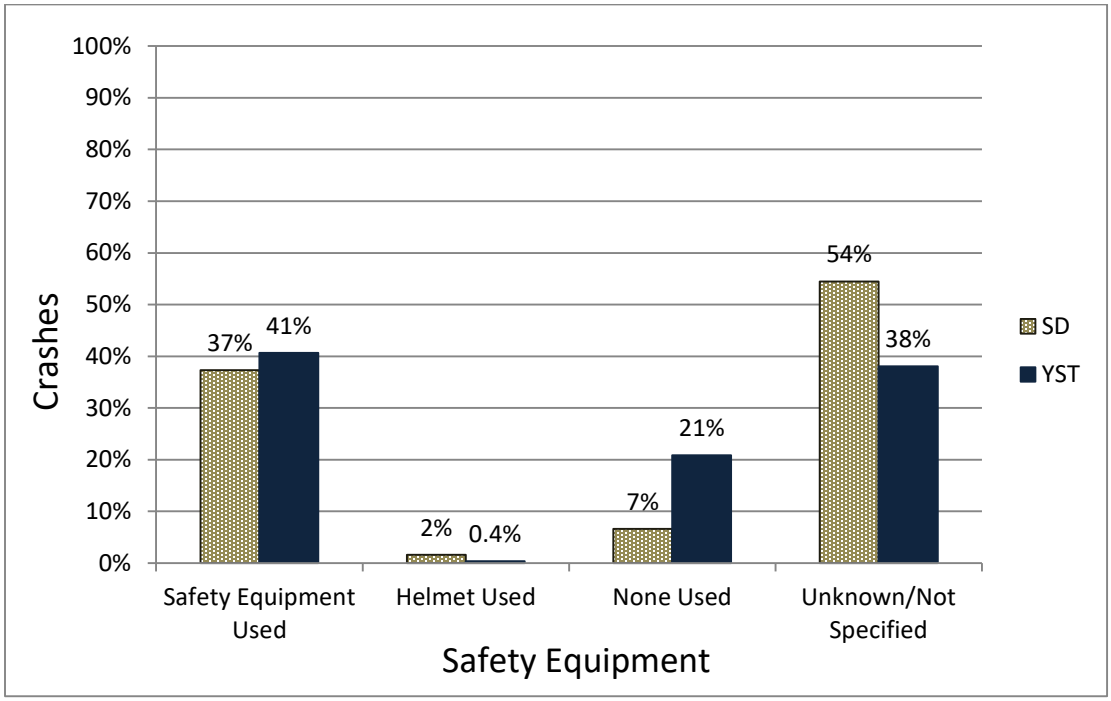

Figure 4.9 Safety Equipment Use in SD and YST 2004-2013

4.2 Chapter Summary

The crash data for YST were analyzed and trends were identified. South Dakota DPS provided crash data from 2004 through 2013. There were a total of 591 crashes reported between 2004 and 2013. Crash trends indicate that crashes have increased over the 10-year period with PDO crashes increasing and injury crashes decreasing. Fatal crashes remained relatively constant. The increase in PDO crashes could be due to better reporting of those, but would require further study to determine. Of all crashes at YST, 2% were fatal and 32% were injury. These rates are slightly higher than statewide fatal and injury crashes at 1% and 21%, respectively.

Animal crashes were the highest FHE at 37% of all crashes, followed by non-collision crashes at 26%, and motor vehicle crashes at 18%. Statewide animal crashes are much higher at 52% and statewide non-collisions were only 12%. The non-collision and fixed object crashes account for most run-off-the-road crashes. YST had somewhat higher percentage of crashes on the roadway than off the roadway. There were as many crashes occurring during daylight as there were occurring at night. Of the crashes, 16% involved alcohol, compared with statewide at 4%. The non-use of safety equipment on YST was three times higher than the state. YST had a higher percentage of young drivers involved in crashes than the state.

5. YANKTON SIOUX TRIBE IMPLEMENTATION

The Yankton Sioux Reservation is located in south-central South Dakota within Charles Mix County. The reservation covers approximately 40,000 acres. There are about 4,500 enrolled members residing on the reservation, along with many non-tribal members owning land within reservation boundaries. They have a transportation department that consists of a transportation director and a transportation safety officer, along with maintenance and administrative personnel. They maintain their BIA roads and share maintenance with the county roads within their boundaries.

5.1 Applied Methodology

The methodology was slightly modified to fit the needs of YST. A preliminary crash ranking was first performed based on mapped locations. A revised crash ranking was performed once milepost locations were established during the field evaluations. In order to maximize resources, the Level I and Level II evaluations were performed simultaneously. See Figure 5.1.

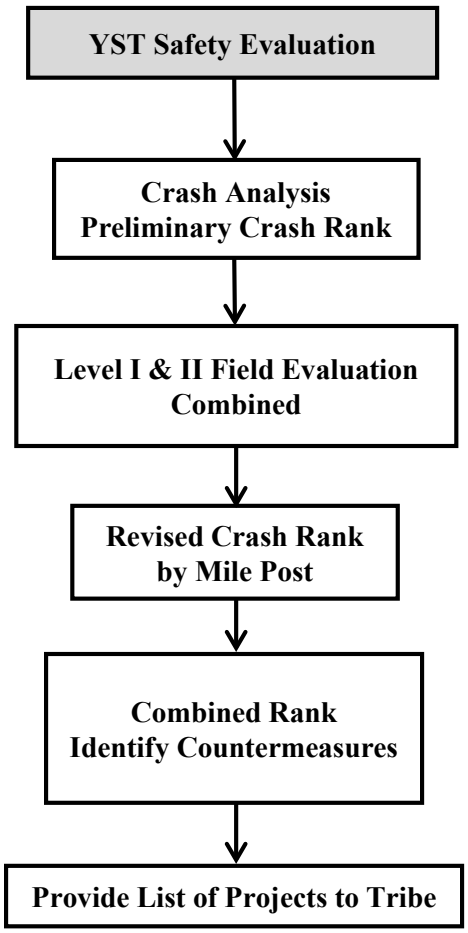

Figure 5.1 Applied Methodology

5.2 Crash Analysis

The analysis of crash data is the first step in the roadway safety program methodology. Safety goals and strategies are driven by data that documents the safety problems. Many factors must be reviewed to determine appropriate safety measures considering the four E's of safety (engineering, enforcement, education, and emergency response).

The analysis and subsequent ranking proceeded using the crash analysis described in Chapter 3. An initial ranking was performed based on GIS maps with the crashes overlaid on the roadways (Appendix A). Initial data did not include all milepost locations. Once the Level I field evaluation was completed, the crash ranking mileposts were revised to match the Level I mileposts. Table 5.1 is the preliminary crash ranking (See Appendix B for the revised crash ranking). The road segments were then sorted by the highest number of crashes per segment. Ranking was assigned starting at one (1). Progressing through the list, equal scores received equal rank.

Table 5.1 YST Preliminary Crash Ranking (2004-2013)

Highway	Functional Class	No. Crashes	Length (mi)	Crashes/ mi	Rank
SD Hwy 46	Rural Principal Other Arterial	127	23	5.5	1
394 Ave	Rural Local Road	17	4	4.3	2
384 Ave	Rural Local Road	2	0.5	4	3
400 Ave (S)	Rural Major Collector	4	1	4	3
US Hwy 18	Rural Minor Arterial	99	26	3.8	5
SD Hwy 50 (C)	Rural Minor Arterial	20	5.5	3.6	6
SD Hwy 50 (W)	Rural Minor Arterial	23	7	3.3	7
391 Ave	Rural Local Road	3	1	3	8
303 St	Rural Local Road	5	2	2.5	9
395 Ave(S)	Rural Major Collector	18	8	2.3	10
285 St	Rural Major Collector	30	14	2.1	11
295 St	Rural Local Road	4	2	2	12
298 St	Rural Local Road	8	4	2	12
379 Ave	Rural Local Road	4	2	2	12
395 Ave(N)	Rural Major Collector	10	5	2	12
400 Ave (N)	Rural Major Collector	4	2	2	12
393 Ave	Rural Local Road	5	3	1.7	17
293 St	Rural Local Road	6	4	1.5	18
County Road 2	Rural Major Collector	7	5	1.4	19
292 St	Rural Local Road	4	3	1.3	20
294 St	Rural Local Road	4	3	1.3	20
386 Ave	Rural Local Road	6	4.5	1.3	20
300 St	Rural Minor Collector	5	4	1.3	20
302 St	Rural Minor Collector	13	10	1.3	20
299 St	Rural Local Road	6	5	1.2	25
388 Ave	Rural Major Collector	7	6	1.2	25
300 St	Rural Local Road	7	7	1	27
382 Ave	Rural Major Collector	9	10	0.9	28

5.3 Level I Field Evaluation

After consultation with the tribe, 21 roads were selected for evaluation, including Chalk Rock Road, which the tribe requested to evaluate. The evaluating team consisted of four individuals, the YST Transportation Safety Officer, maintenance and operations personnel, along with WYT^2/LTAP.

Five categories were evaluated: general roadway conditions, intersections, signage and pavement markings, fixed objects and clear zone, and shoulder and right-of-way as described in Chapter 2. The same criterion used to score the segments for the initial implementation on the Wind River Indian Reservation was used for the YST. Each category was evaluated separately for each one-mile segment, assigning a score of 0 to 10 for each category. Zero (0) would be the worst condition and 10 would be the best. The starting level is five (5). For each segment the score is totaled for all five categories, providing a final score per segment.

The spreadsheets developed for each roadway for Level I can be observed in Appendix C. This process was repeated for each segment of each roadway selected from the crash ranking. Each roadway ranged from one-mile to 25-miles long. Field decisions were made by YST team members to reduce the length evaluated based on knowledge of recent or upcoming construction and maintenance that would address safety issues. Looking at the hotspots in the context of the entire roadway is a practical approach to address roadway safety improvements. For example, if the field evaluation reveals the roadway is in poor condition, pavement markings are missing, or shoulders are narrow, the improvement would not only be applied to the hotspot but to the entire portion of the roadway.

A revised list of roads evaluated was developed to clarify which roads, what sections, and in which direction they were evaluated. Since several roads had more than one name assigned, other names were included in the revised list. These are listed in Table 5.2

Table 5.2 YST Roads Reviewed During Field Evaluation

Highway	Other Road Names	Begin Point	End Point	Beg MP	End MP	Direction Driven
285 St	County Rd 34	375 Ave	US Hwy 281	0	17	W to E
298 St		392 Ave	396 Ave	0	4	W to E
300 St		County Rd 5	388 Ave	0	12.3	E to W
302 St		403 Ave	394 Ave	0	9.2	E to W
303 St		389 Ave	392 Ave	0	3	W to E
County Rd 2	308 St	390 St	398 St	0	10	W to E
382 Ave	Count Rd 29	285 St	291 St	0	7	N to S
386 Ave		SD Hwy 46	SD Hwy 50	0	4.5	S to N
388 Ave		SD Hwy 46	303 St	0	6	N to S
391 Ave		300 St	299 St	0	1	S to N
394 Ave		302 St	298 St	0	4	S to N
395 Ave (N)	County Rd 11	291 St	SD Hwy 46	0	6	N to S
395 Ave (S)	County Rd 2	County Rd 2	SD Hwy 46	0	13	S to N
400 Ave	County Rd 5	300 St	308 St	0	8	N to S
403 Ave	SD Hwy 50	SD Hwy 46	307 St	0	10	N to S
Chalk Rock Rd	303 St	387 Ave	at river	0	3	E to W
SD Hwy 46		US Hwy 281	SD Hwy 50	0	20.4	W to E
SD Hwy 50 (C)		SD Hwy 46	US Hwy 281	0	5.3	S to N
SD Hwy 50 (W)		382 Ave	376 Ave	0	6	E to W
US Hwy 281	US Hwy 18	284 St	SD Hwy 46	0	25	N to S

Once evaluation of all the roads was complete, the segment scores were tabulated. The overall Level I score for each segment was assigned, and the segments were sorted from lowest to highest score. From this, ranking was assigned starting at one (1). Progressing through the list, equal scores received equal rank. The next rank number would then be that associated with the total number of segments ranked so far. Table 5.3 summarizes the Level I ranking for the top 60 segments. See Appendix C for a complete list of the Level I Ranks for all 174 segments.

Table 5.3 YST Level I Rank

Highway	Beg MP	End MP	Level I Score	Level I Rank
Chalk Rock Rd	1	2	18	1
Chalk Rock Rd	2	3	19	2
395 Ave (S)	0	1	20	3
395 Ave (S)	7	8	23	4
County Rd 2	1	2	23	4
County Rd 2	2	3	23	4
County Rd 2	3	4	23	4
County Rd 2	4	5	23	4
County Rd 2	5	6	23	4
County Rd 2	6	7	23	4
County Rd 2	7	8	23	4
County Rd 2	8	9	23	4
County Rd 2	9	10	23	4
395 Ave (S)	4	5	24	14
395 Ave (S)	5	6	24	14
395 Ave (S)	6	7	24	14
395 Ave (S)	8	9	24	14
395 Ave (S)	9	10	24	14
395 Ave (S)	10	11	24	14
395 Ave (S)	11	12	24	14
395 Ave (S)	12	13	24	14
394 Ave	3	4	26	22
395 Ave (N)	3	4	26	22
395 Ave (S)	1	2	26	22
395 Ave (S)	2	3	26	22
395 Ave (S)	3	4	26	22
388 Ave	2	3	28	27
388 Ave	3	4	28	27
388 Ave	5	6	28	27
394 Ave	0	1	28	27
394 Ave	1	2	28	27
394 Ave	2	3	28	27
400 Ave	0	1	28	27
400 Ave	1	2	28	27
400 Ave	4	5	28	27
400 Ave	5	6	28	27
400 Ave	6	7	28	27
400 Ave	7	8	28	27
Chalk Rock Rd	0	1	28	27
300 St	5	6	29	40
300 St	6	7	29	40
300 St	7	8	29	40
300 St	8	9	29	40
300 St	9	10	29	40
300 St	10	11	29	40
300 St	11	12	29	40
300 St	12	13	29	40
303 St	0	1	29	40
388 Ave	4	5	29	40
400 Ave	3	4	29	40
County Rd 2	0	1	29	40
386 Ave	0	1	30	52
386 Ave	1	2	30	52
386 Ave	2	3	30	52
386 Ave	3	4	30	52
386 Ave	4	5	30	52
388 Ave	0	1	30	52
388 Ave	1	2	30	52
400 Ave	2	3	30	52
300 St	0	1	31	60

5.4 Combining the Crash Ranking and the Level 1 Ranking

With a list of all the segments ranked by highest number crashes and lowest Level I score, the two rankings were combined. The crash rankings were first re-done to match the one-mile segments to the Level I one-mile segments for each route. Refer to Appendix B for the revised crash rankings. Then the respective ranks for the respective segments were added. Appendix E provides the combined ranking for all roadway segments.

Once these were all totaled, the segments were sorted from smallest to largest combined rank value. The road segments with the lowest score were used to select the roads that would be evaluated for safety improvements. Table 5.4 is a list of the top 10 roads from the combined ranking.

Table 5.4 Combined Rank for Top 10 Roads

Highway	Beg MP	End MP	Combined Rank
300 St	1	2	97
	6	7	91
303 St	0	1	77
388 Ave	0	1	89
394 Ave	0	1	78
	2	3	35
	3	4	26
395 Ave (S)	0	1	90
	4	5	101
	5	6	101
	6	7	101
	7	8	91
	9	10	65
	10	11	65
	11	12	65
400 Ave	0	1	78
	5	6	46
Chalk Rock Rd	2	3	89
County Rd 2	1	2	91
	3	4	91
	4	5	91
	5	6	91
	6	7	41
	7	8	91
SD Hwy 46	1	2	101
SD Hwy 50 (C)	0	1	89
	1	2	98
	3	4	98

5.5 Level II Field Evaluation – Selection of Countermeasures

As previously explained, Level II field evaluations were performed during the Level I field evaluations. The team discussed countermeasures with the understanding that further investigation would be needed. From the combined rankings, the hotspot locations were reviewed for most severe crashes at those locations, roadway geometrics, and other unique conditions to identify appropriate countermeasures. Ten roads were identified for recommended safety improvements. The countermeasures are identified for the given roadway segments in Table 5.5.

Table 5.5 Level II Field Evaluation and Recommended Countermeasures

Highway	From MP	To MP	Most Severe Crash	Road Geometry	Prevalent Crashes	Recommended Countermeasure
300 St	1	7	Fatal	Gravel, straight, curves, intersections	Overturn/ Rollover, Roadside, Intersection	Improve signage at intersections, two direction arrow at T-intersections, advanced curve warning and chevrons
303 St	0	1	Injury	Gravel, Straight, Hill	Overturn/ Rollover, Roadside	Improve signage at school crossing, stop sign study for 3-way, speed study for compliance.
388 Ave	0	1	Injury	Straight, no shoulder	Overturn/ Rollover, Animal	Domestic animal crossing sign, rumble strip/rumble stripe
394 Ave	0	4	Injury	Gravel, straight	Overturn/ Rollover	Improve signage at intersections, delineators at driveways, object markers at culverts
395 Ave (S)	0	12	Fatal	Straight, curves, intersections	Overturn/ Rollover, animal, intersection	Chevrons in curve, intersection ahead signs
400 Ave	0	6	Fatal	Curves, narrow shoulder	Overturn/ Rollover, Roadside	Chevrons in curves, rumble stripe, object markers at bridges/culverts, improve intersection
Chalk Rock Rd	2	3	Injury	Gravel, curves	Roadside	Curve warning signs, chevrons in curves, object markers at culvert
County Rd 2	1	8	Fatal	Curves, narrow shoulders	Animal, roadside	Chevrons in curves, Deer crossing sign
SD Hwy 46	0	3	Fatal	Straight, wide shoulders	Animal, Night Time	Deer crossing signs exist, good sight distance, investigate state policies on animal crashes, lighting at major intersections
SD Hwy 50 (C)	0	4	Injury	Straight, narrow shoulders	Animal, roadside	Deer crossing signs exist, investigate state policies on animal crashes, safety edge, rumble stripe

5.5.1 Gravel Roads

Four roads recommended for improvements, 300th Street, 303rd Street, 394th Avenue, and Chalk Rock Road, are gravel. The prevalent crashes are rollovers and intersections. Because the surface becomes rough between maintenance, high speeds could be contributing to these crashes. Signage in curves and intersections would help warn and guide drivers through unknown conditions.

On 300th Street, advanced intersection warning signs and two direction arrows at T intersections are recommended. The addition of advanced curve warning signs and chevrons in curves should be installed. The intersection of 300th Street and 399th Avenue is at a skewed angle and includes a tangent off of 300th Street. Because the alignment of 300th Street is along a horizontal curve, installation of curve warning signs with chevrons is recommended. In addition, the tangent off of 300th Street should be closed to reduce the number of conflicts created by the additional access. Intersection ahead signs should also be installed on both roadways. See Figure 5.2.

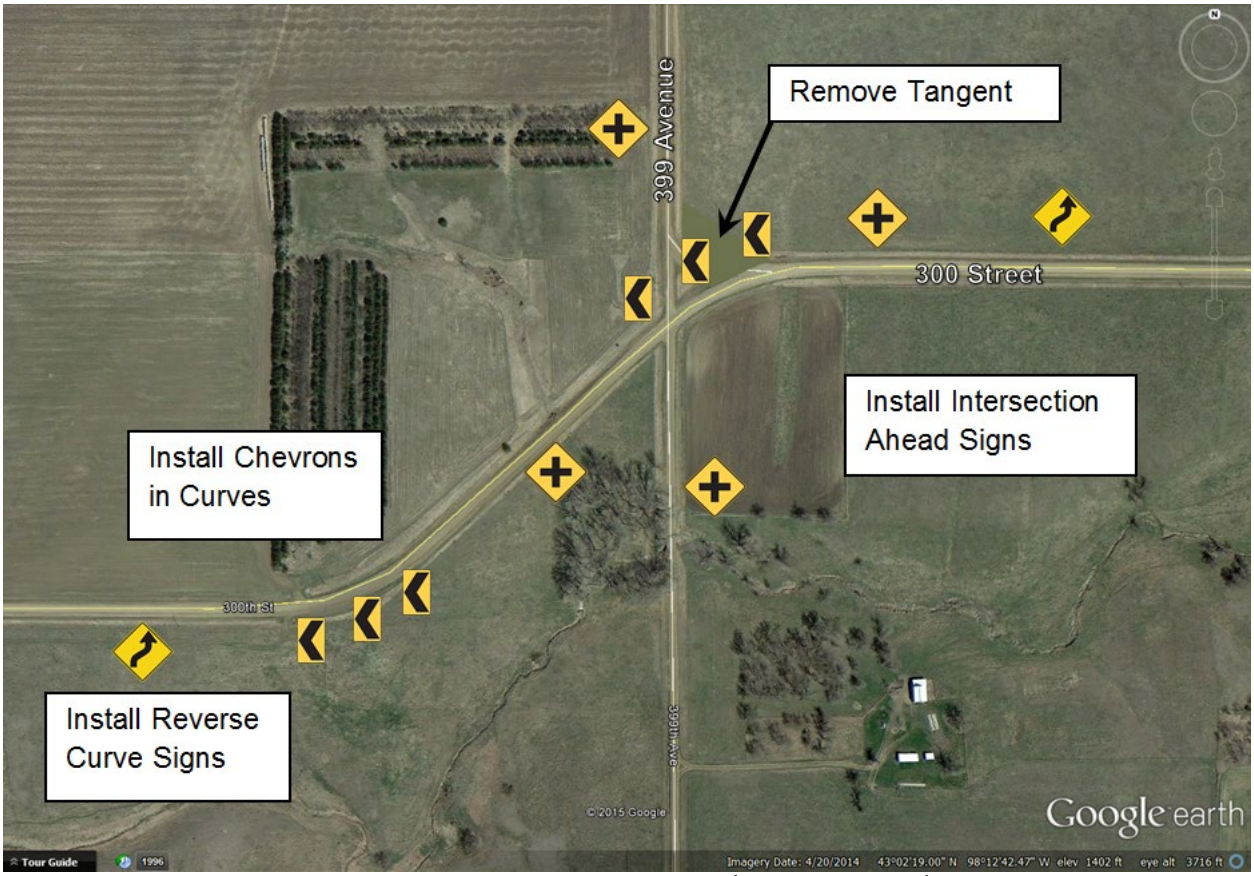

Figure 5.2 Proposed Improvements at 300th Street and 399th Avenue

Asphalt road 303rd Street runs through the town of Marty where the schools are located. The road becomes gravel east of the intersection of the south leg of 388th Avenue. Around milepost 1.4, a steep downgrade exists. Although the roadway is straight, several crashes, including recent fatalities, have occurred at this location. A hill warning sign exists at the beginning of the downgrade. Further investigation is recommended at the crest of the vertical grade to determine if the transition is such that loss of control occurs. If this is the case, re-grading the transition could reduce the risk. Other options include a speed reduction.

The first curve south of Marty includes curve warning signs. However, the southbound sign appears to be too low. The height should be checked to verify whether it meets the Manual on Uniform Traffic Control Devices (MUTCD) standards. In addition, chevrons should be added along the curve.

The intersection of 388th Avenue is within the school zone in Marty. The existing signage is not in compliance with the MUTCD and is confusing to the driver. A stop sign is located at the crosswalk, which is about 50 feet from the T intersection of 388th Avenue (see Figure 5.3)

Figure 5.3 303rd Street in Marty near 388th Avenue Intersection

In addition, upon entering Marty from the north on 388th Avenue, a 15 MPH regulatory speed limit sign is located 1,000 feet south of a 30 MPH speed limit sign. Drivers may have a hard time complying with such a low speed coming off a 55 MPH highway into town. A compliance speed study is recommended. The school zone begins just east of the north leg of 388th Avenue and is posted at 15 MPH with a school sign. The pedestrian crossing signs should be adjusted, locating them at the crosswalk with a diagonal down arrow. An additional school zone sign should be placed east of the school zone and just south of the 388th Avenue intersection if one does not exist in these locations. According to the MUTCD, the stop sign should be located at the approach of the intersection with 388th Avenue. A three-way stop plaque should be added to each stop sign. However, a stop sign warrant study is recommended for this intersection. It may reveal that only 388th Avenue northbound would require a stop sign. See Figure 5.4 for proposed signage.

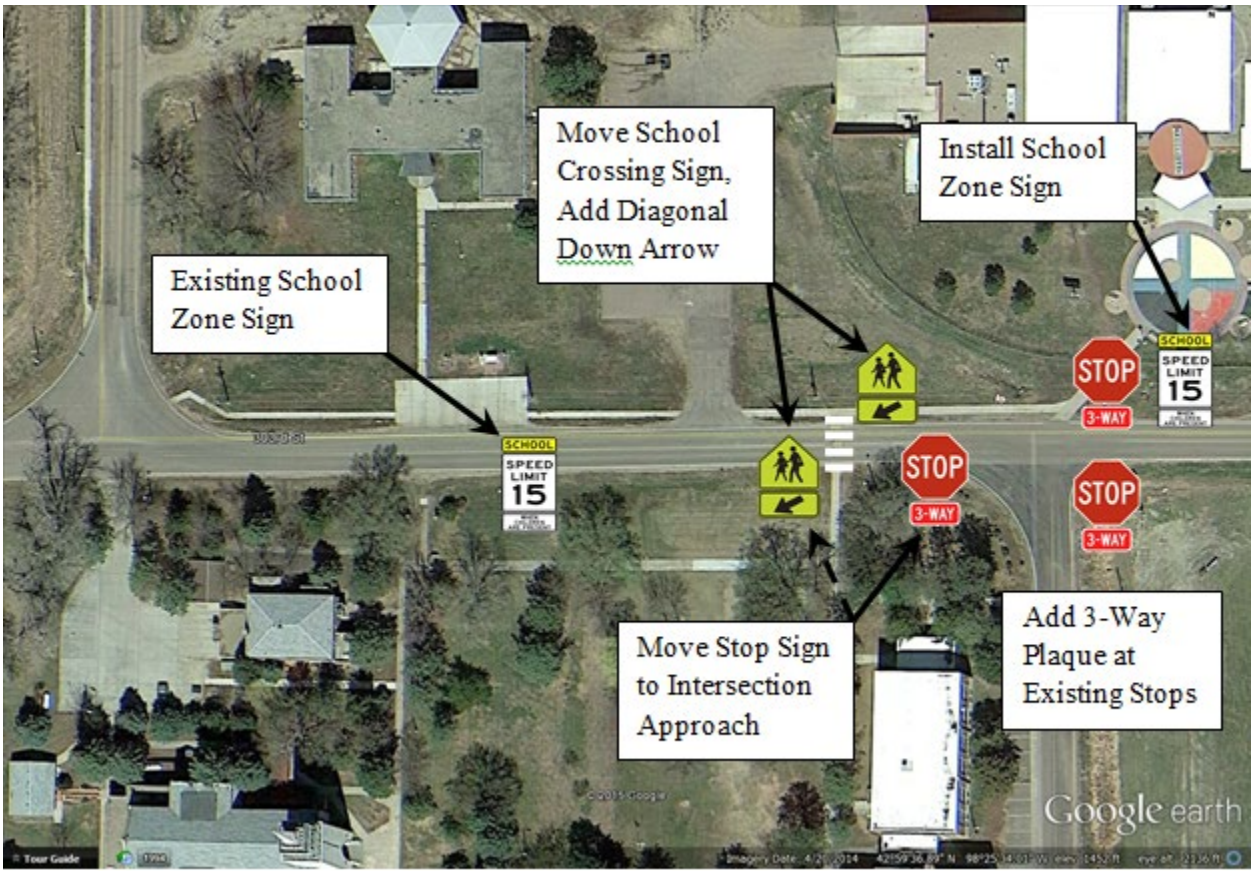

Figure 5.4 303rd Street School Zone Proposed Signage

Gravel road 394th Avenue is a straight road that encounters several rollover crashes. There could be several reasons for this, including speeds too fast for conditions, driveways and narrow culvert crossings, and intersections. As identified in the crash trends, half of all crashes occur at night. On these gravel roads with no markings, any changes in terrain or conditions could cause run-off-the-road crashes. Improved signage at intersections, delineation of driveways, and object markers at bridges and culverts would help reduce crash risks.

The final gravel road evaluated was the winding and narrow Chalk Rock Road, where most crashes are run-off-the-road. No curve warning signs exist. Adding advanced curve warning signs and chevrons in the curves is recommended. Object markers should be added at the existing culvert.

5.5.2 Paved Roads

The local paved roads had similar roadway conditions and similar prevalent crash types. They were straight with some curves with little or no shoulders. Rollovers or roadside hazards are the typical FHE. This indicates that most crashes on these roadways are run-off-the-road. Speed could be a factor because of the narrow widths, no shoulders, and non-recoverable roadside slopes. Animal-related crashes are also common.

Local road 388th Avenue is straight with no shoulder. Around milepost 0.8, domestic animal crashes have occurred. This should be investigated further to determine if a nearby farm has regular crossings for livestock or if animals are not properly fenced. If it is a regular crossing, a livestock crossing sign should be installed. Due to the high number of run-off-the-road crashes, a rumble strip is recommended. If the shoulder is too narrow, a rumble stripe along the edgeline is recommended.

On 395th Avenue, between the town of Wagner and south to County Road 2, there are several intersections where crashes have occurred. Advanced warning signs for intersections are recommended for the major cross streets. These intersection warning signs should also be installed on the cross streets along with advanced stop ahead signs. As discussed previously, nighttime crashes are prevalent on these roadways and advanced warning signs will help reduce the crash risks.

On 395th Avenue, which has narrow shoulders and a steep drop-off, there is an S curve north of County Road 2 (milepost 0.5 to 0.8). Advanced curve warning signs are in place. Chevrons should be added in the curve.

About three miles north of South Dakota Highway 46 on 395th Avenue, a narrow culvert crossing exists with no shoulder or guardrail. It does have object markers, but the road drops off within inches of the edgeline (see Figure 5.5). This culvert should be widened and railings added to provide recovery for any vehicles crossing the edgeline.

Figure 5.5 Culvert on 395th Avenue three Miles North of SD Hwy 46

A narrow paved road, 400th Avenue is mostly straight with some curves. Run-off-the-road crashes are common. A rumble stripe is recommended along the edgeline. Chevrons should be added to curves and object markers installed at bridges and culverts.

The intersection of 400th Avenue and 305th Street has offset connections with a tangent access between the east leg of 305th Street and 400th Avenue. Intersection improvements are recommended to reduce the conflict points and provide advanced intersection warning signs. The tangent should be closed and require drivers to enter and exit 400th Avenue at the T intersection. Two direction arrows should be installed at the T intersections. See Figure 5.6 for proposed intersection improvements.

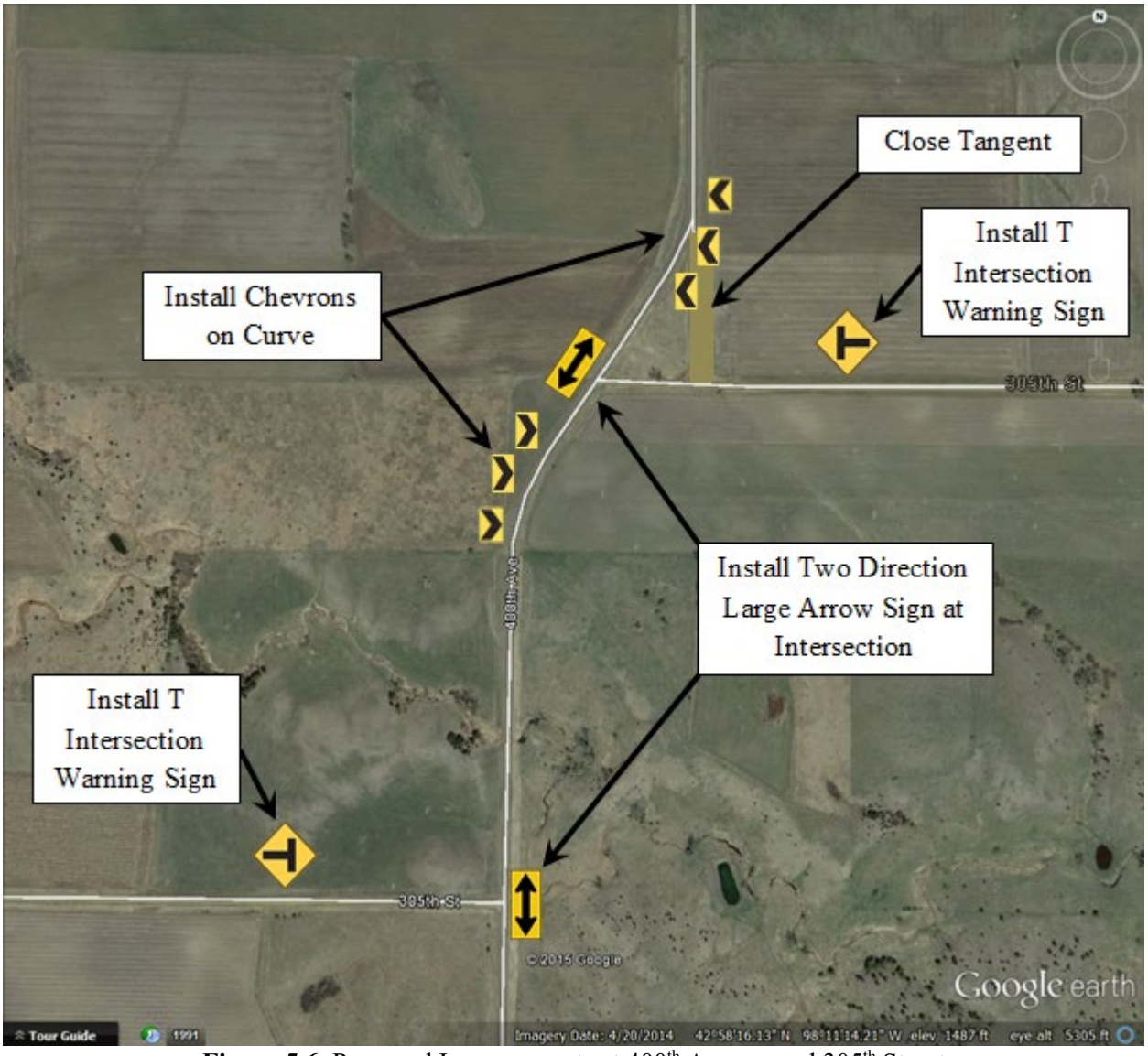

Figure 5.6 Proposed Improvements at 400th Avenue and 305th Street

County Road 2 is a winding, narrow road located along the southern end of the reservation near the Missouri River. Most crashes are animal crashes or run-off-the-road. Deer crossing signs are recommended to be installed. Chevrons in the curves should be added.

5.5.3 State Highways

Portions of two state highways, SD 46 and SD 50, were included in the evaluations. SD 46 between US 18/281 and Fort Randall Casino (MP 3/MP 280) experiences higher percentages of wild animal crashes at 66%, and over 60% of crashes occurred at night. Deer crossing signs are already in place. The road has wide shoulders and good sight distance with concentrated areas of trees near the roadway present in the vicinity of most animal crashes. The only improvements that can be recommended at this point would be to possibly add roadway lighting around the higher traffic areas. To address the high number of wild animal crashes, consideration should be given to other options or policies. This may be a safety concern to be included in the strategic highway safety plan.

One pedestrian fatality occurred at the intersection of SD 46 and US 18/281. Pedestrian safety is a concern on reservations. People will walk to work and to other services on the reservation. Without adequate pedestrian facilities, individuals are forced to walk along the rural highways with narrow shoulders and high-speed traffic. This could be addressed in the strategic highway safety plan as well. SD 50 between SD 46 in Wagner and US 18/281 (intersection of 293rd Street) has narrow to no shoulders. As a rural minor arterial, it carries higher traffic volumes, which increase the risk of run-off-the-road crashes. The addition of a safety edge would improve the recoverability of vehicles that cross the edge line. A rumble stripe along the edgeline would also reduce the crash risk. This section of roadway has also had several animal-related crashes. Deer crossing signs are in place, so other options should be considered and addressed in the strategic highway safety plan.

5.6 Proposed Safety Improvements

The following projects in Table 5.6 are safety improvements proposed for SRST. The tribe should review these improvements and determine which projects they are interested in moving forward on for funding and construction.

Table 5.6 Proposed Safety Improvements for YST

Highway	Project
300 Street	Install Intersection Ahead Signs Install Two Direction Arrows at T Intersections Install Curve Warning Signs Install Chevrons in Curves Intersection Improvements at 399 Avenue
303 Street	Re-grade Crest of Vertical Curve* Speed Study for Speed Reduction Install School Zone Signs Stop Sign Warrant Study
394 Avenue	Install Intersection Ahead Signs Install Delineators at Driveways Install Object Markers at Bridges/Culverts
Chalk Rock Road	Install Curve Warning Signs Install Chevrons in Curves Install Object Markers at Culvert
388 Avenue	Install Livestock Crossing Signs* Install Edgeline Rumble Stripe
395 Avenue (South)	Install Intersection Ahead Signs Install Chevrons in Curves
395 Avenue (North)	Widen Culvert Install Bridge Rail
400 Avenue	Install Chevrons in Curves Install Object Markers at Bridges/Culverts Intersection Improvements at 305 Street
County Road 2	Install Chevrons in Curves Install Deer Crossing Signs
SD Hwy 46	Install Lighting at Intersections
SD Hwy 50 (Central)	Install Safety Edge Install Edgeline Rumble Stripe
System-Wide	Animal Crash Reduction Study

*Further investigation needed

5.7 Benefit-Cost Analysis

Once the tribe determines which projects to pursue, a benefit-cost analysis should be performed. Based on countermeasures provided by FHWA in its Desktop Reference for Crash Reduction Factors (FHWA, 2008), along with the FHWA Manual for Selecting Safety Improvements on High Risk Rural Roads, (Atkinson, et al., 2014), the improvements will be matched with the countermeasures and crash reduction factors (CRF) assigned. The countermeasures and their respective reduction factors are listed in Table 5.7.

Table 5.7 Countermeasures and Respective CRFs

Countermeasures	Crash Type	Crash Reduction Factors			Service Life
		Fatal	Injury	PDO	
Install guide signs (general)	All	15%	15%	15%	5
Install advance warning signs	All	40%	40%	40%	5
Install chevron signs on horizontal curves	All	35%	35%	35%	5
Install curve advance warning signs	All	30%	30%	30%	5
Install delineators (general)	All	11%	11%	11%	4
Install delineators (on bridges)	All	40%	40%	40%	4
Install edge lines, centerlines and delineators	All	0%	45%	0%	4
Install centerline markings	All	33%	33%	33%	2
Improve sight distance to intersection	All	56%	37%	0%	15
Flatten crest vertical curve	All	20%	20%	20%	15
Flatten horizontal curve	All	39%	39%	39%	15
Improve horizontal and vertical alignments	All	58%	58%	58%	15
Flatten side slopes	All	43%	43%	43%	15
Install guardrail (at bridge)	All	22%	22%	22%	10
Install guardrail (at embankment)	All	0%	42%	0%	10
Install guardrail (outside curves)	All	63%	63%	0%	10
Improve guardrail	All	9%	9%	9%	10
Improve superelevation	All	40%	40%	40%	15
Widen bridge	All	45%	45%	45%	15
Install shoulder	All	9%	9%	9%	5
Pave shoulder	All	15%	15%	15%	5
Install transverse rumble strips on approaches	All	35%	35%	35%	3
Improve pavement friction	All	13%	13%	13%	5
Install animal fencing	Animal	80%	80%	80%	10
Install snow fencing	Snow	53%	53%	53%	10

The cost of a countermeasure is calculated based on present construction costs. Since the crash analysis was performed for a 10-year period, if the service life of a countermeasure was different than 10 years, it was converted to a 10-year cost. For example, if a countermeasure had a service life of five years, the current construction cost would be two times the cost of one application.

The benefit is calculated based on societal crash costs. It represents the cost savings of crashes reduced. A value is assigned to each type of crash severity (fatal, injury, or PDO). The values in Table 5.8 are suggested for use in the analysis. However, the others may be used as the tribe deems appropriate.

Table 5.8 Societal Crash Costs

Crash Cost	
Fatal	$2,500,000
Injury	$60,000
PDO	$6,000

The ratio of benefit to cost is then calculated. Values less than 1.0 would indicate there is no benefit in the improvement and the project should be eliminated. Based on the final analysis, the tribe can use the information for funding requests of the projects.

5.8 Chapter Summary

The roadway safety improvement program has been implemented on the Yankton Sioux reservation. A final list of projects is presented to the tribe to determine their priorities on the reservations.

There are gravel roads that have been identified as high-risk crash locations. Some crashes could be due to the lack of maintenance and some appear to be due to high speeds since these roads are posted at 55 MPH. Many of the paved roads were straight with little to no shoulders. Most of the roads with curves had curve warning signs. However, most crashes were run-off-the-road. Recommendations are presented for rumble strip/rumble stripe, safety edge, and chevrons in curves for low-cost safety improvements. YST has many rural intersections. Since half the crashes occur at night, improved intersection signage would provide drivers advanced warning of changes in roadway conditions. Crashes involving wild animals continue to be a problem along the state highways where adequate signage and sight distance exists. Further study is needed to determine strategies to reduce animal-related crashes.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

Tribal communities have suffered with higher fatality rates on their roadways than the general U.S. population. As the country has been successful in decreasing fatal and injury crashes over the past several years, Native Americans have experienced an increase in these types of crashes.

This report presents a five-step methodology developed to assist tribes to improve their roadway safety through low-cost improvements. The methodology was successfully implemented on the WRIR with three low-cost projects funded by the Wyoming DOT and other safety measures implemented through identifying safety concerns in their strategic plan.

WYT^2/LTAP and NPTTAP developed criteria for other tribes in the Northern Plains region to participate in implementing the methodology on their reservations. The criteria required a commitment from the tribes to follow through in the program and provide support. Three reservations were selected for implementation; Standing Rock Sioux Tribe, Sisseton Wahpeton Oyate, and Yankton Sioux Tribe. This report covers the implementation on the Yankton Sioux reservation.

6.2 Conclusions

Yankton Sioux reservation is the fourth reservation where the five-step methodology has been implemented. Many differences were noted throughout the process, as well as similar challenges faced by tribal governments in implementing safety improvement programs. These included the following:

- YST seemed to have adequate crash data obtained from the South Dakota DPS.
- YST had a higher percentage of severe crashes than statewide.
- YST had more young drivers involved in crashes than statewide.
- YST had a higher percentage of crashes involving alcohol.
- YST had more crashes where safety equipment was not used.
- Most crashes were run-off-the-road crashes due to narrow roads with little or no shoulders.
- Most crashes occurred at night where roadway conditions changes (curves and intersections).

6.3 Recommendations

Based on the analysis and the projects identified for YST, the following recommendations are provided:

- The improvement projects identified in this report should be coordinated with the state DOT as well as with the respective counties for funding.
- The strategic plan should be updated to include the safety concerns identified in this report that are not related to engineering improvements, including speeding, impaired driving, intersection improvements, pedestrian safety, and animal-related crashes.
- The state DOT should perform a speed safety study on 303rd Street at the vertical curve crest.
- The state DOT should perform a stop sign warrant study at the T intersection of 303rd Street and 388th Avenue.
- An animal crash reduction study should be performed, or policies and strategies should be discussed with the state DOT.

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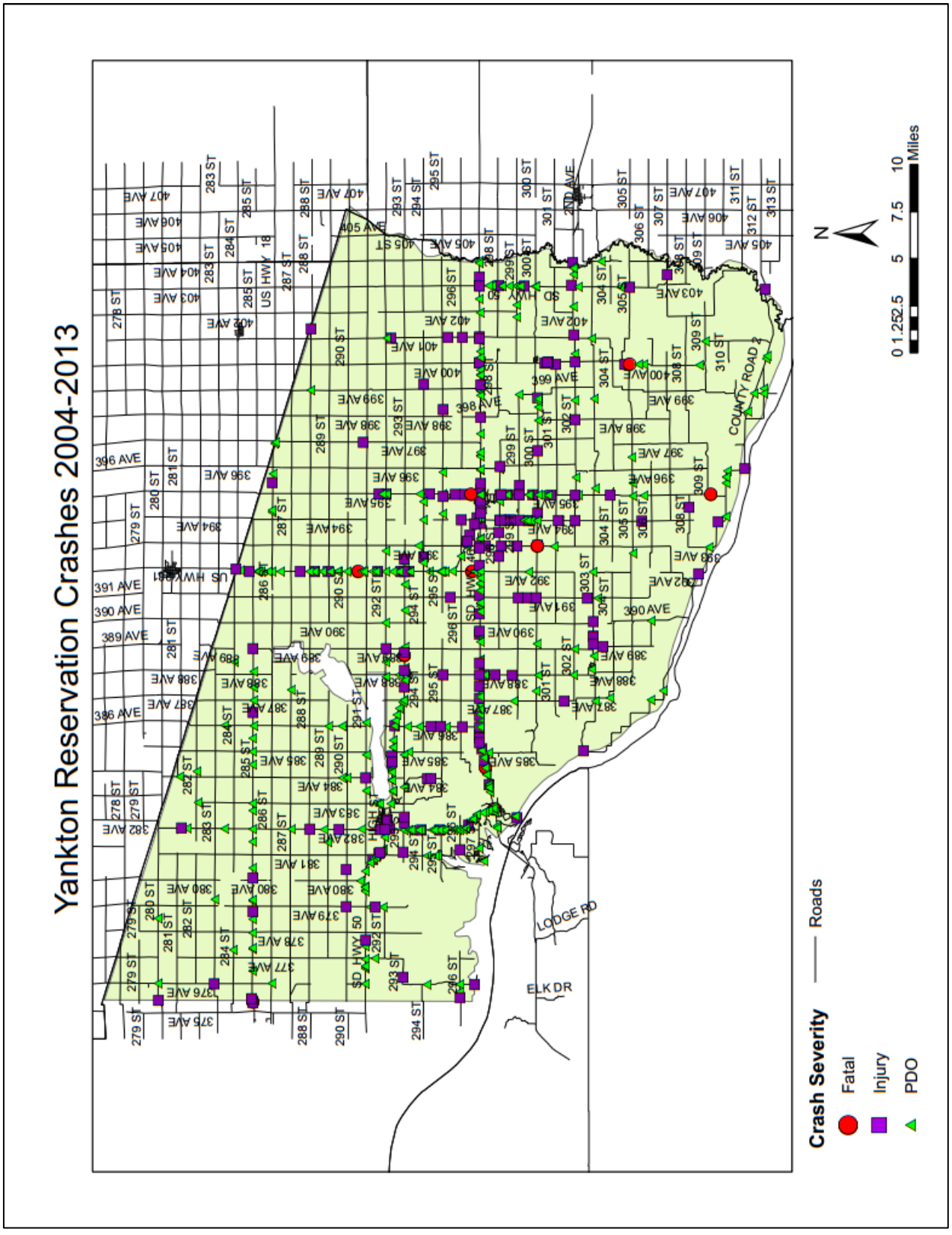
APPENDIX A: MAP OF YANKTON SIOUX RESERVATION CRASHES



APPENDIX B: REVISED CRASH RANKINGS

Highway	Beg MP	End MP	Total Crashes	Crash Rank
SD Hwy 46	0	1	13	1
SD Hwy 46	1	2	12	2
SD Hwy 46	3	4	10	3
394 Ave	3	4	9	4
US Hwy 281	23	24	9	4
SD Hwy 46	16	17	8	6
US Hwy 281	24	25	8	6
394 Ave	2	3	7	8
US Hwy 281	16	17	7	8
285 St	0	1	6	10
403 Ave (SD 50)	0	1	6	10
SD Hwy 46	2	3	6	10
SD Hwy 46	17	18	6	10
SD Hwy 50 (C)	0	1	6	10
SD Hwy 50 (W)	0	1	6	10
SD Hwy 50 (W)	1	2	6	10
US Hwy 281	8	9	6	10
US Hwy 281	13	14	6	10
400 Ave	5	6	5	19
403 Ave (SD 50)	2	3	5	19
SD Hwy 46	4	5	5	19
SD Hwy 46	5	6	5	19
SD Hwy 46	6	7	5	19
SD Hwy 46	8	9	5	19
SD Hwy 46	9	10	5	19
SD Hwy 46	10	11	5	19
SD Hwy 46	13	14	5	19
SD Hwy 50 (C)	1	2	5	19
SD Hwy 50 (C)	3	4	5	19
SD Hwy 50 (W)	2	3	5	19
US Hwy 281	1	2	5	19
US Hwy 281	12	13	5	19
US Hwy 281	15	16	5	19
US Hwy 281	17	18	5	19
US Hwy 281	20	21	5	19
US Hwy 281	21	22	5	19
300 St	1	2	4	37
303 St	0	1	4	37
County Rd 2	6	7	4	37

Highway	Beg MP	End MP	Total Crashes	Crash Rank
388 Ave	0	1	4	37
403 Ave (SD 50)	1	2	4	37
SD Hwy 46	7	8	4	37
SD Hwy 46	18	19	4	37
SD Hwy 50 (C)	4	5	4	37
SD Hwy 50 (W)	5	6	4	37
US Hwy 281	4	5	4	37
US Hwy 281	5	6	4	37
US Hwy 281	14	15	4	37
US Hwy 281	18	19	4	37
US Hwy 281	22	23	4	37
285 St	2	3	3	51
298 St	3	4	3	51
300 St	6	7	3	51
391 Ave	0	1	3	51
394 Ave	0	1	3	51
395 Ave (N)	0	1	3	51
395 Ave (S)	9	10	3	51
395 Ave (S)	10	11	3	51
395 Ave (S)	11	12	3	51
400 Ave	0	1	3	51
SD Hwy 46	20	21	3	51
US Hwy 281	0	1	3	51
US Hwy 281	6	7	3	51
US Hwy 281	7	8	3	51
285 St	3	4	2	65
285 St	4	5	2	65
285 St	5	6	2	65
285 St	6	7	2	65
285 St	7	8	2	65
285 St	9	10	2	65
285 St	10	11	2	65
285 St	11	12	2	65
285 St	12	13	2	65
298 St	1	2	2	65
298 St	2	3	2	65
300 St	5	6	2	65
382 Ave	3	4	2	65
386 Ave	2	3	2	65
386 Ave	3	4	2	65
395 Ave (N)	4	5	2	65

Highway	Beg MP	End MP	Total Crashes	Crash Rank
395 Ave (N)	5	6	2	65
SD Hwy 46	15	16	2	65
SD Hwy 46	19	20	2	65
SD Hwy 50 (W)	4	5	2	65
US Hwy 281	3	4	2	65
US Hwy 281	19	20	2	65
285 St	1	2	1	87
285 St	13	14	1	87
285 St	14	15	1	87
298 St	0	1	1	87
300 St	2	3	1	87
300 St	3	4	1	87
300 St	9	10	1	87
300 St	10	11	1	87
302 St	0	1	1	87
302 St	1	2	1	87
302 St	2	3	1	87
302 St	4	5	1	87
302 St	5	6	1	87
302 St	7	8	1	87
302 St	8	9	1	87
303 St	1	2	1	87
303 St	2	3	1	87
County Rd 2	1	2	1	87
County Rd 2	3	4	1	87
County Rd 2	4	5	1	87
County Rd 2	5	6	1	87
County Rd 2	7	8	1	87
382 Ave	2	3	1	87
382 Ave	4	5	1	87
382 Ave	5	6	1	87
382 Ave	6	7	1	87
386 Ave	0	1	1	87
386 Ave	1	2	1	87
388 Ave	1	2	1	87
388 Ave	3	4	1	87
395 Ave (N)	1	2	1	87
395 Ave (N)	2	3	1	87
395 Ave (N)	3	4	1	87
395 Ave (S)	0	1	1	87
395 Ave (S)	4	5	1	87

Highway	Beg MP	End MP	Total Crashes	Crash Rank
395 Ave (S)	5	6	1	87
395 Ave (S)	6	7	1	87
395 Ave (S)	7	8	1	87
400 Ave	2	3	1	87
403 Ave (SD 50)	3	4	1	87
403 Ave (SD 50)	4	5	1	87
403 Ave (SD 50)	5	6	1	87
403 Ave (SD 50)	7	8	1	87
403 Ave (SD 50)	8	9	1	87
Chalk Rock Rd	0	1	1	87
Chalk Rock Rd	2	3	1	87
SD Hwy 46	14	15	1	87
SD Hwy 50 (C)	2	3	1	87
US Hwy 281	2	3	1	87
US Hwy 281	9	10	1	87
US Hwy 281	10	11	1	87
US Hwy 281	11	12	1	87
285 St	8	9	0	139
285 St	15	16	0	139
285 St	16	17	0	139
300 St	0	1	0	139
300 St	4	5	0	139
300 St	7	8	0	139
300 St	8	9	0	139
300 St	11	12	0	139
300 St	12	13	0	139
302 St	3	4	0	139
302 St	6	7	0	139
County Rd 2	0	1	0	139
County Rd 2	2	3	0	139
County Rd 2	8	9	0	139
County Rd 2	9	10	0	139
382 Ave	0	1	0	139
382 Ave	1	2	0	139
386 Ave	4	5	0	139
388 Ave	2	3	0	139
388 Ave	4	5	0	139
388 Ave	5	6	0	139
394 Ave	1	2	0	139
395 Ave (S)	1	2	0	139
395 Ave (S)	2	3	0	139

Highway	Beg MP	End MP	Total Crashes	Crash Rank
395 Ave (S)	3	4	0	139
395 Ave (S)	8	9	0	139
395 Ave (S)	12	13	0	139
400 Ave	1	2	0	139
400 Ave	3	4	0	139
400 Ave	4	5	0	139
400 Ave	6	7	0	139
400 Ave	7	8	0	139
403 Ave (SD 50)	6	7	0	139
403 Ave (SD 50)	9	10	0	139
Chalk Rock Rd	1	2	0	139
SD Hwy 50 (W)	3	4	0	139

APPENDIX C: LEVEL I FIELD EVALUATION RANKING

Highway	Beg MP	End MP	Level I Score	Level I Rank
Chalk Rock Rd	1	2	18	1
Chalk Rock Rd	2	3	19	2
395 Ave (S)	0	1	20	3
395 Ave (S)	7	8	23	4
County Rd 2	1	2	23	4
County Rd 2	2	3	23	4
County Rd 2	3	4	23	4
County Rd 2	4	5	23	4
County Rd 2	5	6	23	4
County Rd 2	6	7	23	4
County Rd 2	7	8	23	4
County Rd 2	8	9	23	4
County Rd 2	9	10	23	4
395 Ave (S)	4	5	24	14
395 Ave (S)	5	6	24	14
395 Ave (S)	6	7	24	14
395 Ave (S)	8	9	24	14
395 Ave (S)	9	10	24	14
395 Ave (S)	10	11	24	14
395 Ave (S)	11	12	24	14
395 Ave (S)	12	13	24	14
394 Ave	3	4	26	22
395 Ave (N)	3	4	26	22
395 Ave (S)	1	2	26	22
395 Ave (S)	2	3	26	22
395 Ave (S)	3	4	26	22
388 Ave	2	3	28	27
388 Ave	3	4	28	27
388 Ave	5	6	28	27
394 Ave	0	1	28	27
394 Ave	1	2	28	27
394 Ave	2	3	28	27
400 Ave	0	1	28	27
400 Ave	1	2	28	27
400 Ave	4	5	28	27
400 Ave	5	6	28	27
400 Ave	6	7	28	27
400 Ave	7	8	28	27

Highway	Beg MP	End MP	Level I Score	Level I Rank
Chalk Rock Rd	0	1	28	27
300 St	5	6	29	40
300 St	6	7	29	40
300 St	7	8	29	40
300 St	8	9	29	40
300 St	9	10	29	40
300 St	10	11	29	40
300 St	11	12	29	40
300 St	12	13	29	40
303 St	0	1	29	40
388 Ave	4	5	29	40
400 Ave	3	4	29	40
County Rd 2	0	1	29	40
386 Ave	0	1	30	52
386 Ave	1	2	30	52
386 Ave	2	3	30	52
386 Ave	3	4	30	52
386 Ave	4	5	30	52
388 Ave	0	1	30	52
388 Ave	1	2	30	52
400 Ave	2	3	30	52
300 St	0	1	31	60
300 St	1	2	31	60
300 St	2	3	31	60
300 St	3	4	31	60
300 St	4	5	31	60
302 St	3	4	31	60
302 St	4	5	31	60
302 St	5	6	31	60
302 St	6	7	31	60
302 St	7	8	31	60
302 St	8	9	31	60
303 St	1	2	31	60
303 St	2	3	31	60
382 Ave	2	3	31	60
395 Ave (N)	0	1	31	60
395 Ave (N)	1	2	31	60
395 Ave (N)	2	3	31	60
395 Ave (N)	4	5	31	60
395 Ave (N)	5	6	31	60
382 Ave	0	1	32	79

Highway	Beg MP	End MP	Level I Score	Level I Rank
382 Ave	1	2	32	79
382 Ave	3	4	32	79
382 Ave	4	5	32	79
382 Ave	5	6	32	79
382 Ave	6	7	32	79
SD Hwy 50 (C)	0	1	32	79
SD Hwy 50 (C)	1	2	32	79
SD Hwy 50 (C)	2	3	32	79
SD Hwy 50 (C)	3	4	32	79
SD Hwy 50 (C)	4	5	32	79
302 St	0	1	33	90
302 St	1	2	33	90
302 St	2	3	33	90
391 Ave	0	1	33	90
285 St	3	4	34	94
298 St	0	1	34	94
298 St	1	2	34	94
298 St	2	3	34	94
298 St	3	4	34	94
285 St	0	1	35	99
285 St	1	2	35	99
285 St	2	3	35	99
285 St	7	8	35	99
285 St	8	9	35	99
285 St	9	10	35	99
285 St	10	11	35	99
285 St	11	12	35	99
285 St	12	13	35	99
285 St	13	14	35	99
285 St	14	15	35	99
285 St	15	16	35	99
285 St	16	17	35	99
SD Hwy 46	1	2	35	99
SD Hwy 46	2	3	35	99
US Hwy 281	11	12	35	99
US Hwy 281	12	13	35	99
US Hwy 281	17	18	35	99
US Hwy 281	18	19	35	99
US Hwy 281	19	20	35	99
US Hwy 281	20	21	35	99
US Hwy 281	21	22	35	99

Highway	Beg MP	End MP	Level I Score	Level I Rank
US Hwy 281	22	23	35	99
US Hwy 281	23	24	35	99
US Hwy 281	24	25	35	99
285 St	4	5	36	124
285 St	5	6	36	124
285 St	6	7	36	124
SD Hwy 46	3	4	36	124
SD Hwy 46	4	5	36	124
SD Hwy 50 (W)	0	1	36	124
SD Hwy 50 (W)	1	2	36	124
SD Hwy 50 (W)	2	3	36	124
SD Hwy 50 (W)	3	4	36	124
SD Hwy 50 (W)	4	5	36	124
SD Hwy 50 (W)	5	6	36	124
SD Hwy 46	5	6	37	135
SD Hwy 46	6	7	37	135
SD Hwy 46	7	8	37	135
SD Hwy 46	8	9	37	135
SD Hwy 46	9	10	37	135
SD Hwy 46	10	11	37	135
SD Hwy 46	13	14	37	135
SD Hwy 46	14	15	37	135
SD Hwy 46	15	16	37	135
SD Hwy 46	16	17	37	135
SD Hwy 46	17	18	37	135
SD Hwy 46	18	19	37	135
SD Hwy 46	19	20	37	135
SD Hwy 46	20	21	37	135
US Hwy 281	13	14	37	135
US Hwy 281	14	15	37	135
US Hwy 281	15	16	37	135
US Hwy 281	16	17	37	135
403 Ave	0	1	38	153
403 Ave	1	2	38	153
403 Ave	2	3	38	153
403 Ave	3	4	38	153
403 Ave	4	5	38	153
403 Ave	5	6	38	153
403 Ave	6	7	38	153
403 Ave	7	8	38	153
403 Ave	8	9	38	153

Highway	Beg MP	End MP	Level I Score	Level I Rank
403 Ave	9	10	38	153
SD Hwy 46	0	1	38	153
US Hwy 281	0	1	38	153
US Hwy 281	1	2	38	153
US Hwy 281	2	3	38	153
US Hwy 281	3	4	38	153
US Hwy 281	4	5	38	153
US Hwy 281	5	6	38	153
US Hwy 281	6	7	38	153
US Hwy 281	7	8	38	153
US Hwy 281	8	9	38	153
US Hwy 281	9	10	38	153
US Hwy 281	10	11	38	153

APPENDIX D: LEVEL I FIELD EVALUATION WORKSHEETS

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 1 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 388 Ave	Road Length: 6.0
		Road No.:	Road Surface: Asphalt
		Road Class:	Speed Limit: 55

Mile Post	**General**	**Intersections / RR Crossings**	**Signage / Pavement Markings**	**Fixed Objects/ Clear Zones**	**Shoulder / ROW**	**Segment Score**	**Comments**
0.0 - 1.0	5	9	3	9	4	30	Start at SD Hwy 46. Markings faded
1.1 - 2.0	5	9	3	9	4	30	
2.1 - 3.0	5	9	3	9	2	28	Delineators? 2.4 steep slopes, 2.8 speed limit sign faded
3.1 - 4.0	5	9	3	9	2	28	3.6 steep slopes
4.1 - 5.0	5	9	3	9	3	29	4.5 heavy turning traffic at DOT, heavy equipment
5.1 - 6.0	5	9	3	9	2	28	5.8 steep slope east side, 5.8 15 MPH too low
							End at 303 St
							maybe extend south of Marty on BIA 30 388
							1st curve south of Marty - install chevrons
							curve sign too low 5 miles south of Marty
							Picture 1,2

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 2 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 303 Street	Road Length: 3 miles
		Road No.:	Road Surface: asphalt/gravel
		Road Class:	Speed Limit: 15/55 MPH

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	4	8	7	8	2	29	Start at 389 Ave. MP 0.2 ped X-ing, 3-way stop improperly marked
1.1 - 2.0	4	8	7	8	4	31	New pavement not yet marked, no shoulder/narrow
2.1 - 3.0	4	8	7	8	4	31	MP 0.4 gravel/ road narrows, *Chevrons in curve?*
							MP 0.8 washboard
							MP 1.7 fatality, steep hill with sign
							MP 3.0 No advanced warning for intersection
							* Applying for grant for sidewalks
							Picture 3,4,5

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 3 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 391 Ave	Road Length:
		Road No.:	Road Surface: Gravel
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	6	8	5	9	5	33	Start at 300 St. Intersection crashes at 300 St, fatality
							Loose gravel
							Safety study at 300 St/391 Ave intersection
							Intersection wide and high speeds
							Picture 6

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 4 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 298 Street	Road Length: 4 miles
		Road No.:	Road Surface: Gravel/pavement
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	5	8	7	9	5	34	Start at 392 Ave. Farm equip traffic, no advanced warning for stop sign
1.1 - 2.0	5	8	7	9	5	34	narrow roadway
2.1 - 3.0	6	8	7	9	4	34	No advanced warning for stop sign at 394 Ave, change to pavement
3.1 - 4.0	6	8	7	9	4	34	Axel weight limit 7 tons
							Gravel 395 to 396 Ave. End at 396 Ave
							Picture 7,8

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 5 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 300 Street	Road Length: 12.3 miles
		Road No.:	Road Surface: gravel
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	7	5	5	8	6	31	Start at County Rd 5, Dante. Narrow, no shoulder,
1.1 - 2.0	7	5	5	8	6	31	MP 0.4 narrow bridge, fatality. MP 1.1 Curve sign w/speed
2.1 - 3.0	7	5	5	8	6	31	MP 1.2 int 399 Ave. *Curve warning of fork in Road? Chevrons in curve?*
3.1 - 4.0	7	5	5	8	6	31	
4.1 - 5.0	7	5	5	8	6	31	
5.1 - 6.0	5	5	5	8	6	29	MP 5.2 T-intersection no warning. *Install double arrow.*
6.1 - 7.0	5	5	5	8	6	29	No advanced stop sign at 394 Ave Int.
7.1 - 8.0	5	5	5	8	6	29	393 Ave int fatality
8.1 - 9.0	5	5	5	8	6	29	MP 8.1 dangerous intersection
9.1 - 10.0	5	5	5	8	6	29	392 Ave int - sight distance? Fence and vegetation
10.1 - 11.0	5	5	5	8	6	29	No advanced stop warning at 391 Ave intersection
11.1 - 12.0	5	5	5	8	6	29	
12.1 - 13.0	5	5	5	8	6	29	No advanced stop warning at 388 Ave intersection
							End at 388 Ave MP 12.3
							Picture 9, 10

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 6 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 308 Street	Road Length: 10 miles
		Road No.: County Road 2	Road Surface: Asphalt
		Road Class:	Speed Limit: 55 MPH

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	3	8	5	8	5	29	Start at 390 St. Several Curves, no chevrons
1.1 - 2.0	3	2	5	8	5	23	
2.1 - 3.0	3	2	5	8	5	23	
3.1 - 4.0	3	2	5	8	5	23	MP 3.7 2 fatalities in curve
4.1 - 5.0	3	2	5	8	5	23	
5.1 - 6.0	3	2	5	8	5	23	
6.1 - 7.0	3	2	5	8	5	23	
7.1 - 8.0	3	2	5	8	5	23	
8.1 - 9.0	3	2	5	8	5	23	
9.1 - 10.0	3	2	5	8	5	23	End at 398 Street
							Mostly animal crashes
							Picture 11

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 7 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 395 Avenue (South)	Road Length: 12.8 miles
		Road No.: County Road 2	Road Surface: gravel/asphalt
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	3	6	1	8	2	20	Start at 310 Street. Asphalt turns to gravel.
1.1 - 2.0	5	6	2	8	5	26	Back to pavement at MP 1.0.
2.1 - 3.0	5	6	2	8	5	26	
3.1 - 4.0	5	6	2	8	5	26	
4.1 - 5.0	5	6	2	8	3	24	MP 4.9 steep slopes
5.1 - 6.0	5	6	2	8	3	24	
6.1 - 7.0	5	6	2	8	3	24	
7.1 - 8.0	5	6	1	8	3	23	
8.1 - 9.0	5	6	2	8	3	24	
9.1 - 10.0	5	6	2	8	3	24	
10.1 - 11.0	5	6	2	8	3	24	
11.1 - 12.0	5	6	2	8	3	24	
12.1 - 13.0	5	6	2	8	3	24	Enter town at MP 12.8. End at SD 46.
							Several intersection crashes
							Picture 12,13,14,15

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 8 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 386 Ave	Road Length: 4.5 miles
		Road No.:	Road Surface: Gravel
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	5	5	5	8	7	30	Start at SD 43. Loose gravel - currently doing maintenance.
1.1 - 2.0	5	5	5	8	7	30	Dangerous intersection. *Need + intersection ahead sign.*
2.1 - 3.0	5	5	5	8	7	30	295 intersection, no advanced stop.
3.1 - 4.0	5	5	5	8	7	30	
4.1 - 5.0	5	5	5	8	7	30	Stop ahead sign before SD 50
							Picture 16

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 9 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: SD Hwy 50	Road Length: 6 miles
		Road No.:	Road Surface: Asphalt
		Road Class:	Speed Limit: 65 MPH

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments: Start at Lake Andes
0.0 - 1.0	7	8	8	8	5	36	Start at 382 Ave at Lake Andes. *Need sign for curve*
1.1 - 2.0	7	8	8	8	5	36	Fatality at MP 2
2.1 - 3.0	7	8	8	8	5	36	
3.1 - 4.0	7	8	8	8	5	36	
4.1 - 5.0	7	8	8	8	5	36	
5.1 - 6.0	7	8	8	8	5	36	End at 376 Avenue (MP 6.45)
							Picture 17

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 10 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 382 Avenue	Road Length: 7 miles
		Road No.: County Road 29	Road Surface: Asphalt
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	6	8	5	8	5	32	Start at 285 Street
1.1 - 2.0	6	8	5	8	5	32	
2.1 - 3.0	6	8	5	8	4	31	MP 2.4 drop off
3.1 - 4.0	6	8	5	8	5	32	
4.1 - 5.0	6	8	5	8	5	32	
5.1 - 6.0	6	8	5	8	5	32	
6.1 - 7.0	6	8	5	8	5	32	Fatality at 291 Street intersection
							End at 291 Street
							Picture 18, 19

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 11 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 285 Street	Road Length: 17 miles
		Road No.: County Road 34	Road Surface: Asphalt
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	8	7	8	7	5	35	Start at 375 Avenue. Recent overlay and new pavement markings.
1.1 - 2.0	8	7	8	7	5	35	
2.1 - 3.0	8	7	8	7	5	35	
3.1 - 4.0	8	7	8	7	4	34	MP 3.5 Fatality
4.1 - 5.0	8	7	8	7	6	36	
5.1 - 6.0	8	7	8	7	6	36	
6.1 - 7.0	8	7	8	7	6	36	
7.1 - 8.0	8	7	8	7	5	35	382 Avenue intersection on top of high. Sight distance?
8.1 - 9.0	8	7	8	7	5	35	
9.1 - 10.0	8	7	8	7	5	35	
10.1 - 11.0	8	7	8	7	5	35	
11.1 - 12.0	8	7	8	7	5	35	
12.1 - 13.0	8	7	8	7	5	35	MP 12.2 Fatality
13.1 - 14.0	8	7	8	7	5	35	
14.1 - 15.0	8	7	8	7	5	35	
15.1 - 16.0	8	7	8	7	5	35	
16.1 - 17.0	8	7	8	7	5	35	End at US Hwy 281
							Half the crashes are animal
							Picture 20

	Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 12 of 20
	Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: US Hwy 281/18	Road Length: 24 miles
			Road No.:	Road Surface: Asphalt
			Road Class:	Speed Limit:

*Adjusted Mile Post	Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
1.1 - 2.0	0.0 - 1.0	7	8	8	8	7	38	Start at 285 Street. Existing rumble strips
2.1 - 3.0	1.1 - 2.0	7	8	8	8	7	38	MP 1.9 drop off at shoulder
3.1 - 4.0	2.1 - 3.0	7	8	8	8	7	38	
4.1 - 5.0	3.1 - 4.0	7	8	8	8	7	38	Volume of traffic more crashes, truck traffic
5.1 - 6.0	4.1 - 5.0	7	8	8	8	7	38	
6.1 - 7.0	5.1 - 6.0	7	8	8	8	7	38	
7.1 - 8.0	6.1 - 7.0	7	8	8	8	7	38	
8.1 - 9.0	7.1 - 8.0	7	8	8	8	7	38	
9.1 - 10.0	8.1 - 9.0	7	8	8	8	7	38	Intersection with SD 50 at MP 8.0
10.1 - 11.0	9.1 - 10.0	7	8	8	8	7	38	
11.1 - 12.0	10.1 - 11.0	7	8	8	8	7	38	
12.1 - 13.0	11.1 - 12.0	7	5	8	8	7	35	
13.1 - 14.0	12.1 - 13.0	7	5	8	8	7	35	
14.1 - 15.0	13.1 - 14.0	7	7	8	8	7	37	
15.1 - 16.0	14.1 - 15.0	7	7	8	8	7	37	
16.1 - 17.0	15.1 - 16.0	7	7	8	8	7	37	
17.1 - 18.0	16.1 - 17.0	7	7	8	8	7	37	MP 16.7 Pedestrian sign
18.1 - 19.0	17.1 - 18.0	7	5	8	8	7	35	Enter Lake Andes at MP 18
19.1 - 20.0	18.1 - 19.0	7	5	8	8	7	35	
20.1 - 21.0	19.1 - 20.0	7	5	8	8	7	35	
21.1 - 22.0	20.1 - 21.0	7	5	8	8	7	35	
22.1 - 23.0	21.1 - 22.0	7	5	8	8	7	35	
23.1 - 24.0	22.1 - 23.0	7	5	8	8	7	35	MP 23 curve and hill
24.1 - 25.0	23.1 - 24.0	7	5	8	8	7	35	End at SD 46
								* Add first mile to start 286 St
								Picture 21

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 13 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: SD Hwy 46	Road Length: 19.8 miles
		Road No.:	Road Surface: Asphalt
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	7	6	8	9	8	38	Start at US 281. Existing rumble strips. MP 0.8 steep drop off
1.1 - 2.0	7	6	8	9	5	35	
2.1 - 3.0	7	6	8	9	5	35	MP 3 intersections
3.1 - 4.0	7	6	8	9	6	36	
4.1 - 5.0	7	6	8	9	6	36	
5.1 - 6.0	7	6	8	9	7	37	MP 5.2 intersection with 388 Ave.
6.1 - 7.0	7	6	8	9	7	37	
7.1 - 8.0	7	6	8	9	7	37	
8.1 - 9.0	7	6	8	9	7	37	
9.1 - 10.0	7	6	8	9	7	37	
10.1 - 11.0	7	6	8	9	7	37	
11.1 - 12.0	7	6	8	9	7	37	Town of Wagner
12.1 - 13.0	7	6	8	9	7	37	Town of Wagner
13.1 - 14.0	7	6	8	9	7	37	
14.1 - 15.0	7	6	8	9	7	37	
15.1 - 16.0	7	6	8	9	7	37	
16.1 - 17.0	7	6	8	9	7	37	
17.1 - 18.0	7	6	8	9	7	37	
18.1 - 19.0	7	6	8	9	7	37	
19.1 - 20.0	7	6	8	9	7	37	MP 19.2 *Traffic study to determine if turning lanes needed at intersection?*
20.1 - 21.0	7	6	8	9	7	37	End at SD Hwy 50 (403 Ave) MP 20.44
							Picture 22

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 14 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: SD Hwy 50	Road Length: 5.3 miles
		Road No.:	Road Surface: Asphalt
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	6	6	6	9	5	32	Start at SD 46 (Wagner)
1.1 - 2.0	6	6	6	9	5	32	MP 2 skewed intersection
2.1 - 3.0	6	6	6	9	5	32	MP 2.8 skewed intersection in curve
3.1 - 4.0	6	6	6	9	5	32	
4.1 - 5.0	6	6	6	9	5	32	
							End at US Hwy 281
							Picture 23

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 15 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 395 Avenue (North)	Road Length: 5.7 miles
		Road No.: County Road 11	Road Surface: Asphalt
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	5	6	7	8	5	31	Start at 291 St. No advanced warning at intersection 292 St.
1.1 - 2.0	5	6	7	8	5	31	Pavement retaining water, ponding present
2.1 - 3.0	5	6	7	8	5	31	
3.1 - 4.0	4	6	7	8	1	26	MP 3.2 bad culvert/narrow, side rails in ditch, no shoulder, uneven pvmnt
4.1 - 5.0	5	6	7	8	5	31	MP 4.2 Watch for children sign
5.1 - 6.0	5	6	7	8	5	31	MP 5.2 slow sign? MP 5.6 2 fatalities, narrow bridge
							End at MP 5.7 at SD 46
							Picture 24, 25, 26, 27, 28, 29, 30, 31, 32

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 16 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: SD Hwy 50	Road Length:
		Road No.: 403 Avenue	Road Surface: Asphalt
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	7	8	6	9	8	38	Start at SD 46. Existing rumble strip.
1.1 - 2.0	7	8	6	9	8	38	
2.1 - 3.0	7	8	6	9	8	38	
3.1 - 4.0	7	8	6	9	8	38	
4.1 - 5.0	7	8	6	9	8	38	MP 4.8 Curve and bad intersection. End SD 50
5.1 - 6.0	7	8	6	9	8	38	
6.1 - 7.0	7	8	6	9	8	38	
7.1 - 8.0	7	8	6	9	8	38	
8.1 - 9.0	7	8	6	9	8	38	
9.1 - 10.0	7	8	6	9	8	38	End at 307 Street
							Mostly intersection and animal crashes
							Picture 33, 34

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 17 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 302 Street	Road Length: 9.2 miles
		Road No.:	Road Surface: Gravel
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	4	8	5	9	7	33	Start at 403 Ave. Washboarding and water ponding
1.1 - 2.0	4	8	5	9	7	33	MP 1.8 narrow bridge with good railing
2.1 - 3.0	4	8	5	9	7	33	MP 2.0
3.1 - 4.0	3	8	5	9	6	31	Needs more gravel, heavy rutting when muddy, causing slippage
4.1 - 5.0	3	8	5	9	6	31	MP 4.8 curve sign
5.1 - 6.0	3	8	5	9	6	31	
6.1 - 7.0	3	8	5	9	6	31	
7.1 - 8.0	3	8	5	9	6	31	
8.1 - 9.0	3	8	5	9	6	31	End at 394 Avenue
							Mostly intersection crashes
							Picutre 35

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 18 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 400 Avenue	Road Length: 8 miles
		Road No.: County Road 5	Road Surface: Asphalt
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	5	8	3	8	4	28	Start at 300 Street. Little, narrow, veg growing into pvmnt
1.1 - 2.0	5	8	3	8	4	28	*Add speed warning for curve*
2.1 - 3.0	6	8	3	8	5	30	
3.1 - 4.0	6	8	3	8	4	29	MP 3.5 no shoulders
4.1 - 5.0	6	8	3	8	3	28	MP 4.5 curves, MP 5.0 fatality
5.1 - 6.0	6	8	3	8	3	28	Intersection with 305 Street sight distance very bad?
6.1 - 7.0	6	8	3	8	3	28	
7.1 - 8.0	6	8	3	8	3	28	End at 308 Street
							Picture 36, 37

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 19 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 394 Ave	Road Length: 4 miles
		Road No.:	Road Surface: Gravel
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	5	5	4	9	5	28	Start at 302 Street
1.1 - 2.0	5	5	4	9	5	28	*Deer crossing sign?*
2.1 - 3.0	5	5	4	9	5	28	MP 3.0 Children sign
3.1 - 4.0	3	5	4	9	5	26	End at 298 Street
							No picture

Level I Field Evaluation	Evaluator: WYT2/LTAP, YST Transportation	Date: 10/22/2014	Page: 20 of 20
Notes: Evaluation Team: D. Shinstine, P. Brown Bear, M. Sanchez, S. Hare		Road Name: 303 Street	Road Length: 3.0 miles
		Road No.: Chalk Rock Road	Road Surface: Gravel
		Road Class:	Speed Limit:

Mile Post	General	Intersections / RR Crossings	Signage / Pavement Markings	Fixed Objects/ Clear Zones	Shoulder / ROW	Segment Score	Comments
0.0 - 1.0	5	5	6	7	5	28	Start at 387 Ave. MP 1.0 raod narrows
1.1 - 2.0	4	5	5	2	2	18	MP 1.4 big drop off. *Chevrons at curve?* MP 2.0 bridge with guard rail.
2.1 - 3.0	4	5	5	2	3	19	MP 2 to 3 trees in clear zone. MP 2.4 S curve no signs.
							Chevrons at MP 2.6? MP 2.8 narrow culvert.
							End at MP 3.0 near river
							Picture 38, 39

APPENDIX E: COMBINED RANKING BY HIGHWAY

Highway	Beg MP	End MP	Crash Rank	Level I Score	Combined Rank
285 St	0	1	10	35	99
285 St	1	2	87	35	99
285 St	2	3	51	35	99
285 St	3	4	65	34	94
285 St	4	5	65	36	124
285 St	5	6	65	36	124
285 St	6	7	65	36	124
285 St	7	8	65	35	99
285 St	8	9	139	35	99
285 St	9	10	65	35	99
285 St	10	11	65	35	99
285 St	11	12	65	35	99
285 St	12	13	65	35	99
285 St	13	14	87	35	99
285 St	14	15	87	35	99
285 St	15	16	139	35	99
285 St	16	17	139	35	99
298 St	0	1	87	34	94
298 St	1	2	65	34	94
298 St	2	3	65	34	94
298 St	3	4	51	34	94
300 St	0	1	139	31	60
300 St	1	2	37	31	60
300 St	2	3	87	31	60
300 St	3	4	87	31	60
300 St	4	5	139	31	60
300 St	5	6	65	29	40
300 St	6	7	51	29	40
300 St	7	8	139	29	40
300 St	8	9	139	29	40
300 St	9	10	87	29	40
300 St	10	11	87	29	40
300 St	11	12	139	29	40
300 St	12	13	139	29	40
302 St	0	1	87	33	90
302 St	1	2	87	33	90
302 St	2	3	87	33	90
302 St	3	4	139	31	60
302 St	4	5	87	31	60

Highway	Beg MP	End MP	Crash Rank	Level I Score	Combined Rank
302 St	5	6	87	31	60
302 St	6	7	139	31	60
302 St	7	8	87	31	60
302 St	8	9	87	31	60
303 St	0	1	37	29	40
303 St	1	2	87	31	60
303 St	2	3	87	31	60
382 Ave	0	1	139	32	79
382 Ave	1	2	139	32	79
382 Ave	2	3	87	31	60
382 Ave	3	4	65	32	79
382 Ave	4	5	87	32	79
382 Ave	5	6	87	32	79
382 Ave	6	7	87	32	79
386 Ave	0	1	87	30	52
386 Ave	1	2	87	30	52
386 Ave	2	3	65	30	52
386 Ave	3	4	65	30	52
386 Ave	4	5	139	30	52
388 Ave	0	1	37	30	52
388 Ave	1	2	87	30	52
388 Ave	2	3	139	28	27
388 Ave	3	4	87	28	27
388 Ave	4	5	139	29	40
388 Ave	5	6	139	28	27
391 Ave	0	1	51	33	90
394 Ave	0	1	51	28	27
394 Ave	1	2	139	28	27
394 Ave	2	3	8	28	27
394 Ave	3	4	4	26	22
395 Ave (N)	0	1	51	31	60
395 Ave (N)	1	2	87	31	60
395 Ave (N)	2	3	87	31	60
395 Ave (N)	3	4	87	26	22
395 Ave (N)	4	5	65	31	60
395 Ave (N)	5	6	65	31	60
395 Ave (S)	0	1	87	20	3
395 Ave (S)	1	2	139	26	22
395 Ave (S)	2	3	139	26	22
395 Ave (S)	3	4	139	26	22

Highway	Beg MP	End MP	Crash Rank	Level I Score	Combined Rank
395 Ave (S)	4	5	87	24	14
395 Ave (S)	5	6	87	24	14
395 Ave (S)	6	7	87	24	14
395 Ave (S)	7	8	87	23	4
395 Ave (S)	8	9	139	24	14
395 Ave (S)	9	10	51	24	14
395 Ave (S)	10	11	51	24	14
395 Ave (S)	11	12	51	24	14
395 Ave (S)	12	13	139	24	14
400 Ave	0	1	51	28	27
400 Ave	1	2	139	28	27
400 Ave	2	3	87	30	52
400 Ave	3	4	139	29	40
400 Ave	4	5	139	28	27
400 Ave	5	6	19	28	27
400 Ave	6	7	139	28	27
400 Ave	7	8	139	28	27
403 Ave (SD 50)	0	1	10	38	153
403 Ave (SD 50)	1	2	37	38	153
403 Ave (SD 50)	2	3	19	38	153
403 Ave (SD 50)	3	4	87	38	153
403 Ave (SD 50)	4	5	87	38	153
403 Ave (SD 50)	5	6	87	38	153
403 Ave (SD 50)	6	7	139	38	153
403 Ave (SD 50)	7	8	87	38	153
403 Ave (SD 50)	8	9	87	38	153
403 Ave (SD 50)	9	10	139	38	153
Chalk Rock Rd	0	1	87	28	27
Chalk Rock Rd	1	2	139	18	1
Chalk Rock Rd	2	3	87	19	2
County Rd 2	0	1	139	29	40
County Rd 2	1	2	87	23	4
County Rd 2	2	3	139	23	4
County Rd 2	3	4	87	23	4
County Rd 2	4	5	87	23	4
County Rd 2	5	6	87	23	4
County Rd 2	6	7	37	23	4
County Rd 2	7	8	87	23	4
County Rd 2	8	9	139	23	4
County Rd 2	9	10	139	23	4
SD Hwy 46	0	1	1	38	153

Highway	Beg MP	End MP	Crash Rank	Level I Score	Combined Rank
SD Hwy 46	1	2	2	35	99
SD Hwy 46	2	3	10	35	99
SD Hwy 46	3	4	3	36	124
SD Hwy 46	4	5	19	36	124
SD Hwy 46	5	6	19	37	135
SD Hwy 46	6	7	19	37	135
SD Hwy 46	7	8	37	37	135
SD Hwy 46	8	9	19	37	135
SD Hwy 46	9	10	19	37	135
SD Hwy 46	10	11	19	37	135
SD Hwy 46	13	14	19	37	135
SD Hwy 46	14	15	87	37	135
SD Hwy 46	15	16	65	37	135
SD Hwy 46	16	17	6	37	135
SD Hwy 46	17	18	10	37	135
SD Hwy 46	18	19	37	37	135
SD Hwy 46	19	20	65	37	135
SD Hwy 46	20	21	51	37	135
SD Hwy 50 (C)	0	1	10	32	79
SD Hwy 50 (C)	1	2	19	32	79
SD Hwy 50 (C)	2	3	87	32	79
SD Hwy 50 (C)	3	4	19	32	79
SD Hwy 50 (C)	4	5	37	32	79
SD Hwy 50 (W)	0	1	10	36	124
SD Hwy 50 (W)	1	2	10	36	124
SD Hwy 50 (W)	2	3	19	36	124
SD Hwy 50 (W)	3	4	139	36	124
SD Hwy 50 (W)	4	5	65	36	124
SD Hwy 50 (W)	5	6	37	36	124
US Hwy 281	0	1	51	38	153
US Hwy 281	1	2	19	38	153
US Hwy 281	2	3	87	38	153
US Hwy 281	3	4	65	38	153
US Hwy 281	4	5	37	38	153
US Hwy 281	5	6	37	38	153
US Hwy 281	6	7	51	38	153
US Hwy 281	7	8	51	38	153
US Hwy 281	8	9	10	38	153
US Hwy 281	9	10	87	38	153
US Hwy 281	10	11	87	38	153
US Hwy 281	11	12	87	35	99

Highway	Beg MP	End MP	Crash Rank	Level I Score	Combined Rank
US Hwy 281	12	13	19	35	99
US Hwy 281	13	14	10	37	135
US Hwy 281	14	15	37	37	135
US Hwy 281	15	16	19	37	135
US Hwy 281	16	17	8	37	135
US Hwy 281	17	18	19	35	99
US Hwy 281	18	19	37	35	99
US Hwy 281	19	20	65	35	99
US Hwy 281	20	21	19	35	99
US Hwy 281	21	22	19	35	99
US Hwy 281	22	23	37	35	99
US Hwy 281	23	24	4	35	99
US Hwy 281	24	25	6	35	99