UNION COUNTY MASTER TRANSPORTATION PLAN

IN COOPERATION WITH

- UNION COUNTY, SOUTH DAKOTA
- SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION
- FEDERAL HIGHWAY ADMINISTRATION
- SIOUXLAND INTERSTATE METROPOLITAN PLANNING COUNCIL

SD DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
Federal Highway Administration

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FINAL REPORT

MAY 2022

Acknowledgements

Project Manager

Steve Gramm, PE
Project Development
South Dakota Department of Transportation

Study Advisory Team

Mike Dailey, Union County Commission
Milton Ustad, Union County Commission
Jerry Buum, Union County Highway Department Superintendent
Jeff Noteboom, Union County Highway Department Assistant Superintendent
Brandon Cooper, Union County GIS
Cristy Harkness, Union County Highway Department Exec. Secretary
Dennis Henze, Union County Planning & Zoning
Greg Rothschadl, SDDOT – Yankton Area
Jeff Brosz, SDDOT – Transportation Inventory Management
Sarah Gilkerson, SDDOT – MPO Coordinator
Logan Gran, SDDOT – Project Development
Michelle Bostinelos, Sioux City MPO (SIMPCO)

Ulteig Engineers, Inc.

Paul Deutsch, PE
Will Kerns, AICP
Abdullah Kurkcu, Ph.D.
Brad Stangohr, PE

Preparation of this report has been financed in part through grant(s) from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

The preparation of this report has been financed through the South Dakota Department of Transportation's SPR Funding for Local Agencies program. The contents and recommendations of this report do not necessarily reflect official views, policy, or endorsement of the South Dakota Department of Transportation.

Table of Contents

Appendices

Figures

Tables

EXECUTIVE SUMMARY

The Union County Master Transportation Plan is a document that will serve as a guide for the County's future transportation network in a multimodal perspective. Safety, infrastructure, and operations needs are examined and prioritized to enhance economic and social well-being of Union County residents. This study is Union County's first long range transportation plan (20+ years) and sets the baseline for the County's vision and future decision-making. This study set out to meet three objectives:

1. Complete a list of transportation issues and needs facing Union County.

2. Develop feasible solutions to address those issues and needs that meet current design standards and/or traffic level of service expectations under both the current and predicted future traffic conditions while promoting a livable community that will enhance the economic and social well-being of Union County residents.

3. Create final products for use by Union County and the SDDOT which will provide guidance to implement recommended improvements and react to future development plans within the area.

A list of issues and needs were identified as a result of baseline conditions analysis, discussions with the Study Advisory Team, and stakeholder and public feedback. This list forms the basis for the study recommendations, including new standards, guidelines, and future project implementation.

Next, a series of standards and guidelines were developed by this study to help guide the process of implementing planned improvements:

- Major Roads Plan
- Road Cross Section and Bridge Width Standards
- Traffic Impact Study Guidelines
- Level of Service Standards
- Access Management Guidelines
- Jurisdictional Transfer

Specifically, standards and guidelines help address issues and needs when it comes time to design projects and plan funding and responsibility. The standards and documents provided as part of this study will significantly help guide the County with future decision-making questions, including the following:

- Which roads and bridges have the highest priority for funding?
- Which roads can be part of a future connected bike route?
- How wide does a bridge need to be on certain types of roads?
- Where should new driveways and intersections be allowed on a county highway?

- What is an acceptable level of traffic delay due to increased traffic demand?
- Who is responsible for the cost of expanding a road due to new traffic and development?
- When and how should the County plan to transfer jurisdiction to the State, city, or township?

Future conditions analyses were conducted to better understand how the needs of Union County will develop over time. Traffic was forecasted into the future to determine where highway capacity may be lacking. Bridge condition analyses were conducted to determine how many bridges may need to be replaced, as well as candidates for bridge closure should funding prove inadequate. An analysis of highway surfacing condition was conducted to best apply road improvements and preservation techniques to get the best return on investments for road service life. These analyses complete the framework for the final stage of the study, which is a series of plans that guide project implementation.

The Bicycle and Pedestrian Plan provides guidance on how to build an infrastructure network that is friendly to modes of travel beyond the automobile. It recommends a network of on-street bike routes along highways with apparent or potential demand for cyclists and ties in with the typical road cross section design (with paved shoulders) of the Major Roads Plan. It also proposes an exciting comprehensive Trails Master Plan as a vision for active transportation in Union County. This network of trails would benefit Union County for generations through increased physical activity options, quality of life, tourism, economic development, connectivity, and resiliency.

The 10-year Paving Plan was developed using Union County's annual 5-Year Plan as the foundation for paving project planning but extending it out another 5 years. Projects selected for the years 2027-2031 are primarily based on the pavement condition assessment made during the baseline conditions analysis of this study, but also consider the classification of the road in the Major Roads Plan and daily traffic volumes.

The Bridge Replacement Plan features a prioritization of all bridges expected to potentially need replacement by 2045. Bridges are mainly prioritized by condition due to Bridge Improvement Grant (BIG) funding eligibility, but also incorporates relative importance of the bridge to the county highway network. Additionally, a screening of all 113 county-owned bridges was conducted to provide the County with a basic prioritization of all bridges regardless of condition or size.

The Enhancement Project Implementation Plan proposes a list of enhancement projects that specifically address existing and future issues and needs. First, these projects were screened for a purpose and need to ensure the proposed projects meet objectives that address the need(s). Next the projects were prioritized, as funding is not available to address all projects immediately. The criteria used to prioritize these projects include importance, urgency, cost, benefits achieved, and the support observed during the public engagement and survey questionnaire.

Lastly, this study could not have been completed in good faith without input from the Study Advisory Team, stakeholders, and the public. Engagement throughout the study process validates the purpose, intention, and conclusions of the study. Survey results and direct comments were carefully recorded and considered throughout the study process. This study was completed amid the COVID-19 pandemic, which caused unpredictable challenges, particularly for public engagement, restricting in-person gathering for Public Meeting #1. However, these challenges were overcome to the best extent possible by featuring more robust digital resources where the public could view recorded meeting presentations on the project webpage.

This study uses the year 2045 as the planning horizon. However, needs and priorities are expected to change over time, so this document is considered a "living document." It is recommended to maintain this document by performing an update to this study every 5-10 years to keep it current and beneficial to the County.

1. INTRODUCTION

Background

Union County officials recognized a need for long term transportation planning due to the challenges in prioritizing the funding for transportation infrastructure. Transportation needs inevitably change over time. Disruptions to the transportation network emerge that were not a concern in the past. Modern research and innovation present new opportunities for improvement. This document focuses on the current and future transportation infrastructure issues that Union County faces and how and when issues should be addressed knowing that funds may not be available for all improvements.

The South Dakota Department of Transportation (SDDOT) shares funding with local governments for planning and research. Union County applied for and was thus awarded funding for, a county Master Transportation Plan (MTP), to aid in prioritization of transportation needs and investments by considering factors such as traffic volume, crash history, truck routes, flooding trends, infrastructure service life, and multimodal perspectives. Coordinating agencies included the SDDOT, Union County, and the Siouxland Interstate Metropolitan Planning Council (SIMPCO).

Public participation was a vital element in assembling this plan in addition to the input from key stakeholders. The recommendations of this plan have a direct impact to those who depend on the transportation network, whether that means sustaining connectivity, improving safety, or maintaining quality of life. Therefore, the process of assembling this document is structured in a manner to gather and incorporate input and keep all community members informed as issues are identified and strategies are developed. Those that took the opportunity to be involved aided in the future of transportation infrastructure for their county. Their visions and guidance were documented and accounted for when prioritizing future needs for a 20-year planning horizon (2045).

With this document, there is support that transportation infrastructure needs are being met with proper planning to address those needs. It will come to serve as a guide for decision-making and a blueprint of Union County's transportation infrastructure for years and decades to come. It is an adaptable plan; change is inevitable. This plan can be periodically updated to consider emerging challenges and trends.

Study Process

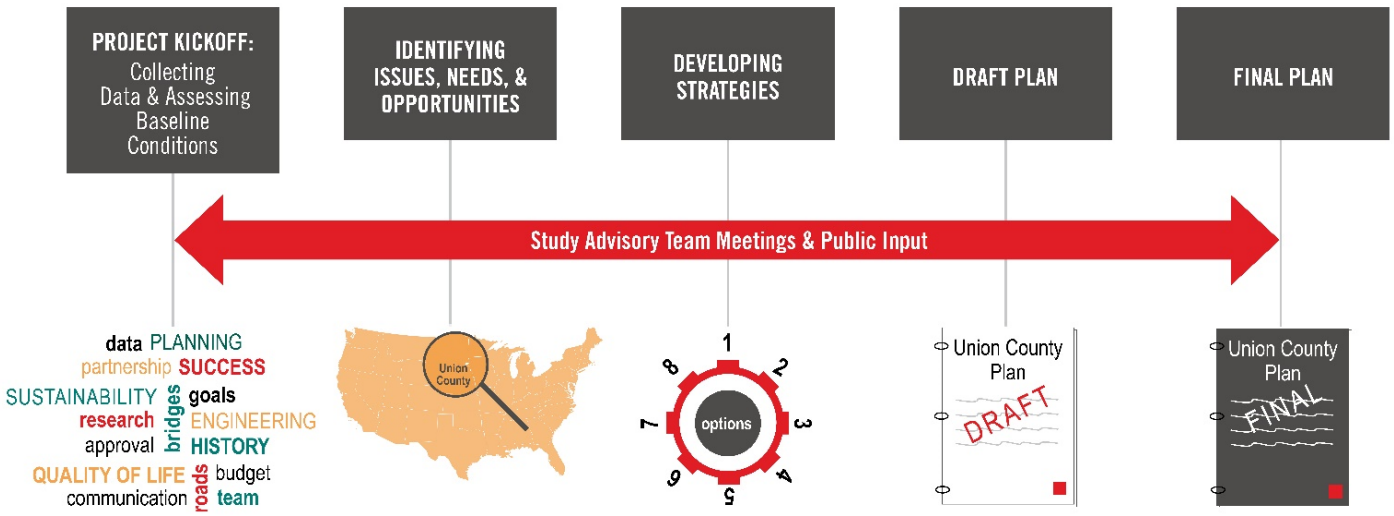


Figure 1: Study Process

Study Advisory Team

The Study Advisory Team (SAT) consists of representatives from Union County, SDDOT, and SIMPCO. The consultant team met with the SAT on several occasions throughout the study process. The role of the SAT was to guide the development of the MTP, review progress, provide comments on study materials, and apply insight throughout the study. The SAT was also responsible to ensure that the study objectives of the Plan were met upon completion of the study.

Location

The study area is Union County, SD, and all communities and surface transportation infrastructure there within. The focus of the Union County Master Transportation Plan is the county-owned and maintained roads and bridges as they require the most significant financial commitment to maintain the county transportation infrastructure network. Figure 2 shows a map of the county road network.

Union County is in the southeastern corner of South Dakota, at the confluence of the Missouri River and Big Sioux River, bordered by Iowa to the east and Nebraska to the south. The county of 460.5 square miles (land) is characterized by fertile farmland and mostly rural population. The 2020 population is estimated to be about 16,811 including communities of Alcester, Beresford, Dakota Dunes, Elk Point, Jefferson, North Sioux City, and Richland.[1] The Sioux City metropolitan area includes North Sioux City, Dakota Dunes, and Jefferson within its planning boundary.[2]

Union County's road system is mostly consistent with a one-square-mile grid pattern, served by State, County, City, and Township owned roads. However, the eastern edge of the county often features winding roads adjacent to the Big Sioux River and/or rolling hill sides. Interstate 29 is the primary thoroughfare, running through the county from north to south. Union County is also served by four state highways: SD 11, SD 46, SD 48, and SD 50.

Union County is responsible for maintenance of 242 miles of road (183 miles paved, 59 miles unpaved) and 113 bridges. This includes all roads within Richland Township, which is unorganized.

[1] U.S. Census Bureau. *2020 Decennial Census*
[2] Siouxland Interstate Metropolitan Planning Council (SIMPCO)

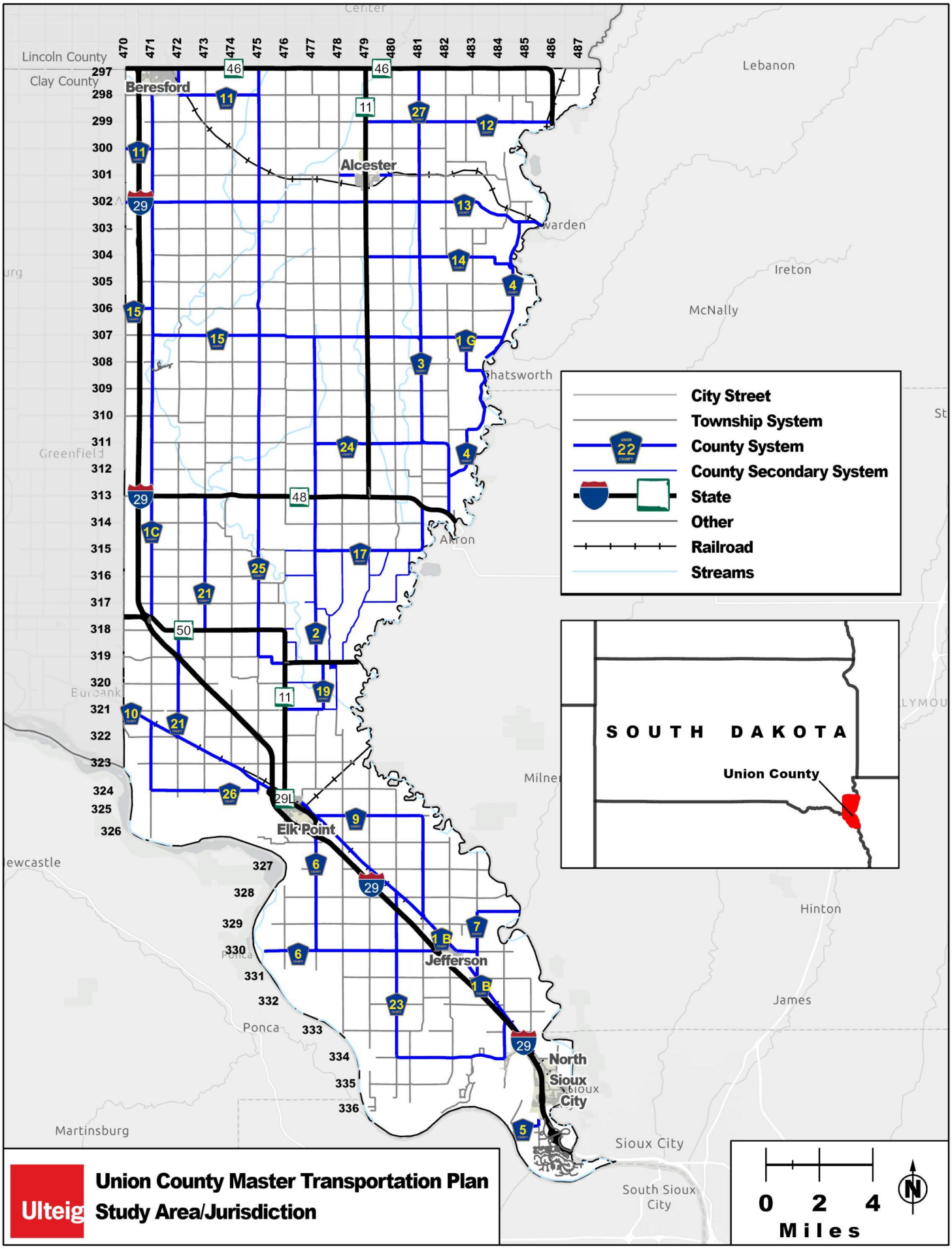


Figure 2: Study Area/Jurisdiction

2. BASELINE CONDITIONS

Demographics, Population, Economy, and Employment

Demographics and Population

According to American Community Survey[3] (ACS) estimates, the median age in Union County is estimated to be 40 years old, which is approximately 2 years older than the median age for all South Dakota residents. The median household income in Union County of $70,378 trended higher than the $58,275 median household income for South Dakota. Current ACS data states an estimated 6.3 percent of Union County individuals live below the poverty level.

Table 1: Demographics and Population of Union County

Demographics	Union County	South Dakota
Population (US Census Bureau, 2020)	16,811	886,667
Median Age (years)	40	37.7
Mean Travel Time to Work (minutes)	19.2	17.2
Median Household Income	$70,378	$58,275
Persons in Poverty (% rate)	6.30%	11.90%
Land Area (square miles)	460.5	75,811

Source: U.S. Census Bureau

Population characteristics and trends are essential to understand when planning transportation systems. High growth areas will face increased demand for infrastructure enhancements. Areas of higher population density are most efficient when considering multimodal transportation modes. Age and income demographics are indicators for preferred mode choice (walking, biking, driving, or transit). Examining population trends better informs decisions where future transportation investments should be best spent.

Based on available data, the population of Union County is matching steady growth with the rest of the state of South Dakota. Communities close to Sioux City metropolitan area near the southern border such as Dakota Dunes and North Sioux City are seeing growth, while the rest of the county is either maintaining or losing population.

Table 2 shows how population has changed since 2000 within the cities of Union County, SD. From 2000-2010, Union County's population was growing at a steady rate of around 350 people, or 2.8% each year. From 2010-2020, the North Sioux City area experienced a faster rate of growth than any other city Union County.

[3] U.S. Census Bureau. *2015-2019 American Community Survey*

Table 2: Decennial US Census Population of Union County

Location	2000	2010	2020	Growth 2010-2020
Alcester	880	807	820	1.6%
Beresford	2,006	2,005	2,180	8.7%
Dakota Dunes	N/A	2,540	4,020	58.3%
Elk Point	1,714	1,963	2,149	9.5%
Jefferson	586	547	475	-13.2%
North Sioux City	2,288	2,530	3,042	20.2%
Richland	N/A	89	97	9.0%
Union County	12,584	14,399	16,811	16.8%
South Dakota	754,844	814,180	886,667	8.9%

Source: U.S. Census Bureau

Vulnerable Populations

Union County's vulnerable population is comprised of those with-low incomes, minorities, youth, or those with limited physical abilities (11.3%). Based on available data by the U.S. Census, estimated information is available for minorities and youth. Similar to many areas in the United States, Union County is experiencing an increase in the number of older adults living in the community. The percentage of population under age 18 decreased from 25.1% to 24.2% and the 16-64 age category reduced from 60.5% to 58.4% over the most recent 5-year period. This increase in proportion of the population that is elderly will create changing demands on the transportation network and transportation services such as local transit and paratransit programs.

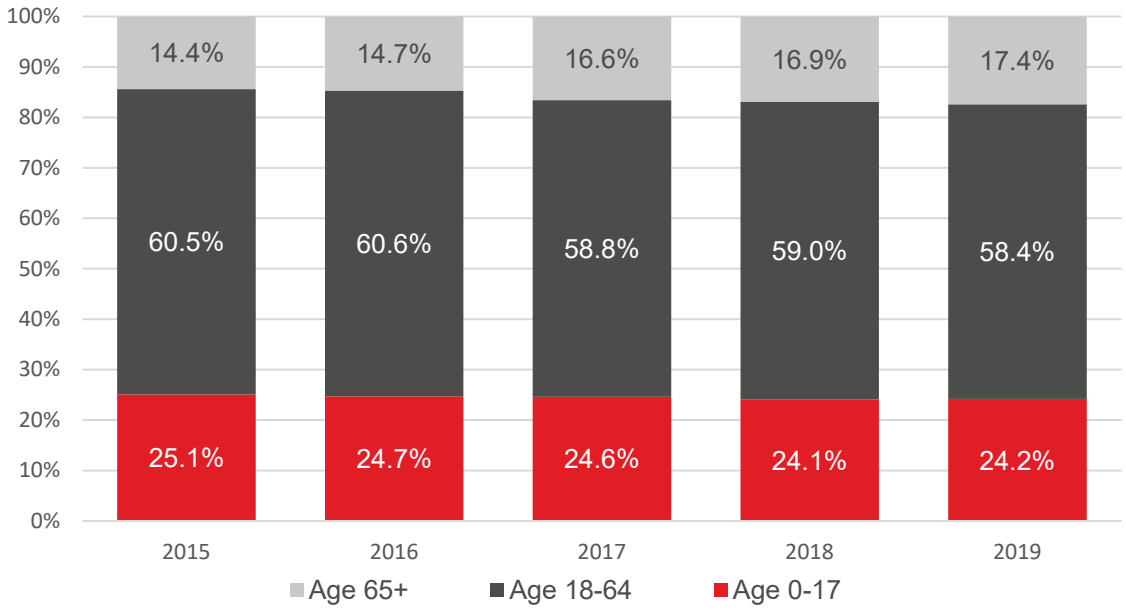


Figure 3: Union County Population by Age Group

Means of Transportation to Work

U.S. Census data was obtained to determine the transportation modes that Union County residents use to commute to work. The most common means of transportation to work is driving alone, which makes up 86% of trips to work. This is close to the South Dakota state average of 81%.

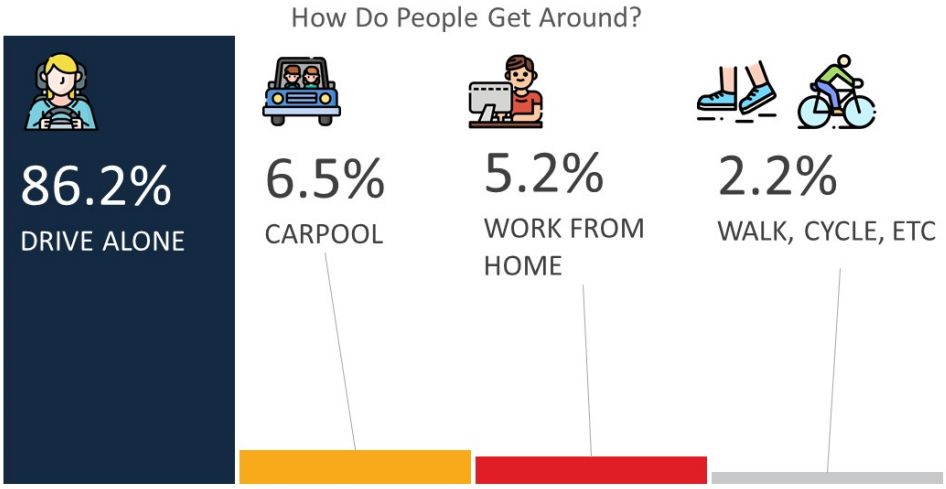


Figure 4: Union County Mode Choice

Economy

The *2019-2023 Comprehensive Economic Development Strategy* (CEDS) was developed for the six counties forming the South Eastern Council of Governments (SECOG), which includes Union County. Overall, it identified steady population growth and low unemployment rate throughout the region.

It also identified the strengths, weaknesses, opportunities, and threats to the region's development, and is designed to guide economic growth. One of the areas of focus included the importance of the infrastructure network. Some of the statements made in the CEDS report are shown below:

- The area is served by I-29 as well as rail providers which allows for easy transport of goods and services.
- Communities closest I-29 do not face the same struggles to maintain population base as agricultural dependent rural communities.
- Quality infrastructure provides a foundation for economic development, but a declining population base in rural areas makes it harder to maintain existing public infrastructure that were established to serve a larger population.
- Develop priority-based, responsible, financially feasible long-term strategies for the financing and replacement of existing infrastructure.
- Develop multi-jurisdictional and regionalized infrastructure development strategies.
- Increase resiliency to disasters through land use and development regulations and address post-disaster redevelopment planning for various types of infrastructure and public facilities.

This study implements one of the goals of the CEDS report by developing a long-term strategy for Union County's aging infrastructure. There is also discussion on multi-jurisdictional cooperation and recommendations for increasing resiliency to disasters such as flooding.

Employment

It is estimated that there are approximately 9,628 jobs in Union County, many located in areas that are closer to Sioux City.[4] Using the North American Industry Classification System (NAICS), there is a diverse mix of employment types, with manufacturing, health care and social assistance, finance and insurance, and management of companies and enterprises being the most prevalent job types in the area.

Table 3: Top 10 Job Counts in Union County by NAICS Industry Sector

NAICS Industry Sector	Employee Count	%
Manufacturing	2,011	20.9%
Health Care and Social Assistance	1,192	12.4%
Finance and Insurance	966	10.0%
Management of Companies and Enterprises	746	7.7%
Accommodation and Food Services	673	7.0%
Educational Services	655	6.8%
Retail Trade	547	5.7%
Professional, Scientific, and Technical Services	517	5.4%
Wholesale Trade	474	4.9%
Administration & Support, Waste Management and Remediation	503	5.2%

Source: U.S. Census Bureau

Jurisdiction

The Union County region's main transportation routes include state highways, bituminous roads, concrete roads, and gravel roads. I-29 borders the county line on the northwest side and runs north-south towards North Sioux City on the south side of the county. The eastern county line boundary is the Big Sioux River, which is also the boundary between Iowa and South Dakota.

Roads within Union County are governed according to their jurisdiction type. The jurisdiction of a road refers to the authority responsible for road maintenance and it impacts the organizational functions and obligations including financial, regulatory, maintenance and construction commitments.

See Figure 2 in the previous section for the Union County Jurisdiction Map.

State highway system roads include Interstate 29, SD Highway 11, SD Highway 46, SD Highway 48, and SD Highway 50. The SDDOT is responsible for maintaining the segments of the State Highway System that pass through counties under US law and agreement with the Federal Highway Administration (FHWA).

County Secondary System roads in Union County represent township roads in unorganized townships. All County Secondary System roads are located in Richland Township,

UNION COUNTY JURISDICTIONAL CLASSIFICATION TYPES

- State Highway System
- County System
- County Secondary System
- Township System
- City Street
- Other Administration

[4] U.S Census Bureau. *Longitudinal Employer-Household Dynamics (2019)*

which includes the unincorporated community of Richland. The revenue sources and spending of funds for these roads in Richland Township are separate from the funds used for all other County System roads.

Other administration roads typically include roads within Union Grove State Park or Dakota Dunes Community Improvement District.

Union County is responsible for approximately 242 miles of the 1,059 miles of roads in the county. This includes all roads within Richland Township, which is unorganized. This responsibility contains 183 miles of paved roads and 59 miles of unpaved roads. There are also 113 bridges connecting county and township roads that the County is also responsible for, and these are often along township roads.

Functional Classification

Union County has jurisdiction over 242 miles, or 22.8% of total road miles, including 1 mile of arterial roadway and 241 miles of collector or local roads.

The Union County road classification system is based on the Highway Functional Classification system from the Federal Highway Administration (FHWA). SDDOT Project Development is responsible for coordinating functional classification for all roads in South Dakota.

FHWA's Functional Classification System[5] ranges from high-speed interstate commerce to local land access, each serving a particular function. Functional classification is also used to determine federal funding eligibility. All public roads functionally classified at least as major collector for rural roads and at least minor collector for urban roads (or higher classifications) are eligible for Federal assistance provided by the Intermodal Surface Transportation Efficiency Act (ISTEA) and continued through the Fixing America's Surface Transportation Act (FAST Act). These roads are referred to as "Federal-aid Highways."

Interstates
Interstates are the highest classification of Arterials. They are designed for mobility and long-distance travel. The Interstate System was initiated in the 1950's, and has provided a superior network of limited access, divided highways that offer high levels of mobility while linking major urban areas of the United States. I-29 is the only interstate that passes through Union County.

Other Freeways and Expressways
Roadways in this category look similar to interstates, with divided driving lanes that are typically separated by a physical barrier. Their access and egress points are limited to on- and off-ramp locations or a very limited number of at-grade intersections. SD 50 west of I-29 Exit 26 to Vermillion is the only road in Union County with this classification.

Other Principal Arterials
All other Principal Arterials serve major centers of metropolitan areas, provide high degree of mobility and can also provide mobility through rural areas, though abutting land uses can be served directly, including driveways to specific parcels and at-grade intersections with other roadways. In the rural setting, they have trip length and travel density characteristics indicative of substantial statewide or interstate travel. There are no roads in Union County with this classification.

Minor Arterials
Minor Arterials provide service for trips of moderate length. In urban settings, they interconnect and augment the higher arterial system and may carry local bus routes. Fully developed areas are spaced about one mile, and suburban fringes have spacings of about 2-3 miles. In rural settings, they are spaced at intervals consistent with population density and have high overall travel speeds. SD 11, SD 46, SD 48,

[5] Federal Highway Administration. *Highway Functional Classification Concepts, Criteria and Procedures, 2013 Edition.* https://dot.sd.gov/media/documents/HwyFunctionalClassification.pdf

SD 50, and the I-29 Business Loop through Elk Point are all considered Rural Minor Arterials. Part of CR 23/Northshore Drive and others in North Sioux City are considered Urban Minor Arterials.

Major and Minor Collectors

Collectors serve a critical role in the roadway network by gathering traffic from Local Roads and funneling them to the arterial network, broken down into two divisions: Rural and Urban, as well as two sub-categories: Major Collectors and Minor Collectors. The determination of whether a given collector is major or minor is frequently one of the biggest challenges in functionally classifying a roadway network, with considerations for destinations, travel distance, travel speeds, traffic volumes, spacing of other classifications. The determination of this classification can influence design of the road itself as well as adjacent land use and access. The majority of Union County roads fall under either the Rural Major Collector or Rural Minor Collector classification.

Major Collectors in the rural setting, which is most applicable to the Union County road network, provide service to any county seat not on an arterial route, to the larger towns not directly served by the higher systems, and to other traffic generators of equivalent intra-county importance (e.g., consolidated schools, shipping points, county parks, important agricultural destinations, etc.). Major Collectors link these places with larger towns or with Arterial routes and serve the most important intra-county travel corridors.

Minor Collectors in the rural setting are spaced at intervals, consistent with population density, collect traffic from Local Roads and bring all developed areas within reasonable distance of a Collector. Minor Collectors provide service to smaller communities not served by a higher-class facility and link locally important traffic generators with their deep rural origins.

Local Roads

Local Roads are the most common of all roadway classifications in terms of mileage. They are not intended for use in long distance travel, except at the origin or destination end of the trip. They provide direct access to abutting land and are often designed to discourage through traffic. These public roads should be accessible for public use throughout the year. Often, all roads not classified as in the other classifications are classified as Local Roads by default. In the urban setting, Local Roads provide direct access to adjacent land, provide access to higher systems, and carry no through traffic movement. In the rural setting, Local Roads primarily provide access to adjacent land and provide service to travel over short distances as compared to other higher systems.

Table 4: Functional Classification

Functional Classification	Total Mileage	County Responsibility (miles)
Principal Arterial - Interstate	108.2	0.0
Principal Arterial - Expressways	1.8	0.0
Principal Arterial - Other	0.0	0.0
Minor Arterial	70.4	1.0
Major Collector	140.4	128.0
Minor Collector	39.4	37.4
Local	699.8	75.5
Total	**1060.0**	**241.9**

Source: SDDOT Geodatabase

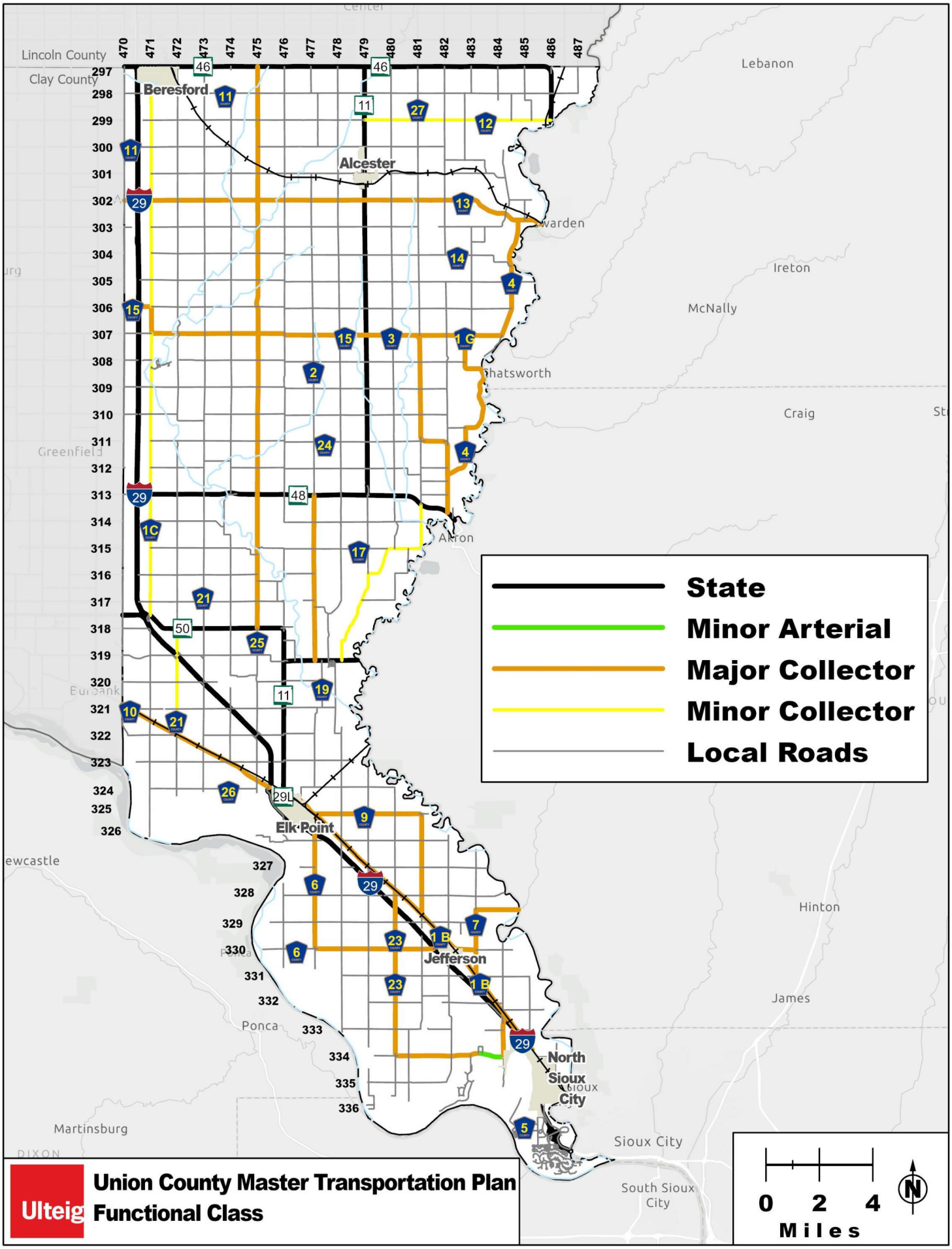


Figure 5: Functional Class

Roadway Surface Type

Union County roads consist of concrete, asphalt/bituminous, gravel, and unsurfaced roads. All unsurfaced roads maintained by Union County are within the Richland Township (unorganized township).

Table 5 shows a summary of Union County owned and maintained roads.

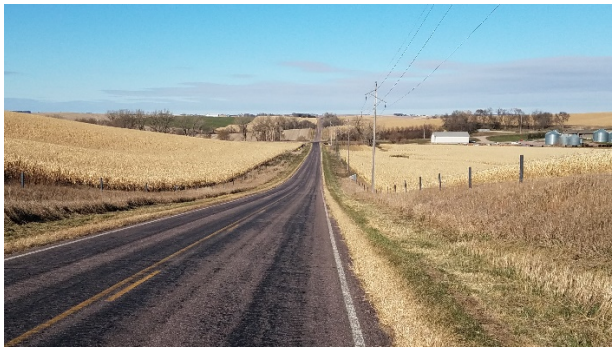


Table 5: Roadway Surface Type

Surface Type	Miles	%
Unsurfaced	4.9	2.0%
Gravel	53.5	22.1%
Bituminous	178.1	73.4%
Concrete	6	2.5%

Source: SDDOT Geodatabase

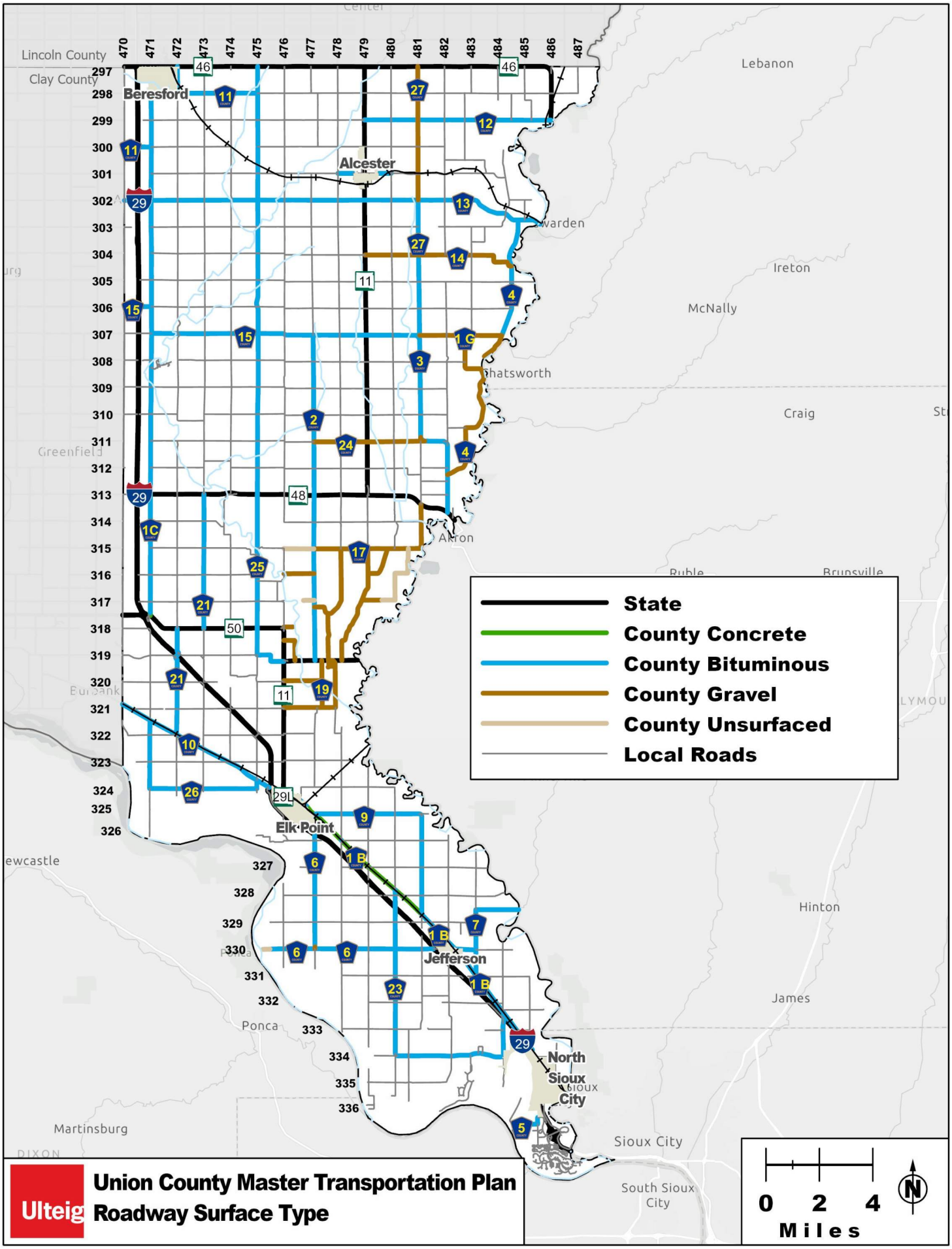


Figure 6: Roadway Surface Type

Traffic Volumes and Level of Service

Union County traffic volumes outside its urban areas were mostly observed to be low. Vehicles predominantly use State roadways to travel the region; and county primary, county secondary, and township roads to circulate within local areas.

The majority of Union County maintained roads are rural in nature, with low or very low daily volumes. The most recent traffic counts for these roads are usually less than 400 vehicles per day, with negligible congestion. Some of the roads within Union County jurisdiction are in the immediate surrounding area of North Sioux City. These roads have higher volumes due to their suburban surroundings, often 1,000 to 2,000 vehicles per day. Congestion may occur on some of these roads during peak traffic hours. For this study, the majority of existing traffic counts were collected in 2018. All counts were extrapolated to the year 2021 using the SDDOT's annual growth rate for Union County, 1.74%, unless traffic trends indicated a greater growth rate should be used.

The *SDDOT Road Design Manual*[6] was consulted in determination of 2-lane planning level capacity. The corresponding V/C ratios along Union County owned roadways were developed based on the table shown below, which is to be used as general guidance for total number of lanes. Roads associated as "Urban" are functionally classified as urban. All other roads outside of the North Sioux City Area are "Rural Level."

Table 6: SDDOT Planning Level Capacity

Table 15-10 Estimated Number of Lanes

Total Number of Lanes	Total Design Year ADT [1]	
	Rural Level	Urban
2	< 8,000	< 2,500
3	[2]	2,500 to 16,000
4	8,000 to 20,000[3]	[3]
5	[2]	16,000 to 30,000
6	> 20,000[4]	> 30,000[4]

[1] Construction/Reconstruction projects are designed based on a typical 20 year ADT projection beyond the anticipated year of project construction.
[2] Continuous left turn lanes may be considered based on left turn volumes and/or when intersections and/or approaches are closely spaced together.
[3] Undivided sections may be used if left turn movements are low and there is no crash history, otherwise consider installing a median or 5 lane section.
[4] Medians should be used.

Source: SDDOT Road Design Manual, Chapter 15 Traffic

The existing traffic volumes on Union County roadways are well below 2-lane planning level capacity for the vast majority of roads. Due to development around North Sioux City, there is one stretch of County Road 23 at the intersection with County Road 1 that is showing signs of minor delays.

Figure 7 shows existing daily traffic volumes and planning level volume to capacity (V/C) ratios along Union County owned roadways. A ratio of 1.0 indicates that the facility is at a planning level capacity.

[6] *SDDOT Road Design Manual*, Chapter 15 Traffic. https://dotfiles.sd.gov/rd/rdmch15.pdf (accessed June 2021)

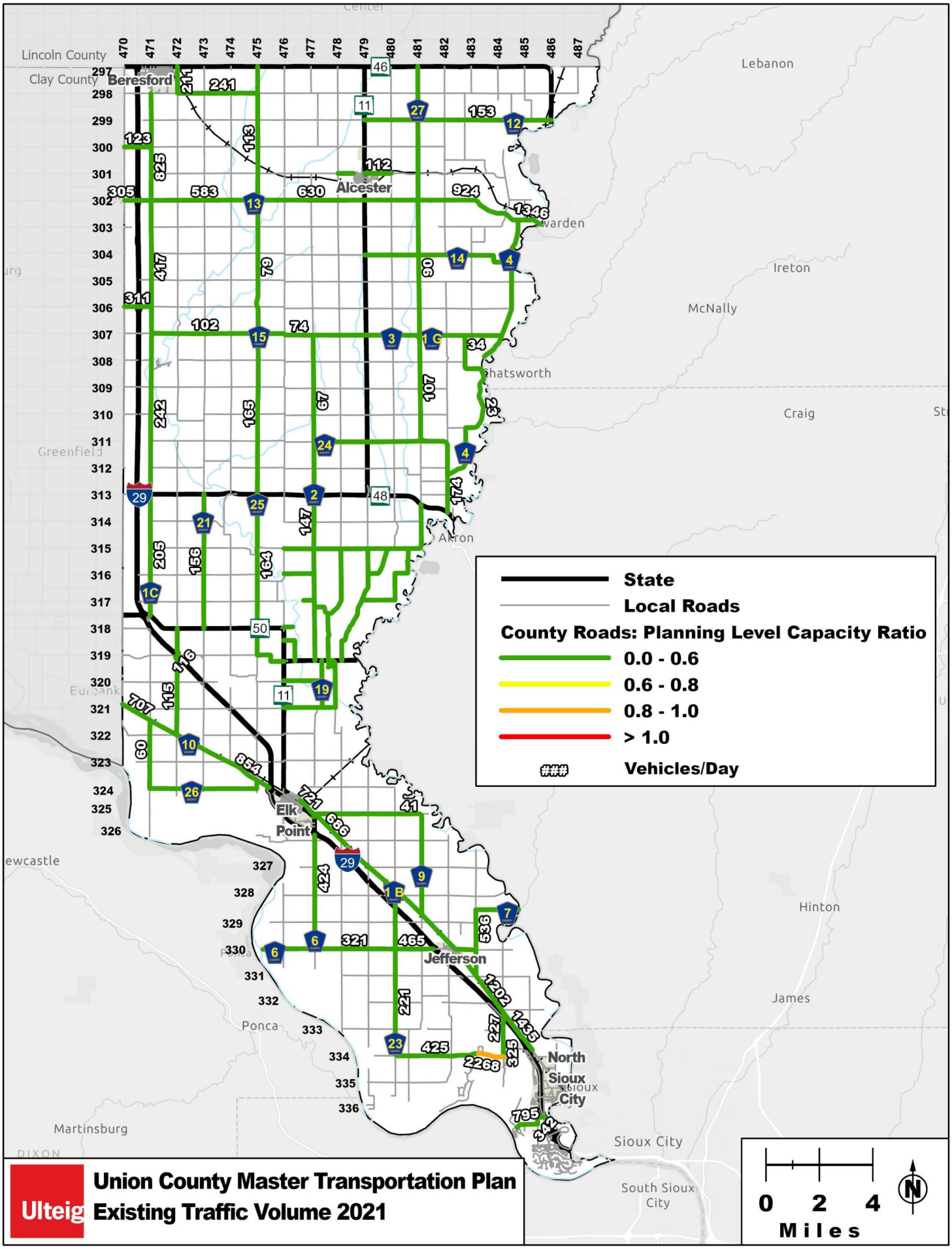


Figure 7: Existing Traffic Volume 2021

As part of this study, peak hour traffic counts were collected at three intersections in Union County in 2020. An analysis of traffic operations was conducted to determine the delays and level of service (LOS) during typical AM and PM peak hours.

LOS is a method used by the Highway Capacity Manual to correlate numerical traffic data to subjective descriptions of traffic operations. The LOS describes the efficiency of an intersection based on delays be designating letters A, B, C, D, E and F, where A represents the lowest delays and F represents the highest delays and severe congestion. The LOS is based on control delay at intersection and the drivers' tolerance for delay. Typically, LOS C or better is an acceptable measure of delay.

Table 7: LOS Criteria for Intersections (Highway Capacity Manual 6th Ed.)

Unsignalized Intersection		Signalized Intersection	
Control Delay (sec/veh)	LOS	Control Delay (sec/veh)	LOS
0-10	A	0-10	A
>10-15	B	>10-20	B
>15-25	C	>20-35	C
>25-35	D	>35-55	D
>35-50	E	>55-80	E
>50	F	>80	F

Source: Highway Capacity Manual 6th Edition

Intersection LOS was analyzed using *Synchro* software for AM and PM peak hours. The results of the analysis are shown in Table 8. See Appendix H for detailed figures and *Synchro* modeling output reports for intersections.

Table 8: Existing Intersection LOS 2020

Intersection	Traffic Control	2020 Level of Service (LOS) AM / PM
CR 10 (Burbank Rd) & CR 26 (475)	Two-Way Stop	A / A
CR 1B & CR 9 (325 St)	Two-Way Stop	A / A
CR 23 (Northshore Dr) & CR 1 (Westshore Dr)	Two-Way Stop	B / B

For traffic operations analysis or traffic impact studies on Union County roads, the recommended minimum acceptable LOS for existing or future conditions is LOS B for rural two-lane highways and LOS C for urban two-lane highways and intersections. These selected level of service standards are consistent with the SDDOT's *Road Design.* The intersection of CR 23 & CR 1 is considered urban due to its functional classification.

The existing intersection delays exhibited are acceptable for all traffic during both peak hours. A review of previous studies found that a Dakota Dunes/North Sioux City Planning study found the same LOS B at CR 23 & CR 1 in 2017.

Crash Analysis

Transportation-related fatalities and injuries pose a serious public health risk, so safety is always a fundamental element when planning transportation infrastructure and improvements. The general public understands what feels safe and what does not. For these reasons, special attention will be given to roads that have been identified as safety concerns throughout the study area. To understand transportation safety issues in Union County, existing crash data from 2014 to 2020 was collected and reviewed. 39 people sustained serious or fatal injuries in Union County in the last 7 years of available data. Acknowledging safety problems and their magnitude is the first step of implementing traffic injury prevention strategies that can reduce traffic-related injuries and deaths. Crash data from Union County was evaluated to identify common crash trends, locations, types, severity, modes, and traffic conditions. The purpose of the assessment was to identify clear crash trends, patterns and systemic safety issues that could be addressed through crash prevention strategies.

All crashes are shown in Figure 9, including I-29, from 2014-2020.[7]

Crash Trends

Crashes on I-29 were filtered out of the crash data analysis in the following sections. Crash trends over time on other roads in Union County were examined and key findings are summarized below:

- The overall trend of the total number of crashes is increasing.
- Fatal and serious injury crashes are not showing significant increases.
- There were 3 fatal and 36 serious injury crashes in the last 7 years.
- Wild animal hit crashes have significantly increased after 2018.

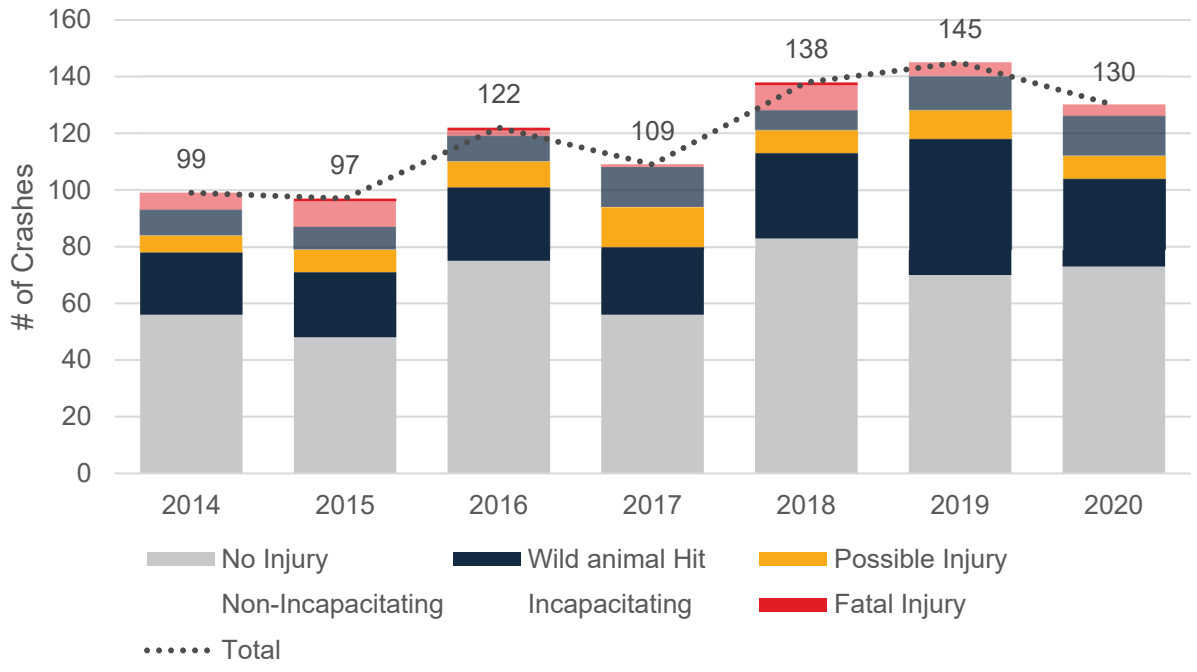


Figure 8: Crash Trends (2014-2020)

[7] SDDOT Crash Database

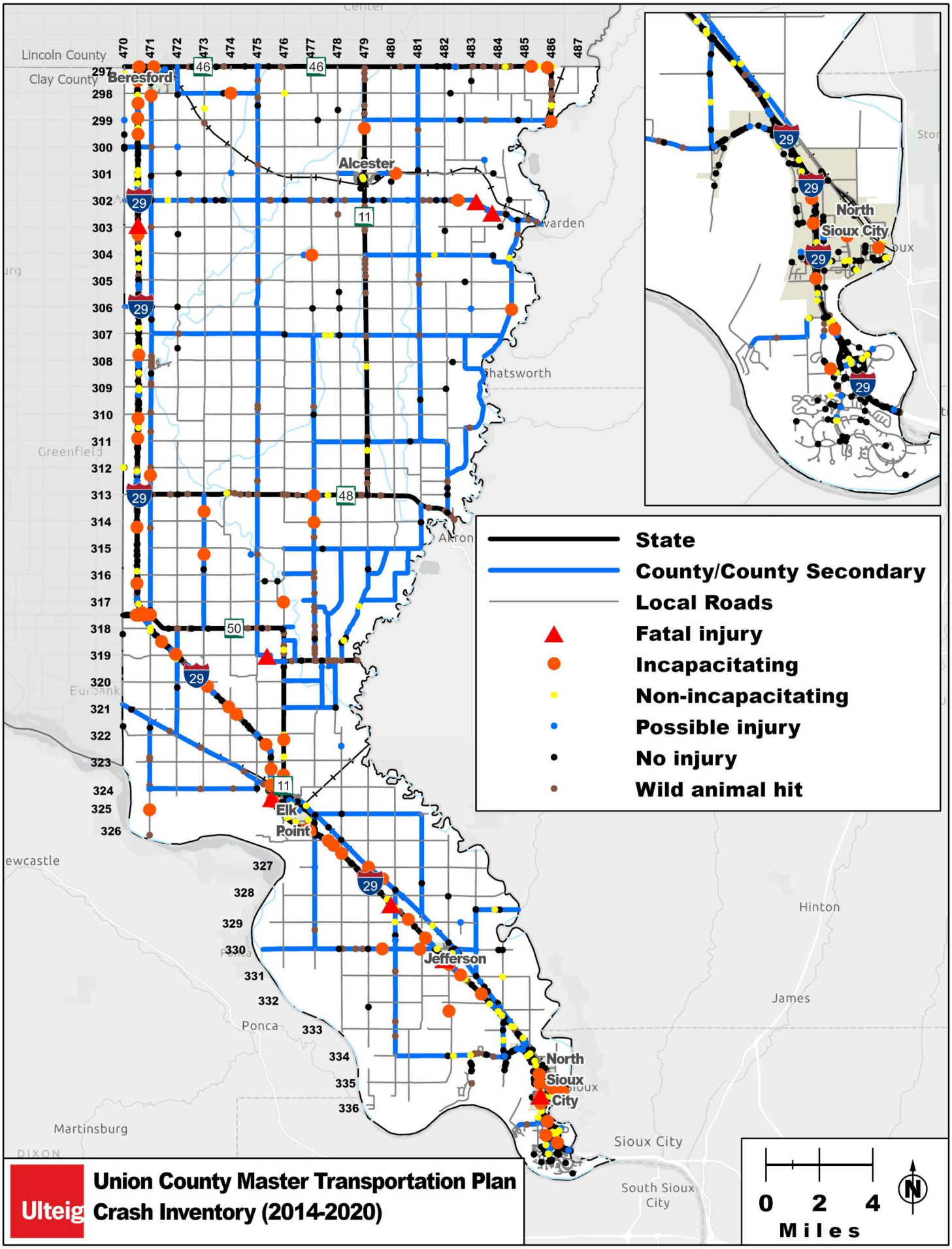


Figure 9: Crash Inventory (2014-2020)

Key Findings

- High severity crashes are crashes that result in serious (Incapacitating) or fatal injuries to one or more people involved. From 2014 to 2020, there were 39 high severity crashes out of a total of 840 reported crashes in Union County (4.6%).
- 2 of the 3 fatal crashes in Union County during the reporting period are less than 1 mile apart on the same road, CR 13.
- While crashes involving pedestrians and bicyclists are nearly 1% of all crashes, pedestrian crashes made up 5% of high severity crashes.
- Motorcycles made up only 2% of all crashes but over 23% of high severity crashes. 50% of all crashes involving motorcycles were high severity crashes.
- Alcohol-impaired driving crashes accounted for approximately 6% of all crashes (49), but almost 28% of high severity crashes involved alcohol.
- 10% of total crashes and 15% of high severity crashes involved speeding.
- 41% of total crashes occurred after dark.
- 79% of crashes occurred during clear weather conditions contributing to 90% of high severity crashes.

Crash Clusters

As a result of crash analysis, crash clusters were identified. The methodology for identifying crash clusters was primarily screened through GIS mapping tools and crash descriptions. Due to the low traffic volumes on almost all county roads, crash rate methodology proved substantially overweighted towards any crash, so it was not utilized (e.g., if one crash occurred on a road with daily traffic volume of 100 vehicles per day, the crash rate proved to be extremely high compared to expected results). Therefore, crash analysis was focused on high severity crashes (fatal and injury) or crash trends in general, particularly at intersections. This screening for crash clusters found crash trends at three intersections and one county highway corridor:

- Intersection of SD 46 & 486 Ave
- Intersection of SD 11 & 302 St/CR 13
- Intersection of SD 50 & SD 11
- 302 St/CR 13 from 482 Ave to Big Sioux River

Road Conditions – PASER

Union County does not have an inventory of road condition or existing pavement thicknesses on paved county roads. As part of this study, the conditions of all 242 miles of county-owned roads were collected using the PASER rating system,[8] which focuses on surface condition by visual inspection of concrete, asphalt, or gravel roadways. This field data collection technique is non-invasive and does not require core drilling. The PASER rating system scores the roadway conditions based on surface distresses identified. Paved road segments are rated on a scale of 1-10 (where 10 is the best condition) and unpaved roadways are rated on a scale of 1-5 (where 5 is the best condition).

[8] University of Wisconsin-Madison Transportation Information Center, Pavement Surface Evaluation and Rating. *PASER Manual Asphalt Roads (2013)* and *PASER Manual Gravel Roads (2015).*

Table 9: Asphalt PASER Ratings (PASER Asphalt Roads Manual)

Asphalt PASER Rating		General Condition	Needed Maintenance or Repair
10	Excellent	New	No maintenance required
9	Excellent	Like new	No maintenance required
8	Very Good	Initial cracking	Little or no maintenance
7	Good	First signs of aging	Routine maintenance, cracksealing and minor patching
6	Good	Definite signs of aging	Preservative treatments (sealcoating)
5	Fair	Definite signs of distress	Preservative treatments (sealcoating)
4	Fair	Losing strength	Structural improvements & leveling (overlay or recycling)
3	Poor	Some loss of strength	Structural improvements & leveling (overlay or recycling)
2	Very Poor	Severe deterioration	Reconstruction
1	Failed	Disintegration	Reconstruction

Source: PASER Manual Asphalt Roads (2013)

Example of Asphalt PASER Condition Rating 4 (Losing Strength)

Table 10: Gravel PASER Ratings (PASER Gravel Roads Manual)

Gravel PASER Rating		General Condition	Needed Maintenance or Repair
5	Excellent	No distress	No Maintenance Required
4	Good	Minor signs of distress	Routine Maintenance
3	Fair	Definite signs of distress	Needs regrading, minor ditch maintenance, and spot gravel application
2	Poor	Slow travel speeds required	Needs additional aggregate layer, major drainage improvements
1	Failed	Travel is difficult or impossible	Complete rebuilding required

Source: PASER Manual Gravel Roads (2015)

Example of Gravel PASER Condition Rating 4 (Minor Signs of Distress)

The average PASER condition rating for paved roads in Union County is 6.2. Only 2% of roads are in poor condition (3 or lower rating), but about 30 miles (16% of roads) of paved roadways scored 4 or lower which means they are the best candidates for rehabilitation such as asphalt overlays.

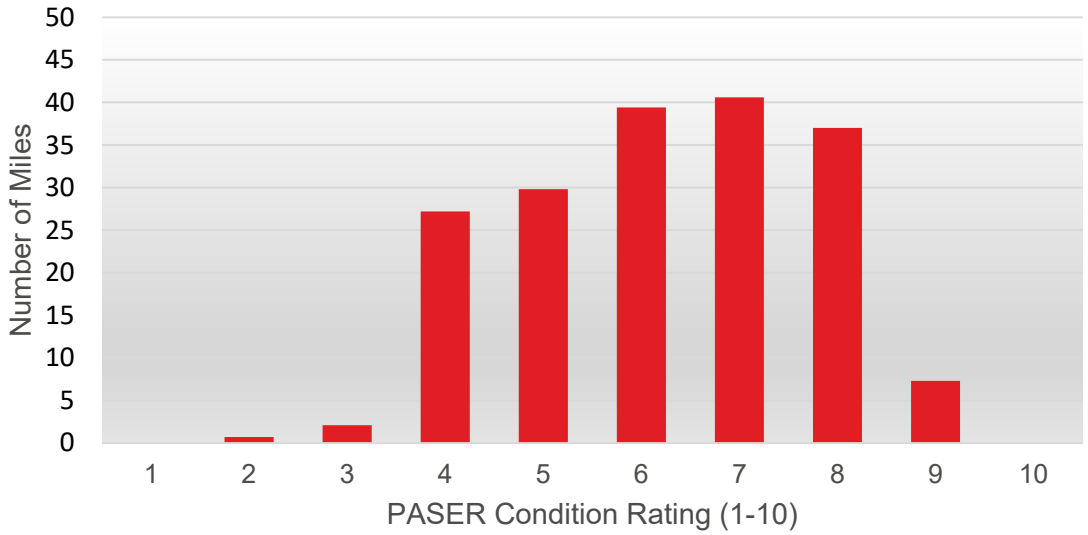


Figure 10: Existing PASER Condition Rating 2019 – Union County Paved Roadways

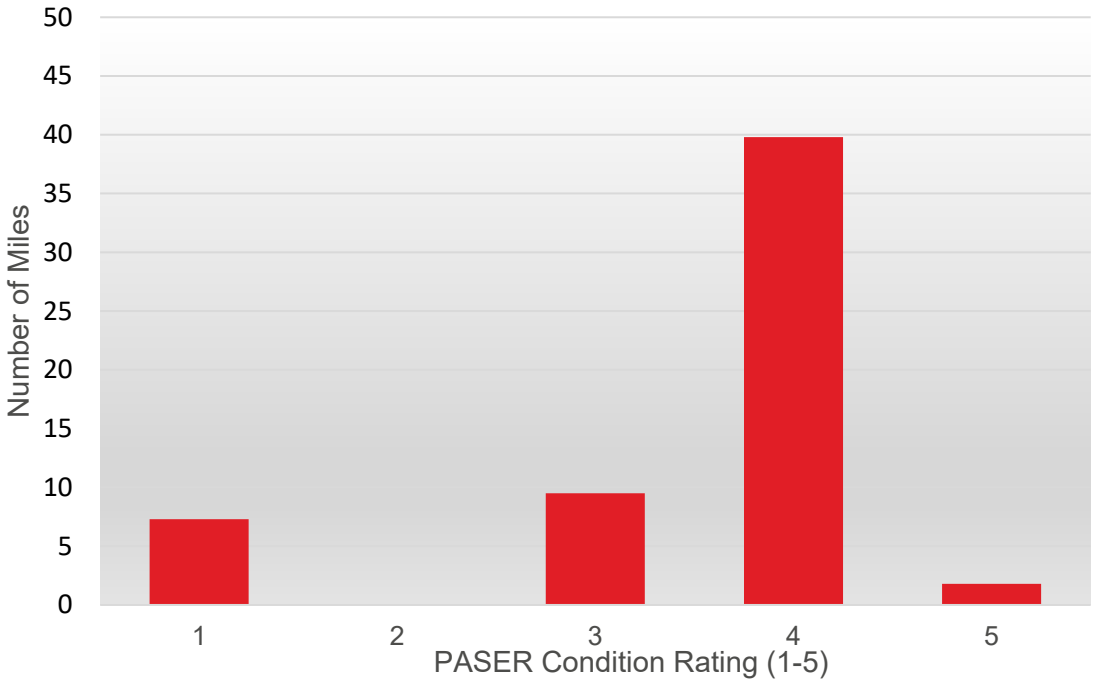


Figure 11: Existing PASER Condition Rating 2019 – Union County Unpaved Roadways

The average PASER condition rating for unpaved roads in Union County is 3.5. The average score was brought down by unimproved roads in Richland Township and roads that were washed out due to flooding at the time of inspection. The majority of county gravel roads are in good condition. See Appendix J for detailed tables showing PASER road conditions.

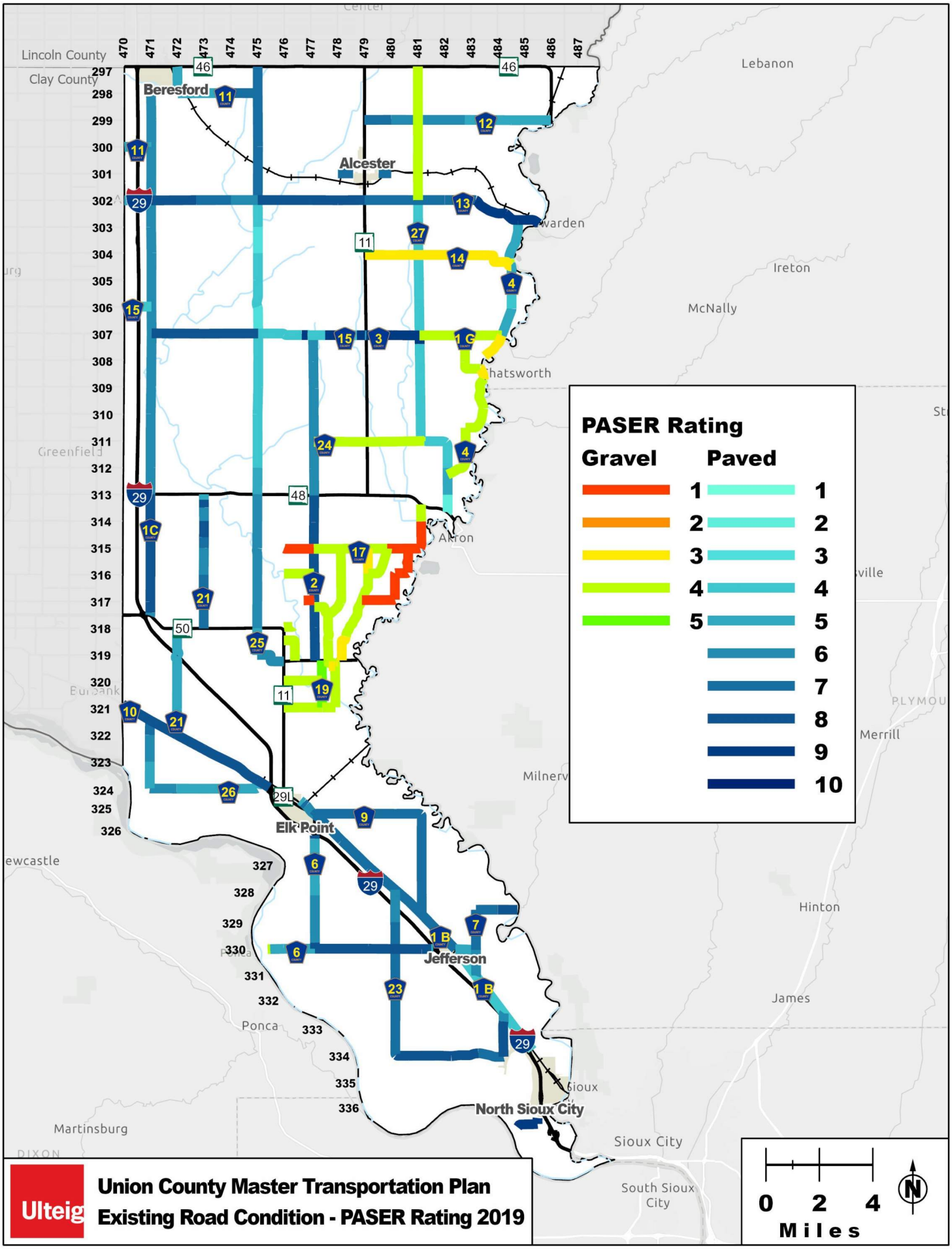


Figure 12: Existing Road Conditions - PASER Rating 2019

Bridge Conditions

Union County maintains 113 bridge structures. Of those, 35 bridges (31%) are over 70 years old.[9]

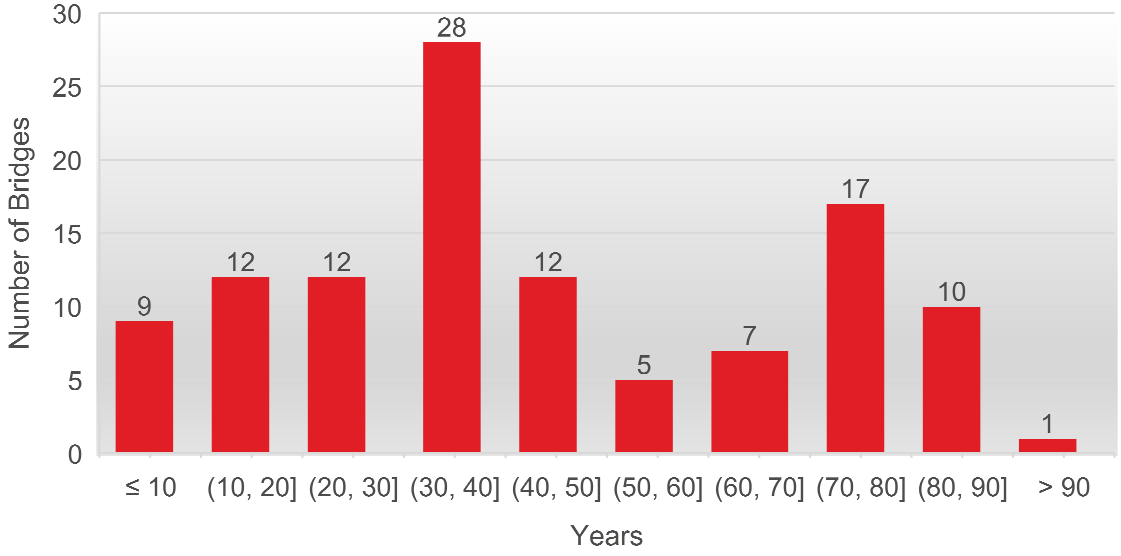


Figure 13: Bridge Age

Union County maintains 113 bridges, and bridge inspections are conducted every 2 years. As a result of bridge inspections, the condition of the bridges falls under one of three categories: Good, Fair, or Poor. Most of Union County bridges are in Fair or Good condition (68%), but 36 of Union County bridges are currently in Poor condition (32%), which means they are structurally deficient. These bridges have short or unknown remaining service lives, and likely require high-cost repairs or replacement. Comparatively, in all of South Dakota, 26% of all county-owned bridges are in Poor Condition.

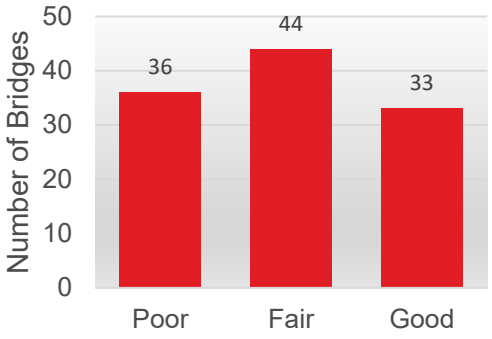


Figure 14: Existing Bridge Condition 2020

Between 2016-2020, Union County has replaced 1.6 bridges/year, and has had some success with SDDOT Bridge Improvement Grants (BIG). At current funding levels, Union County faces a difficult challenge to maintain all bridges in a state of good repair, as bridges continue to deteriorate at a faster rate than they can be repaired or replaced.

[9] Federal Highway Administration. National Bridge Inventory (NBI), 2021 Data.

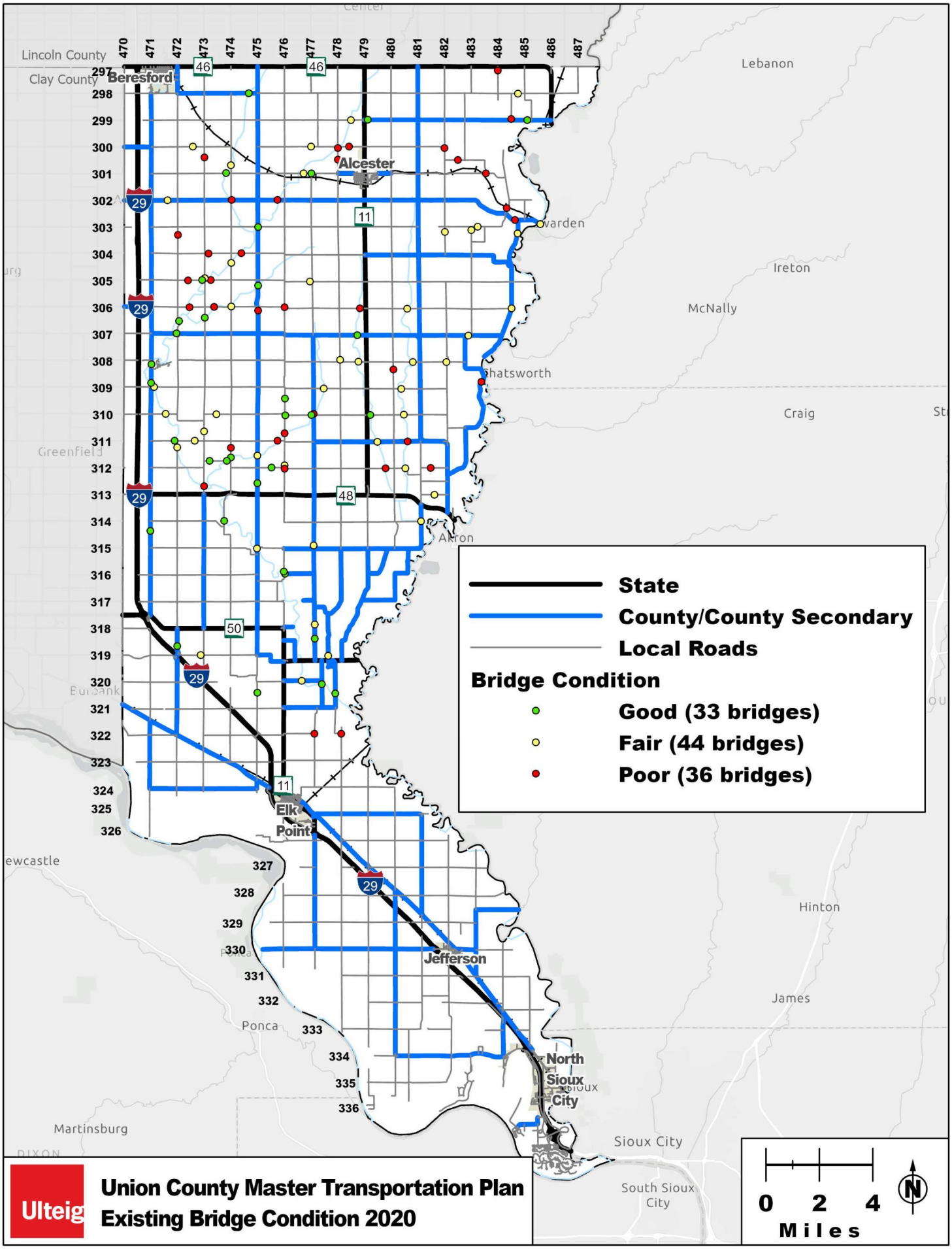


Figure 15: Existing Bridge Condition 2020

Special Locations Analysis

As part of this study, special location road segments were identified as having issues that required specific analysis. These corridors were identified during baseline conditions analysis and by public input.

County Road 13 (302 St)
CR 13, east of 482 Ave, was identified as a road segment with crash history and safety concerns. This segment is functionally classified as Major Collector, approximately 3.8 miles long, with 1,346 vehicles/day. To the east, there is a bridge across the Big Sioux River into Iowa, signifying an important economical route.

CR 13, west of 484 Ave, in presence of vertical and horizontal curve geometry. This corridor has a history of crashes resulting in death and incapacitating injuries and is recommended for shoulder widening as soon as funding is available.

Source: Google Maps. Photo dated August 2021. Image accessed January 2022

Analysis: This road segment has horizontal and vertical curves and there were 3 severe crashes reported, including 2 fatal crashes. Therefore, this road should be a safety improvement priority. Signs for curves are already in place and there are some rumble strips recently added, so additional safety countermeasures should be considered. Short-term improvements could include centerline and edge line rumble strips if not already in place. High Friction Safety Treatment (HFST) may be an alternative if existing pavement friction is inadequate for prevailing site conditions (i.e., friction demand), and there are other factors to consider to determine if HFST is a suitable candidate treatment. Long term improvements could include wider shoulders and lighting. Wider shoulders would be a good safety countermeasure for the crash types reported: wild animal hit, rear-end, run-off-road. The safety benefits of wider shoulders on rural highways are highlighted in the Major Roads Plan (Section 5 of this report).

IMPROVEMENT ALTERNATIVES FOR COUNTY ROAD 13 (302 ST)

- Wider shoulders
- Slope flattening
- Rumble strips
- Lighting
- High friction safety treatment (HFST)

County Road 23 (334 St)
CR 23, from Wynstone Dr to Westshore Dr/CR 1, was identified as a road segment with complaints about speed and safety. In particular, comments received complained of lack of shoulders and safety for walking and biking, speeds being too high, and conversely, speed limits being too low (currently 35 mph). There were requests for walking and biking facilities. This segment is functionally classified as Minor Arterial, approximately 1.3 miles long, with 2,268 vehicles/day. There are no less than 20 access points (15.4 access/mile).

Analysis: The mode function of this stretch of road is inconsistent with its design. It is functionally classified as an urban road, lies on the outskirts of North Sioux City, and the apparent multimodal demand (walking and biking) is that of an urban or suburban nature. There are at least 20 accesses along this stretch and some mailboxes along the roadside, which leads to vehicles slowing or stopping in the driving lane throughout the day. As a result, the speeds limits have been reduced to 35 mph. However, the physical design of the road is still rural in nature with narrow shoulders and ditches for drainage. This

explains why complaints are inconsistent with some saying the speeds are too high and some saying speeds are too low. The physical design should consider how all modes are using it. Complaints about speeds and speed limits will likely continue until the physical design of the road more closely matches the desired driving environment. A widened shoulder would provide space for walking and biking, but a sidepath or a trail would have great benefits and comfort for walkers or bicyclists. In the long term, an urban cross section with curb, gutter, and sidewalk may be the build-out design. Another consideration is the traffic demand, as existing traffic counts indicate that the roadway may be experiencing delays during peak hours. As growth continues, turn lanes should be added for heavy turn movements or perhaps a two-way left turn lane. According to Table 15-10 in the *SDDOT Road Design Manual*, this road segment should be tentatively planned as a 3-lane road as the future traffic forecasts show an ADT of 3431 vehicles/day in the year 2045 (See Traffic Forecast and Level of Service in Section 4 of this report.)

Traffic forecasts are highly dependent on assumed growth in the area. It is recommended that any new development or changes in the traffic network that trigger increases in traffic include traffic operations analysis along this corridor to determine what type of upgrades are recommended. A corridor planning study would also be beneficial to the long-term planning of this road segment.

IMPROVEMENT ALTERNATIVES FOR COUNTY ROAD 23 (334 ST)

- Wider shoulders
- Additional driving lanes and/or turn lanes
- Shared-use path, sidepath, or trail
- Urban cross section with curb, gutter, and sidewalk

County Road 1B

CR 1B, between Elk Point and North Sioux City, was identified as a road segment with general complaints as well as request for bike lane or wider shoulders. This segment is functionally classified as Major Collector, approximately 12.4 miles long (8.1 miles Elk Point to Jefferson, 4.3 miles Jefferson to North Sioux City), with 686 – 1,435 vehicles/day. Peak Hour traffic count samples near Elk Point indicated heavy vehicles make up approximately 10% of traffic on CR 1B.

Analysis: CR 1B received some condition complaints. There was a concrete overlay completed between Elk Point and Jefferson in 2016. This improvement does not appear to be holding up as hoped, and now requires regular repairs. The remaining mileage northwest of Jefferson is planned for mill and overlay in 2024. CR 1B between Jefferson and North Sioux City received a mill and overlay in 2021. There is a railroad that runs adjacent to CR 1B, and the right-of-way is limited. A wider shoulder may be an option and cooperation with the railroad may lead to the construction of a Rail Trail.

IMPROVEMENT ALTERNATIVES FOR COUNTY ROAD 1B

- Surface maintenance improvements
- Wider shoulders
- Rail trail

It is recommended that any new development or changes in the traffic network that trigger increases in traffic include traffic operations analysis along this corridor to determine what type of upgrades are recommended.

Henke Rd

Henke Rd, which is northeast of the Town of Richland, was identified as a road segment with complaints about flooding. This segment is functionally classified as Minor Collector, approximately 3.6 miles long.

Analysis: Henke Rd is a township road. The revenue sources and spending of funds for Richland Township roads are separate from the funds used for all other county system roads. In 2020, the cost to reduce flooding impacts on Henke Rd was found to be too high and a project to address flooding on Henke Rd was not pursued by Union County. Taxpayers in the township voiced concerns of cost and increased taxes to accommodate the project. Therefore, there are no improvements planned.

Railroads, Freight, Airports, and Parks

Railroads

Union County is served by two separate railroad lines. The first railroad is the Dakota and Iowa Railroad (DAIR) operated line that borders the south edge of Alcester and the east edge of the county. The second railroad is the Burlington Northern/Santa Fe (BNSF) railway line that converges with the DAIR railroad in Elk Point.

Table 11: Existing At-Grade Railroad Crossings on Union County Roads

Existing At-Grade Railroad Crossings on County Roads		
County Road	**Location**	**Railroad Ownership**
472 Ave/CR 1F	Between SD 46 & 298 St/CR 11	Dakota and Iowa Railroad (D&I)
298 St/CR 11	Between 472 Ave/CR 1F & 473 Ave	Dakota and Iowa Railroad (D&I)
475 Ave/CR 25	Between 300 St & 301 St	Dakota and Iowa Railroad (D&I)
301 St/CR 1E	Between SD 11 & 480 Ave	Dakota and Iowa Railroad (D&I)
481 Ave/CR 27	Between 300 St & 301 St	Dakota and Iowa Railroad (D&I)
299 St/CR 12	Between 485 St & 486 St	Dakota and Iowa Railroad (D&I)
472 Ave/CR 21	Between 321 St & Burbank Rd	Burlington Northern/Santa Fe (BNSF)
E Rose St/CR 1B (1 -NW)	Between N Elm St & 325 St	Dakota and Iowa Railroad (D&I)
E Rose St/CR 1B (2-SE)	Between N Elm St & 325 St	Dakota and Iowa Railroad (D&I)
325 St/CR 9	Between E Main St & CR 1B	Burlington Northern/Santa Fe (BNSF)
480 Ave/CR23	Between CR 1B & 328 St	Burlington Northern/Santa Fe (BNSF)
484 Ave/CR 1	Between CR 1B & Authier Ave	Burlington Northern/Santa Fe (BNSF)

Freight

The trucking industry helps move goods of some of the industries in and around Union County, such as meat processing plants, ethanol plants, grain, feed, dairy, agricultural, and other general commodities. Most rural areas in South Dakota were constructed with designs that did not account for modern freight loads, and heavy truck travel patterns have also changed over time. It is difficult for the County to maintain roads that were not originally designed to carry regular heavy vehicle loads. Specifically, CR 1B, CR 1C, CR 7, CR 10, and CR 13 were identified as routes that feature heavy truck traffic. Additionally, South Dakota laws are comparatively lenient on the size of farm equipment (so as to support industry economy), which in addition to the weight, often have wheel bases wide enough to damage the integrity of township road shoulders.

Union County implements Spring load limits. In 2021, these load limits were 7 tons per axle on its asphalt surfaced highways with the exception of CR 1B from Jefferson to Exit 4 at I-29. The period of time that these load limits may be in place can be from February 15 to April 30. These load restrictions protect highways during the spring thaw, which is the time when roads are most susceptible to damage from heavy loads. During the Spring, the frozen ground thaws from the top down, and there is a period of time where moisture laden pavement and base material is caught between the heavy loads above it and the frozen subgrade beneath it. By protecting the highways during this time, the County is protecting its largest assets and investments.

Airports

Union County is served by a regional airport in Sioux Falls, also known as Joe Foss Field Sioux Falls Regional airport. It is a public and military use airport and categorized as a primarily commercial service airport due to having over 10,000 boardings per year. Sioux Gateway Airport in Sioux City, a primarily commercial service airport also known as Colonel Bud Day Field, is used by Union County residents as well. Another airport accessible to Union County residents is Graham Field Airport. It is a privately owned public-use airport located in North Sioux City, Union County.

The Graham Airpark is a proposed development consisting of expanded airport, new commercial and residential lots along Old Highway 105 in North Sioux City.[10] Development could expand beyond existing city limits into Union County, particularly near to CR 1B and potentially CR 1. More information on development of North Sioux City is discussed in the Growth and Development section of this report.

National Parks and State Parks

Union County has great parks, nature preserves, and vital wildlife production areas. State Parks in Union County include Union Grove State Park and Adams Homestead and State Nature Preserve. Wildlife Production Areas include the Collar Waterfowl Production Area, and numerous Game Production Areas within Union County. The Missouri National Recreation River is located on the border between Nebraska and South Dakota. It extends as far east as Ponca State Park (Nebraska).

Bicycles, Pedestrians, and Transit

Bicycle and Pedestrian Facilities

Union County has an existing but mostly disconnected bicycle, pedestrian, and trails network. Many sidewalks and trail networks exist in the cities, towns, and parks of Union County, but there does not appear to be any facilities on the county road network. Public feedback has indicated demand for these types of facilities where none exist. Specifically, CR 23 and CR 1B were identified as routes preferred for multimodal enhancement. A tremendous economic development opportunity exists in the development of a Union County trails network and other bicycle and pedestrian-oriented improvements. For instance, taking a closer look at potential to give extra buffer space between roadways and sidewalks or on-street bicycle infrastructure can provide Union County with a more robust multimodal transportation network that can attract more users, and a trails network attracts tourism, and economic development. There will also be opportunities to upgrade pedestrian crossings for increased safety, though no specific crossings were identified during initial reviews.

Transit Facilities

An efficient transit system is essential to meet mobility needs, accelerate sustainable development, and provide for a high quality of life for people of all income levels, ages, and abilities. The American Public Transportation Association (APTA) identified that approximately 9% of transit trips in areas with populations less than 200,000 were for medical reasons. Transit service in Union County is currently provided by Siouxland Regional Transit System (SRTS). SRTS also provides paratransit services to the Union County community. Fares change based on origin and destination as well as requested service type. The Sioux City Transit Riverside Route #5 services destinations in the North Sioux City area. The buses are available for all ages, and they run from 5:30 A.M. to 7:00 P.M. For long distance transit, Jefferson Lines is a bus service in the Midwest with regional destinations across 14 states, and includes nearby destinations of Sioux City, Vermillion, and Sioux Falls.

Other multimodal opportunities for ride sharing and car/van pools and buses are operated by public and private employers in the County, such as Rural Office of Community Services, Inc. (ROCS). ROCS has

[10] Graham Development Master Plan, latest version release date 1-20-2022. https://secure.fly7k7.com/

two vehicles that operate in Elk Point, Jefferson, and North Sioux City. It provides an ADA accessible demand-response service. The buses are available for all ages, and they run from 8:00 A.M. to 4:30 P.M.

Existing transit systems such as SRTS operate on a demand responsive, ADA accessible public transit system. They provide public transit service to southern Union County. However, this existing transit system operates in limited areas, on a call and ride basis. Union County has an opportunity to adopt additional policy language supporting additional regional and statewide transit. As the population of Union County ages, residents wishing to remain in Union County may or may not be able to drive as they age.

TRANSIT ISSUES

- Access to public transit is limited by travel times and distances – no routes to Dakota Valley School District area north of McCook Lake.
- Frequency of service
- Low ridership
- Not well advertised
- Mobility issues relating to transit dependent populations
- Limited funding to increase or expand transit services
- Lack of ITS projects such as real time route information for riders.
- Transit vehicles may not have bike racks, which promote cross-use of various modes of travel.

Union County should consider allocating funding contributions in support of local transit facilities, which would help serve the demand for transit in Union County, particularly for the transit-dependent population in greater Union County.

Ordinances, Guidelines, and Design Standards

One purpose of existing regulations such as ordinances and guidelines are to provide guidance for future development, as well as incorporating best practice for county growth management strategies. Among other purposes, they provide for predictability, methodology, and justification to control land use and development, promote public interest, improve physical environment, fuse long-range considerations with short-range actions, and effect jurisdictional coordination. Union County ordinances pertaining to transportation planning were reviewed as part of this study and are summarized below:

- Though not directly standardized by Union County policy, road design is promoted by the guidelines proposed by the American Association of State Highway and Transportation Officials (AASHTO) and the *SDDOT Local Roads Plan (2011)*.
- The *Union County Comprehensive Plan* also sets policies for future planning decisions. The related 2008 Revised Zoning Regulations ordinance incorporates definitions of zoning districts, articles of regulations, requirements for building permits, off-street parking, signage, as well as flood hazard area development regulations.
- The Access Management ordinance requires access permits for new access, traffic impact study requirements, and access-location criteria requirements.
- The Subdivision ordinance has minimum requirements for road improvements and design standards within subdivisions.
- The Wheel Tax ordinance imposes a $4.00 per wheel tax on all motor vehicles registered in Union County (maximum of $48.00 per vehicle), which also earns Union County 8 points as part of SDDOT Bridge Improvement Grant (BIG) applications.[11]

[11] https://dot.sd.gov/doing-business/local-governments/bridge-improvement-grants

Many of the components, standards, and guidelines described within Section 5 of this report may be integrated into Union County permit processes and ordinances if appropriate.

Subdivisions

Union County has a subdivision ordinance (Ordinance No. UCC 2011-004), and it has minimum requirements for road improvements and design standards within subdivisions. Articles 1 through 13 provide a detailed description and general overview of the subdivision plans, approval process, preliminary plans, and minimum road improvement design standards. The design standards are located in Article 8 with sections 801 through 804 providing a detailed description of the design, right-of-way, road construction and naming convention. Specific attention should be given to section 803 - Road Construction, and its subsections, as this will be most important for maintaining the minimum requirements. Some of the subsections that relate to road design are listed below, but the ordinance itself contains the complete list.

- Minimum roadway width shall be 28 feet from shoulder to shoulder. There will be a minimum of 24 feet width pavement. Ditches and driveways shall have a maximum side slope of 6:1.
- Asphalt and Portland cement concrete surfaces shall be constructed in accordance with specifications of the Highway Superintendent. At a minimum, there shall be a nine (9) inch granular base course with a three (3) inch asphalt surface for a residential development and an eight (8) inch granular base course with a four (4) inch thickness of asphalt for a commercial or industrial development. If Portland cement is used the granular base as a minimum should be six (6) inch with a seven (7) inch thickness of Portland cement.
- A cross slope (crown) shall be provided on all roads at a rate of 0.02 feet per foot.
- The road ditch shall be at least 2 ½ feet below the road grade.

In addition, section 802 - Minimum Road Right-of-Way shall be considered as a part of the minimum design standards, and its subsections are as follows:

- Roads shall have a minimum publicly dedicated right-of-way of 80 feet. An easement of 80 feet shall be reserved for private roads. A maximum right-of-way of 100 feet may be required on any roads designated as arterial or collector.

This MTP does not add to the subdivision ordinance, but it is mentioned here as reference for some road design standards built away from the county highway network.

Growth and Development

One challenge facing Union County is the growth and development of North Sioux City, which brings more traffic and loading on county-owned roads. Of note, North Sioux City is planning a major road alignment to alleviate traffic pressures on Northshore Drive, announced as this MTP study was being finalized.[12] Initial drawings call for a new east-west corridor north of Dakota Valley Schools tying in with CR 1 and CR 23. See Figure 16 for more details. With this new alignment plan, there will be direct and indirect impacts to the Union County road network. Therefore, it is recommended that Union County establish early and proactive discussions with North Sioux City and developers on their intentions for future road jurisdiction and annexation.

[12] "North Sioux City Awarded $17 million in Grants." *Leader-Courier & Times (March 31, 2022).* https://www.leadercourier-times.com/news/article_388f5cae-b10b-11ec-9810-834ff282efd7.html

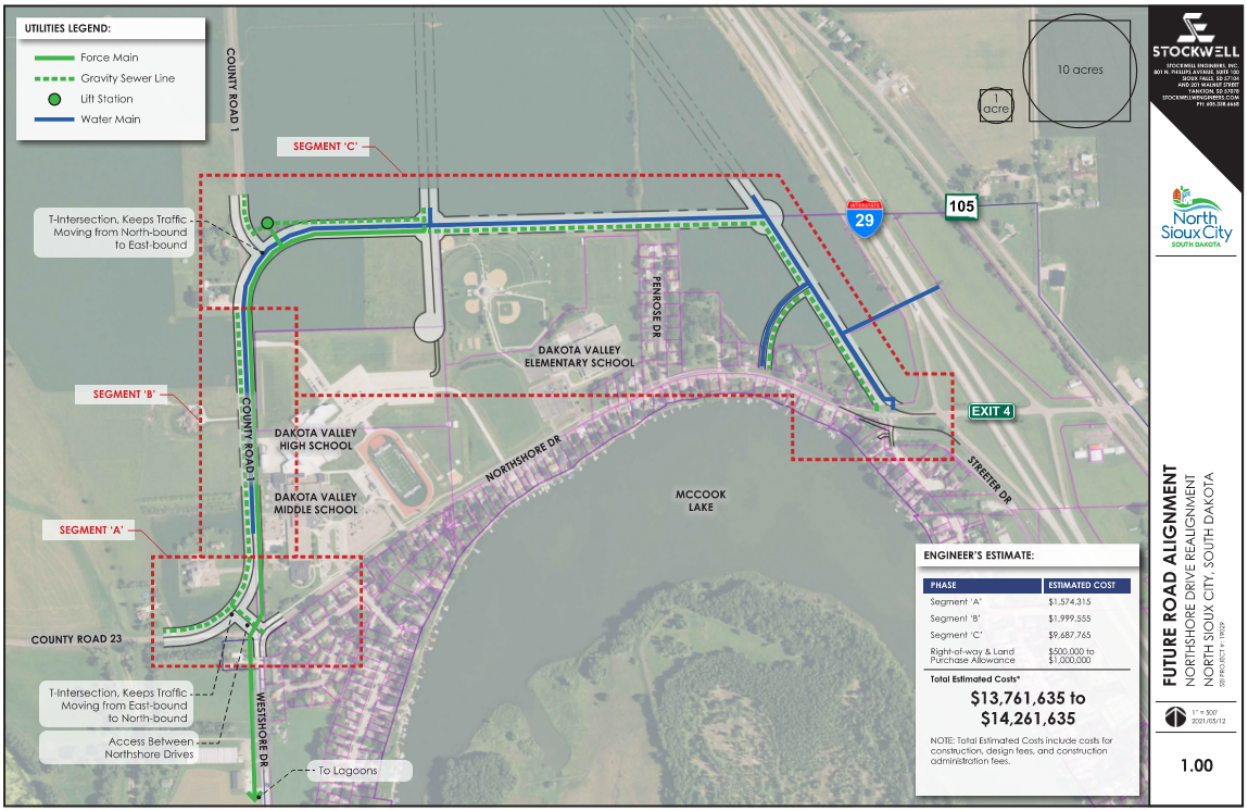


Figure 16: North Sioux City – Future Road Alignment[13]

Additionally, the Graham Airpark is a proposed development consisting of an expanded airport, as well as new commercial and residential lots near Old Highway 105 in North Sioux City.[14] Development could expand beyond existing city limits into Union County, particularly near to CR 1B and potentially CR 1. The growth of this development could create capacity deficiencies on existing roads in the area that may need to be upgraded or expanded. However, it is unknown the magnitude of the impact of this development until more information becomes available. It is recommended that a firm direction is established early in the development process. The County should proactively begin discussions with the North Sioux City and the developer on their intentions for future road jurisdiction and annexation of property.

Union County's Access Management Ordinance determines if a traffic impact study (TIS) is required and responsibility of cost for new developments. If future traffic studies show that adjacent county roads are affected by the future development, the County could enter into a cost sharing agreement with other local governments, a form of compromise when jurisdiction responsibilities cannot be agreed upon. This agreement could include upgrades to the road network and/or general maintenance. The amount of cost sharing between the two government entities would be based on the existing traffic on the county road versus the amount of traffic added by the development. For instance, if the existing ADT of a county road is 1,000 veh/day and the trip generation report for the development shows that an additional ADT of 1,000 veh/day will be added to the roadway, the agreement between the County and City could be a 50/50 cost share between the two entities.

SIMPCO recently completed the *2045 Long Range Transportation Plan*, which includes a traffic demand model (TDM) through 2045. The TDM incorporates assumptions on development and traffic growth, so it will be important to incorporate traffic impacts studies with new developments to the TDM, as they will

[13] Shared with permission from North Sioux City, with CR 1B inadvertently labeled State Highway 105.
[14] Graham Development Master Plan, latest version release date 1-20-2022. https://secure.fly7k7.com/

feature more detailed and reliable traffic estimates that guide future road design. It is recommended to coordinate traffic impact studies with SIMPCO to verify traffic growth assumptions within the Sioux City Area MPO.

Public Input - Internet Based Survey

Public Meeting #1 (virtual) featured an internet-based public survey open from June 3 through July 21, 2021. Stakeholders identified by the SAT were emailed direct invitations, and public notices were advertised in official Union County newspapers on June 3 and June 10, 2021.

The public survey posed questions relating to the existing transportation network in Union County. There were opportunities for participants to provide feedback relating to their usage of the transportation network, overall performance, issues and concerns, budgetary perceptions, prioritization of specific types of improvements, and general comments.

A total of 22 surveys were completed. Some of the results and comments from the survey are shown to the right:

Key Conclusions Drawn from Survey Results

- 95% typically drive alone.
- 77% drive over 100 miles per week (18% drive over 400 miles per week).
- 63% walk/bike outdoors 3-7 days per week during warmer months.
- Lack of bike and walking infrastructure are frequently mentioned as the main obstacles preventing residents from walking and biking more often. Weather conditions were also frequently mentioned.
- 14% said quality of Union County transportation infrastructure is worse than 5 years ago. 18% said the quality was better.
- Existing Road Maintenance/Improvements were ranked as the top priority for future funding. Bridge Maintenance/Replacement, Safety, and Flood Mitigation were also listed as high priority items for funding.

SAMPLE OF PUBLIC COMMENTS

Safety Feedback – Specific Concerns

- *"Speeding, texting/calls on cell phones."*
- *"Steep ditches in places. Small shoulders."*
- *"Distracted drivers and wild animals on the roads."*
- *"Asphalt roads are rough, too many tar joints (dangerous when on motorcycle) ditches aren't mowed frequently enough (concern on watching for wildlife)"*

Feedback on Roads and Bridges – Specific Concerns

- *"Some of the gravel roads that are exposed to recent floods and truck traffic show signs of deteriorating."*
- *"Some of the concrete roads buckle with heat (not enough expansion joints)."*
- *"County Road 1B."*
- *"Maintenance of current roads/bridges."*

Active Transportation and Recreation – Specific Concerns

- *"People do NOT know the rules for riding bikes, scooters, skateboards, walking on roads"*
- *"No shoulders on county roads, specifically on Hwy 23 (334th St.)"*
- *"Safe place to walk/bike not readily available."*

36% of survey respondents report walking or biking 3-5 days per week, while 27% report walking and biking 6-7 days per week, a great baseline number for active living and active transportation in Union County.

Other – Specific Concerns

- *"Public transit and electric vehicle charging."*
- *"Mitigation of road flooding."*
- *"Growth of new developments."*
- *"Traffic congestion around Dakota Valley School"*

- 87% feel very safe or somewhat safe driving or riding in automobiles in Union County.
- 91% feel traffic congestion is not a problem or a minor problem. Travel delays were overwhelmingly represented in the vicinity of Northshore Drive, Dakota Valley Schools, and Exit 4 at I-29, though Union County has transferred jurisdiction of Northshore Drive to North Sioux City between Westshore Dr/CR 1 and I-29.
- 64% said they are willing or would consider supporting transportation fee increases in Union County to support transportation maintenance/improvement projects. 27% said they are not willing or would not consider it.
- Traffic and planning issues at I-29 Exit 4 were repeatedly listed as a specific comment or concern over the next 20 years. However, Exit 4 is a SDDOT owned interchange.

A comprehensive summary of public feedback and survey results can be found in Appendix B.

Public Meeting #1 was entirely virtual due to COVID-19 Pandemic precautions, but Public Meeting #2 was hosted in person at the Union County Courthouse in Elk Point, SD, on December 15, 2021.

3. ISSUES AND NEEDS

A list of issues and needs were identified as a result of the baseline conditions analysis, discussions with the SAT, and public feedback. This list forms the basis for the plan recommendations, including new standards, guidelines, and future project implementation.

Bridge Replacement
Union County maintains 113 bridges. As a result of bridge inspections, the condition of bridges falls under one of three categories: Good, Fair, or Poor. Most of Union County bridges are in Fair or Good condition (68%), but 36 of Union County bridges are currently in Poor conditions (32%), which means they are structurally deficient. These bridges have short or unknown remaining service lives, and likely require high-cost repairs or replacement. Comparatively, in all of South Dakota, 26% of all county-owned bridges are in Poor condition.

Between 2016-2020, Union County has replaced 1.6 bridges/year, and has had some success with SDDOT Bridge Improvement Grants (BIG). At current funding levels, Union County faces a difficult challenge to maintain all bridges in a state of good repair, as bridges continue to deteriorate at a faster rate than they can be repaired or replaced.

Road Conditions
As part of the baseline conditions review, 242 miles of roadway conditions data were inventoried. It was determined that the majority of Union County paved roads are in good shape. Public feedback from the internet based survey also concluded that Union County does a good job with their current road maintenance program. It was also determined that about 30 miles (16%) of paved roadways are the best candidates for rehabilitation such as asphalt overlays.

Increasing Truck Traffic
Most rural areas in South Dakota were constructed with designs that did not account for modern freight loads, and heavy truck travel patterns have also changed over time. It is difficult for the County to maintain roads that were not originally designed to carry regular heavy vehicle loads. Specifically, CR 1B, CR 1C, CR 7, CR 10, and CR 13 were identified as routes that feature heavy truck traffic. Additionally, South Dakota laws are comparatively lenient on the size of farm equipment (so as to support industry economy), which in addition to the weight, often have wheel bases wide enough to damage the integrity of township road shoulders.

Crash History
Safety is always a fundamental element when planning transportation infrastructure and improvements. The general public understands what feels safe and what does not. For these reasons, special attention will be given to roads that have been identified as safety concerns throughout the study area. In order to help identify where improvements should be prioritized in terms of safety, data from the South Dakota Accident Records System were compiled from the last seven years.

Flooded Roads
Years ago, the areas near the Missouri River and the Big Sioux River were chosen for settlement because of ease of access to the rivers. While this spurred development, it also exposes the area to flooding from these same rivers. Flooding is a major issue in this region of South Dakota, and when flooding occurs it is usually during the Spring thaw and is sometimes causes by ice dams that form in constriction areas, such as culverts, underpasses, drain pipes, and blocked or clogged channels. These same issues appear to be exasperated by modern tiling of farm fields, which cause watershed areas to drain to roadside ditches, creeks, and rivers at a faster rate than in decades past. During times of high water, roads may have to be closed to keep drivers safe. This causes significant impacts to those who need the roads open for travel, deliveries or emergencies. Additionally, flooding can permanently damage roads and drainage structures such that they need to be replaced at great expense. Flooding issue

locations were identified during the pavement condition review as well as comments from the SAT and the public.

Images of Flooding Damage in Union County (November 2019):

317 St east of Henke Rd (Top Left); 315 St/CR 17 east of Sargeant Rd (Top Right); 481 Ave/CR 17 south of 314 St (Bottom Left); 482 Ave/CR 3 south of 313 St (Bottom Right)

Lack of Bicycle and Pedestrian Infrastructure

The lack of bicycle and pedestrian infrastructure was noted in the baseline conditions review. Facilities are mostly limited to within city boundaries and state parks. Public feedback also indicated demand for these types of facilities where none exist. Specifically, CR 23 and CR 1B were identified as routes preferred for multimodal enhancement.

North Sioux City Development Causing Concerns

With growth and development of North Sioux City, it brings more traffic and loading on the surrounding roads. Of note, North Sioux City is planning a major road alignment to alleviate traffic pressures on Northshore Drive, announced as this MTP study was being finalized. Additionally, the Graham Airport is a proposed development consisting of an expanded airport, as well as new commercial and residential lots near Old Highway 105. Each or both of these major developments will directly or indirectly impact the

Union County road network, potentially creating deficiencies on existing roads in the area that may need to be upgraded or expanded such as CR 1B, CR 1, and CR 23. However, it is unknown the magnitude of the impacts until more information becomes available.

Jurisdictional Ownership

During the baseline conditions review, it was noted that some county roads are not fully relevant to the county network, which introduces network discontinuity and maintenance inefficiencies. Additionally, concerns were raised by the SAT that jurisdictional ownership is not transferred from the County to growing cities in a manner that is most beneficial to the County. This arises from the fact that in order to transfer jurisdictional ownership, there must be an agreement reached between two competing governmental agencies, and neither agency wants to receive the worse end of the deal. This competing nature between agencies is common in South Dakota, and mutually beneficial arrangements do not appear to be the norm. A specific meeting was created between the SAT and the study team to further understand these dynamics in Union County. As a result, potential jurisdictional matters of contention were identified near North Sioux City area, Elk Point, Alcester, and Beresford.

Prioritizing Improvements with Available Funding

Each year, Union County develops a 5-Year Highway and Bridge Improvement Plan. It is a short-range planning document that is designed as a tool to assist the County in budgeting, planning, and incorporating the needs and concerns of the public into annual road and bridge projects. This plan is updated each year with some projects removed and others added as needed.

Funding is typically not sufficient to address all project needs and desires, and taxpayers demand that money is used effectively to get the best return on investment. Therefore, project prioritization is a key element presented in this study. The long-term investment return of projects cannot be fully encompassed in a 5-year plan. This MTP utilizes the planning horizon of 2045 to prioritize projects over the next 20+ years.

4. FUTURE CONDITIONS

During baseline conditions analysis of this study, existing issues and needs were identified and featured Section 3 of this report. As time passes, these issues will become more prominent and new issues will arise. The analysis in this section aims to forecast future traffic volumes so that future issues and needs may be identified that were not readily apparent during baseline conditions analysis. It is also an opportunity to proactively address issues and correct deficiencies to ensure more safe and sustainable infrastructure for decades to come.

Population

The South Dakota State University Census Data Center created preliminary population projections for Union County in 2010. The population projections indicated growth through the year 2035 exceeding the overall growth rate of the state. Based on recent population trends, this expected growth is likely to occur near the Sioux City metropolitan area.

Table 12: Population Projections for Union County

Location	2020	2035	Est. % Growth 2020-2035
Union County	16,811	20,063	19.3%
South Dakota	886,667	977,574	10.3%

Source: South Dakota State University Census Data Center[15]

Union County could continue to see a larger share of population increase moving forward due to a high quality of life, paired with a lower cost of living and proximity to both Sioux City and Sioux Falls. Union County is likely going to continue to be a desirable destination for remote workers (work-from-home), and those seeking suburban, small-town, and rural places to live.

[15] South Dakota State University Census Data Center. Preliminary Population Projections for South Dakota and Counties, 2010-2035 (Accessed through South Dakota Department of Labor & Regulation. https://dlr.sd.gov/lmic/menu_population.aspx)

Traffic Forecast and Level of Service

Traffic Forecast

Traffic forecasts were developed for the planning horizon year of 2045. With the exception of the southern parts of Union County near the Sioux City metropolitan area, Union County is not covered by regional traffic demand models. To forecast future year traffic, a combination of methodologies was used, including annual growth rates, historical traffic volume trends, and available traffic demand models.

Traffic forecasts utilized the following methodology:

- 1.74% annual growth rates as a baseline to forecast the majority of the roadways. This is the SDDOT's annual growth rate used for planning traffic volumes in Union County.
- 2.00% annual growth rate was used to more aggressively forecast the traffic along County Road 13 (302 St) due to historical traffic patterns, most likely due to hauling operations. It did not appear that population growth in the area was driving the increase in traffic volumes. It was also speculated that increased volumes could be due to more reliability during times of significant flooding, which can impact alternate routes.
- 2045 Traffic Demand Model provided by SIMPCO as part of the SIMPCO 2045 Long Range Transportation Plan when values were greater than the 1.74% baseline. This impacted county roads in the region of Jefferson and North Sioux City.

As with the baseline conditions analysis for year 2021, 2-lane planning level capacity approach was used as a guide to bring focus to roadways with potential for traffic congestion. As a corridor begins to approach capacity, it will be time to implement improvements. Figure 17 shows forecasted daily traffic volumes and planning level volume to capacity (V/C) ratios along Union County owned roadways. A V/C ratio of 1.0 indicates that the facility would be at planning level capacity.

As with existing volumes, Union County traffic volumes outside its urban areas were mostly observed to be low, well below 2-lane planning level capacity for the vast majority of roads. Vehicles predominantly use State roadways to travel the region; and county primary, secondary, and township roads to circulate within local areas.

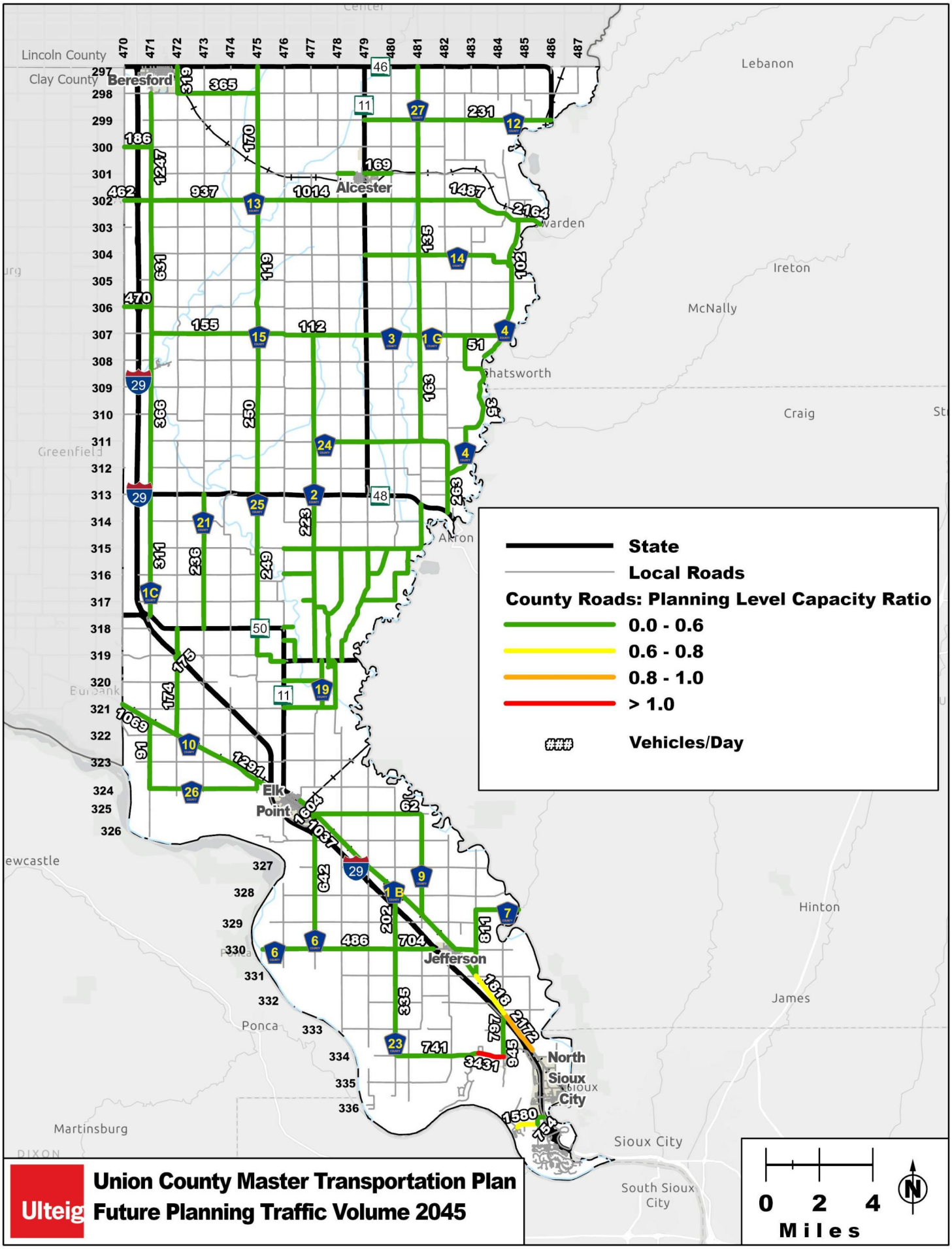


Figure 17: Future Planning Traffic Volume 2045

Due to development in the urban and suburban areas of North Sioux City, future traffic volumes indicate that some roads may approach or exceed capacity by the year 2045. Where and when this will occur is dependent on a number of variables, but the following corridors could be due for capacity improvements such as additional lanes if development in the area continues. The approach below provides an estimated V/C ratio, but further study of turning movements and signal timing may provide a more accurate representation of roadway and intersection performance. It is recommended that traffic operations studies, corridor studies, and/or traffic impact studies should be completed as new development occurs to analyze various design alternatives and cost to make a fully informed recommendation.

CR 1B – Between Jefferson and North Sioux City

- 2021 V/C Ratio = 0.48-0.57 (GREEN)
- 2045 V/C Ratio = 0.73-0.87 (YELLOW/ORANGE)

  Analysis: 2045 traffic volumes are based on base annual growth rate, which was conservatively used as it exceeded the traffic forecasted in the SIMPCO 2045 traffic demand model (TDM). V/C ratios in this range indicate some congestion during peak hours may be experienced. Future traffic will vary depending on growth and development of North Sioux City. Of note, the Graham Airpark is a proposed development consisting of an expanded airport, new commercial and residential lots along Old Highway 105 in North Sioux City. Development could expand beyond existing city limits into Union County, particularly near to CR 1B and potentially CR 1. The growth of this development could create capacity deficiencies on existing roads in the area that may need to be upgraded or expanded. However, it is unknown the magnitude of the impact of this development until more information becomes available.

CR 23 – Between Wynstone Development and CR 1

- 2021 V/C Ratio = 0.91 (ORANGE)
- 2045 V/C Ratio = 1.37 (RED)

  Analysis: The 2021 traffic volumes indicate this corridor is likely experiencing some traffic delays during peak hours. Public engagement indicated complaints about speed and safety. There were also complaints about traffic delays farther east along Northshore Drive during school bell times. 2045 traffic volumes are based on base annual growth rate, which was conservatively used as it exceeded the traffic forecasted in the SIMPCO 2045 traffic demand model (TDM). It is recommended to coordinate future traffic studies with SIMPCO to verify traffic growth assumptions within the Sioux City Area MPO. It is unknown how a new potential alignment in the area of CR 1 will affect traffic volume growth. More information on this alignment and development of North Sioux City is discussed in the Growth and Development section of this report. If the V/C ratio exceeds 1.0 as forecasted, it is likely that excessive traffic delays will be experienced. Future traffic will vary depending on growth and development of North Sioux City and could lead to capacity deficiencies on existing roads in the area that may need to be upgraded or expanded. However, it is unknown the magnitude of the impact of development until more information becomes available. See Special Locations Analysis in Section 2 of this report for more details.

CR 5 – Between Hoffman Ln and Shay Rd

- 2021 V/C Ratio = 0.32 (GREEN)
- 2045 V/C Ratio = 0.63 (YELLOW)

  Analysis: Current traffic volumes do not indicate traffic congestion. 2045 traffic capacity is based on SIMPCO 2045 traffic demand model (TDM), which indicates some congestion during peak hours may be experienced. Future traffic will vary depending on growth and development of the North Sioux City and could lead to capacity deficiencies on existing roads in the area that may need to be upgraded or expanded. However, it is unknown the magnitude of the impact of development until more information becomes available.

Recommendations: It is recommended that a firm direction is established early in the development process. The County should proactively begin discussions with North Sioux City and developers on their intentions for future road jurisdiction and annexation of the property shown in the development plans. Traffic impact studies should recommend improvements to county roads as a result of new traffic demands from new developments. If future traffic studies show that adjacent county roads are affected by the future development, the county could enter into a cost sharing agreement with other local governments, a form of compromise when jurisdiction responsibilities cannot come to an agreed to. This agreement could include upgrades to the road network and/or general maintenance. The amount of cost sharing between the two government entities would be based on the existing traffic on the county road versus the amount of traffic added by the development. For instance, if the existing ADT of a county road is 1,000 veh/day and the trip generation report for the development shows that an additional 1,000 veh/day will be added to the roadway, the agreement between the County and City could be a 50/50 cost share between the two entities.

Level of Service

As part of this study, peak hour traffic counts were collected at three intersections in Union County in 2020. An analysis of traffic operations for future year 2045 determined the delays and level of service (LOS) during typical AM and PM peak hours.

Table 13: Future Intersection LOS 2045

Intersection	Traffic Control	2020 Level of Service (LOS) AM / PM	2045 Level of Service (LOS) AM / PM
CR 10 (Burbank Rd) & CR 26 (475)	Two-Way Stop	A / A	B / B
CR 1B & CR 9 (325 St)	Two-Way Stop	A / A	A / A
CR 23 (Northshore Dr) & CR 1 (Westshore Dr)	Two-Way Stop	B / B	F / F

The TDM of 2045 indicated major intersection improvements would be required at the intersection of Northshore Dr & Westshore Dr, however, the TDM assumes major development and new road connections. By comparison, a Dakota Dunes/North Sioux City Planning study (completed in 2018) projected a LOS B at the same intersection in 2040 due to more modest growth projections. It is clear that the traffic forecasts at this intersection are highly dependent on anticipated growth and development of the area. Of note, North Sioux City is planning a major road alignment to alleviate traffic pressures on Northshore Drive, announced as this MTP study was being finalized. These plans include a modified intersection of Northshore Dr & Westshore Dr. It is recommended that any new development or changes in the traffic network that trigger increases in traffic at this intersection include traffic operations analysis at this intersection to determine what type of upgrades are recommended. This intersection may be a candidate for a traffic signal or roundabout in the future.

See Appendix H for detailed figures and *Synchro* modeling output reports.

Deficiencies

In general, the issues and needs identified in baseline conditions analysis do not change in the future. However, understanding how things are expected to change in the future can bring some issues to the forefront that may not be a priority in the current year. In particular, traffic forecasts and potential development and growth around the North Sioux City area indicate that planning for change now is important for successful outcomes in the future.

Capacity Deficiencies

Due to development in the urban and suburban areas of North Sioux City, future traffic volumes indicate that some roads may approach or exceed capacity by the year 2045. Where and when this will occur is dependent on a number of variables, but some corridors featured in Figure 17 could be due for capacity improvements such as additional lanes if development in the area continues to develop.

Right-Of-Way Deficiencies

As with most counties in South Dakota, the typical right-of-way (ROW) width along Union County roads is 66 feet, which dates back to the original construction of the road network. Modern design standards for modern vehicles and safety expectations of the roadside clear zones make it difficult to construct within this width, and sometimes up to 100 feet (or more) may be needed. There is cost to acquire additional ROW to widen the roadway surface and/or reshape the roadside ditches, particularly when it is adjacent to difficult terrain or fertile farmland. This may be a big hurdle to implementing a vision for the proposed road cross-sections featured in the Major Roads Plan and Road Cross Section Standards (Section 5 of this report). Some rural agencies and DOTs have begun to shift towards Performance-Based Practical Design (PBPD), which is an alternative to following rigid recommended minimum design standards by incorporating performance-based analysis to aid in the design decision process by emphasizing the project's core purpose and need. See Section 5 of this report for more information about PBPD.

Other Deficiencies

Transit Service

Transit service in Union County is mostly provided by a demand-response system rather than fixed route. Perceptions of need for transit dependent populations and additional multimodal service alternatives involving transit based on needs will need to be monitored on an ongoing basis.

Railroad Crossings

A review of the crash history inventory (2014-2020) found 5 crashes related to railroad crossings: one on SD 46, one within the City of Elk Point, and three near different CR 1B intersections (CR 9, 479 Ave, CR 23). Of the three near CR 1B, one was impact with traffic barrier in snowy conditions, one was impact with fixed object, and one was impact with train. Definitive trends or conclusions could not be drawn from the crash history data to recommend specific improvements at these locations. These types of crashes often feature random characteristics. All crossings should receive intermittent improvements (system-wide) to help address the random nature of crashes at low-volume crossings such as improvements for signage, visibility, geometry, crossing control, pavement markings, pavement condition, detection and preemption, and bike/pedestrian crossings.

New Technologies

Technology is changing at a rapid pace and is likely to change the landscape of transportation planning, transportation infrastructure, and how people make travel choices in years to come. However, the rapidity of technological advances will require a flexible approach to planning and delivering transportation infrastructure and services. Union County will need to track and consider emerging technology to meet the mobility needs of a diverse cross section of the population. Transportation trends that deserve consideration to support the evolution of the transportation network include the following:

- Real-time traveler information (transit, traffic, bike/carshare availability, parking)
- Electric vehicle (EV) charging stations
- Ridesharing transportation network companies such as Uber and/or Lyft
- Autonomous vehicles
- Connected vehicles
- Traffic management solutions
- Pedestrian activated flashing crossings

ADA Policy

As Union County considers implementation of pedestrian-friendly infrastructure, it may consider creating new policies, design guidelines, and standards as necessary to comply with modern Americans with Disabilities Act (ADA) requirements. Additionally, Union County should continue to monitor potential safety concerns and conflicts where pedestrian activity may be introduced to the network, and proactively address them.

Bridge Needs

Union County maintains 113 bridges, and bridge inspections are conducted every two years. As a result of bridge inspections, the condition of the bridges falls under one of three categories: Good, Fair, or Poor. Union County has 36 bridges that are currently in Poor Condition (32%), which means they are structurally deficient. These bridges have short or unknown remaining service lives, which is more than the South Dakota county-wide average of 26%. See Figure 15 for more details on Existing Bridge conditions.

Each year, Union County develops a 5-Year Highway and Bridge Improvement Plan. It is a short-range planning document that is designed as a tool to assist the County in budgeting, planning, and incorporating the needs and concerns of the public into annual road and bridge projects. This plan is updated each year with some projects removed and others added as needed. Additionally, by completing this short-range plan each year, Union County is rewarded with eligibility for funding through the local Bridge Improvement Grant (BIG) program established by the SDDOT. Between 2016-2021, Union County has been awarded $1,758,900 in funding from the BIG program for preliminary engineering and bridge rehabilitation/ replacements.

Union County has a need to identify and prioritize the structures that are in critical need. Between 2016-2020, Union County has replaced 1.6 bridges/year, and has had some success with SDDOT Bridge Improvement Grants (BIG). At current funding levels, Union County faces a difficult challenge to maintain all bridges in a state of good repair, as bridges continue to deteriorate at a faster rate than they can be repaired or replaced. The most recent version of Union County's 5-Year County Highway and Bridge Improvement Plan identifies 11 bridge structures for replacement with new bridges or concrete box culverts. As part of the 5-Year Plan, the total project cost of these 11 bridges was estimated to be $5.9 million, which is more than double the estimated cost for these same structures made in 2012-2014 bridge inspections ($2.75 million).[16] Using similar reasoning to estimate cost of all bridge repairs in Union County, the total improvement cost to repair Union County's bridge system is estimated to be more than twice as much as what is currently in the NBI database, or about $19 million.

Road Surfacing Needs

Traditionally, asphalt pavements are designed with a 20-year service life. To avoid high construction costs, roadways can be overlayed when they are around 15 years old. Theoretically, if a county is able to budget for overlays on 10% of its road system (e.g., 10 miles for every 100 miles of roads) every year, it is possible to avoid higher reconstruction costs. It is reasonable to apply preventive measures and overlays for roads in each age class every year to have a mix of roads in the Good, Fair and Poor categories. In this scenario, overlays are preferred for Poor category each year.

[16] *As part of the bridge inspections between 2012-2014, 100 bridges were assigned a bridge improvement cost, as well as a total improvement cost for all bridges in Poor or Fair Condition, and some in Good Condition (and this remains the most up-to-date cost estimation). The bridge improvement cost includes major structure improvements only and the total improvement cost includes all associated bridge improvement costs such as roadway improvement, right-of-way, preliminary engineering, etc. For these 100 bridges, the bridge improvement cost was estimated to be $5.4 million at the time, and the total improvement cost was estimated to be $9.0 million. This total represents an estimate of the cost to repair Union County's bridge system, though somewhat dated.*

Given the lack of funding to provide timely overlays to an adequate proportion of paved roadways, Union County plans for about 8 miles of rehab type overlay projects each year on the county highway system, which is about 4% of the paved county highway system to go along with 25 miles of chip seals/preventative maintenance (14 %). As such, it is expected that the overall roadway condition will deteriorate to where a larger percentage of roads is in poor condition. The strategy to create a cost-sustainable road program for the County is illustrated below:

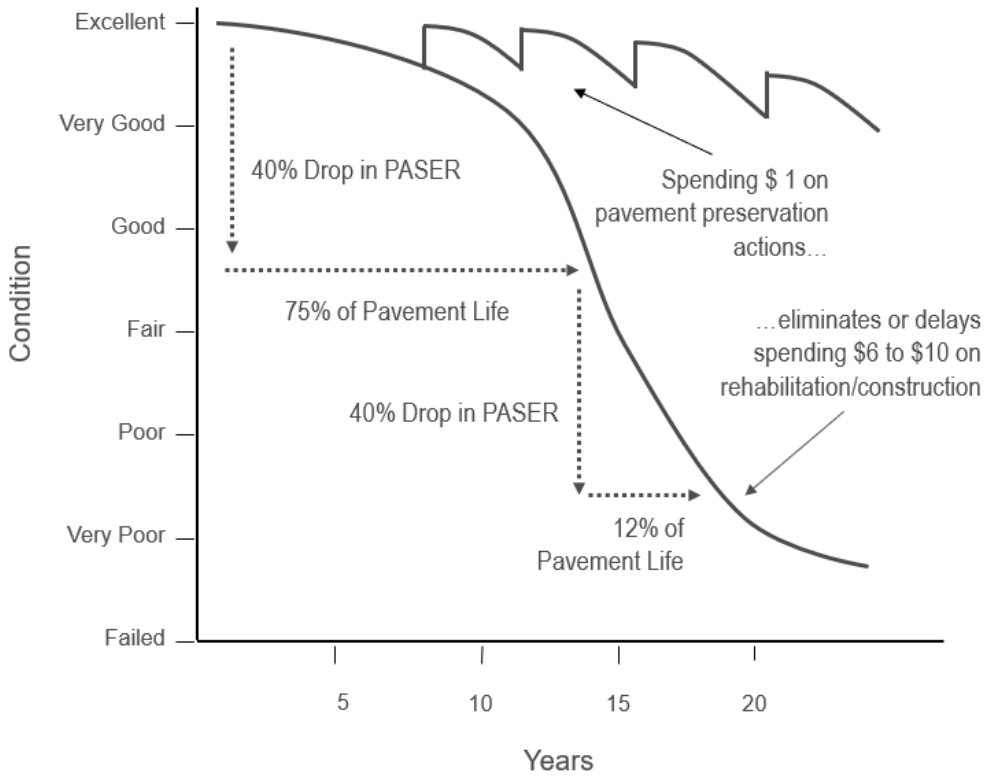


Figure 18: Pavement Deterioration Concepts[17]

The basis of the most cost-effective analysis is defining a deterioration curve for each roadway category that describes and predicts how a pavement quality will change over time. Newly paved or reconstructed roads are given a PASER rating of 10. Over time, the roadway surface deteriorates, and its rating goes down. The deterioration curves for each roadway type are usually built based on historical PASER ratings. However, Union County does not have an inventory of historical pavement quality ratings. For that reason, a linear deterioration curve is assumed for all road types. To determine what treatments or mix of fixes are applied to the road network, the 5-Year County Highway and Bridge Improvement Plan is used. The mix of various fixes including full reconstruction, rehabilitation, and capital preventive maintenance are used in the analysis. It is possible to change the available funding that can be invested into the road network to see various investment scenarios. For the purpose of this report, the focus is on the current funding scenario to predict and illustrate the change of pavement quality in the next 20 years. A sample output using the current funding scenario to maintain roadways is shown in the chart below.

[17] Figure 18 modified from pavement deterioration curve original to FHWA in *Asset Sustainability Index: A proposed Measure for Long-Term Performance (July 2012).* https://www.planning.dot.gov/documents/ASI_report/asi-01.htm

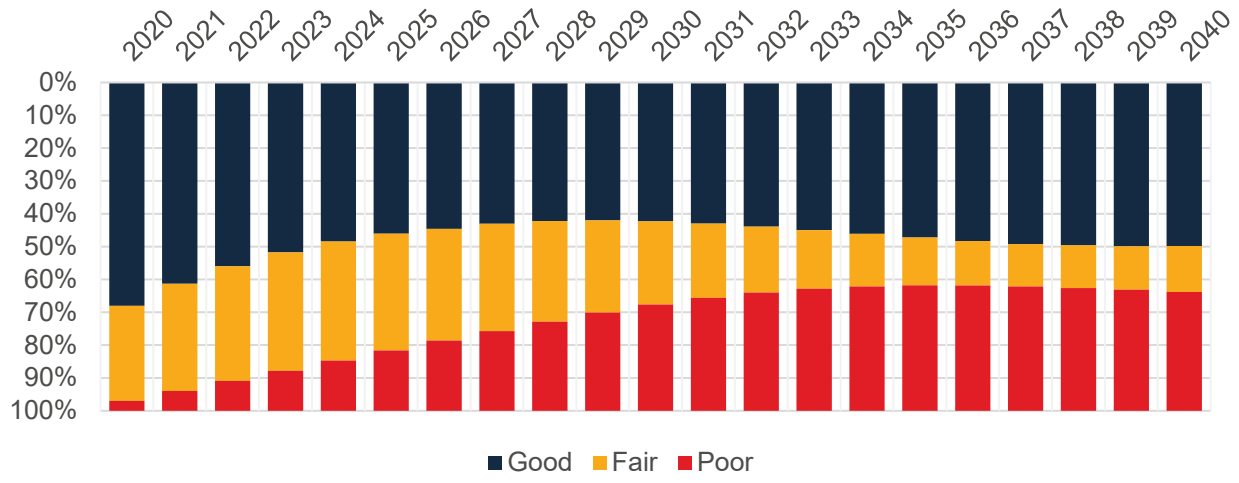


Figure 19: Predicted County Network Paved Road Condition

As seen in the chart above, the ratio of Poor condition roads increases over time and this trend is consistent with state-wide predictions for South Dakota. The County should consider pursuing an effort and generate additional funds to maintain the ratio of Good, Fair and Poor category roadways of the base year.

Union County has implemented other rehab projects such as microsurfacing, concrete overlays, and full-depth reclamation, but for planning purposes, it is generally assumed to be asphalt overlays. It is believed that Union County's pavement preservation strategy does a good job of maximizing the investment of funds available. The chart above is a prediction of future performance and is viewed as a plausible outcome due to its alignment with state-wide predictions for South Dakota.[18] However, it is not a guarantee of future performance in Union County. Union County's pavement condition over time can only be accurately assessed with regular pavement condition assessments. It is recommended that Union County invest in regular pavement condition assessments every two years in order to understand better how its road conditions are tracking over time. If condition assessments over time prove a trend of deteriorating pavement conditions, then the County can pursue generation of additional funds with objective data support in order to fund rehab and reconstruction type projects that restore pavement structural support once it has deteriorated past the threshold where preventative maintenance type projects offer an acceptable return on investment.

Sustainable Community Needs

Moving forward, existing and upcoming generations will have an opportunity to consider living a car-optional lifestyle. While Union County and the Sioux City metropolitan area have largely developed around the automobile over the last 60 years, it is becoming clear that the Millennial Generation and other adults are placing more emphasis on how and where they live based on travel options. Having a variety of available transportation options allows people to consider reducing the number of automobiles they need. More people are likely move out of the automobile-centered lifestyle if the transportation network is seamlessly integrated and alternate transportation options are readily available, safely accessible, time competitive and provide first- and last-mile connectivity.

[18] *SDDOT Long Range Transportation Plan 2045*, Figure 4-1.

Transportation planning strategies for sustainability in the community include a few key themes. The first is active transportation and the allocation of spaces and corridors as part of the roadway and sidewalk network for people to walk and bike. The second is the construction of a master planned trails network throughout Union County as laid out in this plan. Increasing the use of renewable energy is another theme emerging in transportation.

Non-Motorized Facilities

A significant number of bicycle and pedestrian facilities are a part of this plan in Union County; however, at the present time, there are significantly underserved areas particularly in some of the Union County communities and along collector and minor arterial routes. This MTP lays out a phased vision for trails in Union County to increase the amount of active transportation and recreation, while increasing Union County's attractiveness as a place to live.

Bike/Ped Space Tradeoff

As bicycle enhancements are considered, it must be acknowledged that in many instances, this priority will require prioritizing space for bicyclists over other modes. Most often in Union County, this will result in prioritizing space for bikes over the private automobile. This could take the form of slower speeds due to narrower lanes, restricting turning movements, while other times it could mean the reduction of space for on-street parking.

In thinking about sustainability, four elements are usually discussed:

1. Leadership, civic engagement, and responsibility
2. Ecological integrity
3. Economic security
4. Social well-being

In terms of how these elements translate to the transportation network, it can be said that true leadership translates to the political will to find funding and implement the right projects without undue waste. Planning is also a form of civic engagement, and this study was supplemented with public input. The transportation system can be detrimental to the environment, however as society moves towards the electrification of the transportation system, this could help us move around with smaller impacts on air quality and the environment. Economic security is enabled by the transportation network which allows for the movement of goods and services, enabling trade and economic competitiveness. The transportation system also has profound effects on social equity and the manner in which transportation investments are made have been proven to have profound effects on community sustainability. Union County should continue to provide support and funding for transit and paratransit as not everyone is able to drive or is capable of affording a car. Both transit and bike/ped infrastructure have positive effects on social equity, Union County should keep the key sustainability themes outlined in this plan in mind and prioritize the construction of a trails system as trails are highly prized by resident. Places with trails networks attract young people and employers, have higher rates of physical activity, host increased economic development, and provide a better quality of life.

5. ADDRESSING EXISTING AND FUTURE NEEDS

Development of Standards and Guidelines

The following sections describe new and updated references for future planning of the Union County road network:

- ***Functional Classification System***
  Identifies recommended changes in FHWA Functional Classification Designation
- ***Major Roads Plan***
  Presents a new road classification system unique to Union County to aid in future designs and project planning over the next 20 years
- ***Road Cross Section and Bridge Width Standards***
  Presents new design cross sections standards unique to Union County based on the Major Roads Plan classification system
- ***Traffic Impact Study Guidelines***
  Presents new Traffic Impact Study Guidelines which supplement the existing Access Management Ordinance for developments near and seeking access to the Union County road system
- ***Level of Service Standards***
  Presents minimum standard level of service (LOS) for existing and proposed traffic operations analysis
- ***Access Management Guidelines***
  Presents additional guidelines to supplement the existing Access Management Ordinance for access permits on the Union County road system
- ***Jurisdictional Transfer***
  Presents a review of consideration and goals for jurisdictional transfer of Union County roads as well as a legal agreement template (Memorandum of Understanding)

Functional Classification System

The Union County roadway classification system is based on the Highway Functional Classification system from the Federal Highway Administration (FHWA) and is expected to remain the same in almost all cases in terms of classifications. SDDOT Project Development is responsible for coordinating functional classification for all roads in South Dakota.

As part of this study, it is recommended to change one corridor's classification designation:

- CR 1C (City of Beresford to SD 50)

This corridor is currently functionally classified as a Rural Minor Collector. However, due to its characteristics carrying heavy vehicles and other features, it is recommended to follow the SDDOT process and request to change it to a Rural Major Collector. This change would align well with the Major Roads Plan, which identifies paved priority routes as the most critical category for Union County roads.

Major Roads Plan

Utilizing FHWA's functional classification system is not always conducive for roads design standards. For example, a road functionally classified as a collector can be paved or unpaved, carry primarily personal vehicles or heavy freight, as well as other variables not fully encompassed or primarily considered in the functional classification designation. Therefore, a Major Roads Plan unique to Union County has been prepared to aid in future designs and project planning, incorporating the pavement surfacing type and heavy vehicle routes as the primary variables.

The Union County Major Roads Plan focuses on County Roads and their operations, safety, access, and freight capacity. The following objectives and priorities were established for the Union County Major Roads Plan:

1. Maintain connectivity throughout Union County to recreation, jobs, and destinations
2. Maintain existing infrastructure by prioritizing the most critical roads on the county network
3. Designate routes prioritized for farm-to-market, ethanol plants, and other heavy freight
4. Improve road infrastructure when possible
5. Support the growth of economic activity and quality of life
6. Identify considerations for change in roadway functional classification
7. Identify considerations for change in road jurisdiction
8. Support a multimodal transportation network through allocation of space for pedestrians, bicyclists, and transit

The State roads in Union County (I-29, SD 11, SD 46, SD 48, SD 50) will remain the primary routes with the most mobility. County roads will provide the next level of mobility, providing service to towns and other regional connections that cannot be served with local roads.

The Major Roads Plan establishes the following county road classifications:

- County Paved – Priority Route
- County Paved
- County Gravel
- Local Roads

County Paved – Priority Route

The most critical roads in Union County are those that support the most regional connectivity, and therefore carry the most traffic and heaviest freight. They generally carry >400 vehicles/day. These roads also attract bicyclists because they connect communities. In Union County, these roads are typically high-speed facilities. When major improvements are planned, they should include wide shoulders (6'-8') and recoverable 4:1 inslopes.

County Paved

All other paved roads in Union County support regional connectivity but are not as critical as County priority routes. They generally carry < 400 vehicles/day but are still critical to move people and goods within Union County. When major improvements are planned, they may have narrow shoulders (2') if daily traffic volumes are <400 vehicles/day and should include recoverable 4:1 inslopes.

County Gravel

County Primary gravel roads support connectivity but may not have the same regional connectivity as paved county roads. They often carry lower traffic volumes than paved routes, which is likely why they have not been paved in the past. When major improvements are planned, they may have narrow shoulders (2') if daily traffic volumes are <400 vehicles/day and should include recoverable 4:1 inslopes.

Local Roads

All other roads are considered local roads, and typically are maintained under the jurisdiction of townships or municipalities. County Secondary gravel roads are considered a local road for the Major Roads plan as they serve the same function as township gravel roads. When major improvements are planned on a rural high speed local road, they will typically have minimal shoulders (0'-2'), if any, and should include recoverable 4:1 inslopes. Local Roads often have extremely limited right-of-way and major improvements are rare, so the designs may default to bare minimum lane width, shoulder width, and clear zone accommodating ditch design.

See Section 5 of this report for Road Cross Section Standards for each Major Roads Plan classification.

Paved Shoulders on Rural Highways

One of the primary differentiators between the Major Roads Plan classification is paved shoulder width. Although the cost can be prohibitive to have paved shoulders when traffic volumes are lower, it is encouraged to the fullest extent possible when cost and right-of-way will allow. According the AASHTO (Green Book, 2018), there are numerous benefits to having paved shoulders on rural highways:

- Space for vehicles to stop due to mechanical difficulties, flat tires, or other emergencies
- Space for maintenance operations such as snow removal, mowing, and storage
- Space for evasive maneuvers for drivers (very effective for motorcyclists) to avoid potential crashes or reduce their severity
- Space for bicycle use, bus stops, occasional encroachment of vehicles, and mail delivery vehicles
- If wide enough, space for speed-change lane for vehicles turning into driveways
- Space for traffic detours during construction
- Improved sight distance in presence of cut sections and horizontal curves
- Decreased encroachment of high vegetation which can obscure wild animal crossings
- Enhanced highway aesthetics by some types of shoulders
- Encourages uniform speeds
- Lateral offset provided for signs and guardrails
- Stormwater can be discharged farther from traveled way and minimized seepage
- Structural support is given to the pavement

CR 13, west of 484 Ave, in presence of vertical and horizontal curve geometry. This corridor has a history of crashes resulting in death and incapacitating injuries, and is recommended for shoulder widening as soon as funding is available

Source: Google Maps. Photo dated August 2021. Image accessed January 2022

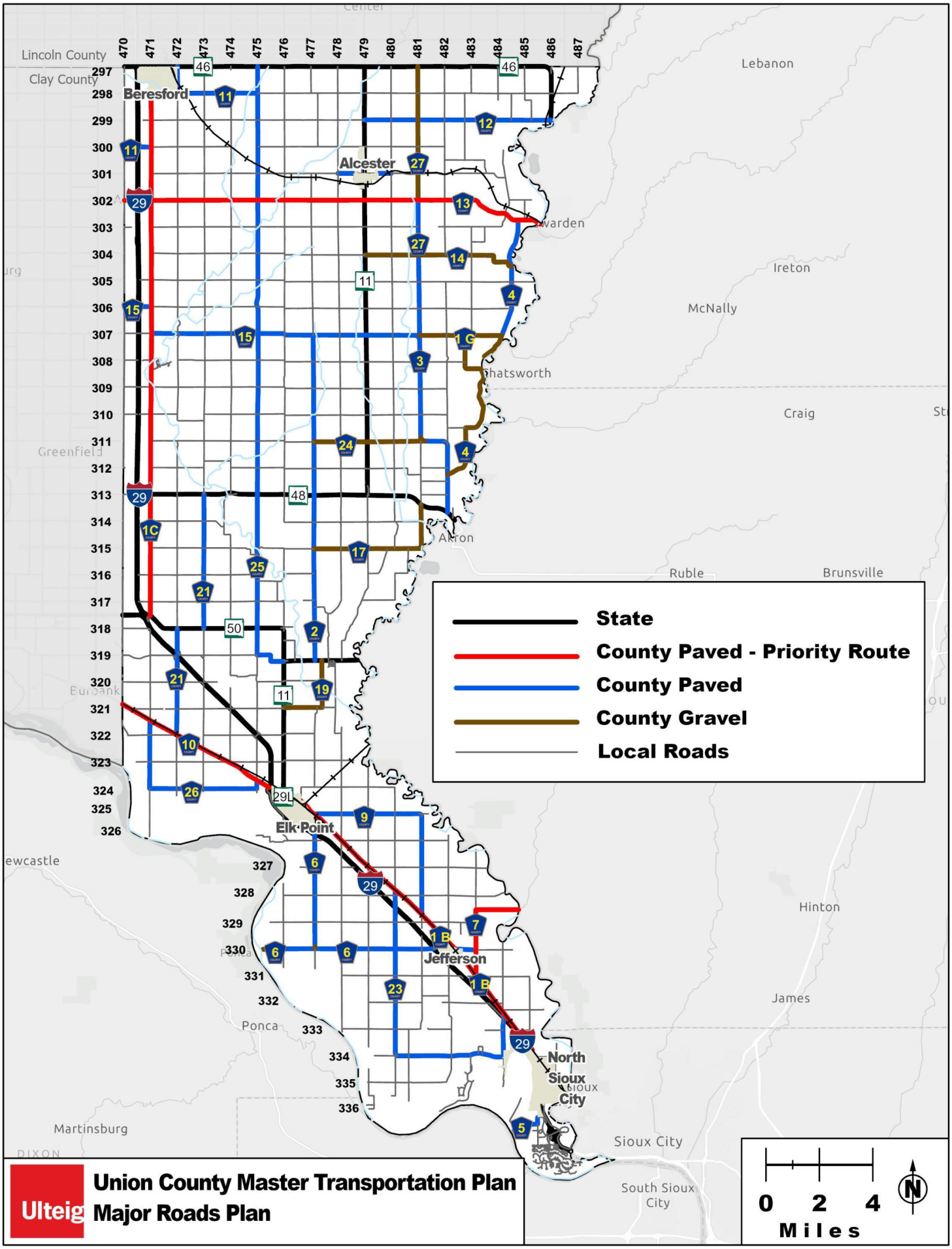


Figure 20: Major Roads Plan

Road Cross Section and Bridge Width Standards

Road Cross Section Standards

The following road cross section design standards for Major Roads Plan classifications are based on the following references:

- *SDDOT Local Roads Plan* (2011)
- *SDDOT Road Design Manual*
- *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2004, 2011, 2017)
- *Guide for the Development of Bicycle Facilities* (AASHTO, 2012)

SDDOT references often source their design recommendations and standards from older editions of AASHTO, thus the multiple editions shown above. Reference documents are often updated with new editions, and the most recent edition should be sourced when designing roads. If constructing new roads or reconstructing existing roads, modern design standards and those recommended below as part of the Major Roads Plan will most likely require right-of-way of 100 feet or more, but not less than required to accommodate all elements of the designed cross section (driving lane, shoulders, slough, inslopes, ditch, backslopes, and utilities.

12-foot wide roadway lanes are the standard lane width particularly for new construction, however 11-foot lanes can be considered for all roadways including truck routes as there is minimal reduction in highway capacity and only slight decrease in safety, particularly in the presence of paved shoulders and rumble strips.

Figure 21 below shows minimum cross section standards unique to Union County based on the Major Roads Plan classifications.

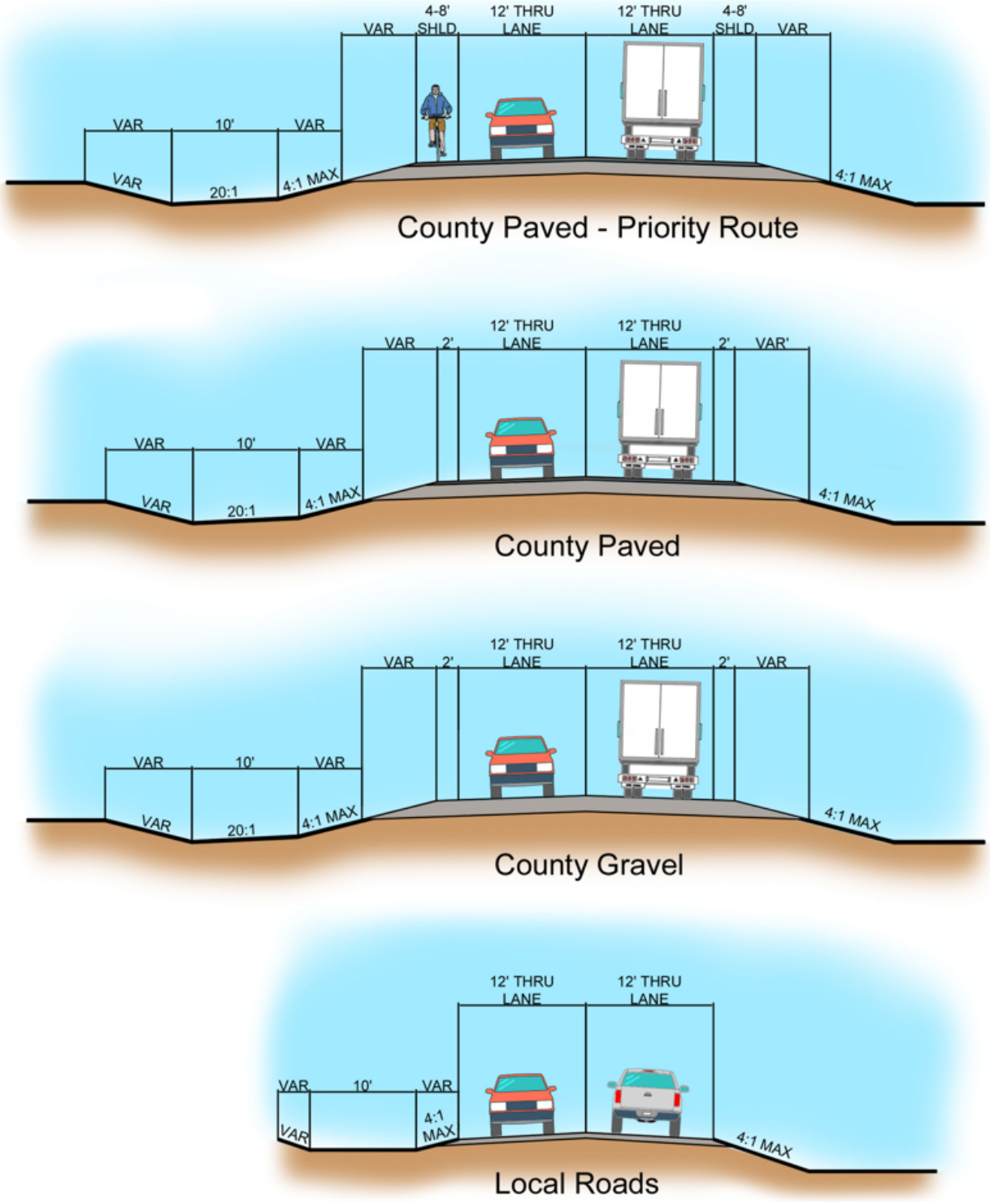


Figure 21: Major Roads Plan Typical Cross Sections

Bridge Width Standards

According to AASHTO *A Policy on Geometric Design of Highways (2018), "the clear width on bridges should preferably be as wide as the approach roadway in order to give drivers a sense of openness and continuity."* Poles, walkways, bridge columns, bridge railing, and parapets located close to the traveled way are potential obstructions and cause drivers to shy away from them. Additionally, they are more likely to be struck by vehicles.

When replacing or constructing a new bridge structure, the bridge width design (minimum clear roadway width for bridges) should include the following considerations for existing and future conditions:

- According to AASHTO[19], the minimum clear roadway width for new and reconstructed bridges depends on the design daily traffic volume and functional classification
- Approach roadway width (traveled way plus shoulder width) – Shoulders should be no less than 2 feet wide and a least as wide as the approaching roadway shoulder
- Presence of paved shoulders or shared-use paths on approaching roadway
- Traffic volumes, and if there is the potential for widening the approach roadway width in the future for additional travel lanes
- Width of farm equipment using the bridge
- Safety performance of existing bridge

MINIMUM CLEAR ROADWAY WIDTH FOR NEW AND RECONSTRUCTED BRIDGES

The following bridge width design standards for new and reconstructed bridges are derived from AASHTO recommendations and integrated with the Major Roads Plan classifications. Ranges shown depend on the approaching roadway width of the future corridor, design daily traffic volume, and functional classification.

- County Paved – Priority Route
  - Approach roadway width (32-40 feet)
- County Paved*
  - Traveled way plus 2-4 feet each side (28-32 feet)
- County Gravel*
  - Traveled way plus 2-4 feet each side (28-32 feet)
- Local Roads
  - Traveled way plus 2 feet each side (28 feet)

*For bridges in excess of 100 feet in length, the minimum width of traveled way plus 3 feet on each side is acceptable.

Performance-Based Practical Design

Some rural highway design agencies and DOTs have begun to shift towards Performance-Based Practical Design (PBPD),[20] which is an alternative to following rigid recommended minimum design standards by incorporating performance-based analysis to aid in the design decision process by emphasizing the project's core purpose and need. A major philosophy of PBPD is that implementing numerous "good" projects is more beneficial than a few "perfect" projects due to funding constraints. For example, if shoulder widths and inslope rate improvements are shown to have minimal long-term effects on safety performance (often due to low traffic volumes), then the cost to make those upgrades may not be justifiable when the funds for those improvements could be used on other safety enhancements that

[19] *AASHTO. A Policy on Geometric Design of Highways (2018)* pg. 5-9 or 6-8.
[20] FHWA. Performance-Based Practical Design. https://www.fhwa.dot.gov/design/pbpd/

would have a more substantial impact on safety performance. There are many aspects of this data-driven approach to consider, and it requires the design professional to always act in accordance with the professional standard of care.

One concern with the practice of PBPD is that agencies may overemphasize short-term cost savings over long-term objectives. Currently, the SDDOT has not officially supported this practice, and has not provided a policy of its use or a toolbox to guide the decision-making process most effectively in context with South Dakota. However, with the trends of the industry, it may happen in the future. Those referring to this Union County MTP should check to see if the SDDOT has provided any updated guidance on this topic, as it would be a valuable guide for use by county highway departments.

Traffic Impact Study Guidelines

Union County may require a Traffic Impact Study (TIS) in order to objectively assess the safety and operational impacts of new development or modified land use on the Union County road system due to generation of new traffic trips or shifts in travel patterns. The TIS will assist Union County in their approval of access permits, properly account for impacts, and identify improvements required by the developer to maintain roadway safety and acceptable traffic operations. Refer to Union County's Access Management Ordinance to determine if a TIS is required and responsibility of cost. The TIS shall be sealed by a South Dakota registered professional engineer.

As a part of this Plan, a new guidance document has been created to guide developers on the requirements, format, and content of traffic impact studies. The guidance document for traffic impact studies is in Appendix F.

Level of Service Standards

As Union County continues to experience growth, there will be a need to observe increased demand and preserve roadway capacity. Level of service (LOS) standards described in this section are used to evaluate existing and future performance of transportation infrastructure.

The existing and future LOS at select intersections are presented in Table 13. The LOS of a roadway changes during the day based on the traffic volume using the facility, but the value pertains to the highest travel delay experienced during the peak hours of traffic, typically during the morning and evening rush hours.

LOS is a mechanism used to quantify how well a transportation facility is operating from a traveler's perspective in terms of quality of service. There are six levels of service, and each is assigned to a letter grade from A to F. LOS A represents the best operating conditions with flowing traffic (no congestion) and LOS F the worst (severe congestion).

The most recent edition of the Highway Capacity Manual should be used to determine LOS, and the *SDDOT Road Design Manual*[21] should be consulted in determination of traffic analysis parameters in place of default values. For general planning purposes, this study utilized the generalized tables of LOS standards found in the SDDOT's latest road design manual. The manual contains a table of minimum acceptable LOS targets for various functional classification and highway types, which is shown below. It is important to mention that the highest practical LOS may be higher than the values listed in the table (e.g., LOS A is better than LOS B and thus meets all minimal acceptable LOS targets).

[21] *SDDOT Road Design Manual*, Chapter 15 Traffic. https://dotfiles.sd.gov/rd/rdmch15.pdf (accessed June 2021)

Table 14: SDDOT Roadway Segment Level of Service Guidelines

Roadway Segments

For Construction/Reconstruction projects Table 15-9 and Table 15-10 are used as the basis for determination of capacity and basic number of lanes based on a typical 20 year average daily traffic (ADT) projection beyond the anticipated year of project construction. The highest LOS as practical, which may be higher than the values listed in Table 15-9, should be provided depending on varying conditions as noted on the following page.

Table 15-9 Level of Service Guidelines

Functional Classification[1]	Highway Type				
	Rural Level	Rural Rolling	Rural Mountainous	Urban[2]	
				Desirable	Minimum
Freeways (Interstate & Expressways, mainline, merge points, diverge points, and weave area)	B	B	C	B	C
Principal Arterial	B	B	C	C	D
Minor Arterial[3]	B	B	C	C	D
Collector[3]	C	C	D	C	D

[1] For functional classifications, refer to the current edition of the *SDDOT Highway Needs and Project Analysis Report.*
[2] Urban includes highways within the city limits of a town or city with consideration of the growth areas beyond city boundaries. The use of level of service D should only be considered in heavily developed (fully built out) sections of metropolitan areas.
[3] Two lane Minor Arterials & Collectors should be considered Class II highways when utilizing the current edition of the *HCM.*

Source: SDDOT Road Design Manual, Chapter 15 Traffic

For intersections, lane requirements shall be determined using the methodologies of the most recent edition of the HCM. For signalized intersections, the desired overall intersection is LOS C; a minimum LOS D may be appropriate for urbanized areas. Additionally, each approach to the intersection should be designed to have the highest LOS practical.

In most instances, traffic analysis in Union County will be for either rural two-lane highways or intersections. Most jurisdictions in Union County region try to maintain a level of service B for the rural roadway system and C for urban highways and intersection operations. For traffic operations analysis or traffic impact studies on Union County roads, the recommended minimum acceptable LOS for existing or future conditions is LOS B for rural two-lane highways and LOS C for urban two-lane highways and intersections. These selected level of service standards are consistent with the SDDOT's *Road Design Manual*. A minimum acceptable level of service B provides a standard that considers smaller delays, driver expectations, and traffic operations that is typical for rural areas. Corridors and intersections operating at LOS C are roadways where drivers can generally travel in free-flow conditions with delays mostly experienced during peak hours. As congestion reaches higher levels at specific corridors or intersections, LOS standards may be relaxed at certain locations due to the limitation of physical constraints such as land uses, topographical constraints, and other external factors. Rural level of service often depends on being able to pass slow moving vehicles such as RVs, trucks, or vehicles towing trailers.

Traffic analysis should also consider multimodal analysis, as the most recent edition of the Highway Capacity Manual provides methods to assess bicycle and pedestrian LOS.

Access Management Guidelines

According to FHWA, access management is the proactive management of vehicular access points to land parcels adjacent to all manner of roadways. Good access management promotes safe and efficient use of the transportation network. It encompasses a set of techniques that state and local governments can use to control access to highways, major arterials, and other roadways. These techniques include access spacing, driveway spacing, safe turning lanes, median treatments, and right-of-way management.

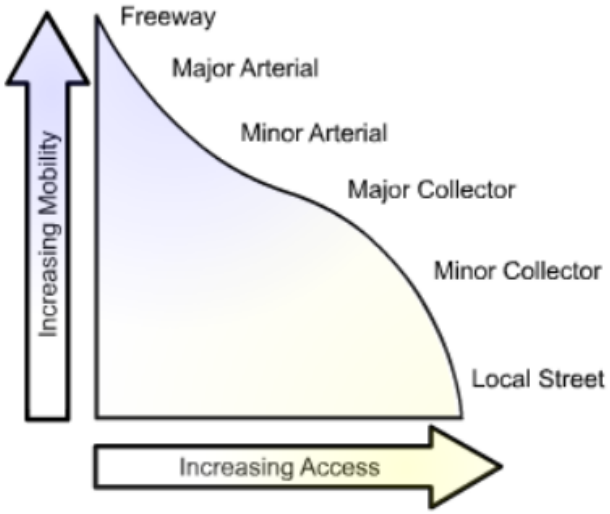


Figure 22: Access Mobility and Functional Classification Relationship (FHWA)[22]

Union County, having permit authority on development and road infrastructure improvements, recognized the need for regulation of entrances from adjoining lands to the traveled way of the county road systems under their supervision in order to promote the public safety, esthetic values, and engineering integrity of its roads. Union County adopted an access management ordinance (Ordinance No. UCC2011-001), and no person may construct an access between any county highway and adjoining property without an access permit issued by Union County. The process for such permit application is described in the ordinance, including the access-location criteria.

Depending on how the proposed access will be used, the impacts can vary greatly. On one end of the spectrum, a major development will generate high numbers of trips, requiring physical improvements to the access point itself as well as nearby intersections. On the other end of the spectrum, a field approach to a field may generate a minimal number of trips. However, in all cases, the conditions have changed, and a new conflict point to the highway has been introduced. The more significant the change, the more complex the evaluation will be. Therefore, Union County provides thresholds within the access management ordinance that trigger traffic impact study requirements, the primary means of evaluating the impact of new developments on the county road system.

By developing access management standards, Union County strives to achieve a balance between property access and functional integrity of the road system. Studies show that implementing access management provides three major benefits to the transportation systems:

- Increased roadway capacity
- Reduced crashes
- Shortened travel time for motorists

[22] Federal Highway Administration. Access Management. https://ops.fhwa.dot.gov/access_mgmt/what_is_accsmgmt.htm

These three benefits are essentially the result of minimizing or managing the number of conflict points that exist along a corridor. When conflict points are introduced by means of a new driveway or intersection, the mainline flow must adjust speeds and sometimes lanes to avoid all manner of delay and conflicts introduced such as slowing, turning, merging, entering, and stopping.

As a part of this Plan, a new guidance document has been created as a supplement to the access management ordinance. The guidance document for Access Management is in Appendix E.

Jurisdictional Transfer

There are multiple ways a matter of jurisdictional transfer of public right-of-way can present itself (development projects, future capacity concerns, maintenance-related funding restrictions, system continuity, very high or very low traffic volumes, special agreements, etc.). Begin conversations with other agencies as early in the process as possible. If it is determined that a jurisdictional transfer is necessary, the following steps should be followed.

The first step is to establish clear boundaries on the limits of the transfer. It is recommended that a professional licensed surveyor is used to create a figure that shows the precise area that will be part of the agreement. Once the area is agreed upon by all parties, a public notice of the proposed jurisdictional transfer should be sent out to all adjacent landowners. After all public comments are addressed, the penultimate step is to prepare a legal agreement between all entities. The agreement should include the following items (in addition to other standard legal language):

- Purpose of the jurisdictional transfer
- Public notice timeline, and state that all public comments of adjacent landowners have been sufficiently addressed
- Clearly state that by signing this agreement, the entities agree to transfer ownership, maintenance, and other responsibilities associated with the land.
- Survey plans showing the area of jurisdictional transfer stamped by a Professional Land Surveyor

The final step is to take the final agreement to the governing bodies for final signatures. There should be a signature block in the agreement for the chairman of the Union County Board of Commissioners, the mayor (or other similar title) of the municipality, and, if pertinent, any relative entity from the South Dakota Department of Transportation. These signature blocks are flexible and should change based on the context of the jurisdictional transfer. See Appendix G for a legal agreement template, which is presented as an option to guide the jurisdictional transfer process by a Memorandum of Understanding (MOU). This document could replace the resolution format used currently by Union County.

A brief review of Union County and discussion with the SAT showed that there are some county road corridors that appear to be candidates for jurisdictional transfer, now or within the planning horizon year of 2045. These candidates were identified as outliers to the county road network of continuity or near city development areas, however, further study and discussion is warranted.

CANDIDATES FOR JURISDICTIONAL TRANSFER

- County Road 1F east of Beresford – Potential Development of area
- County Road 1E west of Alcester – Discontinuity of system
- County Road 1E east of Alcester – Discontinuity of system
- County Road 1B southeast of Elk Point – Potential development of area
- County Road 1B north of North Sioux City – Potential Development of area
- County Road 1 northwest of North Sioux City – Potential Development of area
- County Road 5 south of North Sioux City – Discontinuity of system
- County Road 23 west of North Sioux City – Potential Development of area

Alternatively, jurisdictional transfer can occur by bringing roads into county jurisdiction from other agencies. The SDDOT indicated that SD 11 (between SD 50 and Elk Point) is a candidate for jurisdictional transfer, but Union County is not interested in the transfer at this time.

Road Maintenance

As described in earlier sections, it was concluded in the pavement condition assessment that Union County does a good job maintaining its road surfacing. This was validated in the public survey when the majority of respondents said the quality of the transportation infrastructure in the county was the same as it was 5 years ago, and more responded that the quality was better than worse. Therefore, this study does not make major changes to the current county maintenance strategy. The following strategies are described according to SDDOT's *Pavement Preservation Guidelines.*[23]

Road Preventive Maintenance

Preventive maintenance projects use the philosophy of applying *"the right treatment, to the right pavement, at the right time."* Union County's current maintenance strategy typically consists of applying chip seal maintenance projects for 25 miles each year, which puts the network on roughly a 7-year chip seal cycle, but applications are applied as needed rather than a firm 7-year cycle for each road. Chip seals are popular in South Dakota because they have good return on investments by extending the service life of pavement without high costs. However, their effectiveness is greatly reduced as overall pavement condition deteriorates because it does not replace or add strength to the pavement.

Road Rehabilitation

Rehabilitation projects range from non-structural to structural enhancement. The County's current rehabilitation strategy typically consists of applying asphalt overlay projects with either a leveling course or a milling operation for about 8 miles each year. Applications are applied as needed for each road. Union County has implemented other rehab projects such as microsurfacing, concrete overlays, and full-depth reclamation, but for planning purposes, it is generally assumed to be asphalt overlays. Rehab projects are typically Union County's most expensive roadway surface improvements, so it is essential that these project types are planned for best return on investment. That return can be due to longevity of the road service life gained or supporting economy and quality of life of the most users.

Road Reconstruction

Due to the high cost of reconstruction, it is typically avoided if possible and may not be affordable when it is necessary. Reconstruction of one road can use up most of the annual funding budget. If reconstruction is expected in the future for any county road for any reason, it should be planned years in advance so that funding can raised, planned, and applied.

Spring Load Restrictions

The literal prevention of loading by imposing load limits is a great way to maintain existing road infrastructure, though it must be weighed against the barrier it places on economies of industries that use heavy equipment. With that consideration, South Dakota laws are comparatively lenient on the size of farm and trucking equipment. Because the Spring is the most vulnerable time for roads, the SDDOT and Union County implement Spring load limits. In 2021, these load limits were 7 tons per axle on its asphalt surfaced highways with the exception of CR 1B from Jefferson to Exit 4 at I-29. The period of time that these load limits may be in place can be from February 15 to April 30. These load restrictions protect highways during the spring thaw, which is the time when roads are most susceptible to damage from heavy loads. During the spring, the frozen ground thaws from the top down, and there is a period of time where moisture laden pavement and base material is caught between the heavy loads above it and the frozen subgrade beneath it. By protecting the highways during this time, the County is protecting its largest assets and investments.

[23] SDDOT. *Pavement Preservation Guidelines* (March 2021).

John Butt, Ulteig's Associate Director, Civil, authored the following article about bridge maintenance.

Bridge Maintenance[24]

The best way to get more life out of bridges is to invest in an ounce of prevention in the short term to avoid the expense of a much more costly cure in the long term. Listed below are some strategies for squeezing more life out of existing bridges:

Set up a Prioritization System
No two bridges are alike. Age alone is not the number one factor in prioritizing which bridge gets help first. Take for example the Brooklyn Bridge—even though it opened in 1883, because of its iconic nature, maintenance has been a priority. This bridge continues to service over 100,000 vehicles each day. Focus on consistent preventative maintenance to avoid the need for major rehabilitation. As part of this study, bridge replacement priority is shown in Section 6 (Bridge Replacement Plan) of this report, and a preliminary ranking of all 113 bridges is shown in Appendix I as a basic screening regardless of bridge condition.

Take a Holistic Approach
When a bridge is inspected, make sure the inspection team looks beyond the details, such as the bridge joints or the condition of the bridge deck. Step back to take a look at the entire structure. Is there a change in geometry? Are there changes in how the bridge is being used or the amount of traffic going over the bridge? Factor in the health of the bridge in its entirety into its assessment and planning.

Prevent Small Problems from Becoming Big Problems
The biggest problem in the United States when it comes to bridge maintenance is that small problems are often put off until there are enough accumulated issues to justify hiring a contractor to do all of the fixes at one time. To get more life out of bridges, break out of that pattern and instead start to make all of the small fixes as they are spotted. Consider grouping a number of bridges under one contract to handle such small repairs versus contracting out for each bridge.

Focus on Bridge Joints
The bridge joint is the interface between the road and the bridge, and it should be at the top of the list for preventative maintenance. Many older bridges incorporated a strip seal of some form to waterproof the joint. Some bridges lack this joint sealant all together, creating an opening for moisture and debris to accumulate on the bearing seat. Installing and maintaining the joint seal is a low-cost way of avoiding bigger problems in the future and a good way to extend the life of the bridge. Watch for tearing in the seal and make sure to regularly clear objects that could tear into the seal, such as bolts, screws, nails, wood, and even discarded coffee cups and litter. Pay special attention to bridges in high traffic areas where it is more likely road debris will get into the joint.

Replace or Eliminate the Joints
At some point, through a combination of wear and tear along with routine aging, you will need to completely replace the seal. As much as possible, replace joints before they have completely failed to protect the superstructure and substructure below. When it comes to replacements or major rehabilitations, move the bridge joints off the bridge to eliminate the need for future costly maintenance. One solution could be the use of an integral abutment, moving the joint to the end of the approach slab.

Increase Road Sweeping Frequency
One of the lowest cost, most effective things to maintain bridge life is to regularly use a road sweeper to clean off bridges. Removing dirt, sand, rocks, road salt, and objects such as nails, screws, glass, and

[24] Butt, John. "Fixing America's Bridges on a Shoestring Budget." *Roads and Bridges* (May/June 2021 Issue). https://www.roadsbridges.com/fixing-americas-bridges-shoestring-budget

other items prevent ponding of water that could damage bridge joints. Water is the number one enemy of bridges and allowing it to flow as intended will improve the structure's service life. Instead of once a year, consider doubling or tripling your bridge cleaning efforts. It is a relatively low-cost method to achieve high return on service life.

Install Remote Water Gauges

One of the most common causes of catastrophic bridge failures is scour, where water removes the soil supporting a bridge's foundation. Typically, this is a known issue well in advance of the failure, as identified in biennial inspection reports. Consider installing remotely monitored gauges to measure water levels and water flow, which will give an indication of when bridges are experiencing higher flow events. This can be used as a part of a scour plan of action to trigger an off-cycle bridge inspection to ensure the foundation has not been compromised during the flood event. This is especially important if bridges are located in floodplains and subject to an increasing number of flooding events.

Get Away from Deicing Salts

Salt-based deicing chemicals are highly effective at melting ice, but they are also highly corrosive to steel and leach through concrete, accelerating the deterioration of the bridge superstructure. Consider switching to sand, which is more environmentally friendly and still effective.

Avoid Adding Excessive Dead Load

Excessive amounts of asphalt impose a dead load on the bridge, which will negatively impact the bridges load rating. Consider milling the asphalt surface prior to placing an overlay in locations where the additional dead load would be detrimental to the load rating. Thin overlays in place of more traditional lift thicknesses are also an option. The buildup of gravel on bridges along gravel roads should also be avoided. Instead, match the bridge deck as closely as possible.

Image of Gravel to Bridge Transition
Source: FHWA. Gravel Roads Construction & Maintenance Guide, August 2015

Bridge Improvement Grant (BIG) Program

The Bridge Improvement Grant (BIG) program was created in 2015 by the South Dakota Legislature, which helps counties fund bridge improvements by distributing $15 million annually. It stated that for eligibility for a BIG grant, a county must impose a wheel tax and implement a County Highway and Bridge Improvement Plan detailing proposed highway and bridge projects over the next 5 years. Union County has already implemented a wheel tax in 1986 and completes the annual 5-year improvement plan each spring, thus maintaining eligibility for the BIG grants. BIG grants are very competitive and awards for BIG grants are distributed based on complex scoring criteria.

In the years since the BIG program was implemented, Union County has been awarded $1,758,900 to fund bridge improvements.

Table 15: Union County BIG Program Funding Awarded by SDDOT

Award Category	Funding Awarded to Union County by SDDOT as part of BIG Program						Total
	2016	2017	2018	2019	2020	2021	
Prelim Engineering	$34,000	$31,300		$189,100	$286,500	$147,200	$688,100
Preservation							$0
Rehab/Replacement		$439,900		$630,900			$1,070,800
Total	**$34,000**	**$471,200**		**$820,000**	**$286,500**	**$147,200**	**$1,758,900**

Wheel Tax

Union County imposes a wheel tax of $4.00 per wheel on all motor vehicles registered in Union County, with a maximum of $48.00 per vehicle. This Wheel Tax also earns Union County 8 points as part of SDDOT Bridge Improvement Grant (BIG) applications. Potentially, an increase to the maximum of $5.00 per wheel would award 10 points as part of BIG applications, which would be one facet of a strategy to increase revenue for transportation improvements.

Implementing a wheel tax in Union County puts the County in position to apply for the SDDOT's BIG program. It is strongly recommended that Union County continues to apply for BIG funds each year.

Special Events

If scheduled special events are to take place that place unique demand on the county highway network, the County Highway Department should be contacted to permit temporary use of highway right-of-way. County staff will evaluate applications on a case-by-case basis. Some examples of special events include parades, marathons, bicycle races, and motorcycle rallies. Some potential characteristics of special events include temporary road closure, specific starting and ending times, unknown capacity of spectator viewing, free attendance, and unspecified parking or no parking facilities available.

It is important to consider all possible risks that may be introduced by special events. Therefore, collaboration must be made by all agencies with a functional stake in the event such as sheriffs, police departments, fire departments, emergency operations management, emergency medical services, regional health services, public works, utilities, parks & recreation, and any other city/county/state/federal agency which may be impacted.

Enhancements

In this study, enhancement projects are generally described as any project that address issues and needs identified, and may also improve the infrastructure from baseline conditions. The enhancement projects proposed for Union County fall under six primary categories:

- Flood mitigation
- Bridge replacement
- Safety enhancement
- Jurisdictional transfers
- Multimodal enhancements
- Priority route enhancements (Major Roads Plan)

Each of these project categories address one or more of the issues and needs identified in Section 3 of this report.

In the following sections, some enhancement types are explored that are not specifically proposed in this study's proposed projects. It will serve as a brief resource for Union County to consider for future projects should the need arise.

Bicycle and Pedestrian Plan

In the past, Union County has not dedicated any funding to bicycle/pedestrian or multimodal improvements along its network. This study has proposed enhancements that will directly promote the growth of active multimodal transportation with widened shoulders on County Paved – Priority Routes as part of the Major Roads Plan, specific projects that address concerns and ideas raised by public feedback, and the Union County Trails Master Plan.

Bicycle

Bicycle Facilities should be direct, safe, and low-stress, meaning that on-street bike systems should use routes that are not carrying higher-speed traffic, if possible. The Union County Bicycle System should function well for cyclists of all skill levels with minimal detour or delay. One major long term goal would be a designated Bike Route between North Sioux City and Sioux Falls. Trails along major corridors would be the ideal design, but on-street facilities such as bike lanes or paved shoulders may also meet this goal.

Bicyclists want to feel safe from traffic. An accessible bicycle route features buffered space away from traffic or off the road altogether. Bikeways and trails that create these types of spaces with additional consideration at intersections and crossings help create these types of spaces.

Separated bicycle facilities such as trails or shared-use paths offer the highest levels of safety and comfort to users due to the physical separation from motorized vehicle traffic. They offer opportunities for recreational cycling and commuting that differ qualitatively from on-street riding, thus tending to attract bicyclists of all skill levels as well as a mix of other modes. They can be constructed through natural and scenic areas or within highway right-of-way.

With the vast majority of Union County roads being rural and high speed, the consideration for wide paved shoulders may be the most feasible and quickest means to building up its bike-friendly infrastructure. For paved roadways with no rumble strips, no curb, no vertical obstructions immediately adjacent to the roadway, the design of 4-foot-wide paved shoulders on both sides of the road is considered the minimum width to accommodate bicycle travel,[25] and 5-foot wide if in the presence guardrail, curb, or other roadside barriers. However, it is desirable to increase the width if motor vehicle speeds exceed 50 mph or if the route is used by heavy trucks, buses, or recreational vehicles. With the assumption that Union County roads are 55 mph and used by heavy vehicles (particularly on identified priority routes on the Major Roads Plan), 6- to 8-foot paved shoulders are recommended to accommodate bicyclists.

Future bicycle routes should provide the following recommended features:

- Trail or Shared-Use Path physically separated from the primary roadway's motor vehicle traffic by an open space or physical barrier is most desirable. They often have their own alignments but may be located within the right-of-way of an adjacent roadway. They are typically paved bi-directional pathways and run along one side of the road.
- Paved shoulder widths of 6 to 8 feet on 55 mph county highways, depending on traffic volume and heavy truck presence. The Highway Capacity Manual (HCM) may also be used to check the bicycle level of service (BLOS) as an additional reference to guide paved shoulder width design.

[25] AASHTO. *Guide for the Development of Bicycle Facilities, 2012 4th Edition.*

- If the minimum shoulder width of 4 feet (useable width) is used, rumble strips normally provided outside of the driving lane must be rumble stripe end lines instead. Additional shoulder width should be provided in the presence of curbs, guardrails, roadside barriers, or any other vertical obstruction.
- If rumble strips or rumble stripes are provided, periodic gaps in the rumble strips should be provided to allow bicyclists to move across the rumble strip pattern as needed.
- Shoulders should be level and there should be no abrupt drop-offs. Shoulder cross slope should consider the needs of bicyclists and pedestrians, as well as drainage.
- Shoulders should be on both sides road and not encourage head-to-head travel.
- Bridges should have shoulders whenever possible and have debris cleaned off regularly.
- Where unpaved driveways or crossroads meets the shoulder, it is advisable to pave some portion of the approach to prevent loose gravel from spilling onto the shoulder.
- Consider how turning traffic at intersections will impact the safety of bicyclists and design accordingly.
- Bicycle-safe upgrades may need to be considered near inlet grates, railroad crossings, bridge expansion joints, smooth pavements, rumble strips, and surface type transitions

Pedestrian

Union County should continue to close gaps in the sidewalk and trails network across unincorporated areas. Union County also has an opportunity to build a network of trails to promote active transportation, public health, tourism, sustainability, resiliency, and economic development. Pedestrian safety at crossing locations should also be addressed by design.

On-Street Bike Routes

The addition of paved shoulders and Bike Route designation is recommended for the following roadways in Union County (County and State routes included) to provide enhanced safety for bicyclists and occasional pedestrians:

- CR 13 – from Clay County border in the west to Iowa border in the east
- CR 1C – from SD 50 to Beresford
- SD 50 – from CR 1C to SD 11
- SD 11 – from Elk Point north to SD 50
- CR 1B – from Elk Point to North Sioux City
- CR 10 – from Clay County border to Elk Point
- CR 7 – from CR 1B to Iowa border

Intergovernmental agreements and cooperation are essential for ensuring that on-street bike routes are continuous across jurisdictional boundaries and provide connectivity into towns and bicycle access across the county and region. Some of the on-street bike routes shown above are within SDDOT jurisdiction, though it has been noted that the SDDOT is open to the idea of transferring jurisdiction to Union County for the SD 11 segment.

Quick-Build Projects

Quick-build projects provide an opportunity for Union County to test more walkable and bikeable street projects, road diet applications, and other space reallocation projects for various modes of transportation. Successful pilot/interim/temporary roadway changes present an opportunity for the long-term implementation of modified street configurations.

Quick-build projects are often defined by the following four characteristics:

- **Timeline**: Implemented quicker than typical projects; typically, a few months to 1-2 years
- **Budget**: Small budget using interim, flexible materials; provides the time to evaluate the results and raise funds to build a permanent solution.
- **Material Features**: Flexible delineator posts, paint, planters, temporary curbs, etc. are used to delineate space and calm traffic quickly at low cost. They add physical on-street features such as medians, islands, curb extensions, lanes, etc.
- **Process**: A demonstration is provided to gain support for a long-term solution using a short-term idea. This process is supported by buy-in from the community and local governments and can be scaled up into new policy or programs.

A Quick-Build Traffic Calming Concept using flexible delineators, slows traffic in advance of a crossing
Source: City of Boulder, CO[26]

Trails Master Plan

The phased construction of the Union County Trails Master Plan will benefit Union County for generations through increased physical activity options, quality of life, tourism, economic development, connectivity, and resiliency. Although trails carry specific funding requirements to plan, design, construct, and maintain, the economic and health benefits of a fully realized master planned countywide trails system far exceeds the capital and operational costs.

The Union County Trails Master Plan shown below uses a phased approach and locates trails near existing transportation facilities, towns, riverways, and drainages.

The Union County Trails Master Plan builds from a large existing trails network in North Sioux City that includes existing trail connections on Streeter Drive, Northshore Drive, and Westshore drive that connect into the Adams Homestead Nature Preserve. The Union County Trails Master Plan uses five phases to create an eventual countywide trail network. Shared vision, local buy-in, a local champion, grant awards, and coordination with local governments, transportation utilities, and private landowners will be required to complete the Union County Trails Master Plan. The Union County Trails Master Plan covers a large portion of Union County and has multiple potential connection points to neighboring counties. The Union County Trails network should include wayfinding signage that includes distances to destinations. All trails proposed for Union County could be composed of loose (natural) surface, crusher fines, asphalt, or concrete. Trail alignments in the Union County trails Master Plan are conceptual.

[26] City of Boulder, CO. Vision Zero Innovation Program. https://bouldercolorado.gov/projects/vision-zero-innovation-program

Trails Master Plan Phases

All phases proposed below are preliminary. The ultimate development of a trails plan in Union County should consider multiple route alternatives to gather detailed feedback from the public and feasibility analysis.

Phase 1 Northern and Southern Community Connections – Trail Corridors represent the initial trails to be constructed as part of the Union County Trails Master Plan, Phase 1 trails are shown in **pink** and are envisioned to closely follow rail corridors such as the BNSF railroad from North Sioux City through Jefferson to Elk Point. Another planned Phase 1 Trail alignment connects the northern Union County Cities of Beresford to Alcester and are envisioned to closely follow the D&I railroad. Another Phase 1 trail connection includes a continuation of the Northshore Drive Shared use path on the south side of 334 St/CR 23 (on the east side on 480th Avenue), connecting to the Missouri River.

Phase 2 Intermediary Trails – Secondary trail corridors that provide additional connectivity to neighboring counties, river corridors, and further phases of the Union County trail network. Phase 2 trails are shown in **blue**. The southern Union County trail is envisioned to closely follow the BNSF railroad northwest from Elk Point to the county line with Clay County, also following the D&I railroad northeast from Elk Point to the Big Sioux River, and generally following the Big Sioux River north to Brule Creek. Another planned Phase 2 Trail alignment connects the City of Alcester east to the Big Sioux River closely following the D&I railroad and eventually connecting to Sioux County.

Phase 3 Brule Creek Trail – The tertiary river trails of Phase 3 shown in **green** are envisioned to be scenic forested trails that connect the planned north and south trail networks of Union County. The primary Phase 3 trail alignment will pick up where the southern Phase 2 trail ended and generally follow the Brule Creek corridor connecting with the existing trails system and facilities at Union Grove State Park. The Phase 3 trail continues generally following Brule Creek north of Union Grove State park to a fork with one trail segment following West Brule Creek and the other following East Brule Creek, both linking to the Phase 1 D&I railroad trail segment from Beresford to Alcester.

Phase 4 Big Sioux River Greenway – The longest linear phase of the Union County Trails Master Plan is a Big Sioux River Greenway Trail shown in **purple** generally following the Big Sioux River from North Sioux City north to the county line of Lincoln County. This trail should serve as the crown jewel of the Union County Trails Network, and include park benches, riverbank activations, fishing platforms, and interpretive signage. Since flooding of the river in this area is frequent it may be advisable to construct the trail with a natural surface rather than concrete.

Phase 5 Lewis and Clark Trail – The final phase of the Union County Trails Master Plan is the Lewis and Clark Trail shown in **orange** generally following the Missouri River from North Sioux City northwest to the county line of Clay County. The Lewis and Clark Trail will connect on the southern end to existing Shared Use Paths in Dakota Dunes and will also connect to the Phase 1 Community Connections trail in two different locations on the southwestern portion of Union County. This trail should serve as a scenic, recreational trail for the Union County Trails Network, and include park benches, riverbank activations, fishing platforms, and interpretive signage.

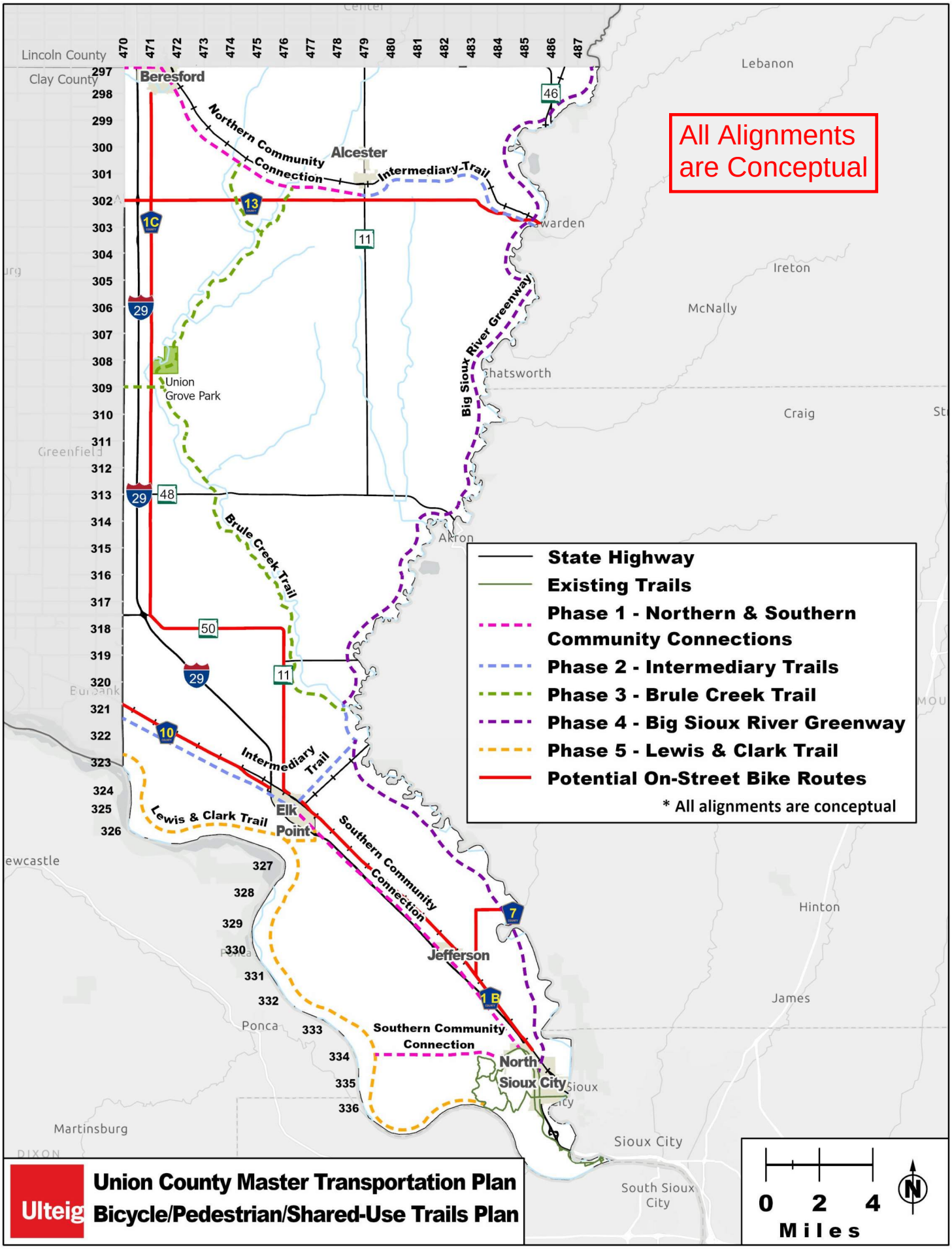


Figure 23: Bicycle/Pedestrian/Shared-Use Trails Plan

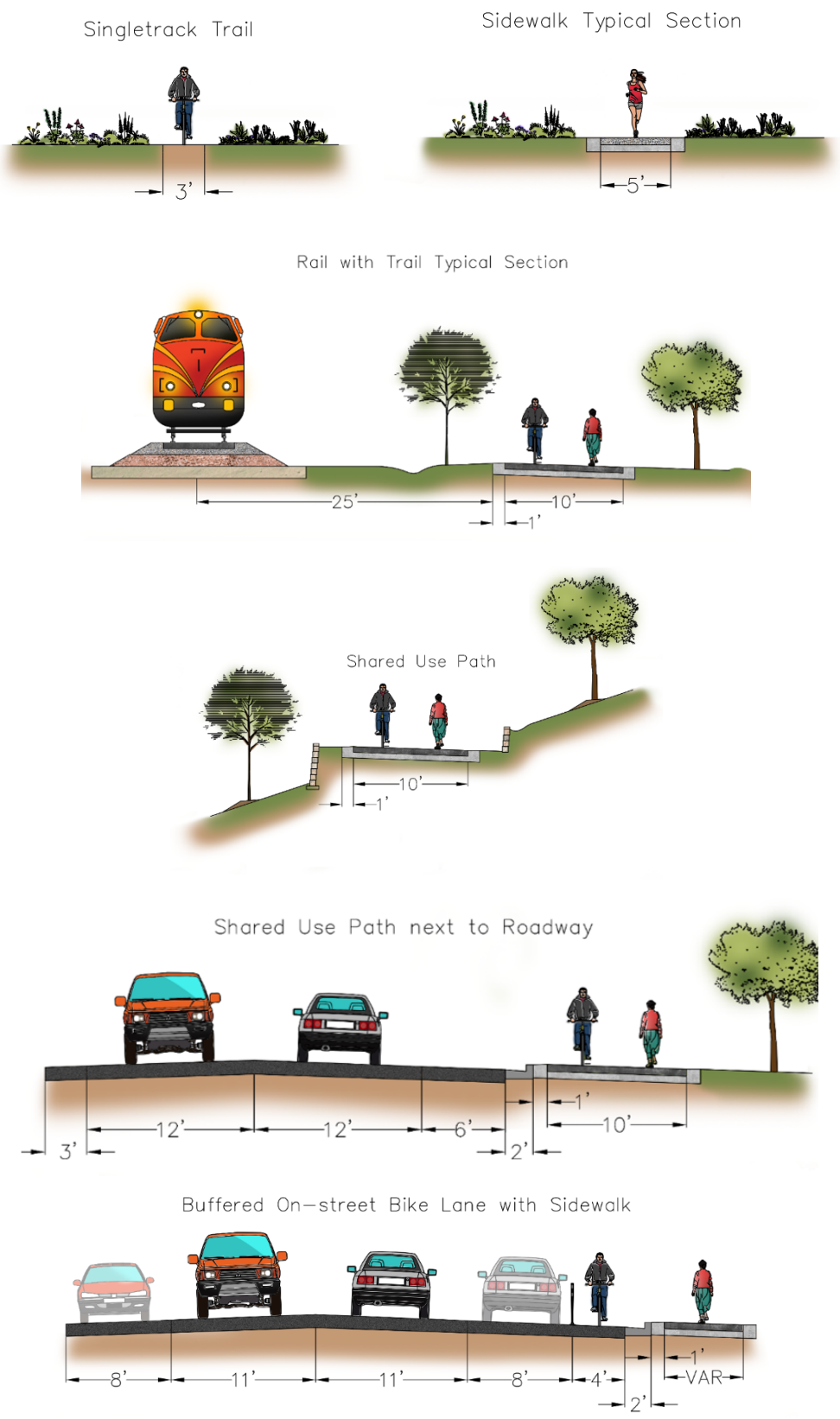


Figure 24: Bicycle/Pedestrian/Shared-Use Conceptual Cross Section Designs

Trails Master Plan Implementation

Shared vision, local buy-in, a local champion, grant awards, and coordination with local governments, transportation utilities, and private landowners will be required to complete the Union County Trails Master Plan. Identification of an organization to build and maintain Union County trails is crucial. The Union County Trails Master Plan covers a large portion of Union County and has multiple potential connection points to neighboring counties. It is recommended to build the trails network out in phases, break each phase into segments. A separate feasibility study or Union County trails implementation plan is recommended for next steps including:

- Identification of a local champion, and maintenance organization
- Prioritize trail corridors
- Prepare preliminary alignments
- Design trail cross-sections and dimensions for each alignment and phase
- Perform trail ROW analysis, including parcel by parcel analysis for initial priority corridor trail segments
- Build preliminary cost estimates for each trail corridor
- Perform detailed mapping and analysis
- Hold public meetings and online opportunities for public feedback

Grants and Funding

Grants can be a great way to supplement or bolster funding for trails projects. However, grants require both funding and staff time to identify projects, grants, and fill out the grant application forms, each of which have different requirements and take different levels of administrative burden to complete. Grants are also typically a competitive process and are inherently risky as not all applications will win a grant award. Some grants require a specific percentage cash match from the applicant or in-kind contribution.

Grants for trails include:

SDDOT Transportation Alternatives Program (TA) Recreational Trails Programs[27]
Transportation Alternatives is a program that uses federal transportation funds, designated by Congress, for specific activities that enhance the inter-modal transportation system and provide safe alternative transportation options. TA is authorized by the Fixing America's Surface Transportation Act (FAST Act) set-aside of Surface Transportation Block Grant (STBG) program.

TA encompasses a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, safe routes to school projects, community improvements such as historic preservation and vegetation management, and environmental mitigation related to storm water and habitat connectivity.

As of April 2022, approximately $7.8 million will be available annually for TA in South Dakota: A portion of these funds is available through a competitive project selection process administered by the South Department of Transportation (SDDOT) Office of Project Development. Each individual project may be approved for a maximum of $600,000 in Federal funds, although SDDOT may approve a larger amount for phased projects. The minimum for infrastructure projects will be $50,000. There is no minimum for non-infrastructure projects.

Eligible activities include:

- Facilities for pedestrians, bicyclists and other non-motorized forms of transportation

[27] SDDOT TA Application: https://dot.sd.gov/programs-services/programs/transportation-alternatives#listItemLink_1420 (or contact SDDOT Planning Engineer)

- Safe routes for non-drivers
- Conversion and use of abandoned railroad corridors for trails
- Construction of turnouts, overlooks, and viewing areas
- Planning and implementation of community improvement activities
- Environmental mitigation
- Implementation of the Safe Routes to School Program
- Boulevards and other roads largely in the right-of-way of former Interstate System routes or other divided highways

South Dakota Game Fish and Parks - Recreational Trails Program (RTP)[28]
The Recreational Trails Program provides partial reimbursement for approved trail projects. Eligible projects include construction of new public trails, rehabilitation of existing public trails, development of trail-related facilities and educational programs that relate to recreational trails.

RTP funds come to the state through the Federal Highway Administration and are apportioned to states by Congress to fund both motorized and non-motorized public recreation trail projects. The amount of funds available is based upon the number of recreational vehicles licensed in each state.

US Environmental Protection Agency – Recreation Economy for Rural Communities (RERC)[29]
The Recreation Economy for Rural Communities planning assistance program helps communities identify strategies to grow their outdoor recreation economy and revitalize their Main Streets.

Activities include the following and more:

- Developing or expanding trail networks to attract overnight visitors and new businesses and foster use by local residents.
- Developing in-town amenities, such as broadband service; electric vehicle charging stations; housing; or shops, restaurants, or breweries, to serve residents and attract new visitors and residents with an interest in nearby outdoor assets.
- Marketing Main Street as a gateway to nearby natural lands to capture and amplify outdoor recreation dollars.
- Ensuring that all residents and visitors have access to and can benefit from the growing outdoor recreation economy.

AARP - AARP Livable Communities Challenge[30]
Grant fund quick-action projects to help communities become more livable for people of all ages. Applications are accepted for projects for public spaces, housing, transportation, civic engagement, COVID-19 pandemic recovery, diversity, inclusion, and more. Eligible applicants include government entities, non-profit organizations, and other types of organizations. Grant amounts vary.

Wellmark Small MATCH Grant Program – Small (IA & SD)[31]
The Wellmark Foundation accepts applications for its Small Matching Assets to Community Health (MATCH) Grant. The Small MATCH Grant is for up to $25,000 and must be matched at 50 percent with cash or in-kind contributions. The funding is for projects that make it easy to eat healthy and engage in daily physical activity. The initiatives should focus on positive, long-term impact on the residents and visitors.

[28] SD Game, Fish and Parks RTP Application: https://gfp.sd.gov/userdocs/docs/rtp-application.pdf (or contact SD Game, Fish and Parks Grants Coordinator)
[29] US Environmental Protection Agency RERC Application: https://www.epa.gov/smartgrowth/recreation-economy-rural-communities
[30] AARP Community Challenge Application: https://www.aarp.org/livable-communities/community-challenge/
[31] Wellmark Small MATCH Program Application: https://www.wellmark.com/foundation/grants/grant-information/matching-assets-to-community-health

Examples of sustainable grants include the following and more:

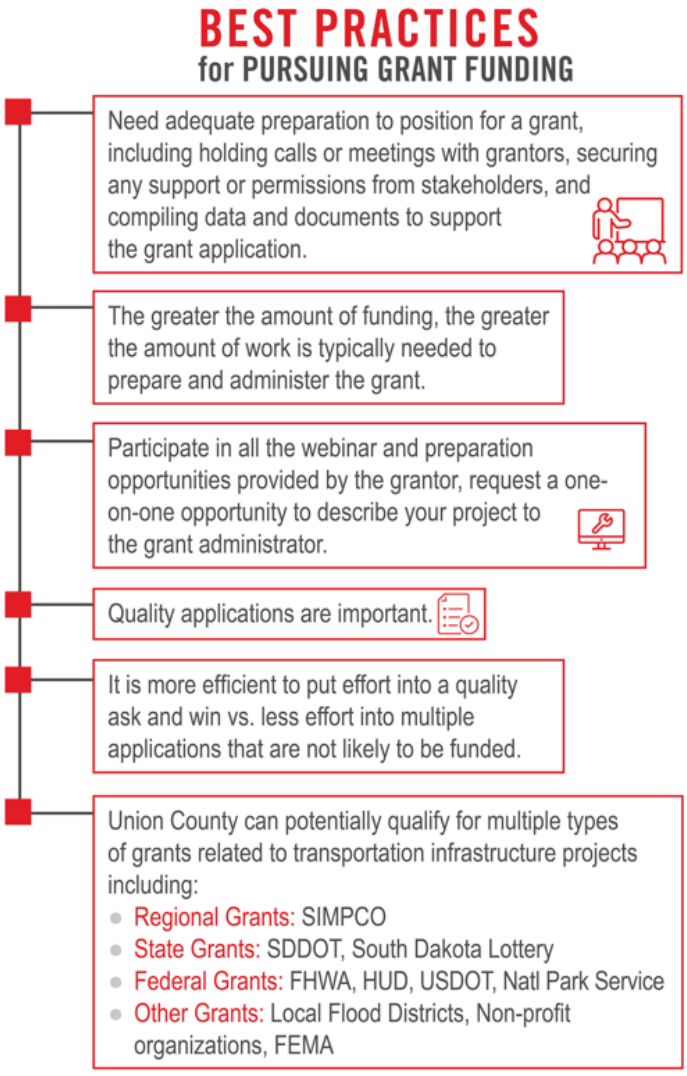
- Trails
- Safe Routes to School plans and infrastructure
- Share-the-road plans and infrastructure, including safe crossing signs and lighting

America Walks – Community Change Grants[32]
The Community Change Grant program supports the growing network of advocates, organizations, and agencies working to advance walkability. Grants are awarded to innovative, engaging, and inclusive programs and projects that create change and opportunity for walking and movement at the community level. The number of grants awarded varies each year.

Competitive Infrastructure Funding Opportunities for Local Governments[33]
As of January 2022, the White House has shared a *Fact Sheet* listing competitive funding opportunities for local governments as part of the Bipartisan Infrastructure Law.

Applying for Grants

Grants can be a great way to supplement or bolster funding for projects. However, grants require both funding and staff time to identify projects, grants, and fill out the grant application forms, each of which have different requirements and take different levels of administrative burden to complete. Grants are also typically a competitive process and are inherently risky as not all applications will win a grant award. Some grants require a specific % cash match from the applicant or in-kind contribution. Grant opportunities for trails are shown above in the previous section of this report. Some best practices for pursuing grant funding are shown in the graphic above.



Safety

Union County has implemented systematic safety improvements such as the County-wide signing program funded by the SDDOT. There are also some rumble strips in select locations. Union County's striping strategy typically consists of applying striping for 90 miles each year, which puts the network on roughly a 2-year striping cycle. This study makes safety recommendations and enhancements

[32] America Walks – Community Change Grants Application: https://americawalks.org/programs/community-change-grants-2021/
[33] The White House – Building A Better America: https://www.whitehouse.gov/wp-content/uploads/2022/01/BIL-Factsheet-Local-Competitive-Funding.pdf (January 20, 2022)

based on the safety assessment and public feedback. See Section 6 (Enhancement Project Implementation Plan) of this report for proposed safety enhancement projects.

Proven Safety Countermeasures

In 2008, FHWA began promoting the widespread use of certain infrastructure-oriented safety treatments and strategies that can offer significant, measurable impacts to improve safety. These *Proven Safety Countermeasures*[34] *(PSC)* are effective in reducing roadway fatalities and serious injuries. Agencies are strongly encouraged to consider widespread implementation of PSCs to improve safety. In 2021, 9 new PSCs were added to the growing list, and there are now a total of 28 different PSCs, addressing a variety of crash types and focus areas such as speed management, roadway departure, intersection, pedestrian, and bicyclist crashes.

Incorporating Safety into the Plan

Individual crashes are random events by their nature, often with multiple contributing factors. Crash patterns are revealed over time, and crash factors are exposed. Crash reduction measures are often applied after it becomes apparent where crash rates are higher, particularly with severe crashes. System-wide crash reduction measures can also be applied at any time, such as sign installation programs, rumble strips, or new construction design elements that incorporate wider shoulders, flatter ditch slopes, and removing or relocating fixed objects.

The absence of paved shoulders and rumble strips on roadways may increase the risk of run-off the road crashes.

- Purchase right-of-way in order to provide wider shoulders along roadway. Install shoulder rumble strips if applicable throughout the corridor.
- Install centerline rumble strips (CLRS) if applicable. CLRS are a proven low-cost safety improvement to reduce target crash types. Target crashes for CLRS are head-on (1% of all crashes in Union County), sideswipe opposing (4% of all crashes in Union County), and run-off road left (12% of all crashes in Union County).

The presence of steep ditches (6% of all crashes in Union County) close to the edge of the pavement may increase the risk of vehicle overturns/rollovers (12% of all crashes in Union County).

- Purchase right-of-way in order to provide wider shoulders and/or flatter slopes along roadway.
- Install guardrail where the slopes are not traversable (steeper than 3:1 slope rate) or where the clear zone cannot be kept clear.

High speeds (10% of all crashes in Union County) on the roadway may increase the likelihood and severity of all types of crashes.

- Improve road signing and enhanced pavement markings, including centerline rumble strips.
- Install street lighting if feasible (28% of all crashes occurred on roadways not lighted).
- Install warning and advisory signs if not in place
- Install dynamic warning signs
- Reduce approach speeds at intersections with visual changes such as effectively reducing the lane width (narrowing intersections).

To mitigate risk for pedestrians and bicyclists along high-speed corridors,

- Provide widened shoulders, bike lanes, shared-use paths, trails, and/or sidewalks.

[34] FHWA. Proven Safety Countermeasures. https://safety.fhwa.dot.gov/provencountermeasures/

To mitigate risk for motorcyclists along high-speed corridors,

- Encourage the wearing of helmets, which are effective at helping to prevent fatal injuries to motorcyclists and passengers.
- Aggressive impaired driving enforcement for all motorists reduces motorcycle fatalities and serious injuries due to a higher rate of involvement of motorcycle riders in impaired driving crashes (3-star SHSP[35] Key Strategy)
- High-Visibility enforcement of aggressive driving and speed laws to reinforce established speed limits (3-star SHSP Key Strategy)
- Rider education and training courses (2-star SHSP Key Strategy)
- Continue to promote SouthDakotaRides.com (1 or 2-star SHSP Key Strategy)
- Provide paved shoulders for recovery and breakdowns
- Continue to apply fog seals after every chip seal to retain loose rocks and chips. Provide notices to the public for times between the chip seal application and the fog seal application, which is often 1-2 days. Post warning signs about loose rock chips. Ensure loose chips are swept up upon completion.
- Take care during crack sealing operations to not unnecessarily create large traction concerns for motorcyclists, as the sealing surfaces are slick when wet.
- High Friction Surface Treatment (HFST) can be considered to be applied in locations with increased friction demand such as horizontal curves and stop-controlled intersection approaches. It is a low-cost safety treatment when compared to cost of repaving or realignment of curves. It is not a pavement preservation technique, and there are factors to consider before determining candidate locations for this treatment.

Flood Mitigation

Seasonal flooding has routinely affected county roads, forcing temporary closure, major repairs, or permanent closure. Understanding flooding patterns can help Union County prepare for the inevitable road closures and detours that occur during flood events. Some locations may be due for an improvement that overcomes flooding issues, but some locations may need to adapt to the reality that flooding will occur.

Flood Maps

Union County should consider developing flood maps showing different water level scenarios, which are excellent tools for Public Works staff and can help evaluate safety and serviceability during times when floods overtop the road at different flood depths. A good understanding of when flooding occurs, flood levels, and flood frequency can better inform flood mapping, emergency flood routing, and evacuation routes.

Development of Roadway Floodways

In flood prone areas, a floodway is a roadway constructed in the drainage path of floodplains, but specially designed to withstand a temporary flood condition that overtops the roadway surface. Floodways can use reinforcement on the roadway shoulders and embankment to keep floodwater eddies from eroding the shoulder and undermining the floodway road base under the road. Typically, floodways are county roads, lower priority routes, and local roads. Higher priority road such as State Highways and Interstates are not recommended for use as floodways. The dimensions (width and height) of the floodway should be chosen to ensure that floodwater spreads widely across the road to decrease flow

[35] SDDOT. *South Dakota Strategic Highway Safety Plan (SHSP), 2019.*

velocity and reduce scour. Recommended lengths of floodways are generally about 1000 feet and are built on straight stretches, not on horizontal curves.

Paved surfacing is preferred for use in floodways, but stabilized base course may be used for floodways on low traffic roads where time under water is expected to be less than 3 days per year.

Image of floodway with reinforced shoulders in nearby Clay County, SD

Floodways should have a warning sign. Depending on the depth of the flood, an indication of the road route and depths at different points on the road should be provided. Barrier rails and other barriers are a significant obstruction to flow over the channel and should be avoided, but object marker posts may be used.

Advantages of Floodways:

- Floodways cost less than bridges, or elevating roadways
- Floodways also ensure controlled, well directed areas of overflow
- Helps preserve wetland functions
- Allow roads in floodplains to have lower embankments, saving costs and increasing safety by reducing run off the road rollover type crashes.

Disadvantages of Floodways:

- During high flood levels floodways are not passable and traffic must be detoured.

By reinforcing the shoulder areas and embankment slopes of floodways, resiliency and flood survivability is built into the roadway, lessening the probability that the roadway will be washed out during a flood event. Typically, a floodway road runs perpendicular to the flow of the flood causing the road to act like the spillway of a dam.

More information can be found on technical floodway information at www.roadsforwater.org

Geomorphic Design of Floodplain Drainageways

Geomorphic design is a strategy to reduce flooding and infrastructure failure by adding flood plain culverts in lieu of expanding or increasing bridge culvert size. Minnesota Department of Natural Resources and Minnesota Department of Transportation are in partnership to deploy this approach in several locations. The approach does not make sense in all cases, depending on soil type, floodplain size, etc. However, using geomorphic design can increase waterway connectivity, design channel sedimentation, and reduce the risk of overtopping. Additional information is needed about its efficacy and the cost tradeoffs. The figure below depicts a simplified example of the flood benefits of adding additional culverts along a river floodplain. This approach is recommended for higher priority routes such as State Highways or Interstates where a floodway type of design is incompatible but is an alternative for all road classes.

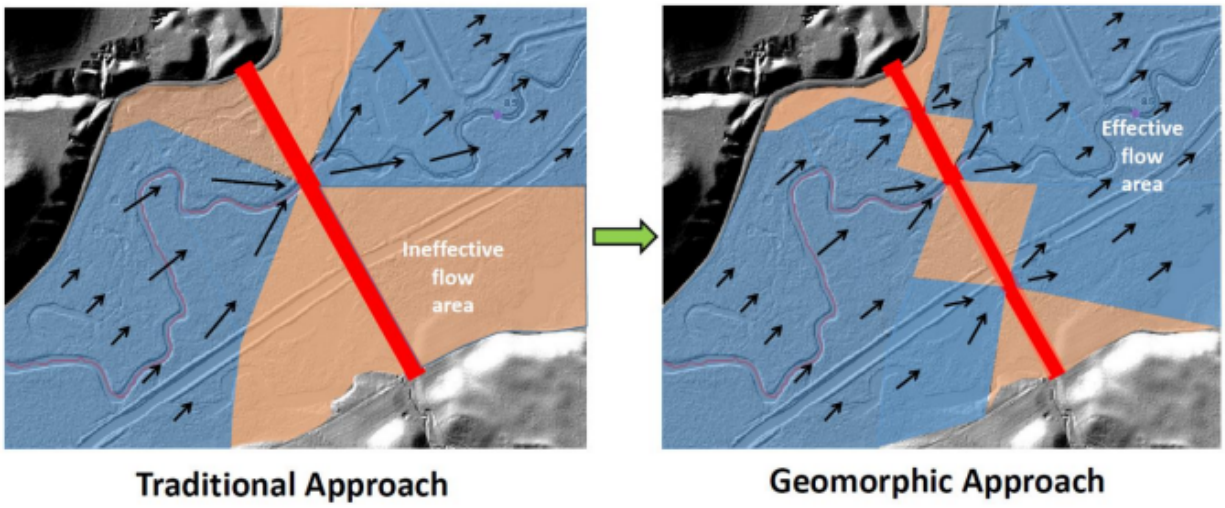


Figure 25: Geomorphic Approach to Floodplains[36]

Other Considerations for Frequently Flooded Roads

If it is determined that mother nature is too much to overcome because of funding limitations, Union County may pursue resolutions that change roads to Minimum Maintenance, No Maintenance, or even abandonment of roads that frequently flood. This ultimately decreases connectivity of the network but may be preferrable to excessive cost and safety concerns.

[36] Zytkovicz, Kevin & Murtada, Salam. *Reducing Localized Impacts to River Systems Through Proper Geomorphic Sizing of On-Channel and Floodplain Openings at Road/River Intersections (2013).* Accessed through Minnesota Department of Transportation. *Transportation Resilience: Current Practices and Opportunities for MnDOT (January 2020).*

6. PROJECT IMPLEMENTATION

Existing Road and Bridge Maintenance/Improvements were ranked as top priorities for future funding by Union County and the public survey results confirmed the priority is aligned. Therefore, project implementation first focuses on maintaining the road and bridge network. This approach has an overall goal of maintaining the condition of the network as a whole, extending useful life of each road and bridge.

With the above priority in focus, other enhancement projects are proposed that address issues and needs identified, prioritized as funding becomes available. Enhancement projects aim to supplement the core effort that is maintaining the existing infrastructure. These projects enhance, that is that they improve above and beyond what is considered essential to maintain. This enhancement can take many forms. The projects proposed in this study generally fall into the same categories identified as issues, needs, challenges, and/or deficiencies. For example, if safety is the identified issue, then the proposed projects' outcome is to prevent future crashes, injuries, and fatalities that may unfortunately continue without action. If network discontinuity is the issue, then the projects' outcome is a modification to rebalance the network, cutting unnecessary costs. The same order of operations is followed for each of the issues identified.

10-Year Highway Paving Plan

5-Year Highway and Bridge Improvement Plan

Each year, Union County develops a 5-Year Highway and Bridge Improvement Plan. It is a short-range planning document that is designed as a tool to assist the County in budgeting, planning, and incorporating the needs and concerns of the public into annual road and bridge projects. This plan is updated each year with some projects removed and others added as needed.

10-Year Highway Paving Plan 2022-2031

Union County's most recent version of the 5-Year Highway and Bridge Improvement Plan is for the 2022-2026 project planning range. As part of this study, a 10-year Paving Plan was developed using the current 5-Year Plan as the foundation for paving project planning. After reviewing recent annual 5-year plans, it was determined that the County plans for about 8 miles of rehab projects each year on the county highway system. Rehab projects in Union County are typically planned as an asphalt overlay with either a leveling course or a milling operation. For both types over overlays, Union County has estimated a cost of $200,000 per mile (2021 $). Continuing with these same assumptions, the 10-Year Paving Plan builds on the 5-Year Plan by noting where rehab projects are most likely to be needed during the 2027-2031 project planning range. The estimate in 2022 dollars (2022 $) is inflated 10% compared to 2021 dollars (2021 $) as an estimated effect due to current issues in the construction industry such as labor shortages, supply chain disruptions, cost of construction materials, and interference with project schedules. These cost estimates are planning level engineering/construction estimates and should always be refined with future project development to incorporate more detailed assumptions. Cost will vary based on project scope, site conditions, site constraints, project schedule, and various economic pressures at the time of construction.

The projects proposed by this study for years 2027-2031 consider the classification of the road in the Major Roads Plan and daily traffic volumes, but projects are primarily based on the pavement condition assessment made during the baseline conditions analysis of this study. Paved roadways that had PASER scores of 4 or lower means they are the best candidates for rehab, and all roads with these scores are addressed in the 10-Year Paving Plan. Additionally, roads with PASER scores of 5 or higher are also represented in the 10-Year Paving Plan due to the nature of continually deteriorating roads and the preference to keep projects compartmentalized. To the greatest extent possible, projects are proposed to

be greater than 1-mile patch-work type projects, but sometimes it cannot be avoided due to the connectivity of the county highway network, the deterioration present, and the bounds of past paving improvement projects.

As time passes, it is expected that the need for certain improvements in certain locations will change due to a shift in priorities or changes in available funding. Some of the projects may not prove as necessary as initially thought. Others may have a better return on investment with something less than a rehab. Lastly, some roads may exhibit unforeseen deterioration and take precedence due to rapid deterioration or the importance of the route. Union County should continually reassess the condition and priority of the roads in the network to get the best return on its annual investments in its transportation infrastructure.

Table 16 and Figure 26 provide the County with a guide for planning paving improvements for the next 10 years. It provides the County with a list of projects and planning level cost estimates to aid in the future implementation of all projects. This list of projects is not comprehensive of all projects proposed in this study, as it only includes rehab projects with the goal of maintaining the condition of the road network's surfacing, a primary outcome desired by Union County and exhibited in the results of the public survey. It does not include enhancements for improved safety, connectivity, flood mitigation, road capacity, and bicycle/pedestrian infrastructure. These enhancements are proposed later in this section, Enhancement Project Implementation Plan (Figure 29).

Table 16: 10-Year Highway Paving Plan (2022-2031)

Map ID	Year	Project Location		Length (mi)	Project Description	Est. Proj. Cost (2022 $)
22-1	2022	CR 15	475 Ave to 479 Ave	4.0	Leveling course and asphalt overlay	$880,000
22-2	2022	CR 1B	SE of 327 St	0.08	Concrete overlay repair by SE Elevator	$165,000
23-1	2023	CR 3	307 St to SD 48	7.5	Leveling course and asphalt overlay	$1,650,000
23-2	2023	CR 7	483 Ave to Iowa	1.5	Leveling course and asphalt overlay	$330,000
24-1	2024	CR 7	CR 7 'Turn' to CR 1B	2.5	Repl culvert, leveling course and asph overlay	$660,000
24-2	2024	CR 1B	481 Ave to 330 St	1.8	Mill and asphalt overlay	$440,000
24-3	2024	CR 1C	298 St to 302 St	4.0	Mill and asphalt overlay	$880,000
25-1	2025	CR 6	I-29 S ramps to 330 St	4.0	Leveling course and asphalt overlay	$880,000
25-2a	2025	CR 25	313 St to 318 St	5.0	Leveling course and asphalt overlay	$1,100,000
25-2b	2025	CR 25	318 St to 476 Ave	2.19	Leveling course and asphalt overlay	$495,000
26-1	2026	CR 1C	302 St to 307 St	5.0	Mill and asphalt overlay	$1,100,000
26-2	2026	CR 25	307 St to 313 St	6.0	Leveling course and asphalt overlay	$1,320,000
-	2027-'31	CR 1B	Elk Point to 481 Ave	5.9	Misc concrete pvmt repair, various locations	$660,000
-	2027-'31	CR 1B	N Elm St to 0.28 mi SE	0.28	Mill or leveling course and asphalt overlay	$110,000
-	2027-'31	CR 1F	297 St to 298 St	1.0	Mill or leveling course and asphalt overlay	$220,000
-	2027-'31	CR 4	CR 13 to 307 St	4.5	Mill or leveling course and asphalt overlay	$990,000
-	2027-'31	CR 6	I-29 S ramps to 0.06 mi W	0.06	Mill or leveling course and asphalt overlay	$27,500
-	2027-'31	CR 6	CR 1B to 483 Ave	0.8	Mill or leveling course and asphalt overlay	$176,000
-	2027-'31	CR 11	470 Ave to 471 Ave	1.0	Mill or leveling course and asphalt overlay	$220,000
-	2027-'31	CR 12	479 Ave to 486 Ave	7.0	Mill or leveling course and asphalt overlay	$1,540,000
-	2027-'31	CR 13	470 Ave to 471 Ave	1.0	Mill or leveling course and asphalt overlay	$220,000
-	2027-'31	CR 13	0.3 mi W of 473 to 475 Ave	2.3	Mill or leveling course and asphalt overlay	$506,000
-	2027-'31	CR 15	470 Ave to 471 Ave	1.0	Mill or leveling course and asphalt overlay	$220,000
-	2027-'31	CR 21	318 St to CR 10	4.0	Mill or leveling course and asphalt overlay	$880,000
-	2027-'31	CR 25	302 St to 307 St	5.0	Mill or leveling course and asphalt overlay	$1,100,000
-	2027-'31	CR 26	471 Ave to CR 10	4.3	Mill or leveling course and asphalt overlay	$946,000
-	2027-'31	CR 27	302 St to 307 St	5.1	Mill or leveling course and asphalt overlay	$1,122,000

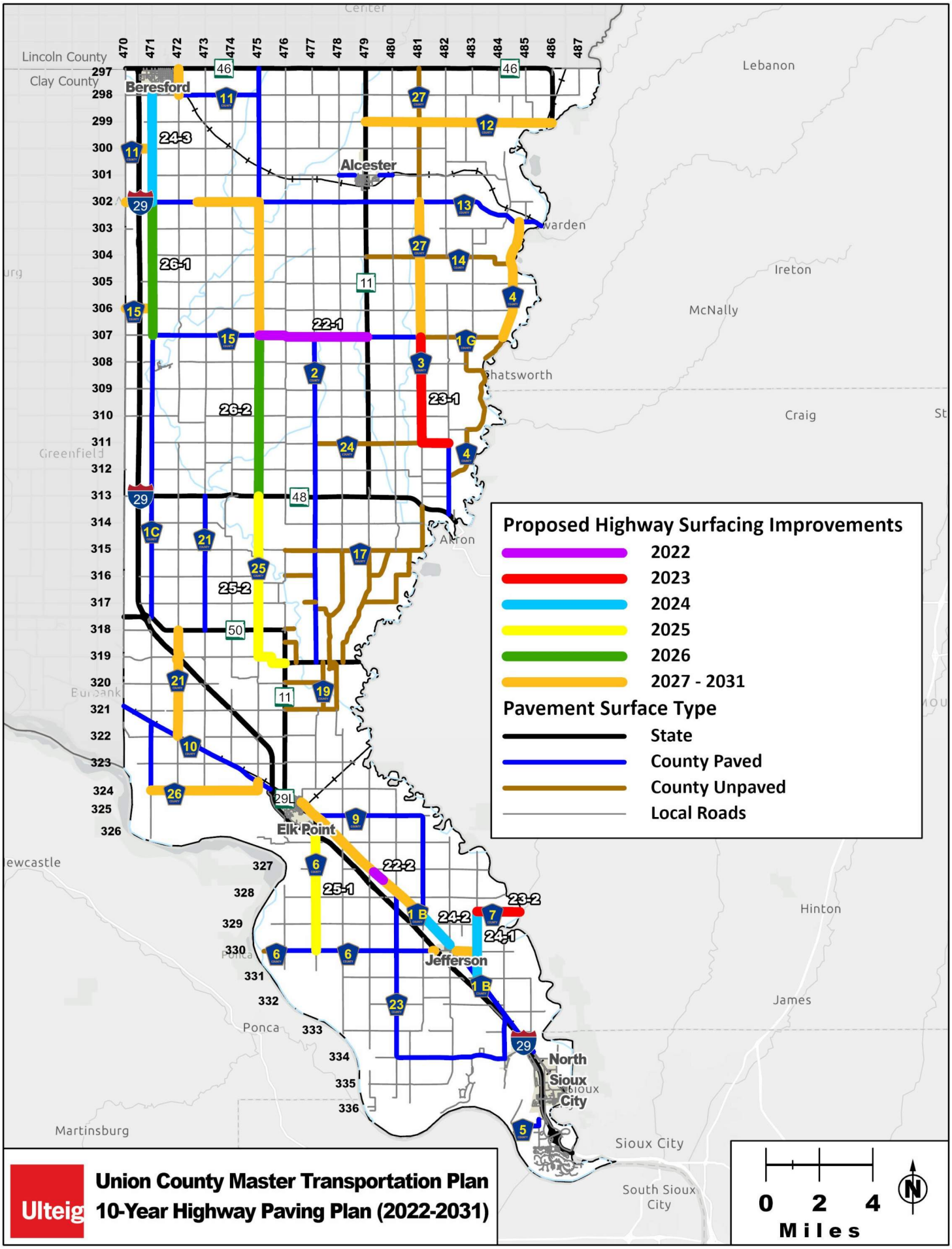


Figure 26: 10-Year Highway Paving Plan (2022-2031)

Bridge Replacement Plan

Table 17 and the corresponding Figure 27 feature the top prioritized bridges (all bridges in Poor Condition) with corresponding BIG scores. The higher the BIG score, the more likely it will be awarded funding from the SDDOT BIG program, with up to 80% of the cost paid for this program. While the BIG score does factor in user impacts as part of the scoring, it is believed that it does not fully encapsulate the relative importance of the bridges to the county bridge network, nor does it indicate a prediction of future performance/condition.

The bridge prioritization method used in this section is subject to change if traffic volumes or condition ratings change. The evaluation process used to score and prioritize bridges in Union County is threefold:

1. The first filtering process is based on bridge condition. The lowest National Bridge Inventory (NBI) ratings for Deck, Superstructure, Substructure and Culvert determines the bridge condition. The bridge is classified as Good if the lowest rating is greater than or equal to 7; the classification is Fair if bridges rated 5 or 6; any ratings below or equal 4 is classified as Poor (Structurally Deficient). All bridges shown in Table 17 were classified as Poor Condition, which is 36 of Union County's 113 brides.
2. Within bridges that are classified as Poor, the second scoring process considers technical criteria, posted load limits and average condition ratings that combine superstructure, substructure, and deck ratings.
3. Thirdly, bridges are evaluated based on the combination of ADT and detour.

As part of this study, the 36 bridges currently in Poor condition have been identified as a priority for replacement in either the Short-Term (2022-2026) or the Mid/Long-Term (2027-2045). However, the list is expected to grow as bridges currently in Fair or Good Condition (Undetermined Bridge Replacement Priority) may also deteriorate to Poor condition.

Table 17: Prioritized Bridge Replacement Plan

Structure Number	Location	Year Built	Deck Area (SF)	Lowest Condition Rating (1-9)	Bridge Condition	ADT (veh/day)	Detour (mile)	Rank*	SDDOT BIG Score	Programmed Cost in 5-Year Plan (2022 $)**		
										Local $	BIG $	Total $
64-050-092	4W & 5.2S ALCESTER	1935	1008	2	Poor	125	4	1	42.8			
64-144-055	5.4E & 1.5S ALCESTER	1947	1390	3	Poor	34	6	2	47.4			
64-080-031	0.5W & 0.9N ALCESTER	1982	1414	4	Poor	45	3	3	45.7			
64-084-030	1N & 0.6W ALCESTER	1997	924	3	Poor	40	3	4	46.5	$ 88,000	$ 352,000	$ 440,000
64-023-090	8S & 0.3E BERESFORD	1979	2163	4	Poor	35	3	5	45.4	$ 220,000	$ 880,000	$ 1,100,000
64-105-140	9.5S & 1.5E ALCESTER	1950	1285	3	Poor	110	3	6	46.6	$ 88,000	$ 352,000	$ 440,000
64-080-251	2E & 1.9N ELK POINT	1940	1410	4	Poor	40	5	7	43.3	$ 220,000	$ 880,000	$ 1,100,000
64-088-090	5S & 0.2W ALCESTER	1950	908	3	Poor	45	4	8	45.1			
64-030-034	1E & 2.4S BERESFORD	1991	888	3	Poor	50	3	9	44.8			
64-060-137	4E & 12.7S BERESFORD	1963	1621	3	Poor	35	4	10	44.7			
64-140-003	12E & 0.3S BERESFORD	1983	1162	3	Poor	25	3	11	44.1			
64-040-144	13.4S & 2E BERESFORD	1983	605	3	Poor	5	3	12	43.5	$ 88,000	$ 352,000	$ 440,000
64-070-130	9S & 2W ALCESTER	1989	742	3	Poor	300	Unknown	13	43.3	$ 88,000	$ 352,000	$ 440,000
64-134-040	3.4E ALCESTER	1950	1022	3	Poor	50	4	14	44.3	$ 88,000	$ 352,000	$ 440,000
64-096-150	11.5S & 0.6E ALCESTER	1986	2210	4	Poor	40	4	15	41.9			
64-100-112	1E & 6.2S ALCESTER	1935	556	4	Poor	40	4	16	41.9			
64-034-090	8S & 1.4E BERESFORD	1948	703	4	Poor	35	3	17	42.4	$ 88,000	$ 352,000	$ 440,000
64-030-157	1E & 14.7S BERESFORD	1976	2357	4	Poor	30	3	18	41.2	$ 220,000	$ 880,000	$ 1,100,000
64-020-063	5.3S BERESFORD	1973	557	3	Poor	30	3	19	43.2	$ 88,000	$ 352,000	$ 440,000
64-120-031	3E & 0.9N ALCESTER	1982	670	4	Poor	45	5	20	37.6	$ 132,000	$ -	$ 132,000
64-042-050	4.8W & 1S ALCESTER	1960	3619	3	Poor	435	4	21	23.3			
64-057-140	13S & 3.7E BERESFORD	1955	1465	4	Poor	30	3	22	24.2			
64-148-058	1.8S & 5.8E ALCESTER	1985	1782	4	Poor	500	3	23	15.6			
64-058-050	3.2W & 1S ALCESTER	1960	4802	4	Poor	270	4	24	14.4			
64-133-118	3E & 1.7S BIG SPRINGS	1979	1438	4	Poor	50	99	25	30.5			
64-125-035	3.5E & 0.5N ALCESTER	1991	963	4	Poor	55	5	26	20.1			
64-023-080	7S & 0.3E BERESFORD	1987	904	4	Poor	45	3	27	18.7			
64-080-034	0.5W & 0.6N ALCESTER	1983	1144	4	Poor	45	3	28	17.7			
64-114-150	10.5S & 2.4E ALCESTER	1940	689	4	Poor	45	3	29	18.7			
64-046-070	6S & 2.6E BERESFORD	1987	1403	4	Poor	40	3	30	17.2			
64-070-250	1E & 2N ELK POINT	1968	1606	4	Poor	40	3	31	18.5			
64-060-090	8S & 4E BERESFORD	1965	580	4	Poor	25	4	32	18.3			
64-145-019	12.5E & 0.9S BERESFORD	1992	693	4	Poor	70	3	33	18.4			
64-061-150	3E & 1N SPINK	1992	679	4	Poor	50	3	34	17.8			
64-032-070	6S & 1.2E BERESFORD	1970	494	4	Poor	43	3	35	17.6			
64-032-080	7S & 2.2E BERESFORD	1989	1691	4	Poor	40	3	36	17.5			

* Lowest number means bridge is the first priority for replacement

** 2021 $ from 5-Year Highway and Bridge Improvement Plan inflated 10% to estimate 2022 $. BIG $ is unnofficially anticipated grant cost share 80/20, and would be awarded in competitive application.

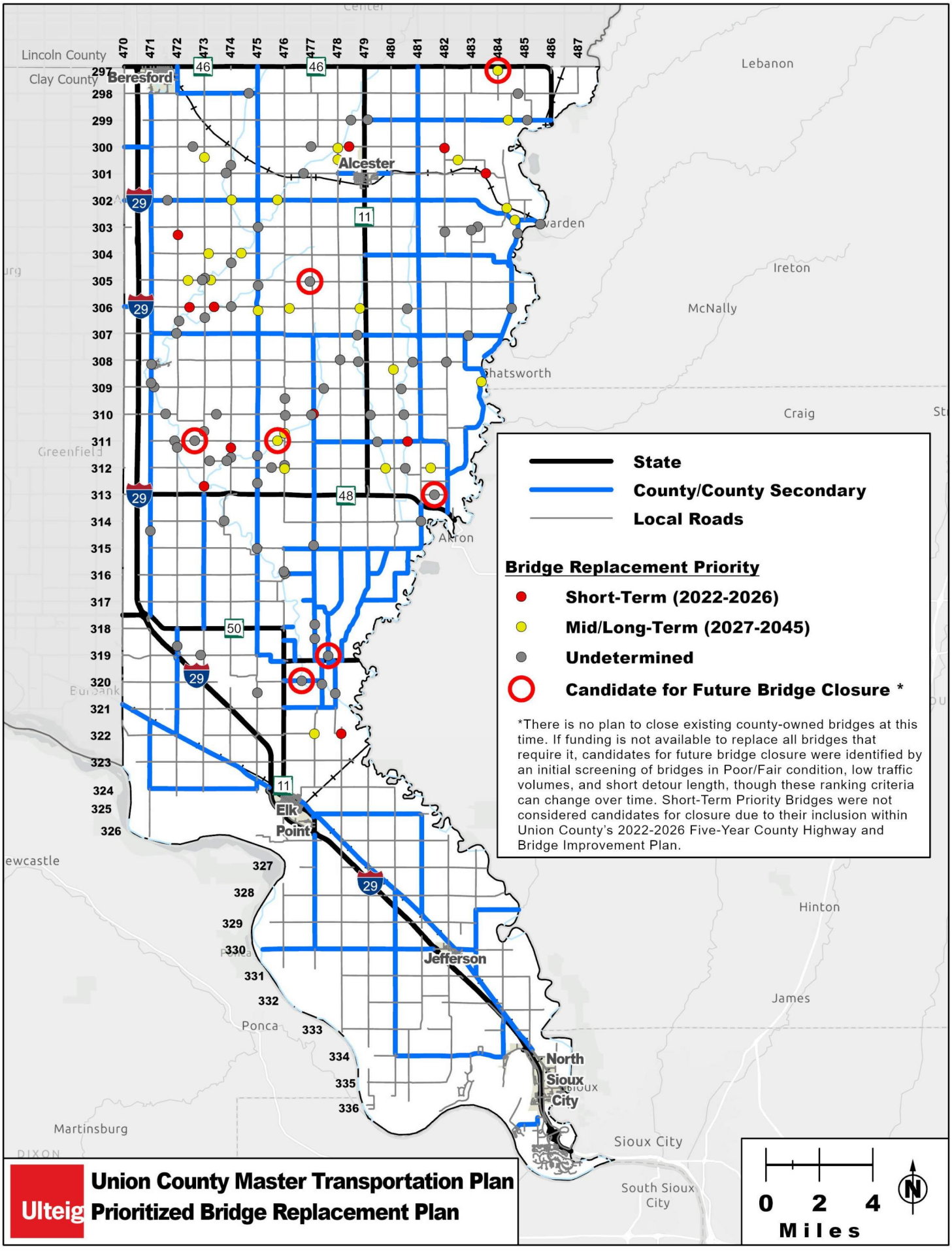


Figure 27: Prioritized Bridge Replacement Plan

Candidates for Future Bridge Closure

If funding is not available to keep up the bridge replacement needs in Union County, 7 bridges were identified as candidates for future bridge closure by conducting an initial screening for bridges with the lowest traffic volumes and shortest detour length[37]. See Figure 27 for bridge replacement priority and candidates for future bridge closure.

While this study does not formally recommend any bridges for closure, it is understood that the cost to repair bridges may exceed available funding. As a practical exercise, the 10 bridges at the bottom of the initial screening list were analyzed in more detail to determine the likely priority of the bridges for closure if funding is not available. This exercise is an example of how Union County could prioritize funding for bridges if funding is too scarce to address all bridges at a given time. In this example, most of the criteria between the bridges is equal, or nearly equal, and the cost consideration becomes the driving factor in ranking bridges for possible closure. In this example, the top Fair/Poor Condition bridge candidate for closure based on user impacts has low daily traffic, low detour length, has not been programmed for major repair within 5 years, is off of the primary county highway system, is functionally classified as a rural local road, has an acceptable alternate route that also includes paved roads, and holds the largest deck area in the list indicating a higher relative probable cost of replacement.

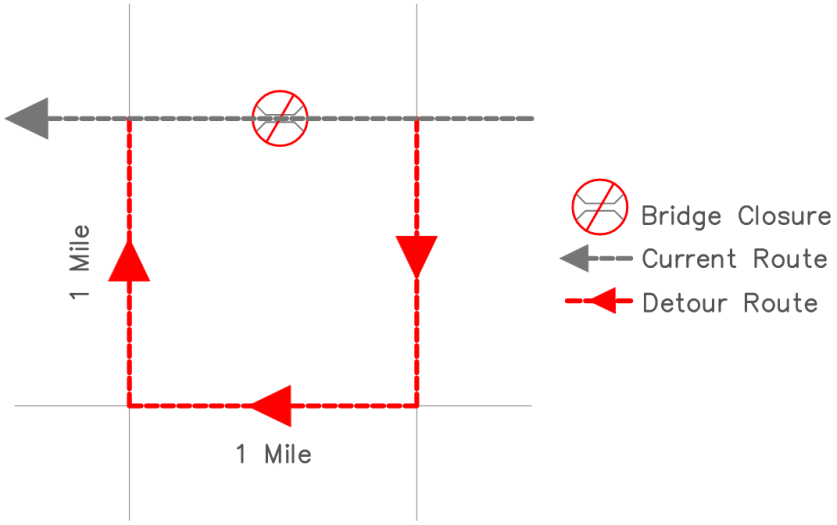


Figure 28: Bridge Detour Route Concept

[37] Traffic volumes (ADT) and detour lengths are entered into the NBI database during bridge inspections.

Table 18: Candidates for Future Bridge Closure

Structure Number	ADT (veh/day)	Detour (miles)	= ADT x Detour	Initial Screened Ranking	Programmed in 5-Year Plan?	County/ Township	Functional Classification	Alternative Route	Full Maintenance? (BIG Eligible?)	Cost Consideration	Candidate For Closure Rank*
64-020-063	30	3	90	95	Yes	Township	Rur. Loc. Rd.	Good	Yes	Bridge, Deck Area 557 SF	Do not close
64-030-157	30	3	90	97	Yes	Township	Rur. Loc. Rd.	Good	Yes	Bridge, Deck Area 2357 SF	Do not close
64-040-144	5	3	15	110	Yes	Township	Rur. Loc. Rd.	Good	Yes	Bridge, Deck Area 605 SF	Do not close
64-026-140	30	3	90	100	No	Township	Rur. Loc. Rd.	Questionable	Yes	Bridge, Deck Area 748 SF	7
64-115-160	30	3	90	99	No	Township	Rur. Loc. Rd.	Good	Yes	Box Culvert, Deck Area 501 SF	6
64-074-220	45	2	90	98	No	County Secondary	Rur. Loc. Rd.	Good	Yes	Bridge, Deck Area 731 SF	5
64-057-140	30	3	90	96	No	Township	Rur. Loc. Rd.	Alt bridge poor, assumed open	Yes	Bridge, Deck Area 1465 SF	4
64-140-003	25	3	75	105	No	Township	Rur. Loc. Rd.	Good	Yes	Bridge, Deck Area 1162 SF	3
64-069-080	15	2	30	109	No	Township	Rur. Loc. Rd.	Good	Yes	Bridge, Deck Area 1011 SF	2
64-067-230	15	5	75	106	No	County Secondary	Rur. Loc. Rd.	Good	Yes	Bridge, Deck Area 1791 SF	1

* Lowest number means bridge is the lowest priority for replacement. "Do not close" means the bridge is already programmed on 5-Year Highway and Bridge Plan.

Note: There is no plan to close existing county-owned bridges at this time. If funding is not available to replace all bridges that require it, candidates for future bride closure were identified by an initial screening of bridges in Poor/Fair condition, low traffic volumes, and short detour length, though these ranking criteria can change over time. Short-Term Priority Bridges were not considered candidates for closure due to their inclusion within Union County's 2022-2026 5-Year County Highway and Bridge Improvement Plan.

$1.2 Trillion Infrastructure Investment and Jobs Act (IIJA)
The largest and most comprehensive infrastructure bill in American history passed by Congress on November 6, 2021, will reauthorize surface transportation programs for five years and invest $110 Billion in additional funding to repair roads and bridges. These funds will filter down to South Dakota counties like Union County and is expected to help in the replacement of existing bridges.

Bridge Screening Ranking of All 113 Bridges

Looking to the future, it is important to understand that any bridge currently rated in Fair or Good Condition could drop to Poor Condition upon its next inspection. Because the bridge prioritization method shown in the previous section is focused on existing bridge condition (and to an extent, BIG scores) and the likelihood of replacement in the next 20 years, not all 113 bridges are included in the list.

An alternative method for Bridge Screening Ranking is provided in Appendix I that includes all 113 bridges. The advantage of using an alternative method for ranking bridges is that the County can prioritize the bridges themselves rather than assuming that existing bridge condition is the primary factor for ranking its bridges.

Enhancement Project Implementation Plan

Enhancement projects are proposed that address issues and needs identified, prioritized as funding becomes available. First, these projects were screened for a purpose and need. That is, it was ensured that the proposed projects meet objectives that address the need(s). The project is therefore justified for the expense. See Table 19.

Next, the proposed projects are prioritized, as funding is not available to address all projects immediately. Union County will need to consider funding mechanisms and phasing sequences to start and complete these projects. Although all proposed projects address important needs, new issues and priorities may present themselves over time. Funding for enhancement projects may also be lacking. For these reasons, the actual implementation of the projects may deviate from the list shown below.

The criteria used to prioritize the enhancement projects include importance, urgency, cost, benefits achieved, and the support observed during the public engagement and survey questionnaire. As a result, a list of enhancement projects has been sorted by project type and prioritized in the short (0-5 years), mid (6-10 years), or long term (11-20 years or more). It has been provided to consider as funding becomes available. This list is prioritized as of the present year (2022) and is subject to change over time as new issues arise and priorities change. However, this list is the product of a system-wide analysis and an assessment over the long term, 20+ years. It is not necessarily subject to the same short-term persuasions that often accompany spontaneous or outspoken planning efforts, and Union County can use it as a reliable guide.

These cost estimates in 2022 dollars (2022 $) are planning level engineering/construction estimates and should always be refined with future project development to incorporate more detailed assumptions. Cost will vary based on project scope, site conditions, site constraints, project schedule, inflation, and various economic pressures at the time of construction. Proposed enhancement projects are shown in Figure 29 and the corresponding Table 20. Table 21 describes a benefit assessment that each of the proposed enhancement projects may provide, either as positive, neutral, or negative impact in general terms.

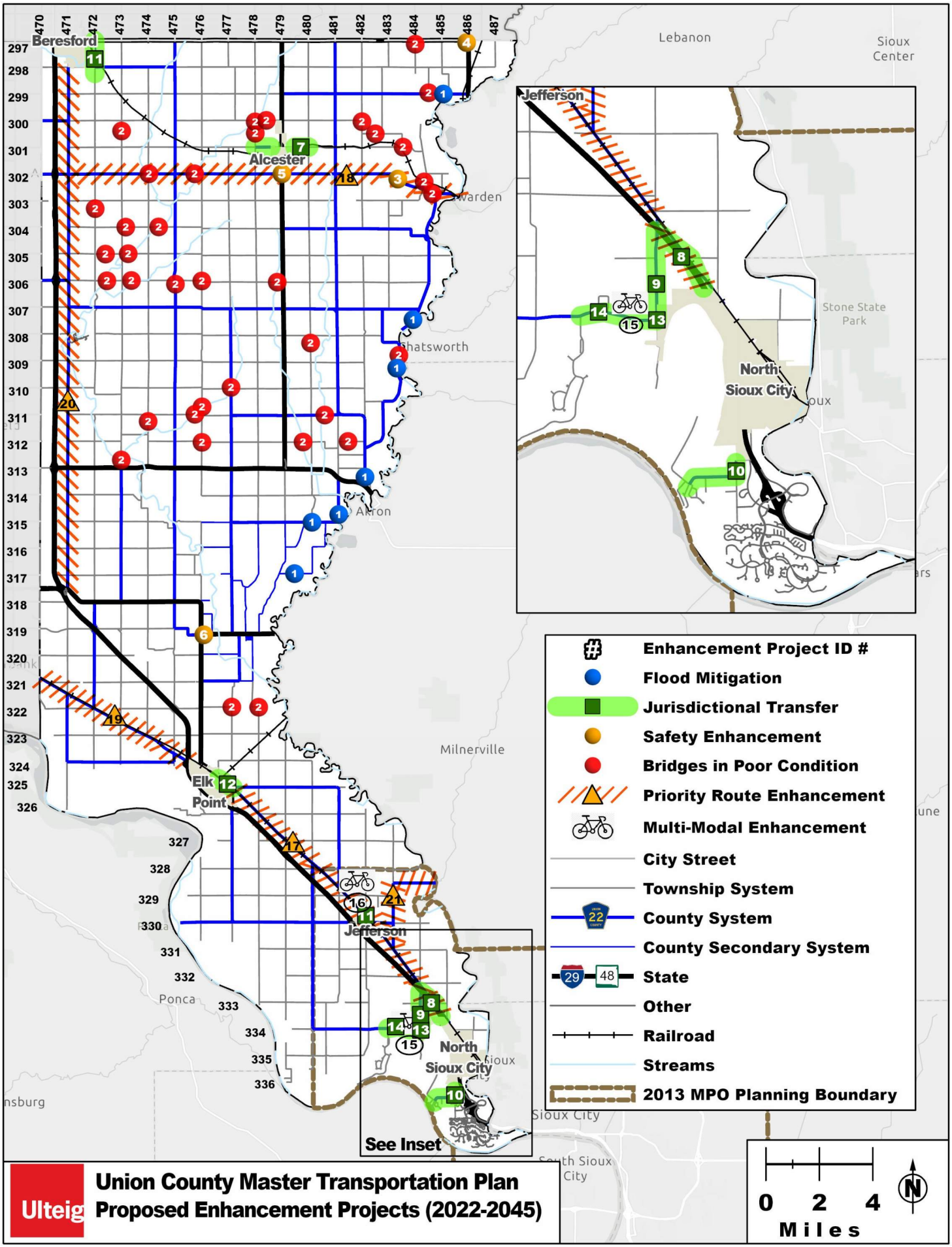


Figure 29: Proposed Enhancement Projects (2022-2045)

Table 19: Proposed Enhancement Projects (2022-2045) - Purpose and Need

Enhancement Type	ID	Location	From	To	Length (mi)	Project Type	Owner	Purpose	Need	Priority * (S, M, L)
Flood Mitigation	1	Multiple (7)	-	-	-	Flood Mitigation for Roads	Union County Primary & Secondary	To improve flooding deficiencies and maintain connectivity	Road facilities have flooding deficiencies; roads occasionally must be closed and flooding can permanently damage roads and drainage structures.	S, M, L
Bridge Replacements	2	Multiple (36)	-	-	-	Bridge Replacements	Union County	To improve bridge deficiencies and maintain connectivity	Bridge facilities in poor condition; bridges may be posted for load limits or closed.	S, M, L
Safety Enhancements	3	302 St/ CR 13 (phase 1 of 2)	482 Ave	Big Sioux River	3.8	Corridor Safety Improvements	Union County	To improve safety	Road segment had 3 severe crashes reported during reporting period, including 2 fatal crashes.	S
	4	SD 46 & 486 Ave	-	-	-	Intersection Safety Improvements	SDDOT	To improve safety	3 Intersection-related crashes during reporting period, including 2 injury crashes; skewed intersection geometry.	S
	5	SD 11 & 302 St/CR 13	-	-	-	Intersection Safety Improvements	SDDOT	To improve safety	2 Intersection-related crashes during reporting period, including 1 rear-end crash.	S
	6	SD 50 & SD 11	-	-	-	Intersection Safety Improvements	SDDOT	To improve safety	3 Intersection-related crashes during reporting period, including 2 angle crashes.	S
Jurisdictional Transfers	7	301 St/CR 1E	478 Ave	480 Ave	1.1	Jurisdictional Transfer	Union County	To improve county system linkage and connectivity	Road segments are not connected to the county system network, causing maintenance and operations innefficiencies.	S, M, L
	8	CR 1B	E Authier Rd	Northshore Dr	1.0	Jurisdictional Transfer	Union County	To use strategic planning to improve future mobility and county system consistency	Potential development may increase congestion; urban/suburban context may not be consistent with county design elements.	S, M, L
	9	484 Ave/CR 1	E Authier Rd	Northshore Dr/CR 23	1.0	Jurisdictional Transfer	Union County	To use strategic planning to improve future mobility and county system consistency	Potential development may increase congestion; urban/suburban context may not be consistent with county design elements.	S, M, L
	10	CR 5/N Shay Rd/Flurie Rd	Hoffman Rd	N Shay Rd (at turn)	1.0	Jurisdictional Transfer	Union County	To improve county system linkage and connectivity	Road segments are not connected to the county system network, causing maintenance and operations innefficiencies.	S, M, L
	11	472 Ave/CR 1F	SD 46	298 St	1.0	Jurisdictional Transfer	Union County	To use strategic planning to improve future mobility and county system consistency	Potential development may increase congestion; urban/suburban context may not be consistent with county design elements.	S, M, L
	12	CR 1B	N Elm St	325 St	0.8	Jurisdictional Transfer	Union County	To use strategic planning to improve future mobility and county system consistency	Potential development may increase congestion; urban/suburban context may not be consistent with county design elements.	S, M, L
	13	334 St/CR 23 & 484 Ave/CR 1	-	-	-	Jurisdictional Transfer, Intersection Reconstruction	Union County/N. Sioux City	To use strategic planning to improve future mobility and county system consistency	Potential development may increase congestion; urban/suburban context may not be consistent with county design elements.	S, M, L
	14	334 St/CR 23	Wynstone Dr	484 Ave/CR 1	1.3	Jurisdictional Transfer, Corridor Widening	Union County	To use strategic planning to improve future mobility and county system consistency	Potential development may increase congestion; urban/suburban context may not be consistent with county design elements.	M
Multi-Modal Enhancements	15	334 St/CR 23	Wynstone Dr	484 Ave/CR 1	1.3	Shoulder Widening	Union County	To improve accessibility and mobility	Route has unmet demand for multi-modal choice (bike & pedestrian).	M
	16	CR 1B (Phase 1 of 2)	Elk Point (N Elm St)	Northshore Dr	12.4	Shoulder Widening	Union County	To improve accessibility and mobility	Route has unmet demand for multi-modal choice (bike).	L
Priority Route Enhancements (Major Roads Plan)	17	CR 1B (Phase 2 of 2)	Elk Point (N Elm St)	Northshore Dr	12.4	Overlay	Union County	To improve mobility and facilitate economic growth	Road identified as "County-Paved - Priority Route" in the Major Roads Plan.	L
	18	302 St/CR 13 (Phase 2 of 2)	Clay County Border	Big Sioux River	15.7	Overlay and Shoulder Widening	Union County	To improve mobility and facilitate economic growth	Road identified as "County-Paved - Priority Route" in the Major Roads Plan.	L
	19	Burbank Rd/CR 10	470 Ave	476 Ave	6.3	Overlay and Shoulder Widening	Union County	To improve mobility and facilitate economic growth	Road identified as "County-Paved - Priority Route" in the Major Roads Plan.	L
	20	471 Ave/CR 1C	298 St	SD 50	19.6	Overlay and Shoulder Widening	Union County	To improve mobility and facilitate economic growth	Road identified as "County-Paved - Priority Route" in the Major Roads Plan.	L
	21	CR 7	CR 1B	Big Sioux River	4.0	Overlay and Shoulder Widening	Union County	To improve mobility and facilitate economic growth	Road identified as "County-Paved - Priority Route" in the Major Roads Plan.	L

* S: Short-Term 1-5 Years
* M: Mid-Term 6-10 Years
* L: Long-Term 11-20 Years or More

Table 20: Proposed Enhancement Projects (2022-2045) - Description and Priority

Enhancement Type	ID	Location	From	To	Length (mi)	Project Type	Owner	Description	Priority * (S, M, L)	Est Cost (2022 $)
Flood Mitigation	1	Multiple (7)	-	-	-	Flood Mitigation for Roads	Union County Primary & Secondary	There are at least 7 roadway locations with known flooding issues. For planning purposes, it is estimated to cost $1,000,000 for each location to address flooding, but cost can vary greatly depending on conditions present, and it may not be feasible to make long term improvements at some or all locations.	S, M, L	$ 7,000,000
Bridge Replacements	2	Multiple (36)	-	-	-	Bridge Replacements	Union County	There are 36 bridges currently in Poor Condition (structurally deficient) that are identified as a priority for replacement as part of the Bridge Replacement Plan. It is estimated to cost $500,000 for each location, but cost will vary at each location depending on the conditions present.	S, M, L	$ 18,000,000
Safety Enhancements	3	302 St/ CR 13 (phase 1 of 2). See ID #18	482 Ave	Big Sioux River	3.8	Corridor Safety Improvements	Union County	Widen shoulders along 3.8 mile stretch with severe crash history and safety concerns.	S	$ 2,400,000
	4	SD 46 & 486 Ave	-	-	-	Intersection Safety Improvements	SDDOT	Realign intersection as "T" intersection due to crash history.	S	$ 450,000
	5	SD 11 & 302 St/CR 13	-	-	-	Intersection Safety Improvements	SDDOT	Intersection warning enhancements due to crash history. Cost estimate assumes flashing beacon mounted stop signs or LED flashing stop signs.	S	$ 5,000
	6	SD 50 & SD 11	-	-	-	Intersection Safety Improvements	SDDOT	Intersection warning enhancements due to crash history. Cost estimate assumes flashing beacon mounted stop signs or LED flashing stop signs.	S	$ 5,000
Jurisdictional Transfers	7	301 St/CR 1E	478 Ave	480 Ave	1.1	Jurisdictional Transfer	Union County	Not connected to county network. Begin conversations with City of Alcester or Alcester Township. When ready, draft agreement (Memorandum of Understanding). Cost is unknown.	S, M, L	$ -
	8	CR 1B	E Authier Rd	Northshore Dr	1.0	Jurisdictional Transfer	Union County	Potential development adds traffic volume. Begin conversations with City of North Sioux City. When ready, draft agreement (Memorandum of Understanding). Improvement types could vary and cost is share is unknown.	S, M, L	$ -
	9	484 Ave/CR 1	E Authier Rd	Northshore Dr/CR 23	1.0	Jurisdictional Transfer	Union County	Potential development adds traffic volume. Begin conversations with City of North Sioux City. When ready, draft agreement (Memorandum of Understanding). Improvement types could vary and cost share is unknown.	S, M, L	$ -
	10	CR 5/N Shay Rd/Flurie Rd	Hoffman Rd	N Shay Rd (at turn)	1.0	Jurisdictional Transfer	Union County	Not connected to county network. Begin conversations with North Sioux City or Big Sioux township. When ready, draft agreement (Memorandum of Understanding). Cost is unknown.	S, M, L	$ -
	11	472 Ave/CR 1F	SD 46	298 St	1.0	Jurisdictional Transfer	Union County	Potential development adds traffic volume. Begin conversations with City of Beresford. When ready, draft agreement (Memorandum of Understanding). Cost is unknown.	S, M, L	$ -
	12	CR 1B	N Elm St	325 St	0.8	Jurisdictional Transfer	Union County	Potential development adds traffic volume. Begin conversations with City of Elk Point. When ready, draft agreement (Memorandum of Understanding). Cost is unknown.	S, M, L	$ -
	13	334 St/CR 23 & 484 Ave/CR 1	-	-	-	Jurisdictional Transfer, Intersection Reconstruction	Union County/N. Sioux City	Potential development adds traffic volume. Begin conversations with City of North Sioux City. When ready, draft agreement (Memorandum of Understanding). Cost estimate assumes intersection reconstruction/improvements, but cost share is unknown.	S, M, L	$ 1,000,000
	14	334 St/CR 23	Wynstone Dr	484 Ave/CR 1	1.3	Jurisdictional Transfer, Corridor Widening	Union County	Potential development adds traffic volume. Begin conversations with City of North Sioux City, perform evaluation of construction alternatives and timeline. When ready, draft agreement (Memorandum of Understanding). Cost estimate assumes urban cross-section with 3 lanes, but cost share is unknown. Costs for Multi-Modal Enhancements should also be considered additionally. See ID #15.	M	$ 3,100,000
Multimodal Enhancements	15	334 St/CR 23	Wynstone Dr	484 Ave/CR 1	1.3	Shoulder Widening	Union County	Design alternatives include shoulder widening, shared-use path, or attached sidewalk to alleviate multi-modal (bike/ped) demands and conflicts. Cost estimates are for shoulder widening only, assuming corridor is not widened to 3 lane urban cross-secction. See ID #14.	M	$ 625,000
	16	CR 1B (Phase 1 of 2). See ID #17.	Elk Point (N Elm St)	Northshore Dr	12.4	Shoulder Widening	Union County	Design alternatives include shoulder widening, shared-use path, or rail trail to alleviate multi-modal (bike/ped) demands and conflicts. Cost estimates are for shoulder widening only.	L	$ 5,600,000
Priority Route Enhancements (Major Roads Plan)	17	CR 1B (Phase 2 of 2). See ID #16	Elk Point (N Elm St)	Northshore Dr	12.4	Overlay	Union County	Identified as "County Paved - Priority Route" on Major Roads Plan and experiences heavy vehicles. Potential for future on-road bike route. Long term design would feature 6'-8' wide shoulders when funding becomes available. Cost estimate assumes asphalt overlay only.	L	$ 2,900,000
	18	302 St/CR 13 (Phase 2 of 2). See ID #3	Clay County Border	Big Sioux River	15.7	Overlay and Shoulder Widening	Union County	Identified as "County Paved - Priority Route" on Major Roads Plan and experiences heavy vehicles. Potential for future on-road bike route. Long term design would feature 6'-8' wide shoulders when funding becomes available. Cost estimate assumes asphalt overlay, shoulder widening, 1 box culvert, and 3 bridges.	L	$ 11,400,000
	19	Burbank Rd/CR 10	470 Ave	476 Ave	6.3	Overlay and Shoulder Widening	Union County	Identified as "County Paved - Priority Route" on Major Roads Plan and experiences heavy vehicles. Potential for future on-road bike route. Long term design would feature 6'-8' wide shoulders when funding becomes available. Cost estimate assumes asphalt overlay and shoulder widening.	L	$ 4,200,000
	20	471 Ave/CR 1C	298 St	SD 50	19.6	Overlay and Shoulder Widening	Union County	Identified as "County Paved - Priority Route" on Major Roads Plan and experiences heavy vehicles. Potential for future on-road bike route. Long term design would feature 6'-8' wide shoulders when funding becomes available. Cost estimate assumes asphalt overlay, shoulder widening, 6 box culverts, and 2 bridges.	L	$ 16,000,000
	21	CR 7	CR 1B	Big Sioux River	4.0	Overlay and Shoulder Widening	Union County	Identified as "County Paved - Priority Route" on Major Roads Plan and experiences heavy vehicles. Potential for future on-road bike route. Long term design would feature 6'-8' wide shoulders when funding becomes available. Cost estimate assumes asphalt overlay and shoulder widening.	L	$ 2,600,000

* S: Short-Term 1-5 Years
* M: Mid-Term 6-10 Years
* L: Long-Term 11-20 Years or More

Table 21: Proposed Enhancement Projects (2022-2045) - Impact Assessment

Enhancement Type	ID	Location	From	To	Length (mi)	Project Type	Benefit Assessment* (+) N (-)					
							Economic	Quality of Life	Delay Reduction	Cost	Public Health	Environment
Flood Mitigation	1	Multiple (7)	-	-	-	Flood Mitigation for Roads	(+)	(+)	(+)	(-)	(+)	N
Bridge Replacements	2	Multiple (36)	-	-	-	Bridge Replacements	(+)	(+)	(+)	(-)	N	N
Safety Enhancements	3	302 St/ CR 13 (phase 1 of 2). See ID# 18	482 Ave	Big Sioux River	3.8	Corridor Safety Improvements	N	N	N	(-)	(+)	N
	4	SD 46 & 486 Ave	-	-	-	Intersection Safety Improvements	N	N	N	(-)	(+)	N
	5	SD 11 & 302 St/CR 13	-	-	-	Intersection Safety Improvements	N	N	N	N	(+)	N
	6	SD 50 & SD 11	-	-	-	Intersection Safety Improvements	N	N	N	N	(+)	N
Jurisdictional Transfers	7	301 St/CR 1E	478 Ave	480 Ave	1.1	Jurisdictional Transfer	N	N	N	N	N	N
	8	CR 1B	E Authier Rd	Northshore Dr	1.0	Jurisdictional Transfer	N	N	N	N	N	N
	9	484 Ave/CR 1	E Authier Rd	Northshore Dr/CR 23	1.0	Jurisdictional Transfer	N	N	N	N	N	N
	10	CR 5/N Shay Rd/Flurie Rd	Hoffman Rd	N Shay Rd (at turn)	1.0	Jurisdictional Transfer	N	N	N	N	N	N
	11	472 Ave/CR 1F	SD 46	298 St	1.0	Jurisdictional Transfer	N	N	N	N	N	N
	12	CR 1B	N Elm St	325 St	0.8	Jurisdictional Transfer	N	N	N	N	N	N
	13	334 St/CR 23 & 484 Ave/CR 1	-	-	-	Jurisdictional Transfer, Intersection Reconstruction	(+)	(+)	(+)	(-)	N	N
	14	334 St/CR 23	Wynstone Dr	484 Ave/CR 1	1.3	Jurisdictional Transfer, Corridor Widening	(+)	(+)	(+)	(-)	N	N
Multimodal Enhancements	15	334 St/CR 23	Wynstone Dr	484 Ave/CR 1	1.3	Shoulder Widening	(+)	(+)	N	(-)	(+)	(+)
	16	CR 1B (Phase 1 of 2). See ID #17	Elk Point (N Elm St)	Northshore Dr	12.4	Shoulder Widening	(+)	(+)	N	(-)	(+)	(+)
Priority Route Enhancements (Major Roads Plan)	17	CR 1B (Phase 2 of 2). See ID #16	Elk Point (N Elm St)	Northshore Dr	12.4	Overlay	(+)	N	N	(-)	N	N
	18	302 St/CR 13 (Phase 2 of 2). See ID #3	Clay County Border	Big Sioux River	15.7	Overlay and Shoulder Widening	(+)	N	N	(-)	(+)	N
	19	Burbank Rd/CR 10	470 Ave	476 Ave	6.3	Overlay and Shoulder Widening	(+)	N	N	(-)	(+)	N
	20	471 Ave/CR 1C	298 St	SD 50	19.6	Overlay and Shoulder Widening	(+)	N	N	(-)	(+)	N
	21	CR 7	CR 1B	Big Sioux River	4.0	Overlay and Shoulder Widening	(+)	N	N	(-)	(+)	N

* (+): Positive Benefits Impact
* N: Neutral Benefits Impact
* (-): Negative Benefits Impact

7. CONCLUSIONS AND RECOMMENDATIONS

Issues and Needs Identified

A list of issues and needs were identified as a result of the baseline conditions analysis, discussions with the SAT, and public feedback. This list forms the basis for the plan recommendations, including new standards, guidelines, and future project implementation.

Union County's primary issues and needs:

- Bridge Replacement
- Road Conditions
- Increasing Truck Traffic
- Crash History
- Flooded Roads
- Lack of Bicycle and Pedestrian Infrastructure
- North Sioux City Development Causing Concerns
- Jurisdictional Ownership
- Prioritizing Improvements with Available Funding

Seeing Into the Future

The primary issues and needs identified as part of the baseline conditions analysis for Union County are all issues that are readily apparent in their present form. They are expected to remain issues in the near future and could all conceivably worsen over time. How each of these issues interact with each other and their prominence in the minds of the public over time is undetermined. It should also be noted that other seemingly less urgent issues, needs, challenges, and/or deficiencies were also identified such as, but not limited to, suburban traffic capacity limitations, aging demographics, lack of available transit, and future needs for electrical infrastructure to support electric vehicles.

This study uses the year 2045 as the planning horizon. However, needs and priorities are expected to change over time, so this document is considered a "living document." It is recommended that Union County intermittently assess the trends of these issues and identify new issues as appropriate. Intermittent updates to long range transportation plans such as this MTP in increments of 5 or more years will be of great benefit to Union County in this regard, but also to help promote and take advantage of new technology and innovation that will conceivably cut long-term costs and promote industry and economic growth. It is recommended to maintain this document by performing an update to this study every 5-10 years to keep it current and beneficial to the County.

Summary of Standards and Guidelines Developed

The next step in the study was to address identified issues and needs in the form of standards and guidelines development and project planning. The standards and guidelines developed by this study in Section 5 of this report help guide the process of implementing planned improvements. Specifically, standards and guidelines help address issues and needs when it comes time to design projects and plan funding and responsibility. The standards and guidelines provided as part of this study will substantially help guide the County with future decision-making, helping to answer questions such as:

- Which roads and bridges have the highest priority for funding?
- Which roads can be part of a future connected bike route?
- How wide does a bridge need to be on certain types of roads?
- When should new driveways and intersections be allowed on a county highway?
- What is an acceptable level of traffic delay due to increased traffic demand?

- Who is responsible for the cost of expanding a road due to new traffic and development?
- When and how should the County plan to transfer jurisdiction to the state, city, or township?

As part of this study, a Major Roads Plan was developed for Union County that classifies roads based on priorities and objectives into four classifications:

- County Paved – Priority Route
- County Paved
- County Gravel
- and Local Roads

When constructing new roads or reconstructing existing roads, modern design standards should be used. Cross section designs for each of the four road classifications have been provided and can be found in the Major Roads Plan. In particular, the wider shoulders recommended for County Paved – Priority Routes will have multiple benefits to drivers and other users, especially safety. For drivers, wider shoulders provide better sight distance to the roadside and around horizontal curves, additional space for emergency parking, evasive maneuvers, maintenance and mail operations, and other benefits. For cyclists, it provides space to bike outside of the driving lane, which is why it can also be designated as bike route.

Additionally, standards and guideline documents are provided as part of this study, which have been created specially to help Union County manage the impacts of new development. New development and increased traffic can rapidly bring on congestion and damaged roads. These documents will help guide the County so that the Highway Department can plan improvements, funding, and cooperation for the road infrastructure near new development:

- Access Management Guidelines (supplements existing Access Management Ordinance)
- Traffic Impact Study Guidelines (supplements existing Access Management Ordinance)
- Level of Service Standards
- Jurisdictional Transfer
    - Candidate roads identified
    - Process guidance
    - Legal agreement template

Summary of Priority Investments and Recommendations

County Highways

The number one project type prioritized by the public in the public survey was existing road maintenance and improvement. Each year, Union County develops a 5-Year Highway and Bridge Improvement Plan. As part of this MTP, a 10-year Paving Plan was developed using the current 5-Year Plan as the foundation for paving project planning. The estimate in 2022 dollars (2022 $) is inflated 10% compared to 2021 dollars (2021 $) as an estimated effect due to current issues in the construction industry such as labor shortages, supply chain disruptions, cost of construction materials, and interference with project schedules. These cost estimates are planning level engineering/construction estimates and should always be refined with future project development to incorporate more detailed assumptions. Cost will vary based on project scope, site conditions, site constraints, project schedule, and various economic pressures at the time of construction. See Section 5 of this report for road maintenance strategies and Section 6 for the 10-Year Highway Paving Plan.

County Bridges

Replacing all of the county-owned bridges as they deteriorate may be the greatest challenge Union County faces. Of 113 bridges, 36 are in Poor Condition and have short or unknown remaining service lives. As part of the study, these 36 bridges are identified as a priority for replacement by the year 2045. However, the list is expected to grow as bridges currently in Fair or Good condition may also deteriorate

to Poor condition. The County should also review bridge maintenance practices to ensure they align with modern and cost-effective techniques to get the most service life out of its bridges. See Section 5 of this report for bridge maintenance strategies and Section 6 for the Bridge Replacement Plan

There is no plan to permanently close existing county-owned bridges. However, if funding is not available to keep up the bridge replacement needs in Union County, some bridges may have to close when they can no longer be safely crossed. Therefore, 7 bridges were identified as candidates for future bridge closure by conducting an initial screening for bridges with low traffic volumes and short detour length. It appears these bridges would impact the fewest people that use them, and those that are affected would have the shortest alternative route.

It is recommended that Union County continues to apply for BIG funding, as it is the most effective way to get funding for bridge replacement. It is also believed that the $1.2 Trillion Dollar Infrastructure Bill will help with the replacement of existing bridges, but to what extent is currently unknown.

Enhancement Projects

Future projects with specific solutions that address identified issues and needs have been proposed and prioritized in the short, mid, or long term as funding becomes available. It is hoped that one of the major outcomes of this study is that proposed projects will specifically address safety concerns in Union County, as even just one life saved as a result of this plan would be a great return for the people of Union County. See Section 6 of this report for the Enhancement Project Implementation Plan.

Bicycle and Pedestrian Plan

An exciting feature of this study is the proposal for a Bicycle and Pedestrian Plan and a Trails Master Plan (Section 5 of this report). There are no bike and pedestrian facilities on the county road network, but there is great potential for trails and on-street bike routes to connect communities. In particular, it is recommended to add paved shoulders to go with a Bike Route designation for the County Paved – Priority Routes, connecting all the major cities and towns in Union County. To complete this as part of the Major Roads Plan, 4- to 8-foot paved shoulders would be constructed over time.

A conceptual but comprehensive Trails Master Plan has also been created as a vision for active transportation in Union County. This network of trails would benefit Union County for generations through increased physical activity, travel options, quality of life, tourism, economic development, connectivity, and resiliency. The County will need to consider funding mechanisms and phasing sequences to start and complete these projects.

Other Recommendations

- Use the standards and guidelines provided in this study to manage the impacts of new development by planning improvements, funding, and cooperation for new road infrastructure near new development.
- Begin proactive discussions about jurisdictional transfer with nearby municipalities and developers on their intentions for future road jurisdiction and annexation. This will establish a firm direction early in the development process.
- Change functional classification of CR 1C (City of Beresford to SD 50) from Rural Minor Collector to Rural Major Collector
- Consider developing flood maps showing different water level scenarios, which are excellent tools for staff to help evaluate safety and emergency route serviceability during times when floods overtop roads.
- Consider allocating funding contributions in support of local transit facilities, which would help serve the demand for transit in Union County, particularly for the transit-dependent population in greater Union County.
- Consider utilizing Performance-Based Practical Design (PBPD), though the SDDOT has not officially supported this practice. Those referring to this MTP should check to see if the SDDOT

has provided any updated guidance on this topic, as it would be a valuable guide for use by county highway departments.
- Track and consider emerging technology to meet mobility needs, including real-time traveler information, electric vehicle charging stations, ridesharing transportation network companies (e.g., Uber, Lyft), autonomous vehicles, connected vehicles, traffic management solutions, and pedestrian activated flashing crossings.
- Consider creating new policies, design guidelines, and standards as necessary to comply with ADA requirements as the County begins to implement pedestrian-friendly infrastructure.
- Intermittently improve all railroad crossings (system-wide) to help address the random nature of crashes at low-volume crossings.
- Implement risk mitigation strategies for motorcyclists along high-speed corridors.
- Invest in regular pavement condition assessments every two years in order to better understand how road conditions are tracking over time and how roads respond to different types of maintenance/rehab applications.
- Maintain this document by performing an update to this study every 5-10 years to keep it current and beneficial to the County

Tax Revenue Options

An increase in wheel tax could bring more revenue and add points for bridge improvement grant (BIG grant) applications for bridge improvements, however this wheel tax increase would have to be approved by voters. Voters and/or elected officials may also have to approve and create a funding and maintenance mechanism to begin to implement the Union County Trails Master Plan outlined within this study.

Grant Opportunities

This study, and its associated recommendations, sets Union County up to be more competitive in grant application processes and pursuits, as recommended projects shown in this plan have already gained community buy-in and prioritization. BIG grants are actively benefiting Union County for bridge replacements, and there are other grant opportunities available for Union County. Strategies for grant applications and some specific grant opportunities are listed in Section 5 of this report.

Cutting Expenses

This study presents recommendations with an understanding that funding is limited. There are options to increase funding by raising money directly and applying for grants, though cutting expenses is an alternative that can be controlled to a greater extent. Some of the options directly presented in this study include being more proactive with jurisdictional transfer, exploring options for frequently flooded roads, and prioritizing bridges for replacement. Additionally, utilizing modern strategies for road and bridge maintenance will offer the greatest return on investment over the long term. Preventative maintenance strategies at the right time will return more longevity in the service lives of roads and bridges.

Challenges Encountered and Lessons Learned

Union County has seen the benefit of required, regular bridge inspections. These inspections allow the County to understand the condition of the entire bridge inventory in order to best plan improvements. It is recommended that the County utilize the same idea for its paved roads. As part of this study, a PASER condition analysis was performed for every mile of paved and unpaved county road. However, it only sets the baseline for the condition and has nothing to compare the results to. It is recommended that the County perform regular pavement condition assessments, the more frequent, the better. PASER condition assessments are one option due to its ease and low cost to implement. However, there is another primary option called Pavement Condition Index (PCI). Because existing road maintenance and

improvement is so important to the County, it makes sense to track road condition over time to effectively plan maintenance and improvements.

The public survey questionnaire received 22 total responses. In the future, it is recommended that a more focused effort to advertise public surveys on government agency social media outreach platforms be implemented to gather a better response rate.

The COVID-19 pandemic presented numerous unpredictable challenges to the completion of this study, including direct impacts to in-person gatherings for public input and traffic data collection. Some secondary impacts included study delays and challenges in long-term planning for Union County when the pandemic has clearly changed some aspects to the way of life as has been typically accustomed. For example, the work-from-home movement will influence transportation in ways that are not yet clear. Challenges encountered due to the pandemic were overcome to the best extent possible by adapting public outreach tactics to incorporate more robust digital resources and taking more time to assess impacts to travel behavior and economics shifts.

Lastly, as this plan is being finalized in early 2022, the two primary inflationary measures (Consumer Price Index and Producer Price Index) are showing big increases across the board on a 12-month change, and it is unknown where it will settle for 2022 and beyond. This will have a big impact on project cost estimation. Costs for this project have been estimated in 2022 dollars (2022 $), inflated 10% compared to 2021 dollars (2021 $) as an estimated effect due to current issues in the construction industry such as labor shortages, supply chain disruptions, cost of construction materials, and interference with project schedules. These cost estimates are planning level estimates and should always be refined with future project development to incorporated detailed assumptions. Cost will vary based on project scope, site constraints, project schedule, inflation, and various economic pressures at the time of construction.

Appendix A
Methods and Assumptions

Methods & Assumptions for the Union County Master Transportation Plan *Amendment #1*

Prepared for
Union County
SDDOT
SIMPCO
FHWA

Prepared by
Ulteig Engineers, Inc.
Original: December 13, 2019
Amendment #1: April 20, 2021

Methods and Assumptions Amendment #1 Meeting
April 13, 2021

Ulteig

We listen. We solve.™

Stakeholder Acceptance

The undersigned parties concur with the Methods and Assumptions for the Union County Master Transportation Plan as presented in this document.

SDDOT:

Signature

Planning Engineer
Title

1-2-2020
Date

Union County:

Milton Ulstad
Signature

Commissioner
Title

12/17/2019
Date

FHWA:

The South Dakota Division of FHWA has relinquished oversight of this study to SDDOT.

Amendment #1 Acceptance
(Document revisions shown in red italics)

SDDOT:

Signature

4-19-2021
Date

(1) Participation on the Study Advisory Team and/or signing of this document does not constitute approval of the Union County Master Transportation Plan's Final Report or conclusions.

(2) All members of the Study Advisory Team will accept this document as a guide and reference as the study progresses through the various stages of development. If there are any agreed upon changes to the assumptions in this document a revision will be created, endorsed and signed by all the signatories.

TABLE OF CONTENTS

1. Introduction and Project Description

A. Background Information

Union County is in the southeastern corner of South Dakota, at the confluence of the Missouri River and Big Sioux River, bordered by Iowa to the east and Nebraska to the south. The county of 467 square miles is characterized by rich farmland and mostly rural population. The 2018 population is estimated to be about 15,619 (*US Census Bureau*) including communities of Alcester, Beresford, Dakota Dunes, Elk Point, Jefferson, and North Sioux City. The Sioux City MPO includes North Sioux City, Dakota Dunes, and Jefferson within its planning boundary.

Union County's roadway system is mostly consistent with a one square mile grid pattern, served by State, County, City, and Township owned roadways. However, the eastern edge of the county often features winding roads adjacent to the Big Sioux River and/or rolling hill sides. Interstate 29 is the primary thoroughfare, running through the county from north to south.

Union County is responsible for upkeep of 242 miles of roadway (183 miles paved, 59 miles unpaved), 115 bridges, and a number of railroad crossings.

B. Location

The study area is Union County and all communities and surface transportation infrastructure there within. The focus of the Union County Master Transportation Plan will be county owned and maintained roadways and bridges. See Figure 1 on the next page for a map of the county roadway network.

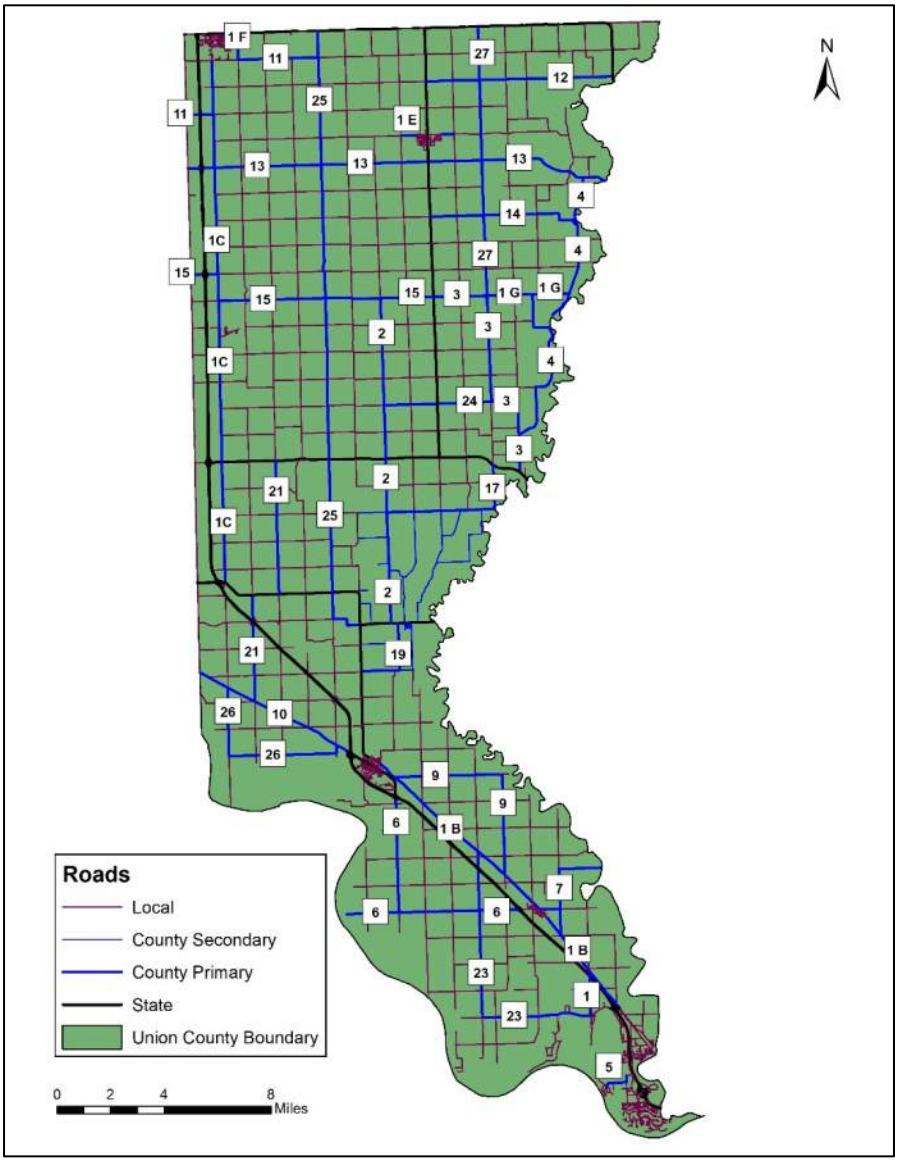


Figure 1: Union County Roads

C. Need for Study

In terms of transportation planning, the County has indicated there is difficulty in maintaining roads and bridges with limited funds. Current and future traffic volumes, crash history, truck routes, flooding trends, infrastructure service life, and multi-modal perspectives are factors that need to be considered in planning as transportation needs inevitably change over time.

The South Dakota Department of Transportation (SDDOT) has recognized the need to share funding with local governments for planning and research. Union County

applied and was thus awarded funding for a county Master Transportation Plan, to aid in prioritization of transportation needs and investments.

The Union County Master Transportation Plan will examine and prioritize safety, infrastructure, and operations needs from a multi-modal perspective in order to enhance economic and social well-being of county residents. It will also provide vision and guidance (incorporating public input) for years to come for local decision-making. Some of the analysis in the plan will include traffic, safety, freight, pavement condition, bicycle/pedestrians, transit, design standards, access management, and future needs for a 20-year planning horizon *(2045).*

D. Study Schedule

October, 2019	*Notice to Proceed*
October, 2019	*Kick-off Meeting/Study Advisory Team Meeting #1*
December, 2019	*Methods and Assumptions Meeting*
April, 2021	*Study Advisory Team Meeting #3*
May, 2021	*Baseline Conditions Analysis Completed*
May, 2021	*Study Advisory Team Meeting #4, #5*
May, 2021	*Internet Based Survey and Website*
May, 2021	*Public Input Meeting #1*
June, 2021 – August, 2021	*Standards Development and Future Needs Assessment*
August, 2021	*Study Advisory Team Meeting #6, #7*
August, 2021	*Public Input Meeting #2*
October, 2021	*Draft Report*
October, 2021	*Present to Union County Commission*
December, 2021	*Final Report*
December 31, 2021	*Work Order Complete*

E. Facilities that will be affected by the study

The study focus will be county owned and maintained roadways and bridges, including an assessment of multi-modal facilities such as pedestrian and bicycle facilities.

F. Previous Studies

The following studies will be reviewed for consistency with the Union County Master Transportation Plan:

- *2020 Decennial Interstate Corridor Study*– In progress
- *SIMPCO Long Range Transportation Plan (LRTP)* – *2021*
- *Union County Pre-Disaster Hazard Mitigation Plan* – 2019
- *Union County 5-year construction plan* – 2019
- *SECOG 2019-2023 SECOG Comprehensive Economic Development Strategy* – 2018
- *Beresford Comprehensive Plan* – 2018
- *Dakota Dunes/N. Sioux City Planning Study* – 2018
- *North Sioux City Comprehensive Plan* – 2017
- *National Parks Service Long Range Transportation Plan Midwest Region* – 2016
- *Elk Point Comprehensive Plan* – 2013
- *Alcester Comprehensive Plan* – 2011
- *SDDOT South Dakota Statewide Long Range Transportation Plan* – 2010
- *Jefferson Comprehensive Plan* – 2007
- *Union County Comprehensive Plan* – 2005

G. Study Advisory Team

The Study Advisory Team consists of representatives from Union County, SDDOT, and SIMPCO.

Mike Dailey	Union County Commission
Milton Ustad	Union County Commission
Jerry Buum	Union County Highway Department Superintendent
Jeff Noteboom	Union County Highway Department Assistant Superintendent
~~Andy Minihan~~	~~Union County Emergency Management~~
Samantha Langley	*Union County Highway Department Administrative Assistant*
Brandon Cooper	Union County GIS
Cristy Harkness	Union County Highway Department Exec. Secretary
Dennis Henze	Union County Planning & Zoning
Steve Gramm	SDDOT – Project Development
Rod Gall	SDDOT – Yankton Area
Jeff Brosz	SDDOT – Transportation Inventory Management
Sarah Gilkerson	SDDOT – Utility Coordinator, MPO Coordinator
Michelle Bostinelos	Sioux City MPO (SIMPCO)
~~Jake Heil~~	~~Sioux City MPO (SIMPCO)~~

2. Study Area

The study area is Union County and all communities and surface transportation infrastructure there within. The focus of the Plan will be County owned and maintained roadways and bridges. Refer to Figure 1.

3. Analysis Years/Periods

The existing year of analysis will be *2021*. The planning design year will be *2045*, the 20-year planning horizon. A 5-year highway and bridge rehabilitation plan will be proposed after a review of existing conditions, maintenance & rehabilitation strategies, project prioritization, and funding expectations.

4. Data Collection

A. Traffic Volumes

The SDDOT has provided 2018 traffic counts at various locations throughout Union County, including many locations along county roadways. See Figure 2 on the next page to see the extent of the available traffic count data. As part of this study, Ulteig will collect 24-hour traffic volume at least three locations to fill in data gaps along relatively higher volume roadways:

- CR 10 between Clay County border and I-29
- CR 1B between Elk Point and CR 6
- CR 23 between Wynstone Dr and CR 1

Ulteig will also collect a sampling of peak hour traffic counts and/or vehicle classification counts as necessary to calibrate/estimate heavy vehicle percentage, peak hour factor, and K factor. A preliminary review of crash history and traffic volume did not indicate an apparent need for turning movement counts at any specific locations.

Traffic volumes collected in the field will be applied seasonal factors provided by the SDDOT. All traffic volumes will be extrapolated to a baseline condition year *2021* based on annual growth factor provided by the SDDOT.

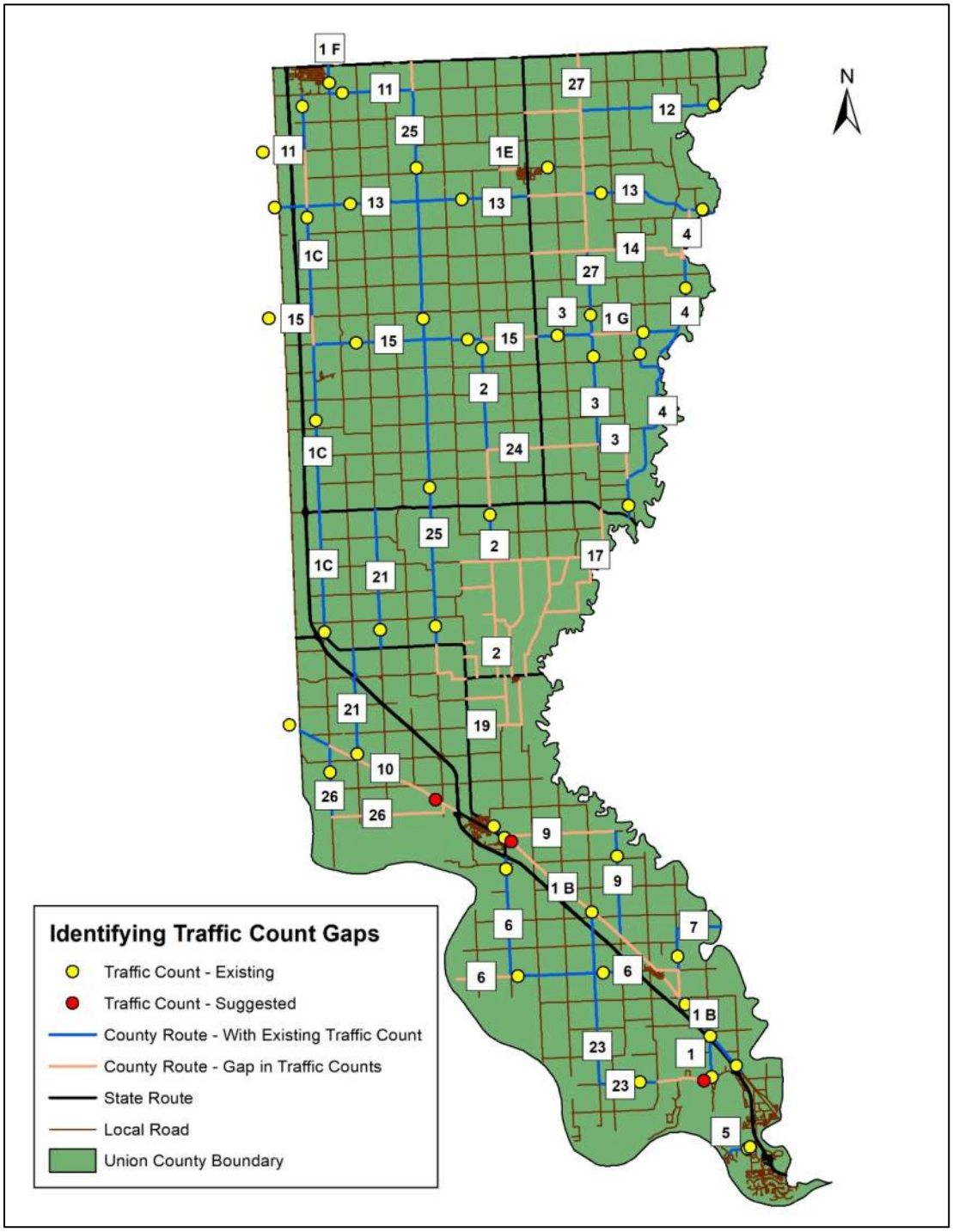


Figure 2: Identifying Traffic Count Gaps

B. Crash History

The SDDOT has provided crash history data for the most recent available 5-year period, 2016-2020.

C. Pavement Condition

Ulteig will collect pavement condition along all County owned/maintained roadways (242 miles) as part of baseline conditions analysis prior to the 2019-2020 winter season. The method of evaluation will be the *PASER Rating System* with approximate one mile intervals, between intersections and changes in surface condition.

D. Bridge Inspection Data

Bridge inspection reports from the most recent year of inspection (*2019-2020*) will be used to review the state of the bridge network for county owned & maintained bridges. Ulteig will utilize all available bridge data, including National Bridge Inspection Reports.

E. Internet-Based Survey

An internet-based survey will be used to collect input from the public to understand origin-destination behaviors and needs. The Study Advisory Team will review and approve the survey questions. The same survey questions will be made available in paper form by special request.

F. Other

Other data will be sourced to complete existing baseline conditions including previous studies, GIS mapping data, ordinances, roadway network classification, and a review of bicycle, pedestrian, transit, rail, and airport facilities.

5. Traffic Operations Analysis

Due to the generally low volumes, it is assumed that volume/capacity ratios (V/C ratios) will be sufficient for traffic operations congestion analysis and planning along county corridors. Additionally, *SDDOT Road Design Manual* Chapter 15 will be used for guidance on capacity planning. If highway or intersection peak hour analysis is required, the most recent release of Synchro or HCS software will be utilized in order to accommodate Highway Capacity Manual (HCM 6th edition) outputs such as level of service.

Determination of traffic analysis parameters such as ideal saturation flow rate, peak hour factor, and heavy vehicle percentage will be will be according to field-measured calibration, SDDOT provided values, *SDDOT Road Design Manual* Chapter 15, or HCM defaults, in that same order of precedence. All deviations will be justified.

It is assumed that traffic signal warrant analysis will be unnecessary. A preliminary review of crash history and traffic volumes did not indicate an apparent need for traffic signal warrant analysis at any specific locations.

It is assumed that trip generation for major developments will be unnecessary as there are no major developments known.

6. Travel Forecast

For county roads within the SIMPCO planning boundary a traffic demand model is in progress for the SIMPCO LRTP. This Plan will ensure consistency with traffic volume projections. All other county road traffic volumes will be projected according to the SDDOT provided annual growth rate. Historical traffic growth trends will be used if a more aggressive growth rate is reliably justified based on available data.

7. Safety Issues

The SDDOT will provide crash data for the most recent available 5-year period. ~~2014-2018~~. Crash analysis will be performed on county roads and intersections to pinpoint trends and to explore safety countermeasures. If available, crash rates will be compared to statewide averages.

8. Selection of Measures of Effectiveness (MOE)

Measures of Effectiveness will include level of service (LOS) and volume/capacity (V/C ratio). LOS will be utilized as appropriate and described according to HCM 6th Edition, to ensure facility design provides acceptable traffic operations at intersections. LOS C or better is desirable for general planning purposes. The V/C ratio will be utilized as appropriate and described according to *SDDOT Road Design Manual*, Chapter 15, to ensure all county corridors have a sufficient number of lanes. A daily traffic V/C ratio of less than 1.0 for 20-year planning purposes is desirable according to Table 15-10 in *SDDOT Road Design Manual* (e.g. less than 8000 veh/day for 2 lanes).

9. FHWA Interstate Access Modification Policy Points

There are no plans for interstate access modification as part of this Plan.

10. Deviations/Justifications

There are no plans to deviate from study standards. If deviations are determined to be necessary, they will be documented and presented to the Study Advisory Team and this document may be amended.

11. Conclusion

The proposed Union County Master Transportation Plan will satisfy the need to evaluate the condition of the transportation network, forecast future needs, identify deficiencies, suggest feasible solutions, prioritize investments, and develop standards. Accounting for limited budgets, this living document will provide vision and guidance (incorporating public input) for local decision-making for years to come.

Appendix A

Methods and Assumptions Meeting *(2020)* Minutes

Date: December 12, 2019

Location: Video/Conference Call, multiple locations

Attendees: Paul Deutsch – Ulteig
Brad Stangohr – Ulteig
Steve Gramm – SDDOT
Jeff Brosz – SDDOT
Jerry Buum – Union County
Jeff Noteboom – Union County
Andy Minihan – Union County
Gabriel Appiah – SIMPCO

Introductions: The attendees introduced themselves.

Project Update: Paul updated the group on the progress of the Master Transportation Plan. Ulteig inspected all Union County owned and maintained roadways for pavement condition in early November before the snow arrived. GIS mapping is in progress with available data. Existing documents and plans have been received and are being looked at for consistency of planning.

Methods and Assumptions: Paul read through the draft document. Some of the attendees had comments on the draft report and are described below.

Table of Contents – Steve G: Add appendix showing a summary of this meeting's comments.

Section 1.F – Steve G: "2020 Decennial Interstate Corridor Study" is the official title.

Section 1.G – Paul D: Asked if a representative from SECOG should be invited to the Study Advisory Team. The group acknowledged that it would be okay to extend an invitation.

Section 4.A – Steve G: Add map showing where the traffic counts have been collected to show where the gaps are. This comment was a result of discussion as to how the suggested traffic counts were determined. Paul said that based on the gaps in traffic counts, most of the roads are low volume or in an area that could be reasonably estimated based on nearby traffic counts, but it is certainly possible that there will be additional locations to count as the project progresses.

Appendix B

Methods and Assumptions Meeting (2021) Minutes

Date: *April 13, 2021*

Location: *Video/Conference Call, multiple locations*

Attendees: *Paul Deutsch – Ulteig*
Brad Stangohr – Ulteig
Steve Gramm – SDDOT
Doug Kinniburgh – SDDOT
Sarah Gilkerson – SDDOT
Jerry Buum – Union County
Jeff Noteboom – Union County
Cristy Harkness – Union County
Samantha Langley – Union County
Hannah Neel – SIMPCO

Introductions: *The attendees introduced themselves.*

Project Update: *Paul updated the group on the progress of the Master Transportation Plan, which has been paused for about one year since the start of the Covid-19 Pandemic. Field Data Collection has been completed, Baseline Conditions Analysis is in progress, and preparation has begun for the first stage of public and stakeholder outreach as well as the internet-based survey and website.*

Public Outreach: *Steve said SDDOT public meetings are still all virtual tentatively until July 1, 2021. Public Input Meeting #1 will be according to SDDOT guidelines. Public Input Meeting #2 may be the traditional way. SDDOT has found the virtual public input strategy has gotten more involvement than the traditional way, so it is possible it will not go back to only the traditional methods entirely. Meetings are still advertised in newspapers. Website, internet-based survey and narrated presentation are launching on the same day, with the first public notice advertised the same day as launch. Many newspapers are weekly, so there is an art to the timing. 30 days are still required for opportunity for public input. For those without internet access, special arrangements can be made, and is shown on the public notice for who to contact.*

Stakeholders: *Paul asked if anyone knew of any stakeholders that should be added to the contact list beyond county municipalities, townships, and school districts. There was no response. He said he would email the SAT if there are any requests to add stakeholders and then finalize the list of stakeholders soon after. Paul asked if stakeholder outreach is being handled differently than general public during the pandemic. Steve said stakeholders should be*

sent an email notice about public input website. Stakeholders may prefer to schedule a one-on-one meeting virtually or in office, depending on how the consultant wants to handle it.

Methods and Assumptions: *Paul brought up topics from the original document that may need to be updated.*

Section 1.D Study Schedule – Paul D: Schedule is roughly one year behind for all tasks.

Section 1.F Previous Studies – Steve G: "2020 Decennial Interstate Corridor Study" Phase 1 is completed, and is likely more current than previous document shared on file.

Section 1.G Study Advisory Team – Jerry B: Union County Emergency Manager position is an open seat, add Samantha Langley as an additional representative for Union County Highway Department (Administrative Assistant).

Section 3 Analysis Years/Periods – Paul D: Will change planning year horizon from 2040 to 2045. Steve agreed.

Section 4.A Traffic Volumes – Steve G: SDDOT Traffic counts are on a 3-year cycle, so 2018 data has not changed.

Section 4.B Crash History – Doug K: Most recent 5-year crash history is more beneficial especially in cases where there have been known fatalities that are not covered by the 2014-2018 data. Steve G: I will send Paul the geodatabase for 2019 and 2020, and no need to go beyond 5 years of data unless there it changes patterns for some reason.

Section 4.C Bridge Inspection Data – Jerry B: There is new bridge data from 2020, so please update the data.

Steve said the significance of these changes may justify amendment to the document. He is typically the only person who signs the amendment but Union County can sign it too. Jerry said he didn't think it is necessary to have Union County sign the amended document. Steve asked Paul to update the document as discussed and send PDF to him with new signature block for amendment #1.

Appendix B
Public Meeting #1 Summary and Survey Results

PUBLIC FEEDBACK SUMMARY FOR PUBLIC MEETING #1 AND ONLINE SURVEY RESULTS

Union County Master Transportation Plan

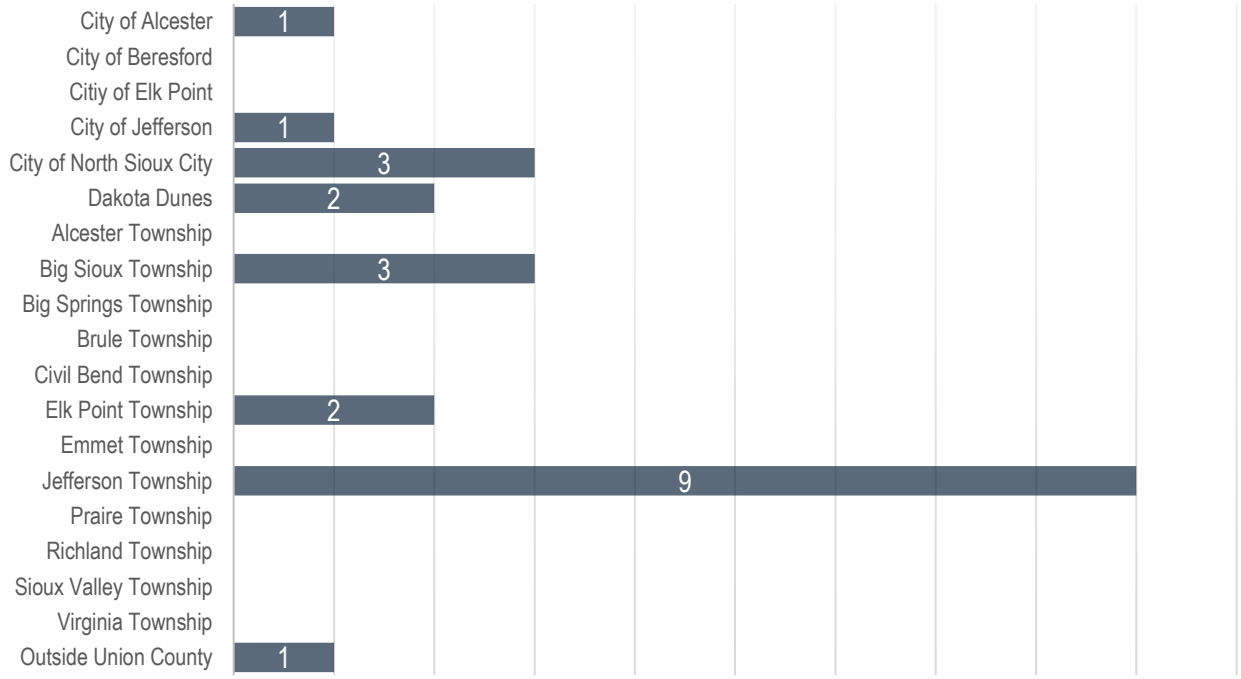
Public Meeting #1 (virtual) and an internet-based public survey were open for public comment from June 3 through July 21, 2021. Due to Covid-19 Pandemic precautions set by SDDOT (following CDC guidance), Public Meeting #1 was presented in an entirely virtual format. Stakeholders identified by the Study Advisory Team were emailed direct invitations for Public Meeting #1, and public advertisements were posted in the following official Union County newspapers on June 3 and June 10, 2021:

- *Alcester Union & Hudsonite*
- *Beresford Republic*
- *Dakota Dunes / North Sioux City Times*
- *The Leader-Courier*

The public survey posed 37 questions relating to the existing transportation network in Union County. There were opportunities for participants to provide feedback relating to their usage of the transportation network, overall performance, issues and concerns, budgetary perceptions, prioritization of specific types of improvements, and general comments.

A total of 22 surveys were completed and 2 individual comments were submitted outside of the survey. The results of the survey questions, comments, and analysis are shown below. With 22 total responses, it will be difficult to draw definitive conclusions, but the results and comments are helpful in identifying transportation issues and opportunities in Union County, as well as gain an understanding on where people stand regarding funding and performance of the transportation network.

Q1. Where in Union County do you live?

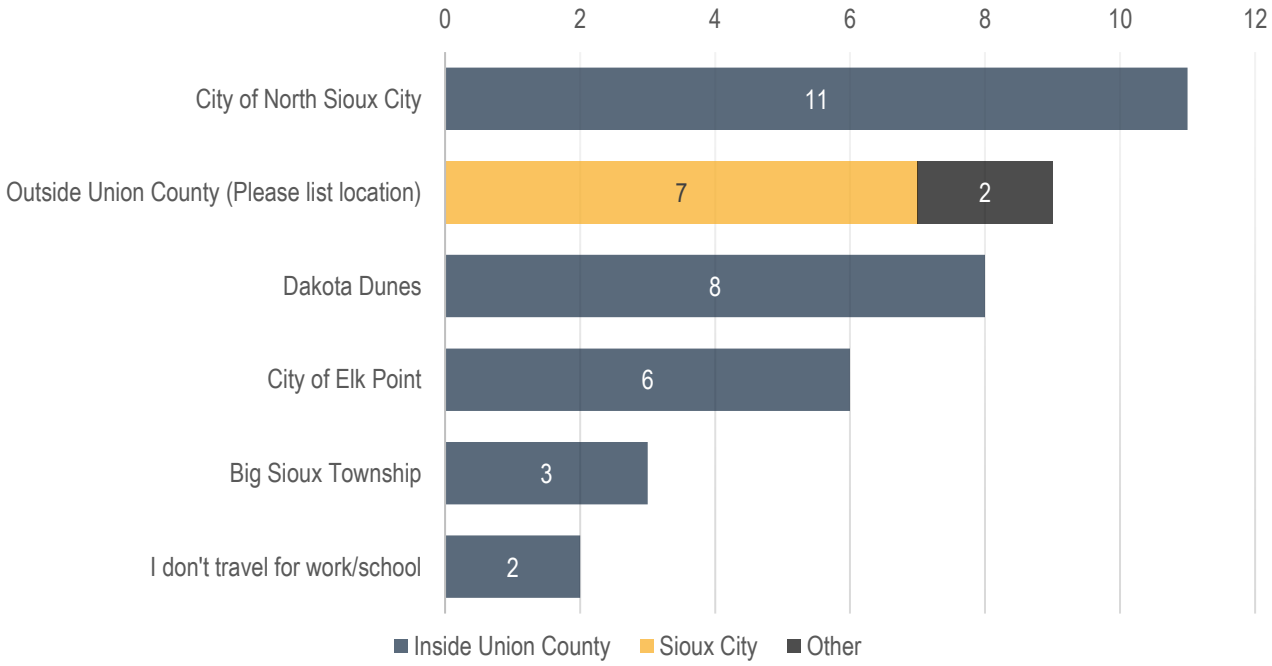


Comments:

- *Outside Union County – Georgia*
- *Jefferson Township – Wynstone community*
- *Jefferson Township – Wysnstone*
- *City of Jefferson – Wynstone*
- *Jefferson Township – Wynstone*
- *Elk Point Township – City of Elk Point*

The majority of survey respondents live in Jefferson Township, with Big Sioux Township and North Sioux City registering the second most responses.

Q2. Where do you travel for work/school in Union County? Select all that apply.

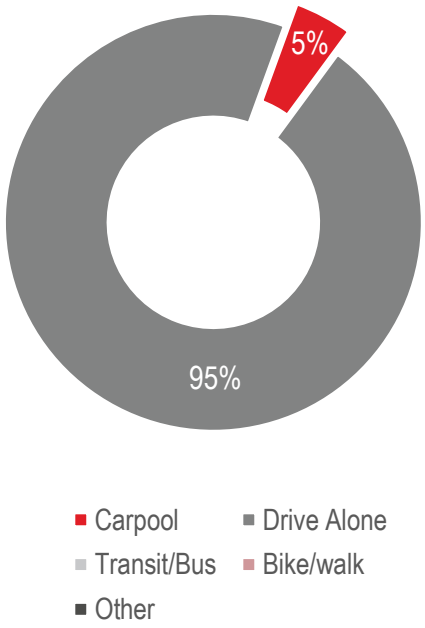


Comments:

- *Outside Union County – Sioux City*
- *Outside Union County – Sioux City, Iowa*
- *Outside Union County – Sioux City, Iowa*
- *Outside Union County – Sioux City*
- *Dakota Valley Elementary School (myself)f; husband – north to Sioux Falls and west*
- *Outside Union County – Sioux City, IA*
- *Outside Union County – Sioux City*

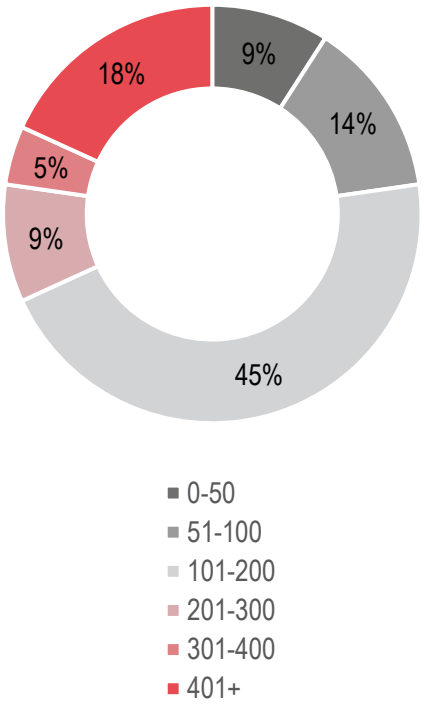
The majority of survey respondents commute to the Sioux City metropolitan area for school or work, including Sioux City, IA, North Sioux City, and Dakota Dunes.

Q3. How do you typically travel to destinations from your home?



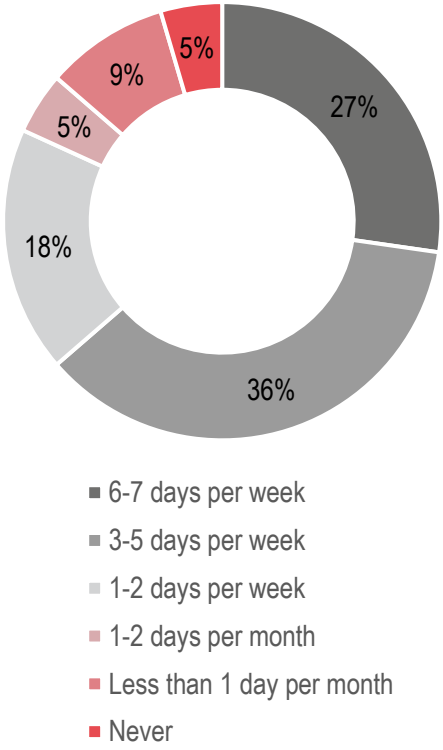
The majority of survey respondents typically drive alone when travelling to outside destinations. This number does not reflect the true number of occupants per vehicle for the majority of trips, as many trips in Union County would be expected to involve family members driving spouses and children, which would technically qualify as a carpool.

Q4. How many miles do you travel in a typical week?



Survey respondents most frequently responded that they drive between 100 to 200 miles in a typical week, with the second largest cohort driving over 400 miles per week. This travel behavior is normal for a rural population.

Q5. During warmer months, how often do you walk/bike outdoors in Union County?



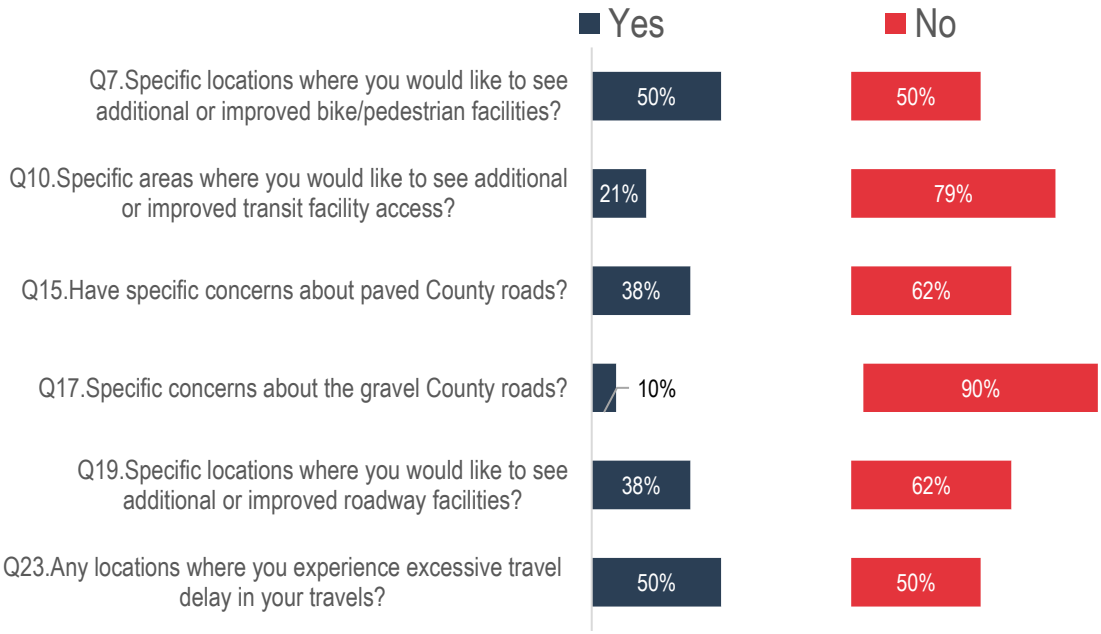
36% of survey respondents report walking or biking 3-5 days per week, while 27% reported walking and biking 6-7 days per week, a great baseline number for active living and active transportation in Union County.

Q6. What prevents you from walking/biking outdoors more often than you do? Please explain and identify issues regarding pedestrian facilities and safety within Union County.

- Weather, other commitments.
- Nothing prevents me from walking.
- There are no sidewalks or bike lanes. I utilize Adam's Nature Area to walk and bike ride.
- Safe place to walk/bike not readily available.
- No Sidewalk in Wynstone.
- No shoulders on county roads, specifically on Hwy 23 (334th St.).
- No biking trails/paths--must ride on a fairly heavily trafficed highway.
- There is no walking path near me. (Deer Run Circle) The county road is too busy to walk safely.
- The road from the Dakota Valley Middle School to Deer Run is NOT pedestrian/bike friendly; cars traveling west after work have sun in their eyes, cars traveling east have the morning sun in their eyes, no shoulders on the road, and people are traveling MUCH faster then the speed limit.
- Conditions excellent for walking/biking McCook Lake Area and Dakota Dunes. Could use bike lanes up to Jefferson and also out to Wynstone on county Roads.
- Connectors to neighboring communities.
- Weather or personal schedule keep me from walking each day. I sometimes walk on the school track or on the golf course. Few other locations have sidewalks or walk paths.
- No place to ride.

Lack of bike and walking infrastructure (trails, sidewalk, paved shoulders, and bike lanes) are frequently mentioned as the main obstacles preventing Union County residents from walking and biking more often. Weather conditions were also frequently mentioned.

Summary of Responses for Q7, Q10, Q15, Q17, Q19, & Q23 (Comments are shown in the following sections)



The details of these questions are provided later in the document. By comparing side by side, there is an opportunity to discern where survey respondents are identifying specific concerns and opportunities for improvement rather than simply generalizing them.

Q7. Are there specific locations where you would like to see additional or improved bike/pedestrian facilities in Union County?

If Yes, please explain:

- Bike/Walk trail to Adam's Nature to Dakota Dunes.
- Along 334th St a bike/walking trail connecting Wynstone to McCook/N Sioux City bike/walk trail
- Wynstone
- Hwy23/Northshore drive.
- Sidewalk along the south side of Deer Run, walk way to Adams Nature Preserve from Deer Run along the buffalo fence/pasture, sidewalk/bike path along road from Deer Run to Dakota Valley Middle School.
- Nice bike paths in Adams Homestead Nature Preserve
- Along MO River
- SD side of Big Sioux fm Dunes to the strip in North Sioux City & bridge to Sioux City, IA
- If the railroad line between Hawarden and Beresford was ever abandoned that might make a good walking trail.
- County rd 1b needs a bike lane

The respondents identified a variety of ideas for improved bike/pedestrian facilities. These suggestions will be incorporated into the Draft Union County Master Transportation Plan where applicable.

Q8. How often do you use public transit (e.g. buses, paratransit, etc.)?

This is an expected response for many rural residents. The inconvenience of utilizing public access and/or the lack of access to public transit could be factors in this heavily weighted response. However, 21% of respondents (Q10) indicated they have specific areas where they would like to see additional or improved transit facility access.

Q9. Why do you use public transit? Select all that apply.

- A bus from NSC w/bike rack would be great.

The inconvenience of utilizing public access and/or the lack of access to public transit could be factors in this heavily weighted response. However, 21% of respondents (Q10) indicated they have specific areas where they would like to see additional or improved transit facility access. A recommendation for bicycle accommodations on buses has been incorporated into the Draft Union County Master Transportation Plan.

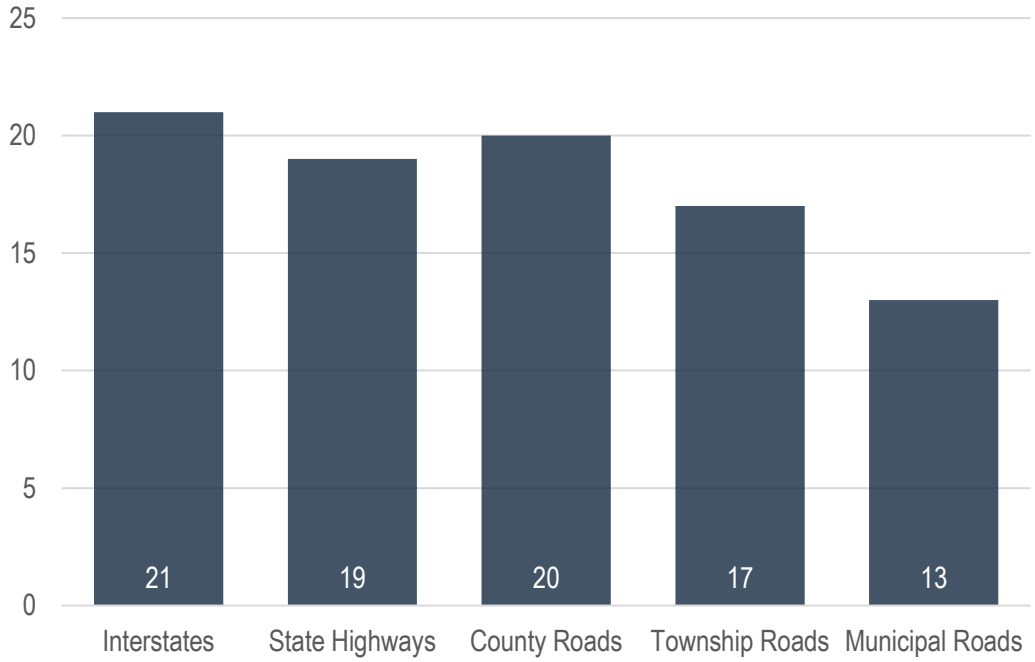
Q10. Are there specific areas where you would like to see additional or improved transit facility access in Union County?

If Yes, please explain:

- Much better bus service.
- Around Dakota Valley schools
- Bus to Sioux City.
- Access within cities, public transit is not advertised very well.

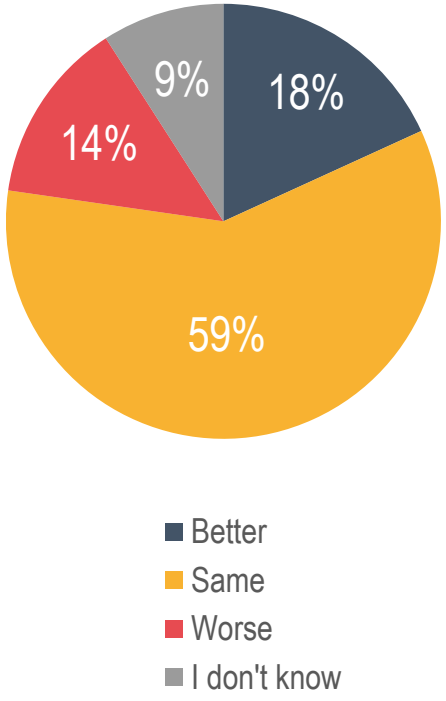
Recommendations for transit service have been incorporated into the Draft Union County Master Transportation Plan.

Q11. Which types of roadway do you depend on to be maintained? Select all that apply.



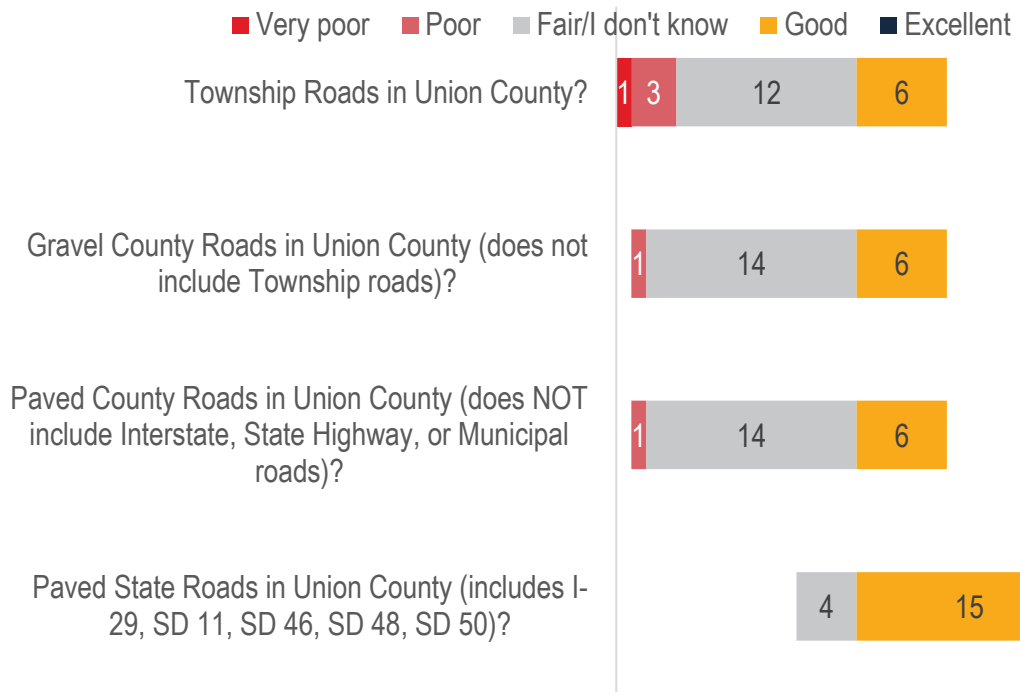
All roadway types are mentioned; however, Interstates, State Highways, and County Roads have the highest maintenance priority.

Q12. How would you rate the quality of Union County transportation infrastructure compared to 5 years ago?



The majority of survey respondents have listed the quality of Union County transportation infrastructure as the same compared to 5 years ago.

Q13,14,16 and 18. How would you rate the condition of … ?



Survey respondents indicated Township Roads, Gravel Roads, and Paved County Roads are mostly Fair to Good condition, while Paved State Roads are mostly in Good condition.

Q15. Do you have specific concerns about paved County roads in Union County (does NOT include Interstate, State Highway, or Municipal roads)?

- Exit 4 overpass bridge and approach on each side there's bad washboarding and bumps
- Asphalt roads are rough, too many tar joints (dangerous when on motorcycle) ditches aren't mowed frequently enough (concern on watching for wildlife) and some of the concrete roads buckle with heat (not enough expansion joints) the road at hwy 23 near exit 4 from I-29 is very rough, needs repair.
- but wish county still maintained Northshore Drive as they did better job
- Speed limit on County Road 23 between Dakota Valley School and Wynstone should be at least 45 mph not 35 mph
- When pink rock goes down the excess is never tended to; leaving a hazard for motorcycles and bicycles.
- I am concerned Union Co will spend money needlessly on road construction to correct a problem that doesn't exist.
- County Road 1B.
- County road 1B between Jefferson and Elk Point
- Some of the county asphalt roads are starting to show there age from local traffic

These concerns will be incorporated into the Draft Union County Master Transportation Plan and Maintenance Plan section, where applicable.

Q17. Do you have specific concerns about the gravel County roads in Union County (does not include Township roads)?

- Washerboard.
- Some of the gravel roads that are exposed to recent floods and truck traffic show signs of deteriorating

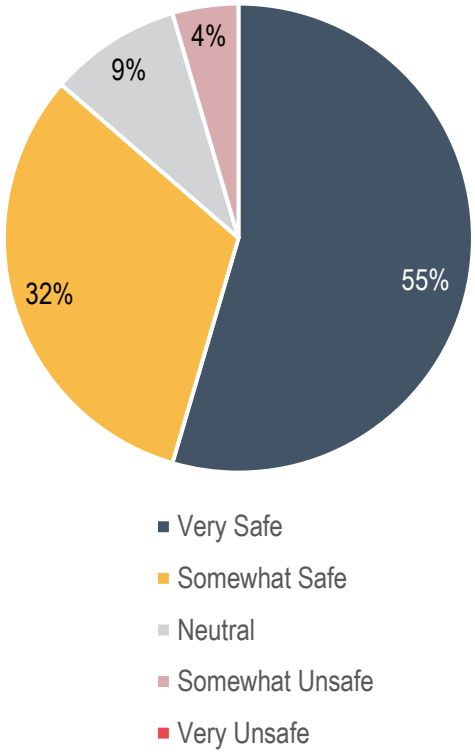
Routine scheduled grading will alleviate most maintenance concerns. If flooding and truck traffic are expected to continue on certain routes, an improvement plan beyond routine grading may need to be considered. There will be an attempt to identify specific locations as part of the plan.

Q19. Are there specific locations where you would like to see additional or improved roadway facilities (beyond typical maintenance and resurfacing) in Union County?

- big siux township roads in general.
- Around Dakota valley schools.
- Northshore Drive needs to be 3-lane or with school turning lanes and also need surface improvement. Few years ago new wide concrete street with curb and gutter south on Westshore to Adams and beyond and Northshore needs same.
- In front of Dakota Valley School
- Again, pick up the excess pink gravel after application.
- Henke Rd. Some bus route gravel roads north of Richland. 471st St to Burbank Beach.
- New bridge on I29 exit 4 moved north of existing bridge for safety and economic development. Noisy interstate pavements going thru North Sioux City and Dakota Dunes
- Heavy traffic highways 330th 480th

These suggestions for additional or improved roadway facilities will be considered for future enhancement project planning, where applicable.

Q20. How safe do you feel driving or riding in automobiles in Union County?



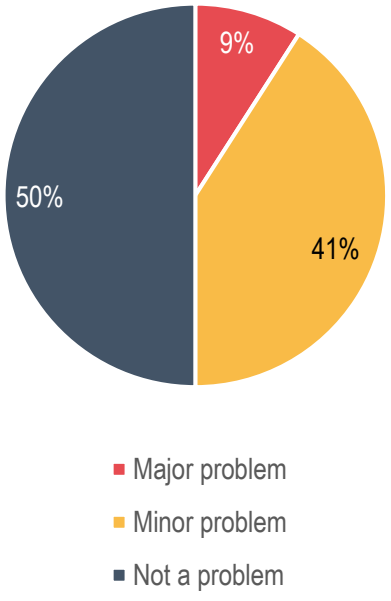
A majority of survey respondents feel very safe to somewhat safe driving or riding in automobiles in Union County.

Q21. Identify general or specific safety issues that you are most concerned about in Union County.

- other drivers
- I don't have an issue.
- View for pulling out and merging with traffic on Exit 4 overpass is horrible and very dangerous. Site lines blocked by bridge.
- Traffic around Dakota Valley schools
- Ditches need to be mowed better, as a motorcyclist, too many chances for deer to run out. Also, need to enforce the law that grass clippings are not to be spread onto the road way, that is like ice to a motorcycle
- people do NOT know the rules for riding bikes, scooters, skateboards, walking on roads - wheels go with the cars not against traffic, pedestrians go against the traffic so you can make eye contact with the driver. Educate the public!
- No safety issues
- Difficulty going from Wynstone on County Road 23 to Interstate 29 in front of Dakota Valley School; road design is not able to accommodate such a HIGH volume of traffic.
- Speeding, texting/calls on cell phones.
- Steep ditches in places. Small shoulders.
- Distracted drivers and wild animals on the roads.

The responses were varied and valid. These concerns will be incorporated into the Draft Union County Master Transportation Plan and Safety section, where applicable.

Q22. Rate the overall level of traffic congestion in Union County?



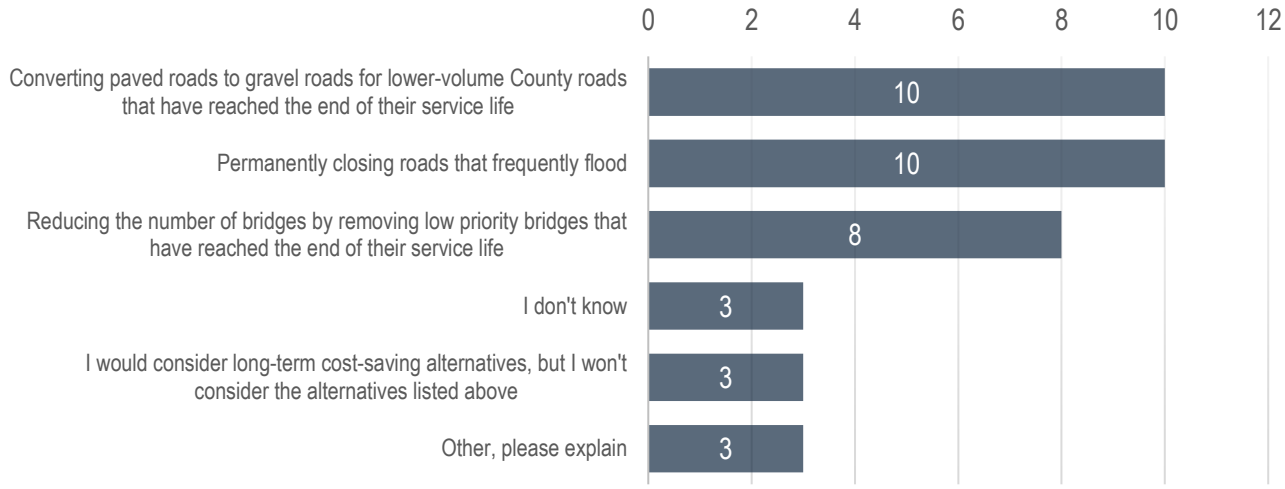
A majority of survey respondents feel that traffic congestion is Not a problem or a Minor problem in Union County.

Q23. Are there any locations in Union County where you experience excessive travel delay in your travels? Please list the location and when excessive travel delays occur.

- Dakota Dunes Bllvd
- Dakota Valley School Area in 8am and 3pm when school is in session.
- Road in front of Dakota Valley school AND the Exit 4 ramps due to school traffic
- McCook Lake
- Dakota Valley schools
- Northbound Exit 4 gets backed up in the morning during school and then in the evenings. Intersection with Hwy 23/Northshore and that exit can be bad. If you are sitting at that exit, it is very hard to see eastbound traffic on northshore coming over the bridge.
- DV schools
- In front of Dakota Valley schools in the morning and mid-afternoon
- NORTH SHORE DRIVE @ 8:00am and 3:15pm - school arrival time and school dismissal time; during sporting events
- twice daily during school year on school days at drop off and pick up minor traffic delay due to no turning lanes and 6 separate school entrances off northshore drive. School could connect elementary and high school parking lots so that middle school exiting traffic could exit through high school lot to Westshore and left turning lanes into the lots would totally alleviate issues.
- Dakota Valley School

Comments on travel delays were overwhelmingly represented in the vicinity of Northshore Drive, Dakota Valley Schools, and Exit 4 at Interstate 29, though Union County has transferred jurisdiction of North Shore Drive to North Sioux City between Westshore Dr/CR 1 and Interstate 29. Survey respondents list school drop-off and pick-up times as places where they experience excessive travel delay. Mitigation strategies include Safe Routes to School programs that encourage walking and biking, carpooling, walking school busses, and development of school access plans. A planning study along this corridor may be beneficial, as travel delays will increase as the area develop.

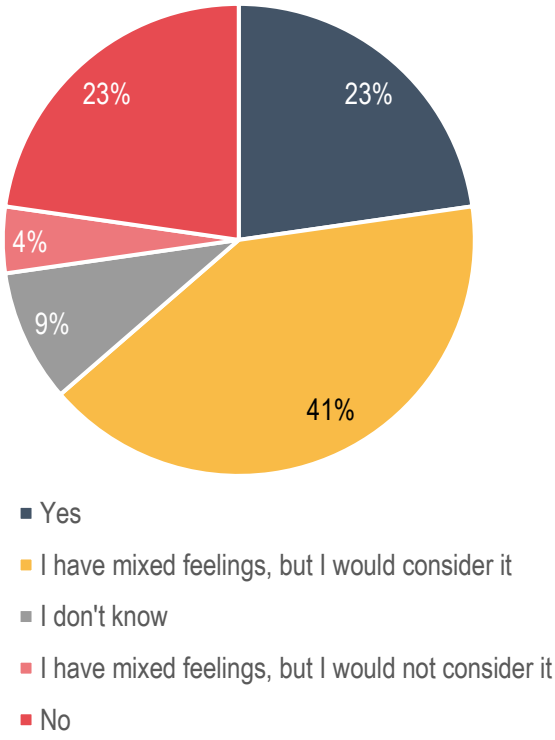
Q24. Which long-term cost-saving alternatives would you consider if funding is not adequate to maintain existing transportation infrastructure in Union County? Select all that apply.



- Otherwise, what about a higher tax on things that damage the roads more (Semis, tractor trailers, farming equipment, etc.) cars and motorcycles are creating issues on the roads, it's the heavier equipment. There has to be a way to increase funding by charging those that damage the road more.
- I would need more information and time to consider.
- Would rather fix above vrs $16 million to divert traffic from lake near DV.
- Would consider these cost saving options if it does not severely alter our bus routes for the school.

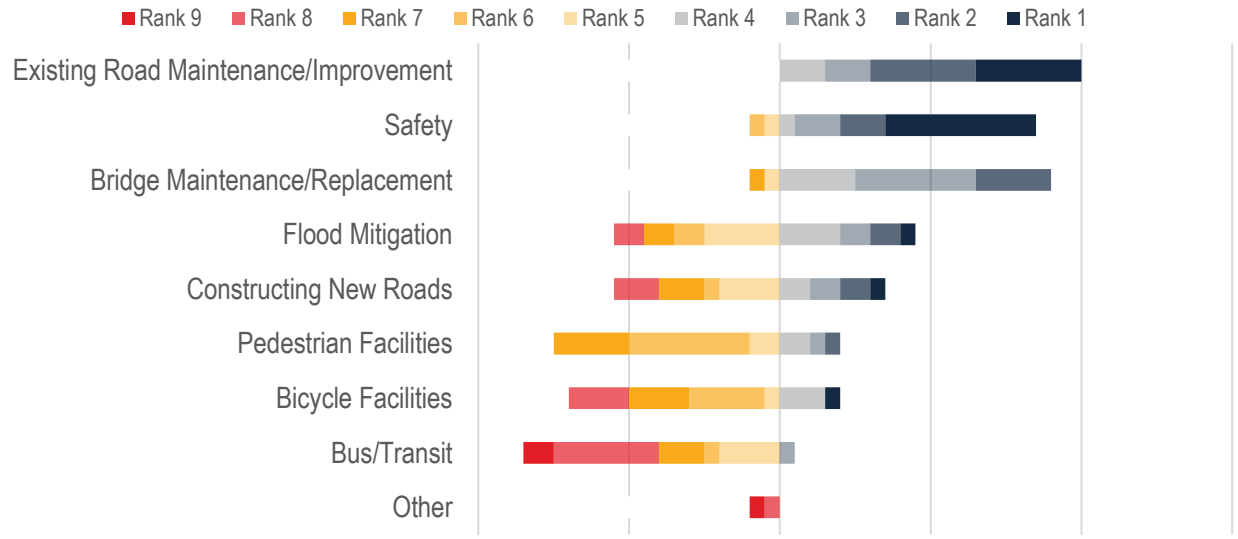
There was not one particular response that stands out, though most survey respondents are willing to consider long-term cost-saving alternatives. These alternatives will be considered in the Draft Union County Master Transportation Plan, Maintenance Plan section and revenue assessments. Union County has indicated they would prefer not to implement any of these cost-saving strategies if the network can be maintained without these measures.

Q25. Are you willing to support potential increases in fees to support transportation maintenance/improvement projects in Union County such as Bicycle, Bridge Maintenance/Replacement, Bus/Transit, Road Maintenance/Improvement, Flood Mitigation, New Road Construction, Pedestrian, and Safety?



A majority (64%) of survey respondents are willing or would consider supporting transportation fee increases in Union County. 27% of survey respondents are not willing or would not consider supporting transportation fee increases in Union County.

Q26. Rate the following transportation project types in order of importance (For example, an entry of 8, 7, 6, 5, 4, 3, 2, 1 would mean that you think Safety projects are the most important and Bicycle Facilities projects are the least important).

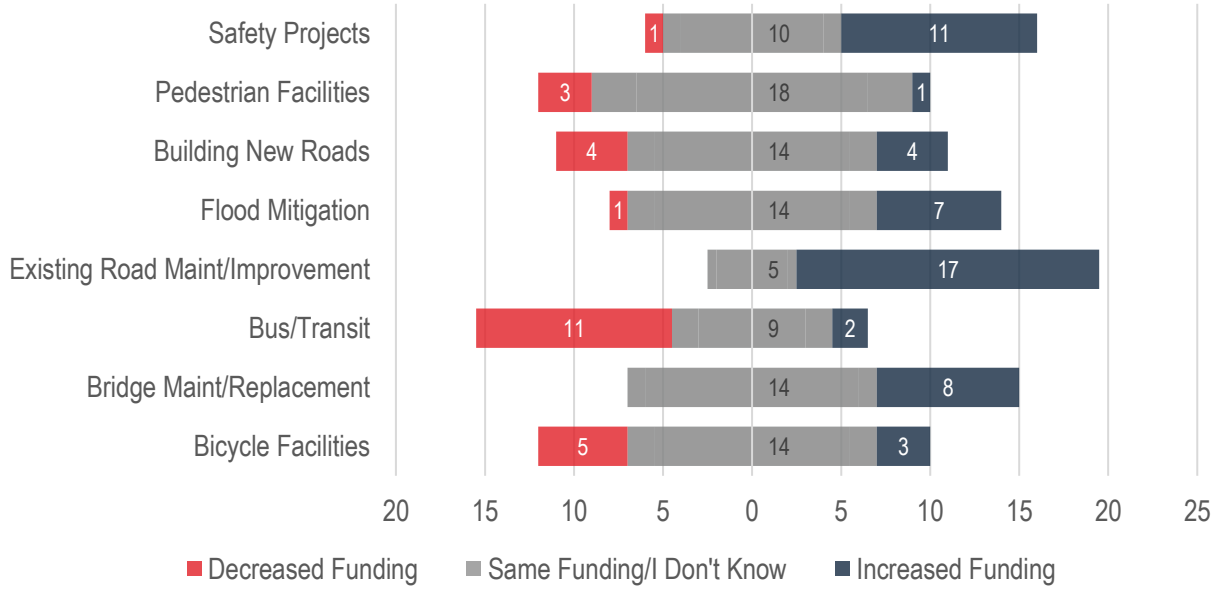


Comments:

- *(increase speed limit to rural speed on 334th township road instead of 35--look at all the other roads around are at least 45 just dumb limitation slowing traffic once past McCook) and last would be [Bus Transit] which I don't think should be publicly paid for or funded=it's just a HUGE waste of money review the actual usage and NO ONE uses hardly at all.*
- *Comfortable with how things are right now except for the traffic in front of the elementary school and high school dismissal time. The elementary made huge improvements with the new parking lot procedure last year, but more needs to be done.*
- *safety and existing road and bridge conditions go hand in hand*
- *No way on $16m to build a four-lane road north and around DV. Seems an exit at 484 would be better.*
- *Bicycle Facilities, Bus/Transit, Constructing New Roads, Pedestrian Facilities all equal at the lowest level of importance or less.*

Survey respondents ranked Existing Road Maintenance/Improvements as their priority in Union County, though Safety was ranked No. 1 most frequently. Bridge Maintenance/Replacement and Safety were also listed as high priority items, while Bus/Transit was ranked as least important. Flood Mitigation, Constructing New Roads, Pedestrian Facilities, and Bicycle Facilities had mixed priorities Note: All responses were included even if some of the project types were omitted by mistake or on purpose by the respondents.

Q27-34. Compared to now, how do you think future funding should be spent on…?



Survey respondents ranked Existing Road Maintenance/Improvements as their priority for future funding in Union County. Bridge Maintenance/Replacement, Safety, and Flood Mitigation were also listed as high priority items for funding, while Bus/Transit was ranked as least important. Pedestrian Facilities, Building New Roads, and Bicycle Facilities had mixed responses. Note: Survey respondents were not provided with any funding figures, so responses may only be based on perception.

Q35. What is your biggest transportation concern for Union County over the next 20 years? Please describe.

- Public transit and electric vehicle charging
- Mitigation of road flooding
- Maintenance on current roads
- Maintenance on roads and bridges that they have. Growth of new developments.
- traffic congestion around Dakota Valley school and frontage road. Dakota Dunes and N Sioux City continued development needs to assume substantial growth and with it appropriate traffic handling.
- Traffic through McCook Lake
- Increased population thus increased use/travel causing infrastructure concerns.
- Existing Road Conditions, Keeping Ditches Clear, finding a way to increase funding by charging heavy equipment that accelerates the decline of the road conditions
- Maintenance of current roads/bridges
- Northshore Drive; day time travels and school arrival and dismissal
- your question on funding increase, decrease , same or I don't know are difficult to answer since no current information on current levels of spending are provided or how they have changed over the years.
- Fixing traffic congestion by Dakota Valley School
- Bridge maintenance.
- My biggest concern is commissioners spending taxpayers money to fix preceived future problems that don't exist and won't.
- Having adequate electric vehicle charging stations.
- Keeping our roads up to standard with traffic demands

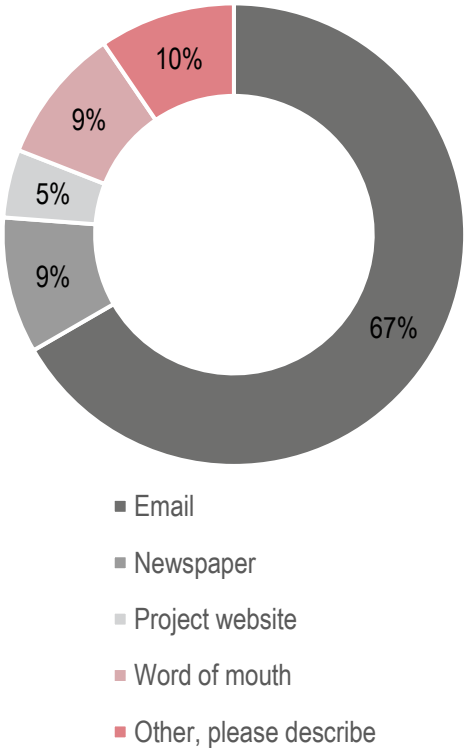
For this fill-in-the-blank response, survey respondents listed general road/bridge maintenance, as well as traffic congestion along Northshore Drive and Dakota Valley Schools as their largest concerns over the next 20 years in Union County. Other concerns were varied, including flooding, electric vehicle charging stations, development growth, ditch maintenance, fee increases for heavy vehicles, and spending.

Q36. Do you have any other comments, concerns, or ideas about the Union County transportation network over the next 20 years that you haven't addressed in any of the previous questions?

- Implementing a roundabout system on exit 4 instead of closing the offramp would cut down on the cost of opening a new exit. I express reservations regarding the fiscal responsibility of financing a completely new, unnecessary road.
- Consider having another exit one mile north after Exit 4 behind the school that would bypass around the back of the school and to the West side of McCook. Also, Sioux Point Rd frontage road from Dakota Dunes to N Sioux City=should be straightened (by N Shay connection) and the stop sign changed to only stop N Shay (through traffic on Sioux Point should not stop) to keep flow of traffic moving through there. It gets very congested there during busy hours or events at the church close by.
- No
- Would be good to reconfigure Exit 4, I don't have an answer, but that should be addressed in some way.
- The City of North Sioux City is proposing a new $16 million dollar road to the north around the school properties to connect with Westshore. I am opposed to this expenditure when clearly Northshore is in need of replacement / repair with turning lanes and or 3-lane road. I am opposed to closing off access from Northshore Dr. to the I-29 exit 4 by this new proposal. I am in favor of the roundabout concept for the west side of Exit 4 to accommodate the traffic flow from Streeter Drive , Leisure Lane and Northshore..
- Common sense long term planning. Busses or bikes to get people to Sioux City or more jobs up here.
- Union County will assist towns located in Union County that benefits those towns instead looking at what benefits the citizens who live in rural areas of Union Co. Who is watching out for the good of the rural citizens?
- No

Survey respondents listed Traffic and Planning issues at Exit 4 repeatedly, however Exit 4 is a SDDOT owned interchange and does not appear to be a direct County Road issue. However, Exit 4 and potential planned changes to the north and west could certainly impact County Roads and these potential changes will be considered in the Draft Union County Transportation Master Plan. Other specific comments and ideas were shared with the Study Advisory Team and will be included in the plan where applicable.

Q37. How did you learn about this online survey?



Other, please describe.

- SDDOT Website
- Home Owner Association President for Deer Run

Individual comments submitted outside of the survey.

- I am against this very unnecessary and expensive plan. which is definitely not a wise use of tax payer dollars which we have entrusted you to be our watch dog of this for us.
- I'm interested in what meetings Union County is having with North Sioux City about road expansions.

At the time comments were being accepted, the Union County Highway Department was not in contact with North Sioux City regarding road expansions and no such plans are included in the 5-year construction plan.

Ulteig We listen. We solve.®

Union County Master Transportation Plan
Public Meeting #1 (Virtual)

June 3, 2021

Agenda

- Introduction and Background
- Existing Conditions
  - Roads
  - Bridges
  - Traffic
  - Crash History
  - Pedestrian/Bicycle Facilities
- Next Steps
  - Your Contribution
  - Study Schedule
  - Study Website

Introduction and Background

Study Participants

- Agency Partners: Union County, SDDOT, SIMPCO, FHWA
- Study Advisory Team: Union County (8), SDDOT (4), SIMPCO (1)
- Consultant: Ulteig

SD DOT

simpco

U.S. Department of Transportation Federal Highway Administration

Ulteig We listen. We solve.®

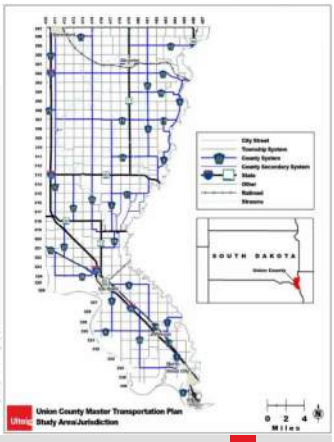
What is a Master Transportation Plan (MTP)?

- A 20-year planning document that will serve as a guide for the County's future transportation network for all modes of travel
- The Master Transportation Plan examines the following:
  - Safety
  - Infrastructure
  - Operations

Study Process

Study Area

- Union County and all communities and surface infrastructure within
- The focus of the MTP will be Union County owned and maintained roadways and bridges.

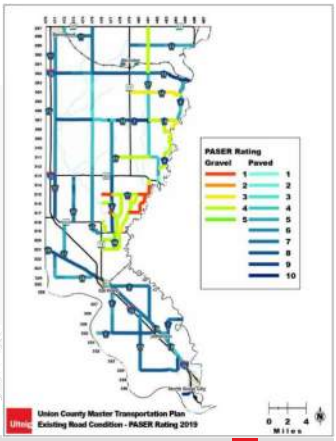


Existing Conditions

Existing Conditions - Roads

- Collected 242 miles of roadway condition data for all County-maintained roads
- The PASER rating system focuses on surface condition of asphalt, concrete, and gravel roadways by visual inspection.
- Identifies surface distress and scores the roadway condition

Surface Type	Miles	%
Unsurfaced	4.9	2.0%
Gravel	53.5	22.1%
Bituminous	178.1	73.4%
Concrete	6.0	2.5%



Existing Conditions – Roads

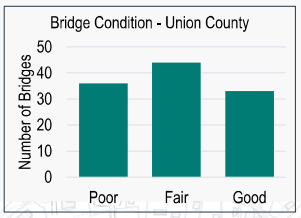
- Average PASER Condition Rating for Paved Roads in Union County is 6.2

Existing Conditions - Bridges

- Bridge: Any Bridge or Box Culvert structure greater than 20 feet in length
- Condition is based bridge inspections that occur every 2 years
- Union County owns and maintains 113 bridges
- 36 of these bridges are currently in Poor Condition (32%)
  - Remaining Service Life is short or unknown
  - High costs to repair or replace

Existing Conditions - Bridges

- Bridges in Poor Condition are defined as "Structurally Deficient"
  - 8% of USA Bridges
  - 18% of South Dakota Bridges
  - 32% of Union County-Owned Bridges
  - (26% of South Dakota County-Owned Bridges are in Poor Condition)
- Between 2016 and 2020, Union County has replaced 1.6 bridges/year.

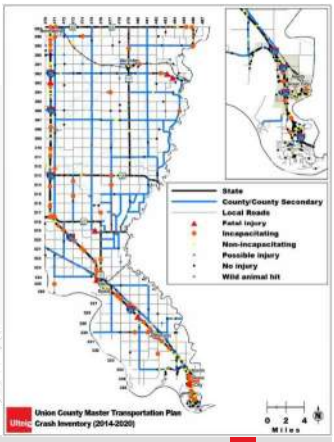


Existing Conditions - Traffic

- **Based on existing daily traffic volumes, traffic congestion is likely not an issue for anyone driving on Union County highways.**
  - Almost all County roads are well below planning capacity levels that would indicate a need for additional traffic lanes.
  - The highest traffic volumes are near Dakota Valley High School (North Sioux City) on County Road 23.

Crash History

- **Individual crashes are random events by their nature.**
- **Crash patterns are revealed over time, and crash factors are exposed.**
  - Crash reduction measures are often applied after it becomes apparent where crash rates are higher, particularly with severe crashes.
  - System-wide crash reduction measures can be applied at any time.



Crash History

- **Union County averages 120 reported crashes/year on non-interstate roadways. Total crashes are generally increasing over time.**
- **25% Wild Animals**
- **3 Fatal Crashes in 7 years**
- **5% Severe Crashes**
  - Fatal or Incapacitating

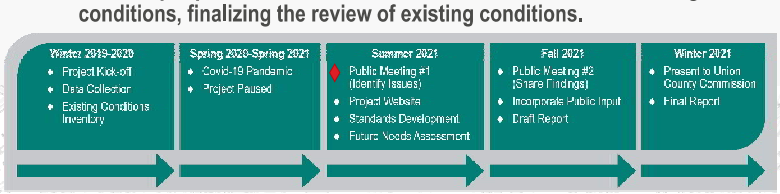
Review of Pedestrian/Bicycle Facilities

- **Pedestrian/Bicycle facilities are mostly limited to within City Boundaries**
- **Trails in Union Grove State Park Adams Homestead & Nature Preserve**

Next Steps

Your Contributions and Study Schedule

- **Opportunities for review and comment on plan documents**
  - Internet-based survey questionnaire (Deadline: July 3rd, 2021)
  - Online comment form
  - Public Meeting #2 in Fall 2021
- **Public input provides valuable feedback and context to the existing conditions, finalizing the review of existing conditions.**



Study Website

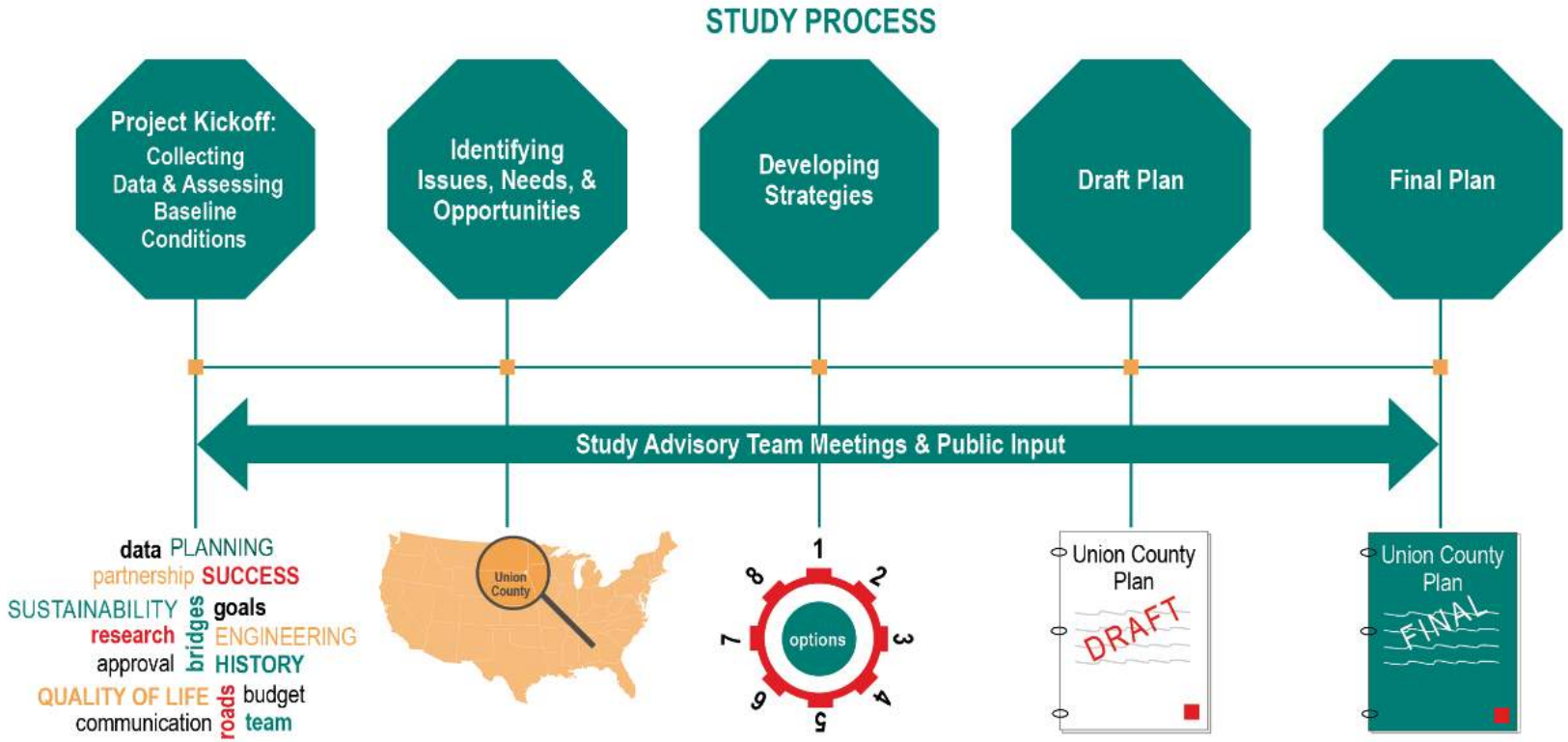
- www.ulteig.com/unioncountymtp/
  - Existing Conditions Review
  - Internet-Based Survey Questionnaire
  - Comment Form
  - This Presentation
- **Project updates will also be posted on website**

Thank You!

- **Next Meeting – Public Meeting #2 will be in Fall 2021**
- **Project Managers**
  - SDDOT
    - *Steve Gramm (Steve.Gramm@state.sd.us)*
  - Consultant Team
    - *Paul Deutsch (Paul.Deutsch@Ulteig.com)*
    - *Brad Stangohr (Brad.Stangohr@Ulteig.com)*

INTRODUCTION AND BACKGROUND

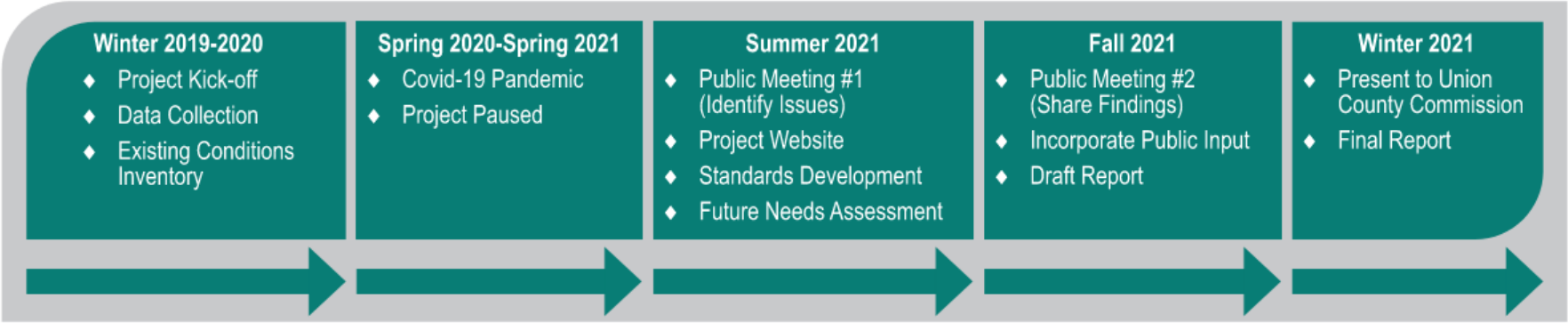
- **What is the Union County Master Transportation Plan (MTP)?** – It is a document that will serve as a guide for the County's future transportation network in a multi-modal perspective. Safety, infrastructure, and operations needs are examined and prioritized in order to enhance economic and social well-being of county residents. It provides a vision and guides local decision-making.



- **Why is it being made?** – SDDOT must set aside funds for transportation planning and research. It shares some of this with the local level on an annual application and award basis through the State Planning & Research for Local Government Program (SPR for Locals). Union County applied and was awarded funding towards a county Master Transportation Plan.

- **Why is it beneficial to Union County?** – This is an opportunity for the public to be involved in the future of transportation infrastructure for their county. If there is a vision, it should be documented so it can be fulfilled. With official documentation of future transportation priorities, this plan will guide decision-making. The County will have a blueprint of its transportation needs and desires for years to come. Proper transportation planning can assure that infrastructure needs are met. It is an adaptable plan: change is inevitable. This plan can be periodically updated to consider emerging challenges and trends.

- **Is there still time to ask questions and comment on the Union County MTP?** – Yes! the process of completing the Union County MTP is still in progress. What is being presented here are existing conditions and preliminary analysis of the transportation network in Union County. The major outcome of this public outreach effort is to better understand the current and future issues and needs of the transportation network in Union County. As a result, priorities will be identified, and strategies can be developed to address those issues and needs as part of this long range, 20-year plan.



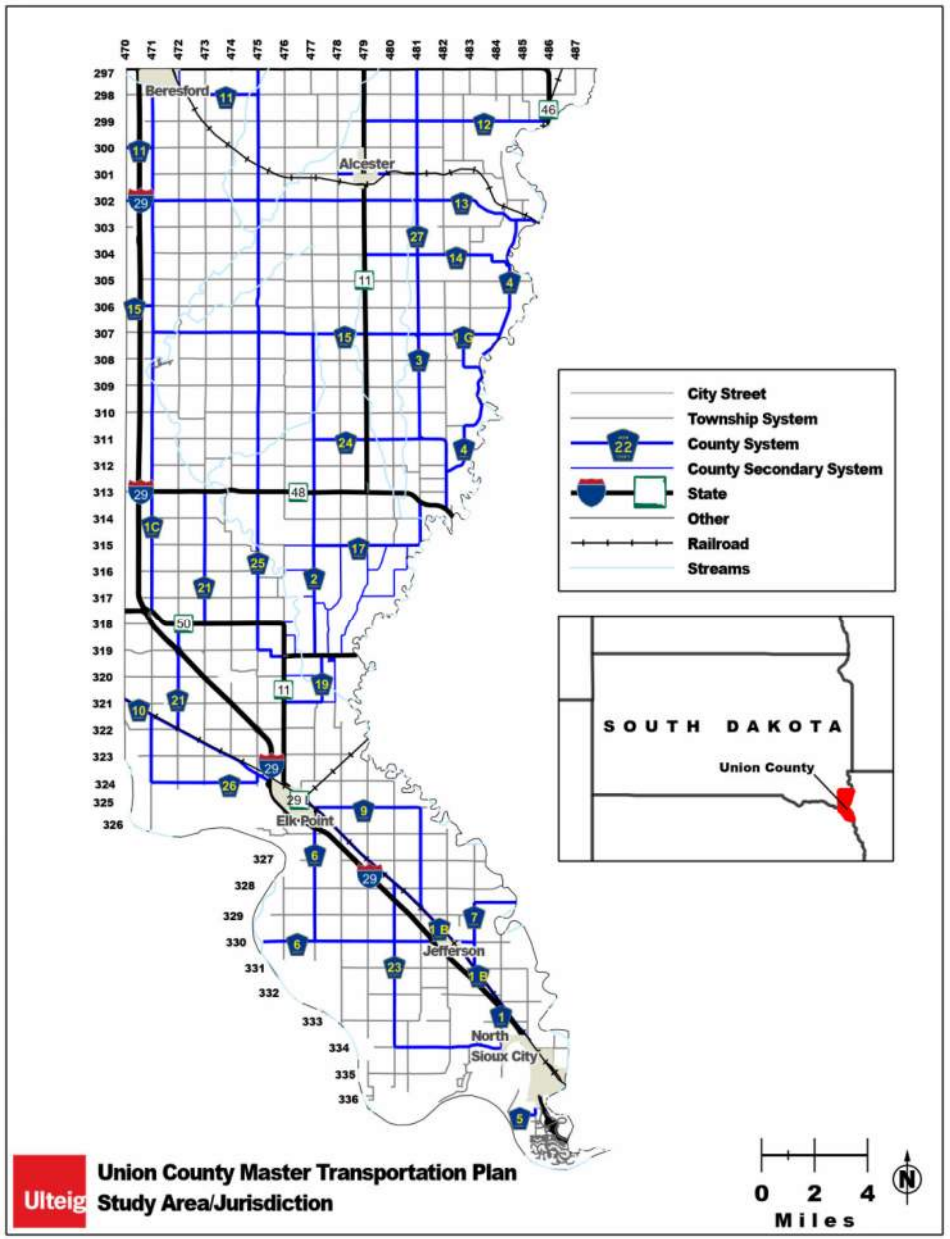
PUBLIC INPUT

As shown in the study schedule above, the advertisement and launch of this website serve as the first of two opportunities for the general public to provide feedback on the needs and desires of the Union County transportation network, including pedestrian, bicycle, transit, freight, and automobiles movements. This is a critical process in the development of the Union County MTP as the transportation system impacts every resident. Information on the existing conditions of the transportation network in Union County is presented at this time.

Note: Due to Covid-19 Pandemic precautions set by SDDOT (following CDC guidance), this opportunity for public feedback is entirely virtual. If you know of someone that is unable to view the website and would like to participate, please follow the contact directions at the end of this document.

STUDY AREA

The study area for the Union County MTP will include all roadways within Union County, primarily focusing on the county highway network and county bridges, for which Union County is responsible for. Union County is responsible for upkeep of 242 miles of roadway (184 miles paved, 58 miles unpaved), 113 bridges, and a number of railroad crossings. Roads and bridges represent large assets to Union County, and maintenance of the network requires planning to effectively manage short and long terms costs. This study will evaluate multimodal needs (pedestrian, bicycle, transit, freight, and automobile) along the network.



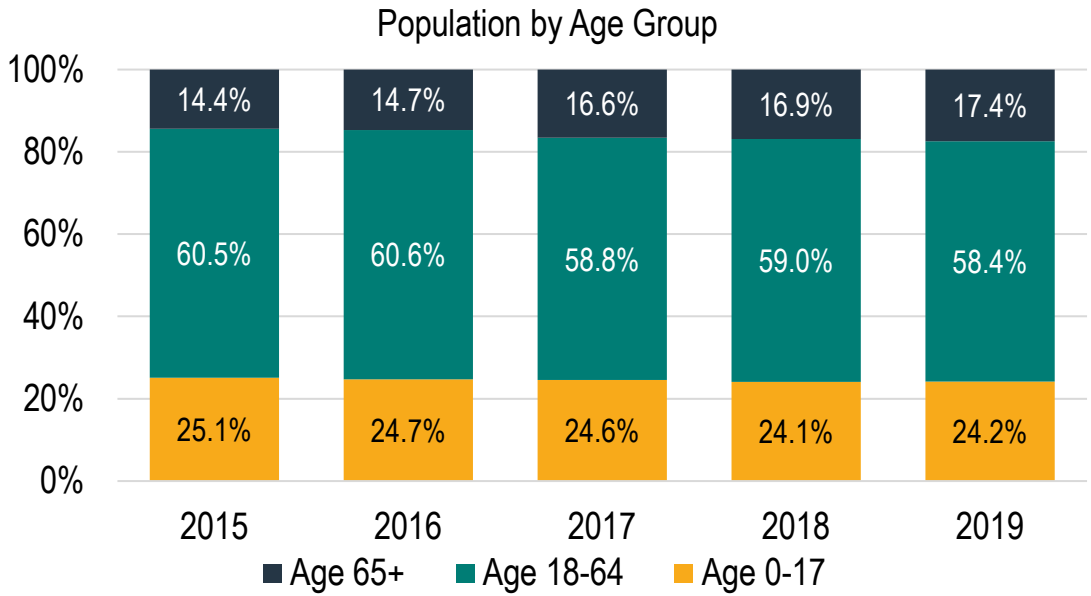
POPULATION TRENDS (US CENSUS BUREAU, AMERICAN COMMUNITY SURVEY)

Population characteristics and trends are essential to understand when planning transportation systems. High growth areas will face increased demand for infrastructure enhancements. Areas of higher population density are most efficient when considering multi-modal transportation modes. Age and income demographics are indicators for preferred mode choice (walking, biking, driving, or transit). Examining population trends better informs decisions where future transportation investments should be best spent.

The table to the right shows how population has changed since 2000 within the cities of Union County, SD. From 2000-2010, Union County's population was growing at a steady rate of around 181 people, or 1.4% each year. Based on 2019 ACS estimates, Union County is estimated to have 15,368 people living in the County. Between 2010-2019, Union County's population growth was 0.7% each year.

	2000	2010	2019 (Est.)	Growth 2010-2019 (Est.)
Alcester	880	807	906	12.3%
Beresford	2,006	2,005	2,291	14.3%
Dakota Dunes	N/A	2,540	3,156	24.3%
Elk Point	1,714	1,963	2,176	10.9%
Jefferson	586	547	633	15.7%
North Sioux City	2,288	2,530	2,837	12.1%
Richland	N/A	89	56*	-37.1%
Union County	**12,584**	**14,399**	**15,368**	**6.7%**
South Dakota	**754,844**	**814,180**	**884,659**	**8.7%**

**2017*

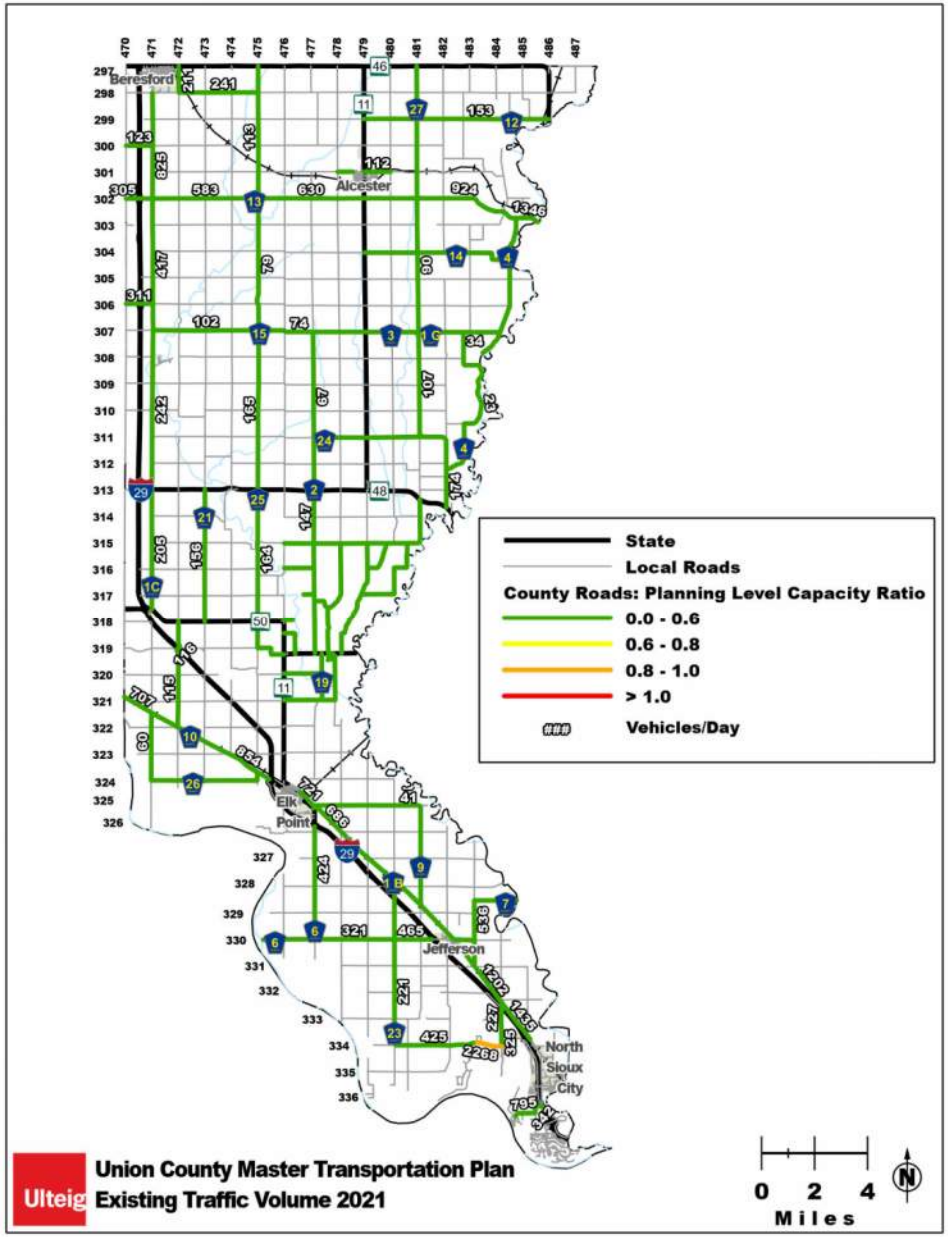


Similar to many areas in the United States, Union County is experiencing an aging population. The percentage of population under 18 years old decreased from 25.1% to 24.2% and the 65+ age category increased from 14.4% to 17.4% over the most recent 5-year period. This increase in proportion of the population that is elderly will create changing demands on the transportation network and transportation services.

EXISTING TRAFFIC VOLUMES

The existing traffic volumes on Union County roadways are well below 2-lane planning level capacity for the vast majority of roads. Due to development around North Sioux City, there is one stretch of County Road 23 at the intersection with County Road 1 that is showing signs of minor delays. As part of the MTP, traffic will be forecasted out to year 2045 to identify roadways and intersections that may need improvements to accommodate future traffic growth.

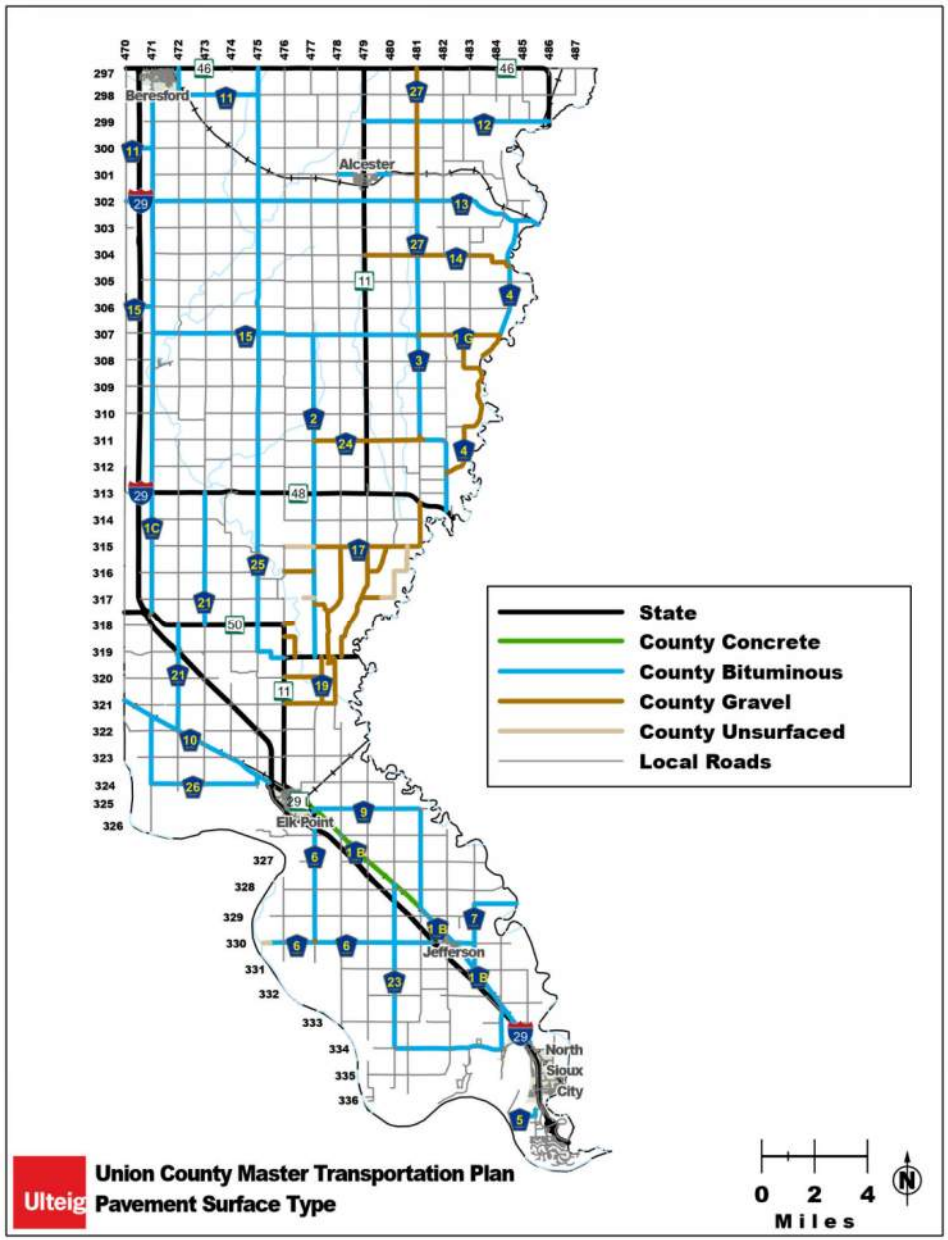
Intersection of County Road 23 (Northshore Dr) and County Road 1 (Westshore Dr/484th Ave) is near Dakota Valley High School. Future development in the area could advance the need for intersection improvements.



ROAD INVENTORY

Union County Roads consist of concrete, asphalt/bituminous, gravel, and unsurfaced roads. All unsurfaced roads maintained by Union County are within the Richland Township (unorganized township). The table below is a summary of Union County owned and maintained roads.

Surface Type	Miles	%
Unsurfaced	4.9	2.0%
Gravel	53.5	22.1%
Bituminous	178.1	73.4%
Concrete	6.0	2.5%

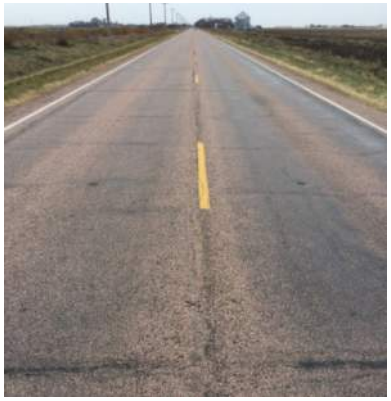


EXISTING ROAD CONDITIONS

The condition of all 242 miles of County-owned Roads was collected using the PASER rating system, which focuses on surface condition by visual inspection of concrete, asphalt, or gravel roadways. The PASER rating system scores the roadway conditions based on surface distresses identified. Paved road segments are rated on a scale of 1-10 (where 10 is the best condition) and unpaved roadways are rated on a scale of 1-5 (where 5 is the best condition).

Asphalt PASER Rating		General Condition	Needed Maintenance or Repair
10	Excellent	New	No maintenance required
9	Excellent	Like new	No maintenance required
8	Very Good	Initial cracking	Little or no maintenance
7	Good	First signs of aging	Routine maintenance, cracksealing and minor patching
6	Good	Definite signs of aging	Preservative treatments (sealcoating)
5	Fair	Definite signs of distress	Preservative treatments (sealcoating)
4	Fair	Losing strength	Structural improvements & leveling (overlay or recycling)
3	Poor	Some loss of strength	Structural improvements & leveling (overlay or recycling)
2	Very Poor	Severe deterioration	Reconstruction
1	Failed	Disintegration	Reconstruction

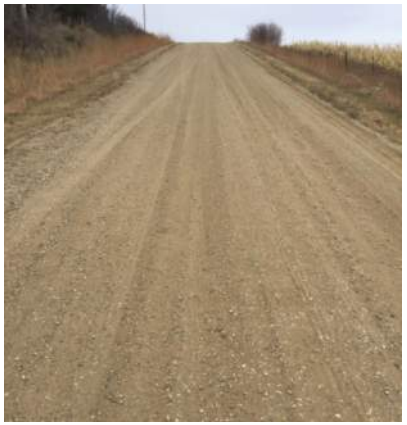
Table: Asphalt PASER Ratings
(from *PASER Asphalt Roads Manual*)



Example of Asphalt PASER Condition Rating 4 (Losing Strength)

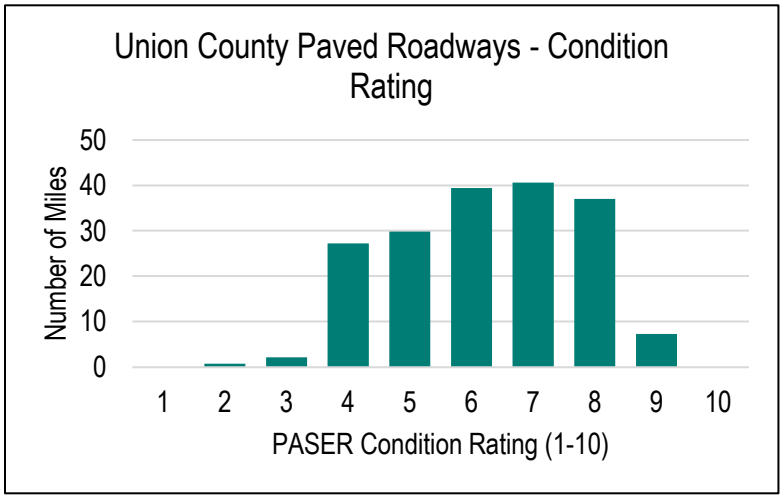
Gravel PASER Rating		General Condition	Needed Maintenance or Repair
5	Excellent	No distress	No Maintenance Required
4	Good	Minor signs of distress	Routine Maintenance
3	Fair	Definite signs of distress	Needs regrading, minor ditch maintenance, and spot gravel application
2	Poor	Slow travel speeds required	Needs additional aggregate layer, major drainage improvements
1	Failed	Travel is difficult or impossible	Complete rebuilding required

Table: Gravel PASER Ratings
(from *PASER Gravel Roads Manual*)

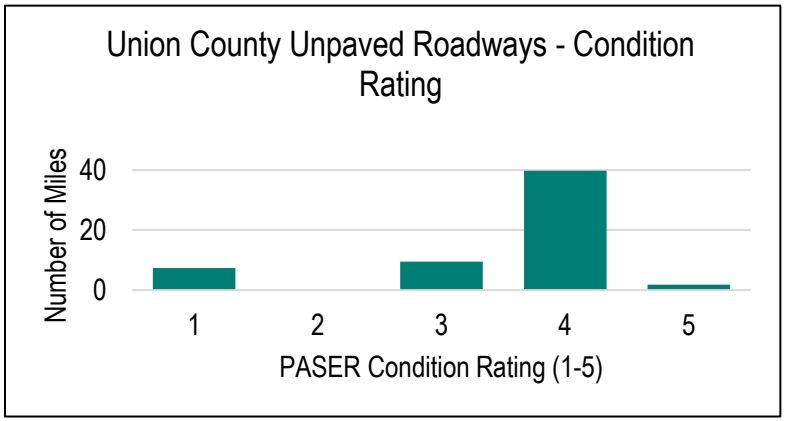


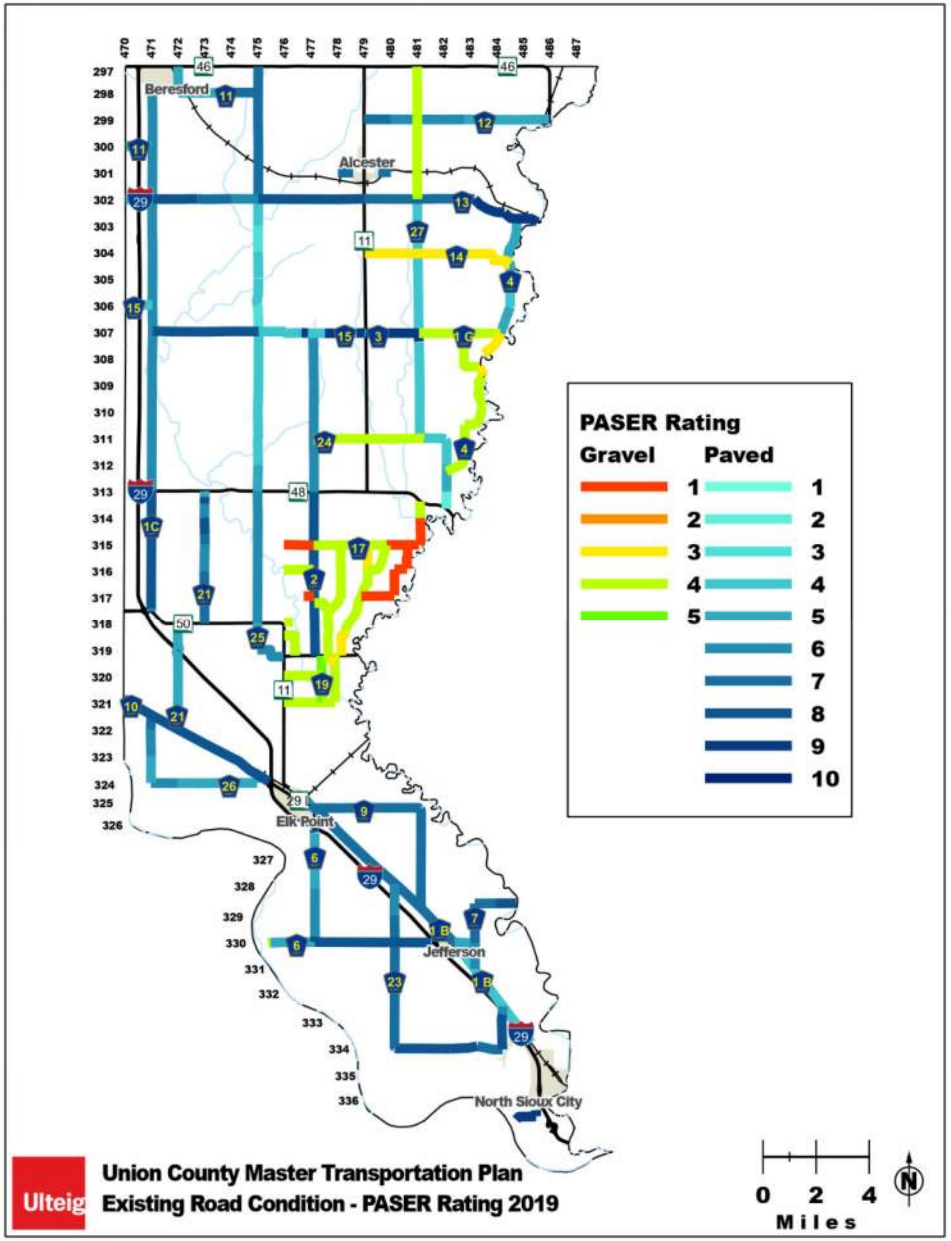
Example of Gravel PASER Condition Rating 4 (Minor signs of distress)

The average PASER condition rating for paved roads in Union County is 6.2. Only 2% of roads are in poor condition (3 or lower rating), but about 30 miles (16% of roads) of paved roadways scored 4 or lower which means they are the best candidates for major rehabilitation such as asphalt overlays.



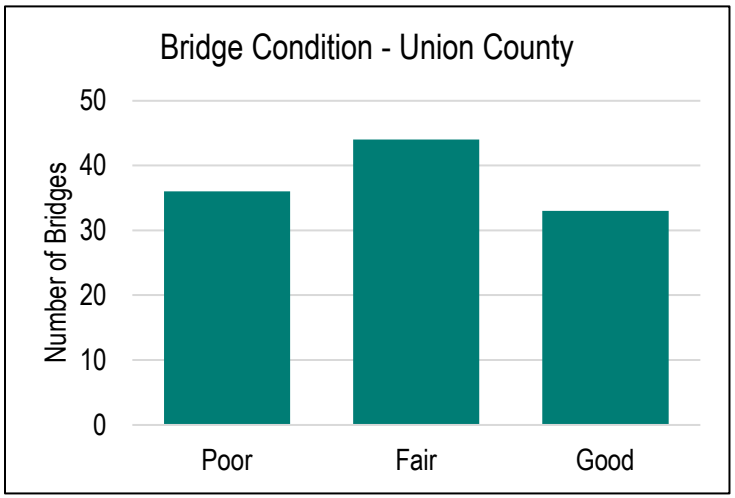
The average PASER condition rating for unpaved roads in Union County is 3.5. The average score was brought down by unimproved roads in Richland Township and roads that were washed out due to flooding at the time of inspection. The majority of county gravel roads are in good condition.



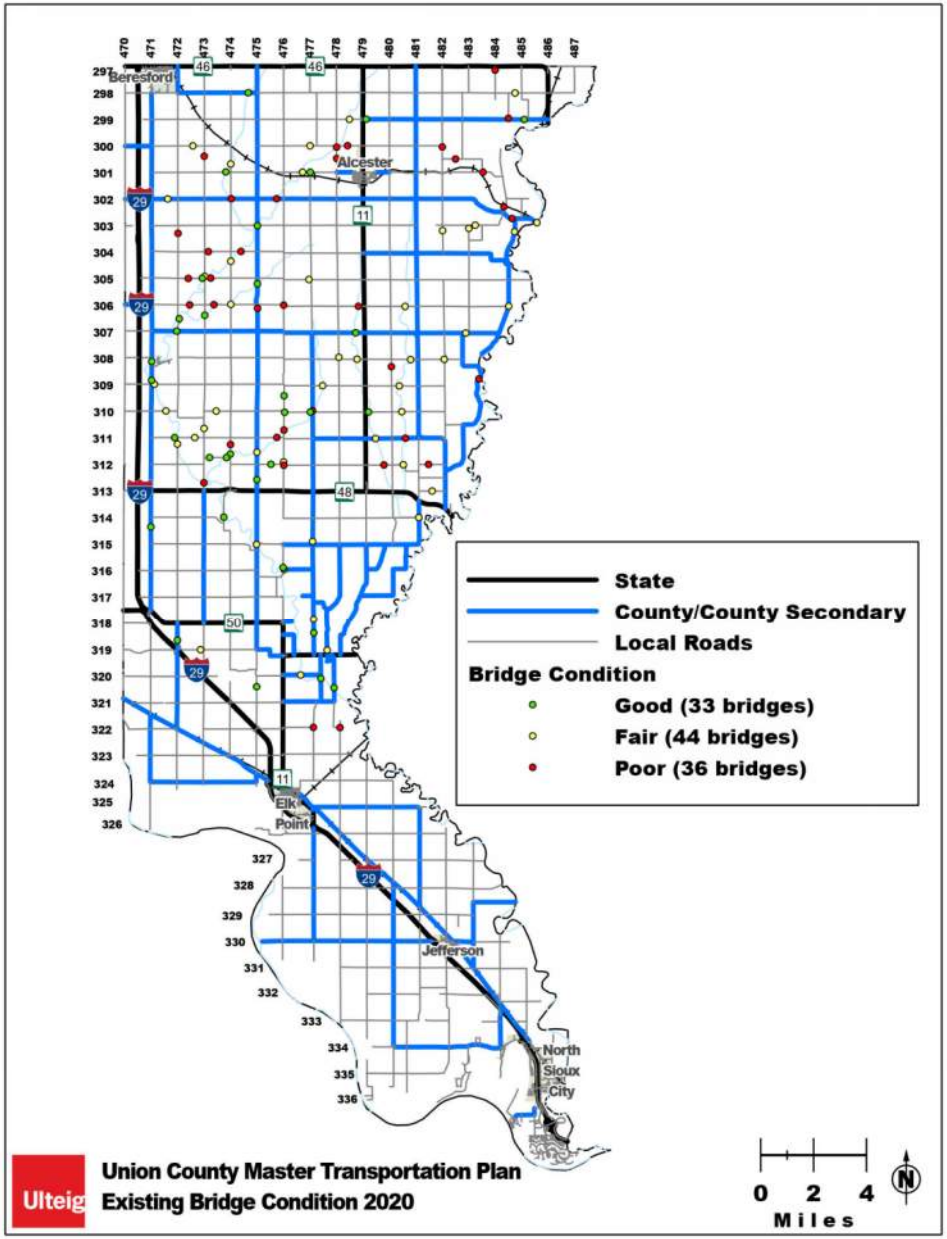


EXISTING BRIDGE CONDITIONS

Union County maintains 113 bridges, and bridge inspections are conducted every 2 years. As a result of bridge inspections, the condition of the bridges falls under one of three categories: Good, Fair, or Poor. Most of Union County bridges are in Fair or Good condition (68%), but 36 of Union County bridges are currently in Poor condition (32%), which means they are structurally deficient. These bridges have short or unknown remaining service lives, and likely require high-cost repairs or replacement. Comparatively, in all of South Dakota, 26% of all county-owned bridges are in Poor Condition.



Between 2016-2020, Union County has replaced 1.6 bridges/year, usually with significant funding assistance from SDDOT Bridge Improvement Grants. At current funding levels, Union County faces a difficult challenge to maintain all bridges in a state of good repair, as bridges continue to deteriorate at a faster rate than they can be repaired or replaced.

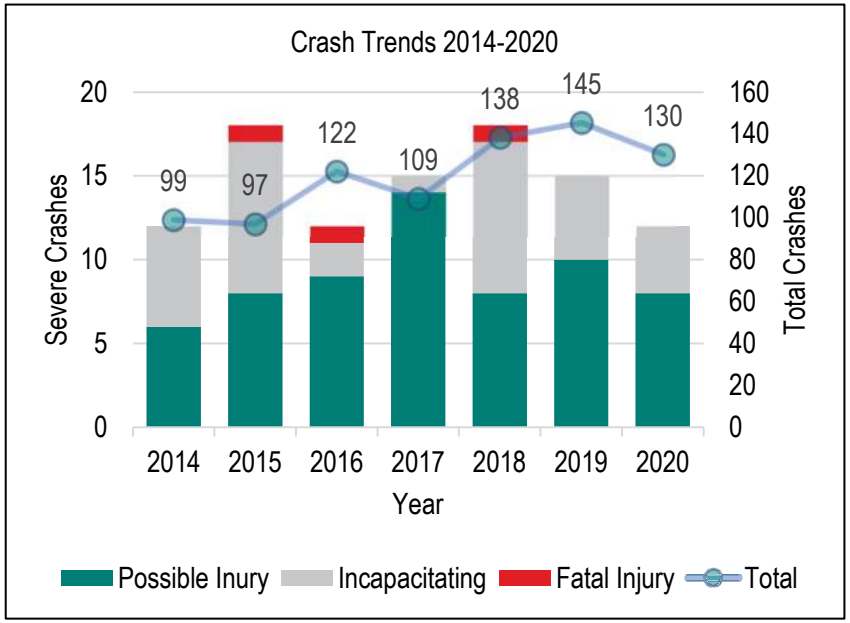


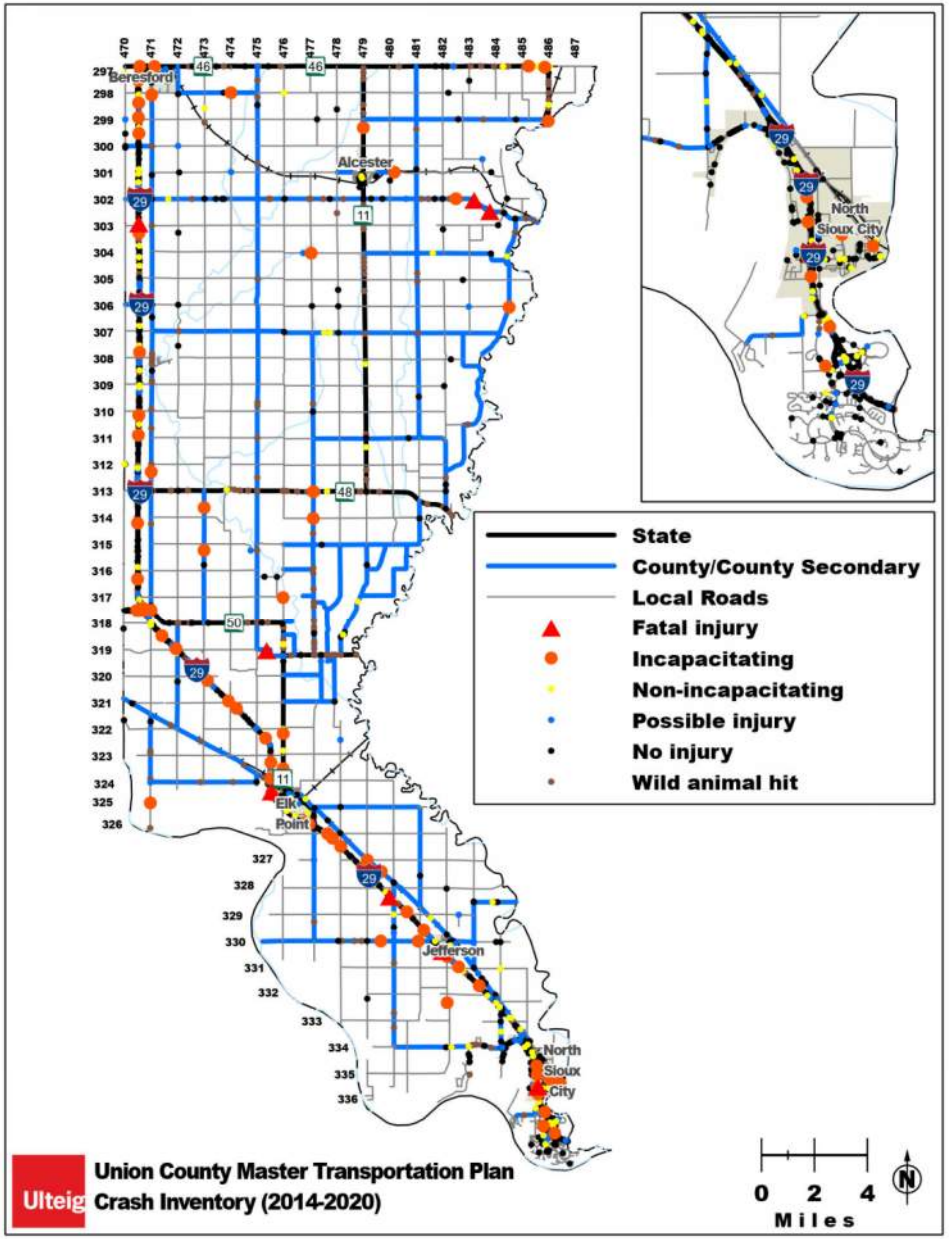
CRASH HISTORY

Safety is always a fundamental element when planning transportation infrastructure and improvements. The general public understands what feels safe and what does not. For these reasons, special attention will be given to roads that have been identified as safety concerns throughout the study area. In order to help identify where improvements should be prioritized in terms of safety, data from the South Dakota Accident Records System were compiled from the last seven years. However, feedback from the public adds more context and can identify locations of concern.

The map to the right shows all reported crashes and severity type between 2014-2020. Excluding crashes on I-29, there were 840 crashes on roadways within Union County. There were 3 fatal injury crashes and 36 serious injury crashes.

The Union County MTP will identify locations of concerns and recommend appropriate safety countermeasures to enhance roadway safety.





GETTING INVOLVED

STAY CONNECTED

Receive updates and announcements by visiting our website and submitting your email address: www.ulteig.com/unioncountymtp/

STAY TUNED FOR PUBLIC MEETING #2

Public Meeting #2 is scheduled for Fall 2021. A public notice will be posted in the local newspapers.
Add your email address on the comment form to receive a direct invitation.

INTERNET SURVEY QUESTIONNAIRE

The internet survey is one of the most cost-effective public involvement tools utilized early in transportation plan development process.
Please compete the survey to share your experience using the Union County Transportation Network. The deadline to complete the survey is July 3, 2021.

LEAVE A COMMENT

If you have additional comments about the project, please fill out the comment form on the project website.

If you have and direct questions or concerns, please contact one of the project managers listed below.

Steve Gramm (Steve.Gramm@state.sd.us), Paul Deutsch (Paul.Deutsch@Ulteig.com) or Brad Stangohr (Brad.Stangohr@Ulteig.com)

SD DOT

simpco

U.S. Department of Transportation
Federal Highway Administration

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION AND UNION COUNTY NOTICE OF ONLINE PUBLIC INFORMATION RELEASE VIA VIRTUAL PUBLIC MEETING FOR UNION COUNTY MASTER TRANSPORTATION PLAN

Dates: June 3, 2021 through July 3, 2021

Website: www.ulteig.com/unioncountymtp/

The South Dakota Department of Transportation (SDDOT), in conjunction with Union County and the Siouxland Interstate Metropolitan Planning Council (SIMPCO), will hold an online public meeting to present information on the Union County Master Transportation Plan on the dates listed above.

Due to limitations on public gatherings recommended by the Centers for Disease Control, the SDDOT is posting information to the study website rather than presenting documents at an in-person public meeting. Members of the public may submit questions or comments through the study website or by reaching out to one of the project representatives listed below.

This public meeting will introduce the study scope and background, as well as present a review of baseline conditions. An internet-based survey questionnaire is also available on the study website to help identify issues and needs.

Area residents and commuters are encouraged to participate in the study. The major outcome of this public outreach effort is to better understand the current and future issues and needs of the transportation network in Union County. As a result, priorities will be identified, and strategies can be developed to address those issues and needs as part of a long range, 20-year plan.

Any individuals with disabilities who will require a reasonable accommodation to access the information on the study website may submit a request to the SDDOT ADA Coordinator at 605-773-3540 or 1-800-877-1113 (Telecommunication Relay Services for the Deaf). Public Meeting information will be posted to the study website: Website: www.ulteig.com/unioncountymtp/

Questions and comments regarding the study may be directed to Steve Gramm at (605) 773-6641 (steve.gramm@state.sd.us) or Paul Deutsch at (605) 323-6023 (paul.deutsh@ulteig.com) or Brad Stangohr at (605) 323-6036 (brad.stangohr@ulteig.com).

Comments will be accepted until July 3, 2021, and may be submitted online through the study website, or directly to one of the project representatives.

Notice published twice at the total approximate cost of $

Beresford Republic

Alcester Union ~ Hudsonite

6-3, 6-10

81 lines

AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA
SS

COUNTY: UNION

CITY: BERESFORD

NEWSPAPER: BERESFORD REPUBLIC

Allyson M. Hill, being first duly sworn, on oath, says that the BERESFORD REPUBLIC IS a weekly newspaper published in said city and county, State of South Dakota; that she has full and personal knowledge of the facts herein stated; that said newspaper is a legal newspaper as defined in SDCL 17-2-2.1 through 17-2-2.4 inclusive, and has met all the requirements for at least one year next prior to the first publication of the attached public notice, and that said notice, a printed copy of which, taken from the paper in which the same was published, and which is hereto attached and made a part of this affidavit, was published in said newspaper

2 time(s) as follows: that the first publication of said notice in said newspaper aforesaid was on Thursday the

3 day of June, 2021, and that the succeeding publications were severally on

Thursday, the 10 day of June, 2021;

Thursday, the ____day of _____, 2021;

Thursday, the ____day of _____, 2021

Affiant further says that the full amount of the fees charged for the publication of said notice inures to the benefit of the publishers of said newspaper; that no agreement of understanding for the division thereof has been made with any other person, that no part therefore has been agreed to be paid to any person whomsoever; and that the fees charges for the publication thereof are:

DOLLARS $ 43.60

X Allyson M Hill, Allyson M. Hill

Subscribed and sworn to before me this 23rd day of June, 2021.

Cheri O'Dell

Notary Public

My commission expires 03/12/2025.

Cheri O'Dell
SEAL NOTARY PUBLIC SOUTH DAKOTA SEAL

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION AND UNION COUNTY NOTICE OF ONLINE PUBLIC INFORMATION RELEASE VIA VIRTUAL PUBLIC MEETING FOR UNION COUNTY MASTER TRANSPORTATION PLAN

Dates: June 3, 2021 through July 3, 2021

Website: www.ulteig.com/unioncountymtp/

The South Dakota Department of Transportation (SDDOT), in conjunction with Union County and the Siouxland Interstate Metropolitan Planning Council (SIMPCO), will hold an online public meeting to present information on the Union County Master Transportation Plan on the dates listed above.

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This public meeting will introduce the study scope and background, as well as present a review of baseline conditions. An internet-based survey questionnaire is also available on the study website to help identify issues and needs.

Area residents and commuters are encouraged to participate in the study. The major outcome of this public outreach effort is to better understand the current and future issues

gohr@ulteig.com).

Comments will be accepted until July 3, 2021, and may be submitted online through the study website, or directly to one of the project representatives.

Notice published twice at the total approximate cost of $43.60

Affidavit of Publication

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF UNION)

Allyson M. Hill, being duly sworn, says: the *Alcester Union & Hudsonite* is, and during all the times hereinafter mentioned was, a weekly legal newspaper as defined in SDCL 17-2-2, as amended, published at Alcester, Union County, South Dakota; that affiant is and during all of said times was, the publisher of such newspaper and has personal knowledge of the facts stated in this affidavit; that the notice, order or advertisement, a printed copy of which is attached, was published in said newspaper 2 successive issue(s), bearing the following date(s):

on Thursday the 3 day of June, 2021

and that the succeeding publications were severally

on Thursday, the 10 day of June, 2021

on Thursday, the _____ day of _____, 2021

on Thursday, the _____ day of _____, 2021

on Thursday, the _____ day of _____, 2021

that the full amount of the fee charged for publishing the same, to-wit, the sum of $ 43.60 insures solely to the benefit of the publisher of said newspaper; that no agreement or understanding for the division of the fee has been made with any person, and that no part of the fee has been agreed to be paid to any other person.

Allyson M Hill

Subscribed and sworn to before me this 23rd day of June, 2021

Cheri O'Dell

Notary Public, South Dakota
My commission expires 03/12/2025

(SEAL)

Cheri O'Dell
NOTARY PUBLIC
SOUTH DAKOTA

Public Notices

Because the people must know.

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION AND UNION COUNTY NOTICE OF ONLINE PUBLIC INFORMATION RELEASE VIA VIRTUAL PUBLIC MEETING FOR UNION COUNTY MASTER TRANSPORTATION PLAN

Dates: June 3, 2021 through July 3, 2021

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Comments will be accepted until July 3, 2021, and may be submitted online through the study website, or directly to one of the project representatives.

Notice published twice at the total approximate cost of $43.60

AFFIDAVIT OF PUBLICATION

State of South Dakota)
:ss
County of Union)

Bruce L. Odson,
the publisher of the Leader-Courier, deposes and says that

The Leader-Courier

is a legal weekly newspaper of a general circulation, printed and published in Elk Point, County of Union, State of South Dakota, and has been such legal newspaper during the time hereinafter mentioned, and that affiant is and was during all the time hereinafter mentioned in charge of the advertising department thereof, and has personal knowledge of all the facts stated in this affidavit: and that the notice and advertisement headed:

Notice of Online Public Information Release

a printed copy of which is hereunto attached and made a part hereof, was printed and published in the said newspaper at least once in

each week for 2 successive weeks; that said newspaper at the time of the first publication of said notice hereinafter stated, had, and still has, a bona fide circulation of over two hundred paid copies weekly, and had been published in the said County of Union for more than one year immediately prior to the date of the said publication of said notice, and that said newspaper during said times, was, and is, printed in part in an office maintained at said city of Elk Point, the said place of publication; that the first publication of said notice in said newspaper was

on Thursday, the 3 day of June, 2021

and that the succeeding publications were

on Thursday, the 10 day of June, 2021

on Thursday, the _____ day of _____, _____

on Thursday, the _____ day of _____, _____

that the fees for the printing and publishing of said notice and advertisement in said newspaper as aforesaid were

$49.78, that the full amount of the fee charged insures to the benefit of the publisher of the said newspaper, that no agreement or understanding for the division thereof has been made with any other person and that no part thereof has been agreed to be paid to any other person whomsoever.

B L Odson

Subscribed and sworn to before me

this 10 day of June, 2021

My commission expires 7-12-23

SUSAN ODSON
NOTARY PUBLIC
SOUTH DAKOTA

Notary Public

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION AND UNION COUNTY NOTICE OF ONLINE PUBLIC INFORMATION RELEASE VIA VIRTUAL PUBLIC MEETING FOR UNION COUNTY MASTER TRANSPORTATION PLAN

Dates: June 3, 2021 through July 3, 2021

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Comments will be accepted until July 3, 2021, and may be submitted online through the study website, or directly to one of the project representatives.

Publish June 3 and 10, 2021
Published twice at the total approximate costs of $49.78
22-2-90

AFFIDAVIT OF PUBLICATION

State of South Dakota)
:ss
County of Union)

Bruce Odson,
the publisher of the Dakota Dunes / North Sioux City Times,
deposes and says that

The Dakota Dunes / North Sioux City Times

is a legal weekly newspaper of a general circulation, printed and published in North Sioux City, County of Union, State of South Dakota, and has been such legal newspaper during the time hereinafter mentioned, and that affiant is and was during all the time hereinafter mentioned in charge of the advertising department thereof, and has personal knowledge of all the facts stated in this affidavit: and that the notice and advertisement headed:

Notice of Online Public Information Release

a printed copy of which is hereunto attached and made a part hereof, was printed and published in the said newspaper at least once in

each week for 2 successive weeks; that said newspaper at the time of the first publication of said notice hereinafter stated, had, and still has, a bona fide circulation of over two hundred paid copies weekly, and had been published in the said County of Union for more than one year immediately prior to the date of the said publication of said notice, and that said newspaper during said times, was, and is, printed in part in an office maintained at said city of North Sioux City, the said place of publication; that the first publication of said notice in said newspaper was

on Thursday, the 3 day of June, 2021

and that the succeeding publications were

on Thursday, the 10 day of June, 2021

on Thursday, the _____ day of _____, _____

on Thursday, the _____ day of _____, _____

that the fees for the printing and publishing of said notice and advertisement in said newspaper as aforesaid were

$ 49.63, that the full amount of the fee charged insures to the benefit of the publisher of the said newspaper, that no agreement or understanding for the division thereof has been made with any other person and that no part thereof has been agreed to be paid to any other person whomsoever.

B Odson

Subscribed and sworn to before me

this 10 day of June, 2021

My commission expires 7-12-23

SUSAN ODSON
NOTARY PUBLIC
SOUTH DAKOTA

S Odson

Notary Public

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION AND UNION COUNTY NOTICE OF ONLINE PUBLIC INFORMATION RELEASE VIA VIRTUAL PUBLIC MEETING FOR UNION COUNTY MASTER TRANSPORTATION PLAN

~~Dates: June 3, 2021~~ through July 3, 2021

Website: www.ulteig.com/unioncountymtp/

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Comments will be accepted until July 3, 2021, and may be submitted online through the study website, or directly to one of the project representatives.

Publish June 3 and 10, 2021

Published twice at the total approximate cost of $49.63

T22-2-97

Appendix C
Public Meeting #2 Summary and Feedback

PUBLIC FEEDBACK FOR PUBLIC MEETING #2

Union County Master Transportation Plan

Public Meeting #2 was hosted at the Union County Courthouse in Elk Point, SD, on December 15, 2021. Stakeholder meetings were hosted at the same location in the afternoon of the same day. Public comments were accepted until January 3, 2022. Stakeholders identified by the Study Advisory Team were emailed direct invitations for the meetings, and public advertisements were posted in the following official Union County newspapers on November 25 and December 2, 2021:

- *Alcester Union & Hudsonite*
- *Beresford Republic*
- *Dakota Dunes / North Sioux City Times*
- *The Leader-Courier*

Meeting Schedule

1:00 PM to 2:00 PM – Stakeholder Meeting 1: Townships
2:00 PM to 3:00 PM – Stakeholder Meeting 2: Municipalities
3:00 PM to 4:00 PM – Stakeholder Meeting 3: Other (Coops, Homeowners Association, etc.)
4:00 PM to 5:00 PM – Stakeholder Meeting 4: School Districts
5:30 PM to 7:00 PM – Public Meeting #2

Attendance

Stakeholders – 8
Public – 4
Study Advisory Team and Staff – 8

Summary of Materials Provided

Exhibits were placed in the room for attendees to browse. A presentation was made using PowerPoint. Attendees were asked to record their presence on the sign-in sheet and leave optional comments on the comment cards provided.

Comments and Questions

During the meetings, attendees commented and asked questions about the study and materials presented.

<u>Comments During Meetings on December 15, 2021:</u>

- What is the feasibility of Trail plan along Big Sioux River with periodic flooding?

  Response: Since flooding is frequent along rivers in this region, it is recommended to construct the trail with a natural surface and/or gravel rather than a paved surface.

- Who owns the trails? Who maintains it?

  Response: An entity to construct trails would need to be identified, and an entity to maintain the trails would need to be identified, these entities do not necessarily need to be the same, however they will work closely together. One idea is that a trails network could be constructed and maintained by a non-profit entity. Another option is to form a Union County Parks, Trails, and Open Space Department or Division, this entity could fall under the Highways Department, or be a stand-alone department.

- Do the costs for trails cut into the budget of the roads and bridges?

  Response: Funding for a trails network can come out of the same fund for roads and bridges. However, a goal should be to find alternative funding sources such as grants to lessen the financial impact that trails have on roadway funding, or the possibility exists to pass a voter approved trails fund.

- Township roads are only 18-20 feet wide, and 66 feet of Right-of-Way. We have concerns about combine widths that are as wide as the road bed. There is no state law about size of farm equipment. The roads were designed many years ago and did not account for such large vehicles.

  Response: Improving township roads solely to accommodate very large farm equipment is probably not feasible. A different kind of discussion may need to take place.

- The delineators placed as a result of a signs project have presented maintenance challenges. It is hard to mow, and the long grass causes snow drifting in the winter. Sometimes large farm equipment needs spotters on the road to flag vehicles ahead, because the farm equipment needs both lanes of the road.

  Response: The intentions of the delineators along roads with steep slopes and along curves are well intended, to improve safety and visibility of the roadside. There may have been some unintended consequences that cause new safety concerns.

- In Beresford, there is a problem with people running stop signs in town because they don't notice the stop signs.

  Response: There are ways to increase the conspicuity of stop signs, including larger signs, advanced signing, flags, LED flashers, and other engineering solutions. The location(s) described are within Beresford jurisdiction, not Union County.

- There is a path that connects Wynstone Housing Development to the Adams Homestead and State Nature Preserve.

  Response: Noted that this connection exists for non-vehicular transportation modes.

- How much funding will there be for the County from the big new infrastructure bill?

  Response: Appropriation of funding has not been passed yet.

- How does the new interstate interchange plan near North Sioux City affect this study?

  Response: New interstate interchanges or a moved interchange have not been programmed for SDDOT funding. The recent Decennial Interstate Corridor Study did not include a new or moved interchange in North Sioux City. Interstate plans take a long time, and the preference is to time it when the bridges have reached their useful service life. This led to additional discussion about development in North Sioux City and cooperation with SDDOT and likely timelines. This discussion topic did not directly apply to the Union County MTP, but potential modifications at the interstate would likely affect the transportation network nearby, including Union County highways.

- Does Union County prioritize "Farm to Market Roads?"

  Response: This terminology varies by county. Union County does not officially define roads this way. The Major Roads Plan as part of the Union County MTP prioritizes the roads based on operations, safety, access, and freight capacity. Farm-to-market type routes are part of the consideration.

- County Road 1B would be great to have wider shoulders.

  Response: County Road 1B is defined as a "County Paved – Priority Route" in the Major Roads Plan.

- School traffic is bad on Northshore Drive, not designed well. It is also in disrepair.

  Response: The area in question is under North Sioux City jurisdiction, and there has been some analysis completed to come up with alternatives for solutions.

<u>Comments submitted by stakeholders who could not attend stakeholder meetings in person:</u>

- Are bus routes considered for roads with bridges that may be closed?

  Response: Bus routes can vary over time. It is mostly assumed that bus routes are correlated with annual traffic volumes. The lower the traffic volume, the less likely it is used as a bus route. Low traffic volumes are a factor considered with bridges that are deemed as candidates for future closure. Before a bridge is ultimately deemed to be closed, consideration for its use as a bus route and the resulting detour should be taken into consideration.

- Between Alcester and Hawarden, the railroad tracks appear to be used for storage, and could be a good option for a trail.

  Response: Rail Trails or Rails with Trails are good options to consider when designing a new trail plan.

Comments submitted outside of the meetings:

- "What are the plans for raising Hehke Rd. I assume we will be receiving federal money from the inferstructure program."

  Response: Henke Road is a township road. The cost to improve flooding on Henke Road was found to be too high and the project to improve flooding on Henke Road was not pursued. Taxpayers in the township voiced concerns of cost and increased taxes to accommodate the project. As for funding from the new infrastructure bill, we still don't know how that would impact funding for townships.

- "A few years back (possibly 2018) Union county hired your firm to do a study on Henke Road. You found it was possible to raise the road on the south end in order to stop the flooding in order to make travel possible on Henke Road. I would like to see that process carried out. Every time the road floods we are not able to access Henke Road. If ever there was a medical emergency or fire, it would take emergency personnel extra time to go the long way around to get to somebody's house and even then there's a couple of houses that can't be reached when the road floods."

  Response: See comment above.

- "I appreicate the group taking the time to review the roads and take public input, I know it is extra work and appreciate the opportunity to provide my comments. I was unable to attend the meetings that day due to being out of town for work. It appears that adding some shoulders on 23/334th St. is part of the plan, which is good. One thing that I feel the study group needs to still consider and discuss is Chip Sealing, and how to reduce the hazards of this. I understand the need and reasons to chip seal, and am not suggesting it be completly eliminated. As a motorcyclist, this is a VERY dangerous process, both during the chip seal process, and after. After the process is done, and the signs taken down, there are still instances of loose chip, and that is harder to see than black ice is in the winter. Again, I am not suggesting it be eliminated, but what can we do to reduce it uses where possible. Even though this method of repair is economical, there are costs to motorists, rocks getting thrown up and could damage paint, could create rock chips in windows of cars behind, get caught in brake rotors. For where budget does not allow an alternative maintenance method, what can we do to reduce the safety risks.

  Ideas:
  - Notify public at least 2 weeks prior to the process, what roads, and overall schedule. Notify via Facebook, local papers (NSC/DD Times for example) contact the local ABATE chapter, etc.
  - Chip Seal/Loose Gravel Const. signs that state the road work being done, but place signs at a prior intersection so motorcyclists have the option to detour.
  - Increase the quality control inspections at the completion of the work to ensure no patches of loose gravel remain and all of the excess chip gets swept up."

  Response: Thank you for your ideas! Union County does a fog seal after every chip seal which results in very high rock retention. The fog seal is applied a day or two after the chip seal. As far as more notice, Union County hires a contractor to do the project, it is hard for the contractor to schedule two weeks in advance.

SIGN-IN SHEET

Union County Master Transportation Plan

Public Meeting #2 – December 15, 2021 (5:30 PM to 7:00 PM)

Union County Courthouse – Office of Emergency Management Room – Elk Point, SD

Name	Organization	City/Address	Email
Paul Deutsch	Ulteig	Sioux Falls, SD	Paul.Deutsch@Ulteig.com
Bob Corio	Jefferson Township	Jefferson SD 57038	bcorio@icloud.com
Steve Hofland	Bhule Township	Elk Point S.D. 57025	
GREGG HANSON	Brule Twp	EP. SD	brule clerk@gmail.com
Brian McInerney	Brule	EP. SD	macfarms@evertek.net
Cristy Harkness	UCHD	EP, SD	Cristy.Harkness@unioncountysd.org
Jeff Noteboom	UCHD	EP, SD	Jeff.noteboom@unioncountysd.org
Jeff Heidebrecht	City of Beresford	Beresford	water@bmtc.net / jeffh@bmtc.net
LARRY H BORK	SOUTHEAST FARMERS COOP	BURBANK	l.bork@SOUTHEAST FARMERS.com
Dick Billings	SC Cyclists Wynstone HOA	Jefferson	dickbillings2020@gmail.com
DEREK BARRIOS	Elk Point-Jefferson Schools	Elk Point	~~derek.B~~ derek.barrios@k12.sd.us

SIGN-IN SHEET

Name	Organization	City/Address	Email
Logan Gran	SDDOT	Pierre, SD	Logan.Gran@State.Sd.us
Sarah Gilkerson	" "	" "	sarah.gilkerson@state.sd.us
Steve Gramm	SDDOT	Pierre, SD	steve.gramm@state.sd.us
Gary Bogenrief	N.S.C. Council	North Sioux City	cgbogiel@gmail.com
MIKE DAILEY	UNION COUNTY	Jefferson S.D	mike.dailey@unioncountysd.org
Steve Bruening	?	McCook Lake	Steve@dracoeng.com
Jerry Buum	self	North Sioux City	bkb8111@g.mail.com

Comment Sheet

Union County Master Transportation Plan

Public Meeting #2 – December 15, 2021 (5:30 PM to 7:00 PM)

Union County Courthouse – Office of Emergency Management Room – Elk Point, SD

Please use the space below to leave a comment for the project team regarding the Union County Master Transportation Plan. You may leave a comment on the form below or by submitting a comment on the project website. You also have the option to mail your comments directly. Comments will be accepted until January 3, 2022.

Project Website: www.ulteig.com/unioncountymtp/

Mailing Address: Paul Deutsch
Ulteig Engineers, Inc.
5701 South Corporate Place, Suite 1
Sioux Falls, SD 57108

Comment:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name (optional): _____

Organization (optional): _____

Address (optional): _____

Phone Number (optional): _____

Email Address (optional): _____

Would you like to receive future emails about the Union County MTP? _____

Ulteig

Ulteig We listen. We solve.®

Union County Master Transportation Plan
Public Meeting #2

Union County Courthouse – Office of Emergency Management Room
5:30 PM - 7:00 PM (presentation at 5:45 PM)
Elk Point, SD
December 15, 2021

Agenda

- Background and Purpose
- Public Feedback
- Future Needs Analysis
- Addressing Issues and Deficiencies
- Standards Development
- Next Steps

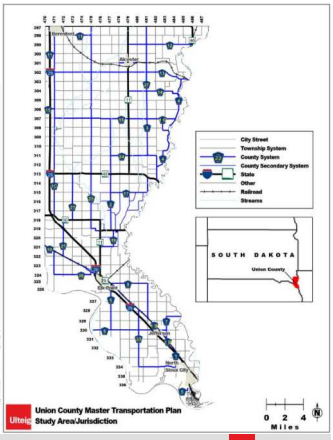
Background and Purpose

- **What is the Union County Master Transportation Plan?**
  - A 20-year planning document that will serve as a guide for the County's future transportation network for all modes of travel
  - Examines Safety, Infrastructure, and Operations
- **Study Participants**
  - Agency Partners: Union County, SDDOT, SIMPCO, FHWA
  - Study Advisory Team: Union County (7), SDDOT (5), SIMPCO (1)

SD DOT simpco U.S. Department of Transportation Federal Highway Administration Ulteig We listen. We solve.™

Study Area

- **Union County and all communities within**
- **The focus of the MTP is Union County owned and maintained roadways and bridges.**



Public Feedback

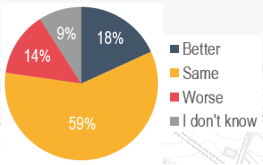
Public Survey Results

- **The Internet-Based Survey Questionnaire was conducted during the time of Public Meeting #1**
  - 37 questions
  - 22 Surveys were completed
- **The questions related to the existing transportation network**
  - Travel Preferences
  - Overall Performance
  - Issues and Concerns
  - Budgetary Perceptions
  - Prioritization of Specific Types of Improvements
  - General Comments

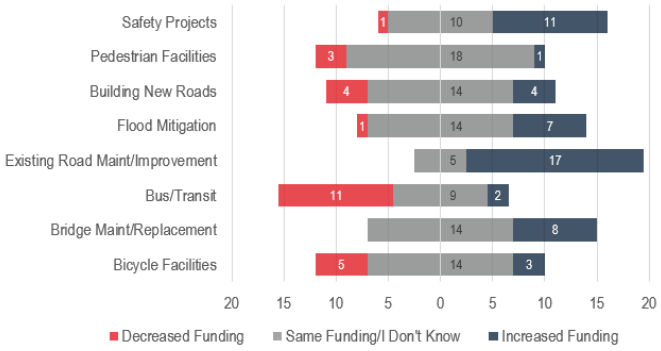
Public Survey Results

- 95% typically drive alone
- 77% drive over 100 miles per week (18% drive over 400 miles per week)
- 63% walk/bike outdoors 3-7 days per week

Q12. How would you rate the quality of Union County Transportation Infrastructure Compared to 5 Years ago?



Public Survey Results



Future Needs Analysis

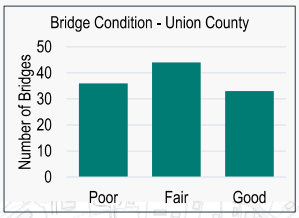
Road Conditions and Surfacing Needs

- Bituminous (or asphalt paved) roadways represent most County road mileage
- 67% of paved roads in Union County have condition rating of Good to Excellent
- 16% (about 30 miles) of paved roadways - identified as candidates for major rehabilitation

Surface Type	Miles	%
Unsurfaced	4.9	2.0%
Gravel	53.5	22.1%
Bituminous	178.1	73.4%
Concrete	6.0	2.5%

Bridge Conditions and Replacement Needs

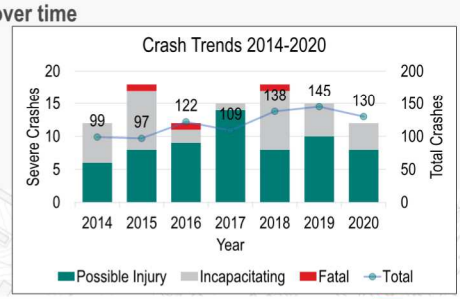
- 113 Bridges Owned by Union County
- Bridges in Poor Condition are defined as "Structurally Deficient"
  - 8% of USA Bridges
  - 18% of South Dakota Bridges
  - 32% of Union County-Owned Bridges
  - (26% of South Dakota County-Owned Bridges are in Poor Condition)
- Between 2016 and 2020, Union County has replaced 1.6 bridges/year.



36 Bridges in Poor Condition
32% of Union County-Owned Bridges

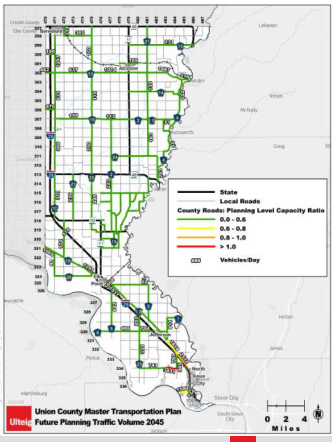
Crash History

- Union County Roads average 120 reported crashes/year.
- Total crashes increasing over time
- 25% Wild Animals
- 3 Fatal Crashes in 7 years
- 5% Severe Crashes
  - Fatal or Incapacitating



2045 Capacity Analysis

- **Based on future planning daily traffic volumes, traffic congestion is not expected to be an issue for the vast majority of county roads**
  - Almost all County roads are well below a need for additional traffic lanes.
  - The highest planned traffic volumes are near North Sioux City on County Road 23 and County Road 1B
    - *Extra driving lanes may be necessary, but only after a detailed traffic operations study indicates the need for it.*

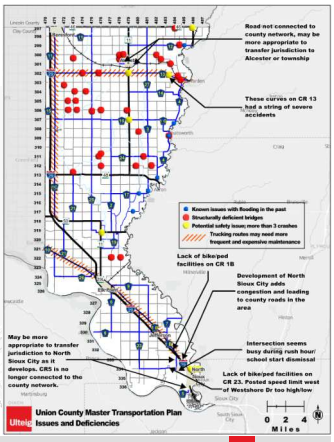


Pedestrian/Bicycle Facilities

- **Pedestrian/Bicycle facilities are mostly limited to within City Boundaries**
- **Trails in Union Grove State Park Adams Homestead & Nature Preserve**

Issues and Deficiencies

- **Issues Identified from Existing Conditions Review and Public Feedback:**
  - – Bridge Replacement Needs
  - – Road Conditions
  - – Increasing Truck Traffic
  - – Locations with Multiple Crashes
  - – Flooded Roads
  - – Lack of Bike/Ped Infrastructure and Safety
  - – North Sioux City Development Causing Concerns about Congestion, Road Condition, and Cost
  - – Jurisdictional Ownership
  - – Prioritizing Improvements with Available Funding



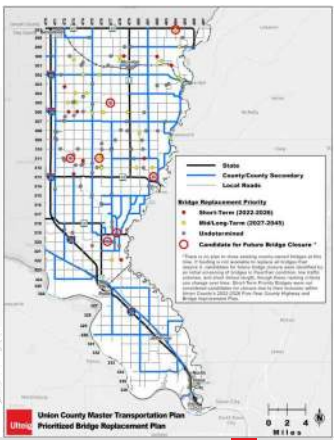
Addressing Issues and Deficiencies

Corridor Improvements (County Highways)

- **Issue/Deficiency Addressed:**
  - – Road Conditions
  - – Increasing Truck Traffic
  - – Lack of Bike/Ped Infrastructure and Safety
  - – Prioritizing Improvements with Available Funding
- **Maintaining existing infrastructure is the priority with available funding**
  - – Preventative Maintenance, Minor and Major Rehab
  - – Chip Seals, Microsurfacing, Asphalt Overlays, Etc.
- **The Major Roads Plan prioritizes the most critical county roads**
  - – Capital Improvements, Support Multimodal Transportation (biking, walking)
  - – Reconstruction, Shoulder Widening

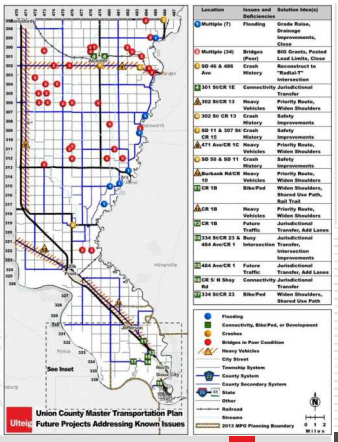
Bridge Improvements

- **Issue/Deficiency Addressed:**
  - – Bridge Replacement Needs
  - – Prioritizing Improvements with Available Funding
- **36 bridges are identified as a priority for replacement by 2045**
- **If funding is not available for all bridges, some bridges may need to be closed**
  - – BIG funding helps!
  - – $1.2 Trillion Infrastructure Investment and Jobs Act (IIJA) will help too!

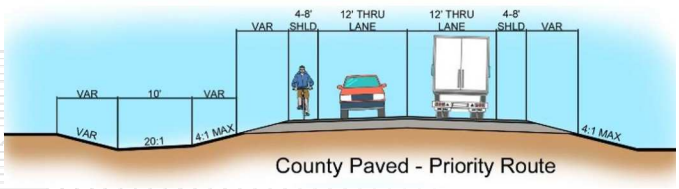


Safety Improvements and Enhancements

- **Issue/Deficiency Addressed:**
  - Locations with History of Multiple Crashes
  - Lack of Bike/Ped Infrastructure and Safety
  - Flooded Roads
  - North Sioux City Development Causing Concerns about Congestion, Road Condition, and Cost
  - Prioritizing Improvements with Available Funding
- **Future Projects Addressing Known Issues**
  - Flooding, Crash History, Bridges in Poor Condition, Connectivity, Bike/Ped, Traffic Growth, Development, Heavy Vehicles
  - Will be ranked by priority as funding becomes available



Standards Development

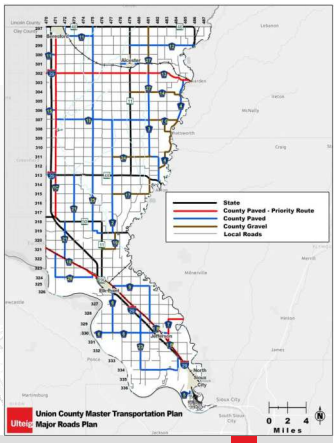


Standards Development

- **Issue/Deficiency Addressed:**
  - Bridge Replacement Needs
  - Road Conditions
  - Increasing Truck Traffic
  - Lack of Bike/Ped Infrastructure and Safety
  - North Sioux City Development Causing Concerns about Congestion, Road Condition, and Cost
  - Unideal Jurisdictional Ownership

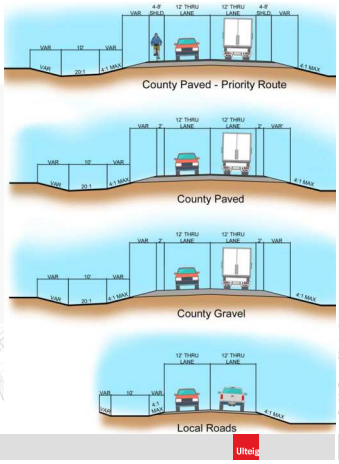
Major Roads Plan

- **Prioritizes the most critical county roads**
  - Guides future designs and project planning
- **Classifications:**
  - County Paved - Priority Route
  - County Paved
  - County Gravel
  - Local Roads



Road Design Standards

- **Modern design standards for road reconstruction**
- **Guided by the Major Roads Plan**
  - County Paved - Priority Route
  - County Paved
  - County Gravel
  - Local Roads

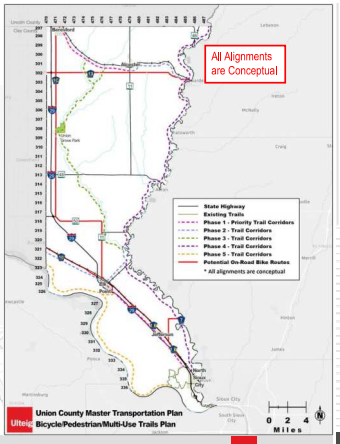


Transportation Standards for New Development

- **Access Management Guidelines**
  - Supplements Access Management Ordinance
- **Traffic Impact Study Guidelines**
  - Supplements Access Management Ordinance
  - Level of Service Standards
- **Jurisdictional Transfer Policy**
  - Candidate Roads Identified
  - Process Guidance
  - Legal Agreement Template

Bicycle and Pedestrian Plan

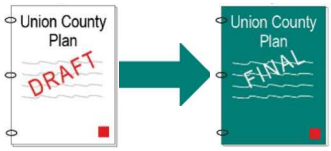
- **On-Street Bicycle and Pedestrian Accommodations in Union County**
  - The addition of paved shoulders (according to Major Roads Plan) and Bike Route designation is recommended for the County Paved – Priority Routes
- **Trails Master Plan**
  - A comprehensive network of trails
  - Phased implementation
  - Optional surface types and width
    - *Loose surface, gravel, crusher fines, asphalt, concrete*



Next Steps

Next Steps

- **Public Meeting #2 (today)**
- **Incorporate Public Feedback**
- **Draft Report**
- **Present to Union County Commission**
- **Final Report by May 31, 2022**



Public Participation

- **Public Feedback Options:**
  - Direct Discussion with the Project Team
  - Written Comments
    - *Comment sheets are provided in the meeting room*
    - *Comments can also be submitted on the project website*
  - Comments will be accepted until January 3, 2022

Thank You!

- **Study Website**
  - www.Ulteig.com/unioncountymtp/
    - *Study Documents, Recorded Presentations*
    - *Project Updates*
    - *Comment Form*
- **Project Managers**
  - SDDOT
    - *Steve Gramm (Steve.Gramm@state.sd.us)*
  - Consultant Team
    - *Paul Deutsch (Paul.Deutsch@Ulteig.com)*
    - *Will Kerns (William.Kerns@Ulteig.com)*
    - *Brad Stangohr (Brad.Stangohr@Ulteig.com)*

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PUBLIC SURVEY RESULTS

The public survey posed 37 questions relating to the existing transportation network in Union County. A total of 22 surveys were completed and 2 individual comments were submitted outside of the survey. Some of the results and comments from the survey are shown below.

SAFETY FEEDBACK – SPECIFIC CONCERNS

- *"Speeding, texting/calls on cell phones."*
- *"Steep ditches in places. Small shoulders."*
- *"Distracted drivers and wild animals on the roads."*
- *"Asphalt roads are rough, too many tar joints (dangerous when on motorcycle) ditches aren't mowed frequently enough (concern on watching for wildlife)*

FEEDBACK ON ROADS AND BRIDGES – SPECIFIC CONCERNS

- *"Some of the gravel roads that are exposed to recent floods and truck traffic show signs of deteriorating."*
- *"Some of the concrete roads buckle with heat (not enough expansion joints).*
- *"County Road 1B."*
- *"Maintenance of current roads/bridges."*

ACTIVE TRANSPORTATION AND RECREATION – SPECIFIC CONCERNS

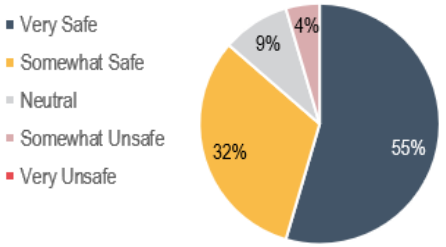
- *"People do NOT know the rules for riding bikes, scooters, skateboards, walking on roads*
- *"No shoulders on county roads, specifically on Hwy 23 (334th St.)"*
- *"Safe place to walk/bike not readily available."*

36% of survey respondents report walking or biking 3-5 days per week, while 27% report walking and biking 6-7 days per week, a great baseline number for active living and active transportation in Union County.

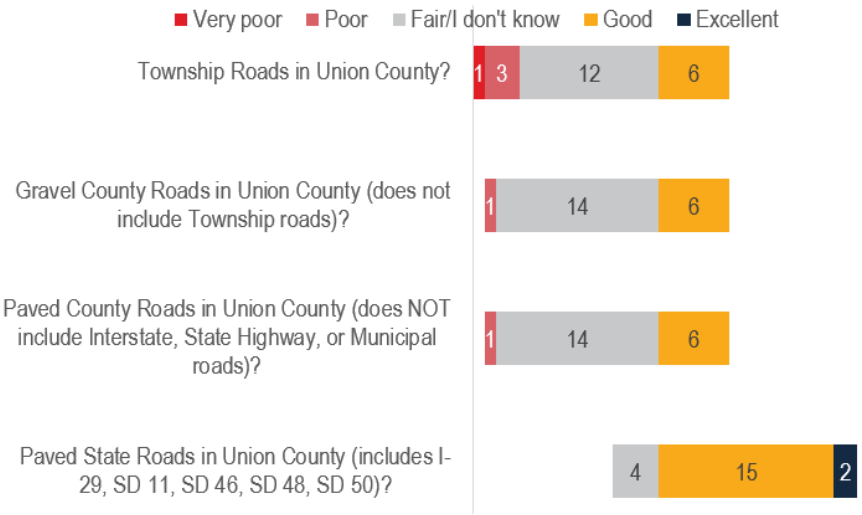
OTHER CONCERNS

- *"Public transit and electric vehicle charging."*
- *"Mitigation of road flooding."*
- *"Growth of new developments."*
- *"Traffic congestion around Dakota Valley School"*

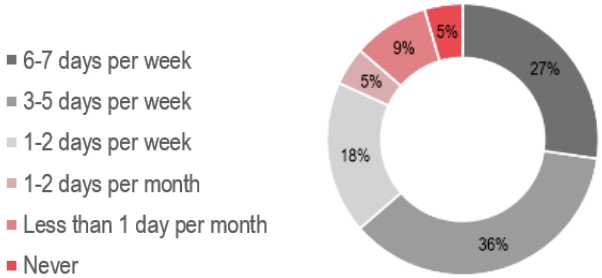
Q20. How safe do you feel driving or riding in automobiles in Union County?



Q13,14,16 and 18. How would you rate the condition of … ?



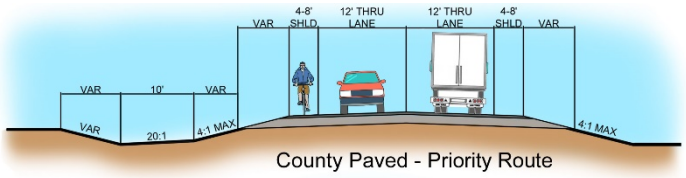
Q5. During warmer months, how often do you walk/bike outdoors in Union County?



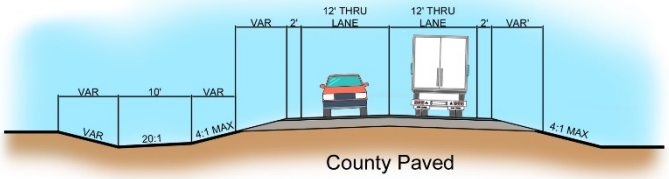
MAJOR ROADS PLAN

The Union County Major Roads Plan classifies county roads based on the following priorities and objectives:

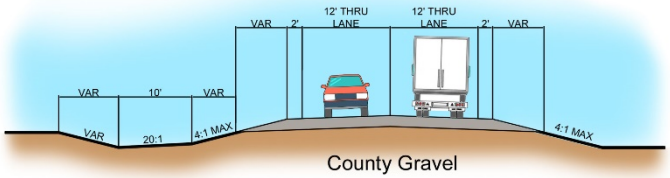
- Maintain connectivity – recreation, jobs, and destinations
- Maintain existing infrastructure
- Prioritize the most critical roads for farm-to-market, ethanol plants, and other heavy freight
- Support the growth of economic activity and quality of life
- Idenitfy considerations for change in roadway functional classification
- Identify considerations for change in roadway jurisdiction
- Support a multimodal transportation network through allocation of space for pedestrians, bicyclists, and transit.



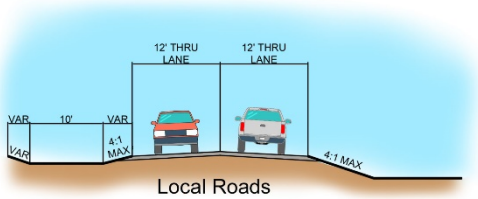
County Paved - Priority Route



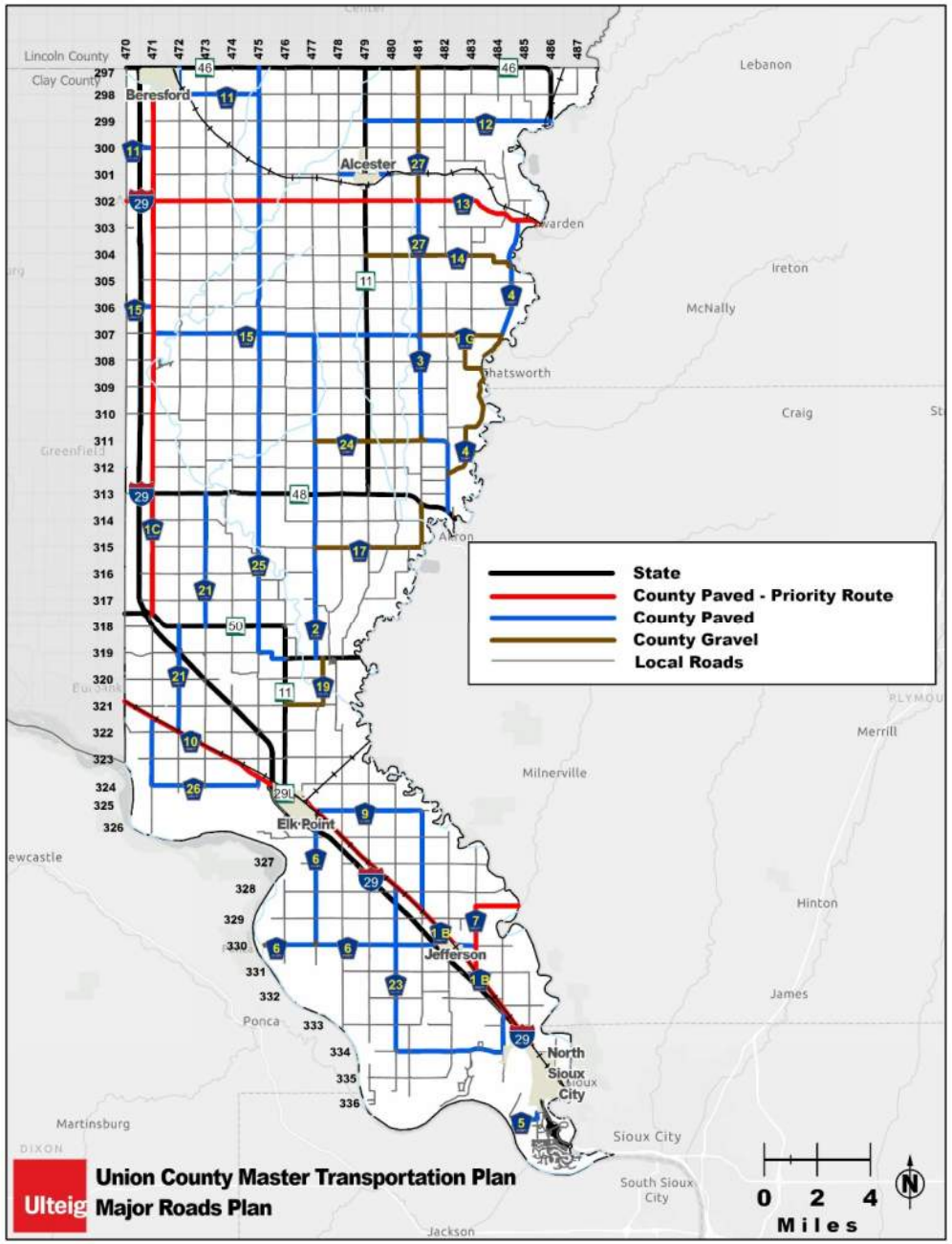
County Paved



County Gravel



Local Roads



ADDRESSING ISSUES AND DEFICIENCIES

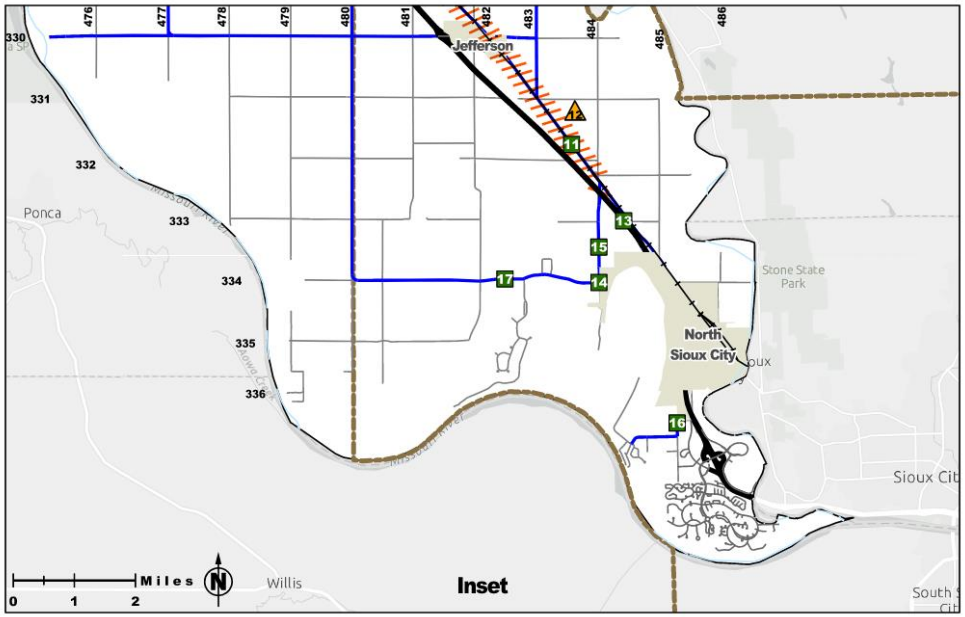
A list of Issues and Deficiencies have been identified as a result of the existing conditions analysis, discussions with the study advisory team, and public feedback:

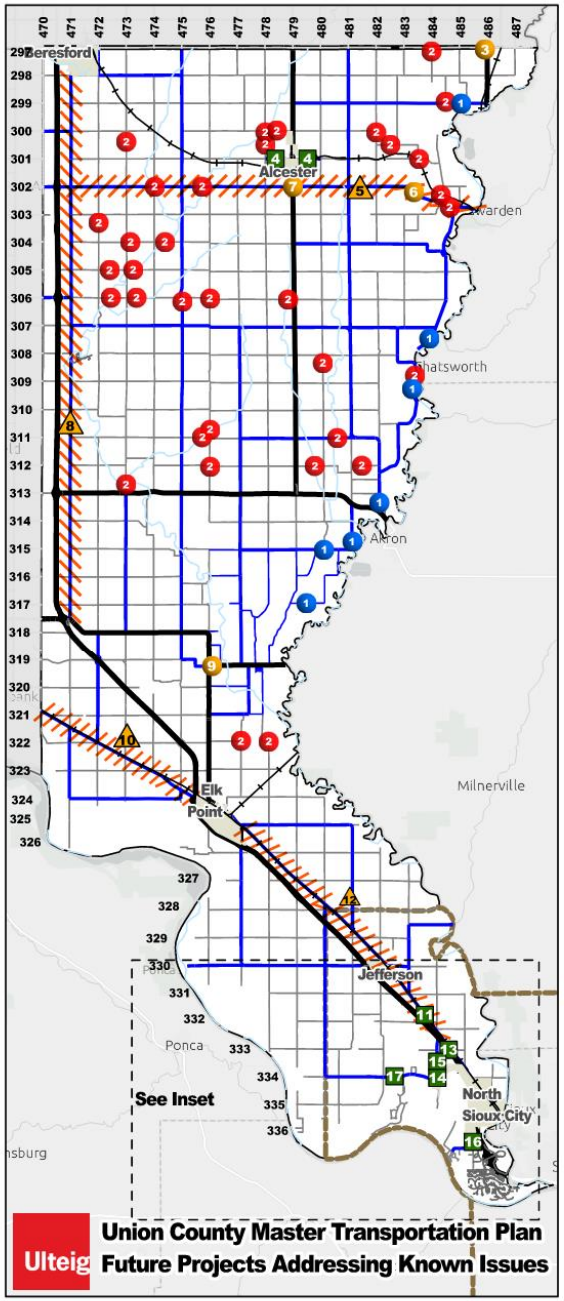
- Bridge Replacement Needs
- Road Conditions
- Increasing Truck Traffic
- Locations with Multiple Crashes
- Flooded Roads
- Lack of Bike/Ped Infrastructure and Safety
- North Sioux City Development Causing Concerns
- Jurisdictional Ownership
- Prioritizing Improvements with Available Funding

FUTURE PROJECTS PROPOSED TO ADDRESS KNOWN ISSUES

Safety Improvements and other Enhancements were identified during Existing Conditions Review. Future projects with specific solutions that address these issues have been proposed and will be ranked by priority as funding becomes available.

- Corridor Improvements
- Intersection Improvements
- Bridge Replacement
- Drainage Improvements
- Safety Improvements
- Bike and Pedestrian Improvements
- Jurisdictional Transfer





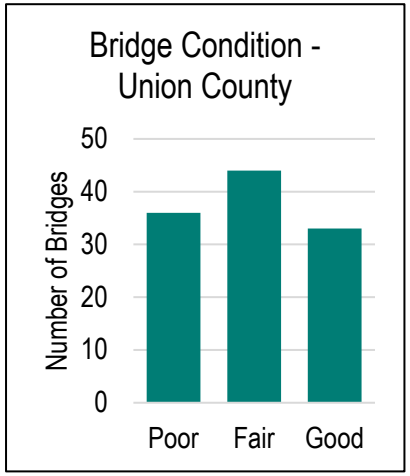
Location	Issues and Deficiencies	Solution Idea(s)
1 Multiple (7)	Flooding	Grade Raise, Drainage Improvements, Close
2 Multiple (34)	Bridges (Poor)	BIG Grants, Posted Load Limits, Close
3 SD 46 & 486 Ave	Crash History	Reconstruct to "Radial-T" Intersection
4 301 St/CR 1E	Connectivity	Jurisdictional Transfer
5 302 St/CR 13	Heavy Vehicles	Priority Route, Widen Shoulders
6 302 St/ CR 13	Crash History	Safety Improvements
7 SD 11 & 307 St/ CR 15	Crash History	Safety Improvements
8 471 Ave/CR 1C	Heavy Vehicles	Priority Route, Widen Shoulders
9 SD 50 & SD 11	Crash History	Safety Improvements
10 Burbank Rd/CR 10	Heavy Vehicles	Priority Route, Widen Shoulders
11 CR 1B	Bike/Ped	Widen Shoulders, Shared Use Path, Rail Trail
12 CR 1B	Heavy Vehicles	Priority Route, Widen Shoulders
13 CR 1B	Future Traffic	Jurisdictional Transfer, Add Lanes
14 334 St/CR 23 & 484 Ave/CR 1	Busy Intersection	Jurisdictional Transfer, Intersection Improvements
15 484 Ave/CR 1	Future Traffic	Jurisdictional Transfer, Add Lanes
16 CR 5/ N Shay Rd	Connectivity	Jurisdictional Transfer
17 334 St/CR 23	Bike/Ped	Widen Shoulders, Shared Use Path

- Flooding
- Connectivity, Bike/Ped, or Development
- Crashes
- Bridges in Poor Condition
- Heavy Vehicles
- City Street
- Township System
- County System
- County Secondary System
- State
- Other
- Railroad
- Streams
- 2013 MPO Planning Boundary

0 1 2 Miles

BRIDGE REPLACEMENT PLAN

Union County maintains 113 bridges. As a result of bridge inspections, the condition of the bridges falls under one of three categories: Good, Fair, or Poor. Most of Union County bridges are in Fair or Good condition (68%), but 36 of Union County bridges are currently in Poor condition (32%), which means they are structurally deficient. These bridges have short or unknown remaining service lives, and likely require high-cost repairs or replacement. Comparatively, in all of South Dakota, 26% of all county-owned bridges are in Poor Condition.



Between 2016-2020, Union County has replaced 1.6 bridges/year, usually with significant funding assistance from SDDOT Bridge Improvement Grants. At current funding levels, Union County faces a difficult challenge to maintain all bridges in a state of good repair, as bridges continue to deteriorate at a faster rate than they can be repaired or replaced.

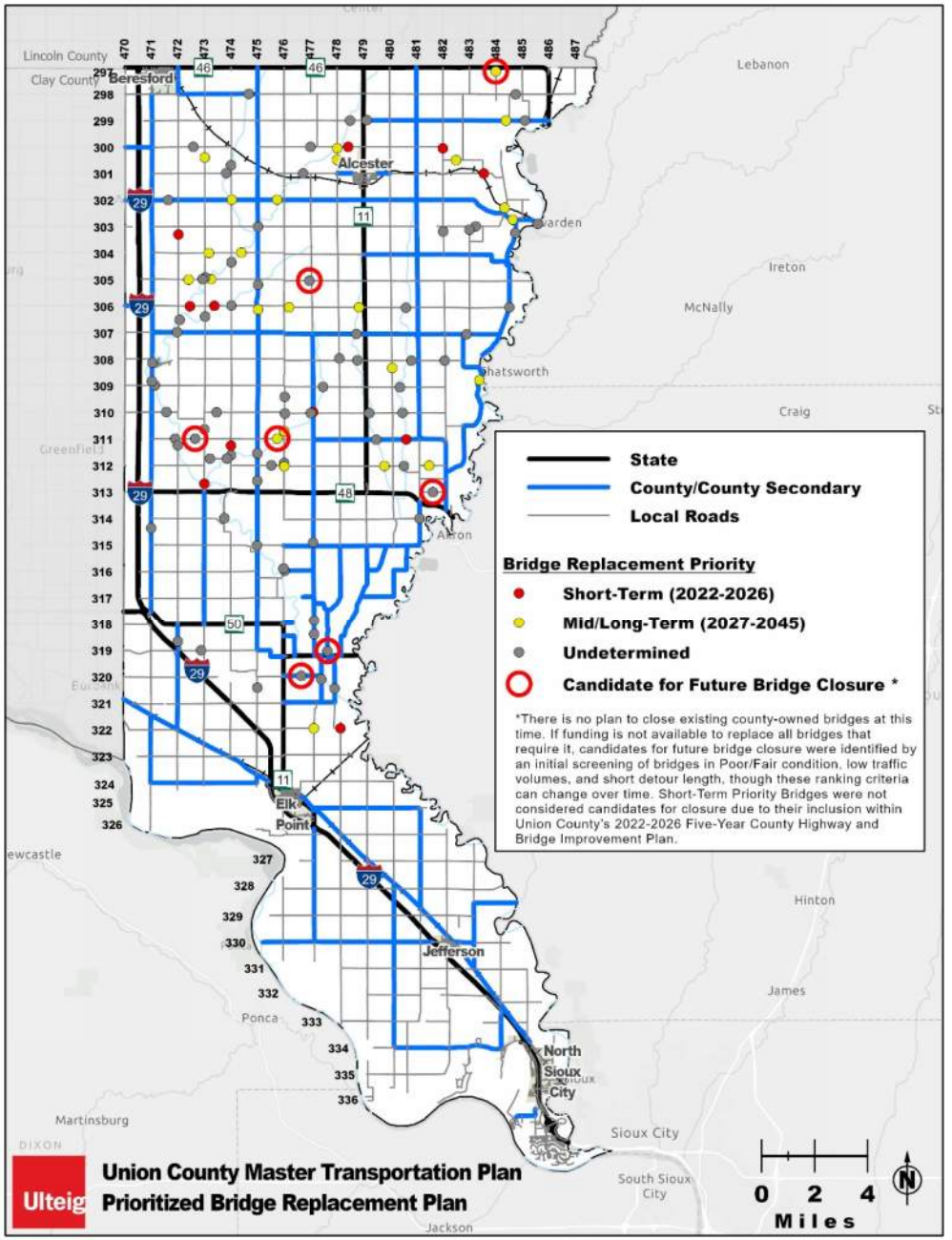
As part of this Plan, the 36 bridges currently in Poor condition have been identified as a priority for replacement in either the Short-Term (2022-2026) or the Mid/Long-Term (2027-2045). However, the list is expected to grow as bridges currently in Fair or Good condition may also deteriorate to Poor condition.

CANDIDATES FOR FUTURE BRIDGE CLOSURE

If funding is not available to keep up the bridge replacement needs in Union County, 7 bridges were identified as candidates for future bridge closure by conducting an initial screening for bridges with low traffic volumes and short detour length.

$1.2 Trillion Infrastructure Investment and Jobs Act (IIJA)

The largest and most comprehensive infrastructure bill in American history passed by Congress on November 6, 2021, will reauthorize surface transportation programs for five years and invest $110 Billion in additional funding to repair roads and bridges. These funds will filter down to South Dakota counties like Union County and is expected to help in the replacement of existing bridges.

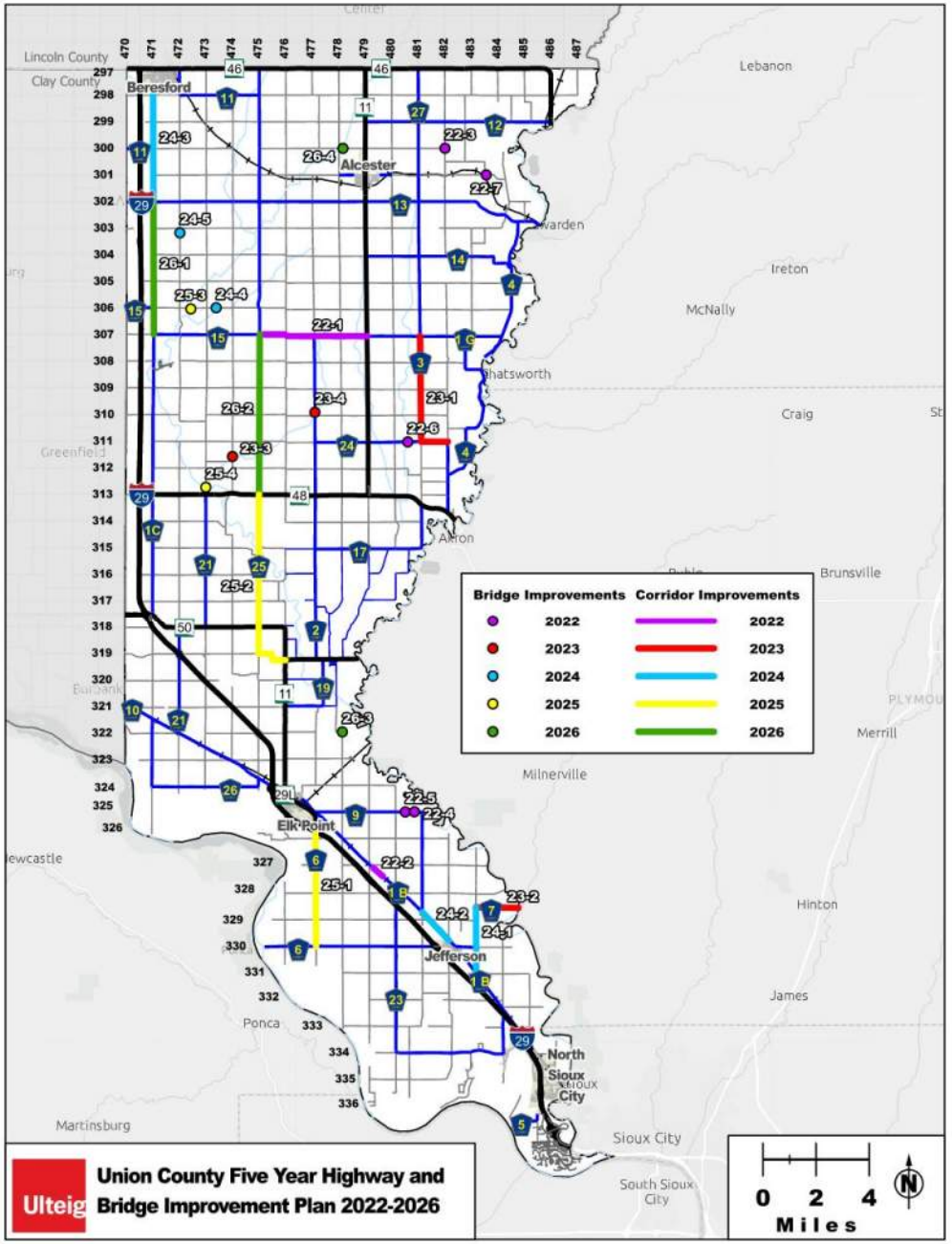


UNION COUNTY FIVE-YEAR HIGHWAY AND BRIDGE IMPROVEMENT PLAN 2022-2026

Each year, Union County develops a Five-Year Highway and Bridge Improvement Plan. It is a short-range planning document that is designed as a tool to assist the County in budgeting, planning, and incorporating the needs and concerns of the public into annual road and bridge projects. This plan is updated each year with some projects removed and others added as need.

Additionally, by completing this short-range plan each year, Union County is rewarded with eligibility for funding through the local Bridge Improvement Grant (BIG), established by the SDDOT. Almost all bridge replacements in Union County are aided with funding from the BIG program.

Map ID	Year	Project Location	Bridge Number	Project Description	Total Project Cost
22-1	2022	CR #15	-	4 miles leveling course and asphalt over lay	$800,000
22-2	2022	CR #1B	-	400 ft of Concrete Overlay Repair by SE Elevator	$150,000
22-3	2022	300th St Ave	64-120-031	Replace with Box culvert	$120,000
22-4	2022	CR #9	64-107-280	Replace CMP with Conrete Culverts	$90,000
22-5	2022	CR #9	64-110-285	Replace CMP with Conrete Culverts	$90,000
22-6	2022	CR #24	64-105-140	BIG Replacement Grant Concrete Box Culvert	$400,000
22-7	2022	301st St	64-134-040	BIG Replacement Grant Concrete Box Culvert	$400,000
23-1	2023	CR #3	-	9 miles leveling course and asphalt overlay	$1,800,000
23-2	2023	CR #7	-	1.5 miles leveling course and overlay	$300,000
23-3	2023	474 Ave	64-040-144	BIG Replacement Grant Concrete Box Culvert	$400,000
23-4	2023	476 Ave	64-070-130	BIG Replacement Grant Concrete Box Culvert	$400,000
24-1	2024	CR #7	-	2.5 miles replace culvert, leveling couse and overlay	$600,000
24-2	2024	CR #1B	-	1.8 miles mill and overlay	$400,000
24-3	2024	CR #1C	-	4 miles mill and overlay	$800,000
24-4	2024	306th St	64-034-090	BIG Replacement Grant Concrete Box Culvert	$400,000
24-5	2024	472nd Ave	64-020-063	BIG Replacement Grant Concrete Box Culvert	$400,000
25-1	2025	CR #6	-	4 miles leveling course and asphalt over lay	$800,000
25-2	2025	CR #25	-	2.19 miles leveling course and overlay	$450,000
25-3	2025	306th St	64-023-090	BIG Replacement Grant replace with bridge	$1,000,000
25-4	2025	473rd Ave	64-030-157	BIG Replacement Grant replace with bridge	$1,000,000
26-1	2026	CR #1C	-	5 miles Mill and overlay	$1,000,000
26-2	2026	CR # 25	-	6.0 miles leveling course and overlay	$1,200,000
26-3	2026	478th Ave	64-080-251	BIG Replacement Grant replace with bridge	$1,000,000
26-4	2026	300th St	64-084-030	BIG Replacement Grant replace with bridge	$400,000



BICYCLE AND PEDESTRIAN PLAN

On-Road Bicycle and Pedestrian Accommodations in Union County
The addition of paved shoulders (according to Major Roads Plan) and Bike Route designation is recommended in Union County to provide enhanced safety for bicyclists and occasional pedestrians. (See map to the right.)

Trails Master Plan Phases

Phase 1 Northern and Southern Community Connections – Phase 1 of the comprehensive trails plan is shown in **pink** and are envisioned to closely follow rail corridors such as the BNSF railroad from North Sioux City through Jefferson to Elk Point. Another planned Phase 1 Trail alignment connects the northern Union County towns of Beresford to Alcester and are envisioned to closely follow the D&I railroad.

Phase 2 Intermediary Trails – Phase 2 trails are shown in **blue**. The southern Union County trail is envisioned to closely follow the BNSF railroad northwest from Elk Point to the county line with Clay County, also following the D&I railroad northeast from Elk Point to the Big Sioux River, and generally following the Big Sioux River north to Brule Creek. Another planned Phase 2 Trail alignment connects the northern Union County town of Alcester east to the Big Sioux River closely following the D&I railroad and eventually connecting to Sioux County.

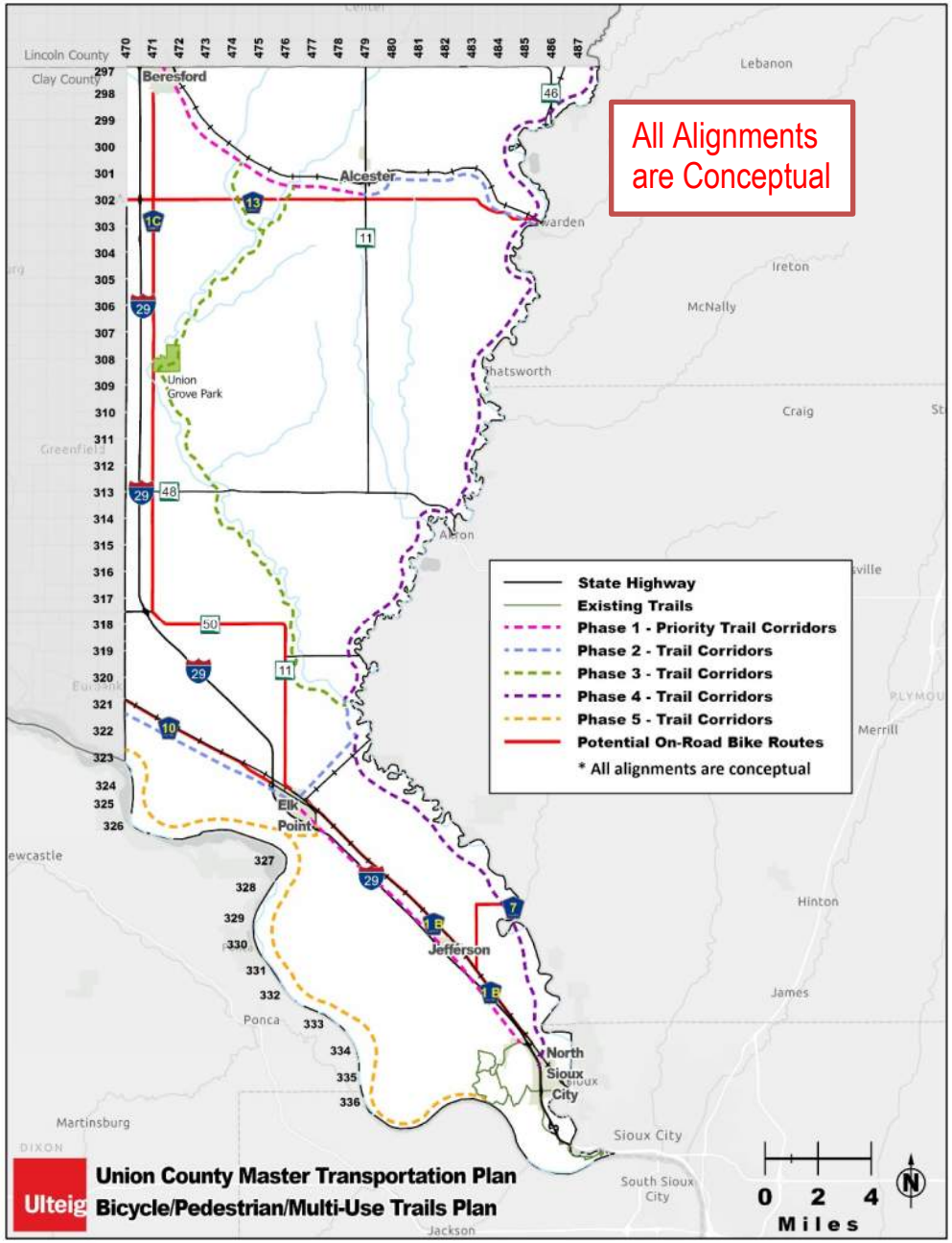
Phase 3 Brule Creek Trail –Phase 3 shown in **green** are envisioned to be scenic forested trails that connect the planned north and south trail networks of Union County with Union Grove State Park.

Phase 4 Big Sioux River Greenway – Trail shown in **purple** generally following the Big Sioux River from North Sioux City north to the county line of Lincoln County. This trail should serve as the crown jewel of the Union County Trails Network, and include park benches, riverbank activations, fishing platforms, and interpretive signage.

Phase 5 Missouri River Greenway – The final trail shown in **orange** generally following the Missouri River from North Sioux City northwest to the county line of Clay County. The Missouri River Greenway will connect on the southern end to existing trails in the Dakota Dunes Subdivision and will also connect to the Phase 1 Community Connections trail in two different locations on the southwestern portion of Union County.

Trail Surface Type Options

- Loose Surface
- Gravel
- Crusher fines
- Asphalt
- Concrete



FUTURE TRAFFIC VOLUMES (2045)

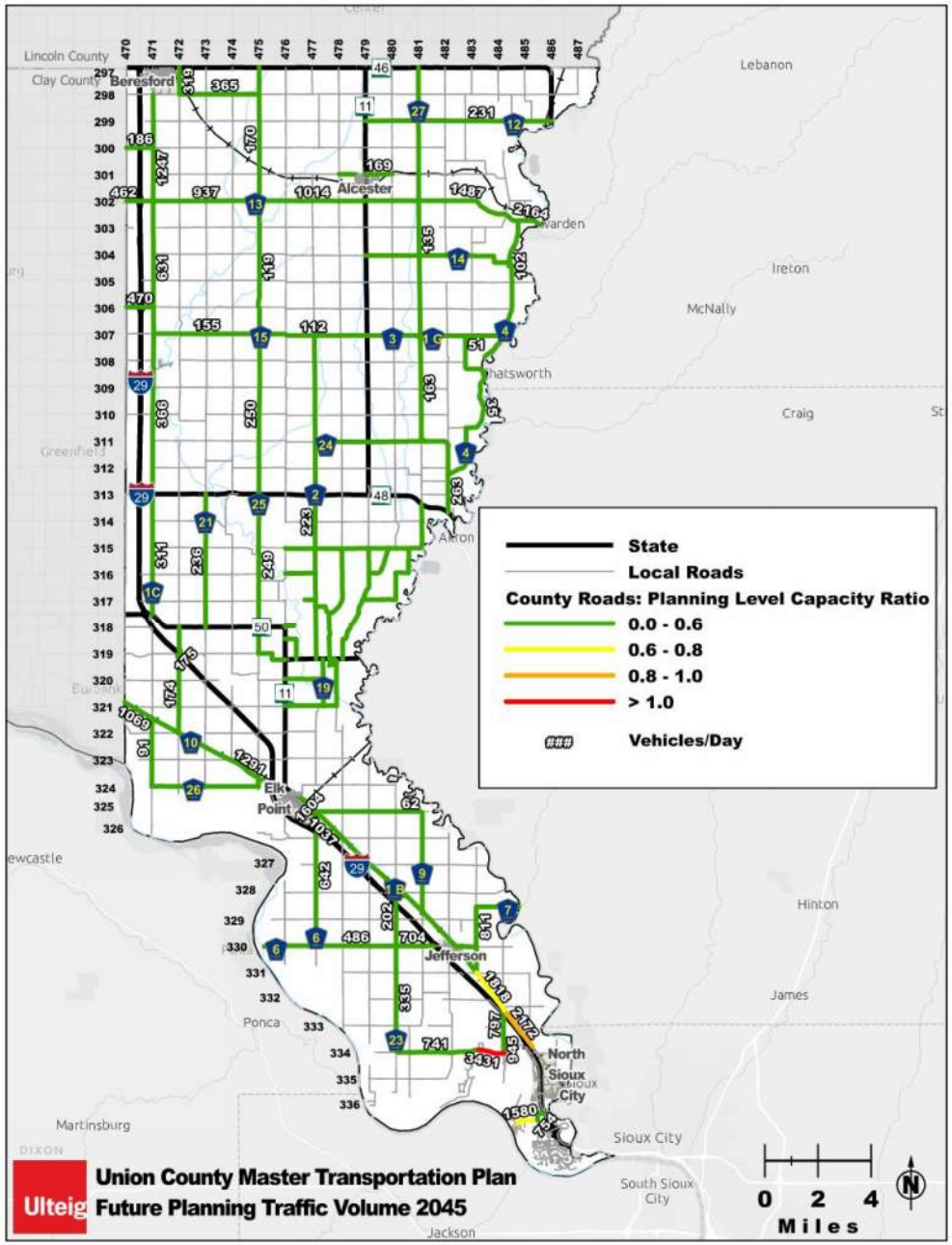
Based on future planning daily traffic volumes for the year 2045, traffic congestion is not expected to be an issue for the vast majority of county roads. Almost all County roads are well below planning level capacity

The highest planned traffic volumes are near North Sioux City:

- County Road 23
- County Road 1B
- Intersection of County Road 23 (Northshore Dr) & County Road 1 (484 Ave / Westshore Dr)

The intersection of CR 23 and CR 1 will exceed capacity according to 2045 Traffic Demand Model, though it assumed significant development which has yet to take place.

As these roads begin to approach planning capacity volumes, additional driving lanes may be necessary, but only after a detailed traffic operations study indicates the need for it.



TRANSPORTATION STANDARDS FOR NEW DEVELOPMENT

As part of the MTP, standards have also been created to aid with new development that stresses the transportation network:

- Access Management Guidelines
- Traffic Impact Study Guidelines
- Jurisdictional Transfer Legal Agreement Template

GETTING INVOLVED

STAY CONNECTED

Receive updates and announcements by visiting the project website and submitting your email address: www.ulteig.com/unioncountymtp/

LEAVE A COMMENT

If you have additional comments about the project, please fill out the comment form on the project website.

If you have and direct questions or concerns, please contact one of the project managers listed below.

Steve Gramm (Steve.Gramm@state.sd.us), Paul Deutsch (Paul.Deutsch@Ulteig.com), Will Kerns (William.Kerns@ulteig.com) or Brad Stangohr (Brad.Stangohr@Ulteig.com)

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION AND UNION COUNTY NOTICE OF PUBLIC OPEN HOUSE / INFORMATION MEETING FOR UNION COUNTY MASTER TRANSPORTATION PLAN

Date: December 15, 2021
Time: 5:30 PM to 7:00 PM
Place: Union County Courthouse
Office of Emergency Management (OEM) Room
209 E Main St
Elk Point, SD 57025
Website:
www.ulteig.com/unioncountymtp/

The South Dakota Department of Transportation (SDDOT), in conjunction with Union County and the Siouxland Interstate Metropolitan Planning Council (SIMPCO), will hold an open house style public information meeting on the date listed above to receive public input on the Union County Master Transportation Plan. The open house will be informal allowing for one-on-one discussion with the study team. The purpose of the meeting is to present the findings of the study and receive public comments. Area residents and commuters are encouraged to attend and participate in the study.

A brief presentation will take place at 5:45 PM. SDDOT, Union County, and consultant staff will be available after the presentation to discuss the study and answer questions. During this time, you will also have the opportunity to present written comments.

Those who cannot attend this public meeting in person may also view the meeting materials on the project website, which will be updated with the meeting materials presented at the public meeting no later than December 15, 2021. Comments and questions can also be submitted through the project website.

Notice is further given to individuals with disabilities that this open house is being held in a physically accessible place. Any individuals with disabilities who will require a reasonable accommodation in order to participate in the open house should submit a request to the department's ADA Coordinator at 605-773-3540 or 1-800-877-1113 (Telecommunication Relay Services for the Deaf). Please request the accommodations no later than 2 business days prior to the meeting to ensure accommodations are available.

Questions and comments regarding the study may be directed to:
Steve Gramm at (605) 773-3281
(steve.gramm@state.sd.us) or
Paul Deutsch at (605) 323-6023
(paul.deutsch@ulteig.com) or
Brad Stangohr at (605) 323-6036
(brad.stangohr@ulteig.com).

Comments will be accepted until January 3, 2022, and may be submitted online through the study website, or directly to one of the project representatives.

Notice published twice at the total approximate cost of $

84 lines

Alcester Union Hudsonite
Beresford Republic

11-25, 12-2

AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA

SS

COUNTY: UNION

CITY: BERESFORD

NEWSPAPER: BERESFORD REPUBLIC

Allyson M. Hill, being first duly sworn, on oath, says that the BERESFORD REPUBLIC IS a weekly newspaper published in said city and county, State of South Dakota; that she has full and personal knowledge of the facts herein stated; that said newspaper is a legal newspaper as defined in SDCL 17-2-2.1 through 17-2-2.4 inclusive, and has met all the requirements for at least one year next prior to the first publication of the attached public notice, and that said notice, a printed copy of which, taken from the paper in which the same was published, and which is hereto attached and made a part of this affidavit, was published in said newspaper

2 time(s) as follows: that the first publication of said notice in said newspaper aforesaid was on Thursday the

25 day of November, 2021, and that the succeeding publications were severally on

Thursday, the 2 day of December, 2021;

Thursday, the ____day of _____, 2021;

Thursday, the ____day of _____, 2021

Affiant further says that the full amount of the fees charged for the publication of said notice inures to the benefit of the publishers of said newspaper; that no agreement of understanding for the division thereof has been made with any other person, that no part therefore has been agreed to be paid to any person whomsoever; and that the fees charges for the publication thereof are:

DOLLARS $ 45.21

X Allyson M Hill, Allyson M. Hill

Subscribed and sworn to before me this 15th day of Dec., 2021.

Cheri O'Dell

Notary Public

My commission expires 03/12/2025.

Cheri O'Dell
SEAL NOTARY PUBLIC SOUTH DAKOTA SEAL

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION AND UNION COUNTY NOTICE OF PUBLIC OPEN HOUSE / INFORMATION MEETING FOR UNION COUNTY MASTER TRANSPORTATION PLAN

Date: December 15, 2021
Time: 5:30 PM to 7:00 PM
Place: Union County Courthouse
Office of Emergency Management (OEM) Room
209 E Main St
Elk Point, SD 57025
Website:
www.ulteig.com/unioncountymtp/

The South Dakota Department of Transportation (SDDOT), in conjunction with Union County and the Siouxland Interstate Metropolitan Planning Council (SIMPCO), will hold an open house style public information meeting on the date listed above to receive public input on the Union County Master Transportation Plan. The open house will be informal allowing for one-on-one discussion with the study team. The purpose of the meeting is to present the findings of the study and receive public comments. Area residents and commuters are encouraged to attend and participate in the study.

A brief presentation will take place at 5:45 PM. SDDOT, Union County, and consultant staff will be available after

773-3540 or 1-800-
communication Relay Services for the Deaf). Please request the accommodations no later than 2 business days prior to the meeting to ensure accommodations are available.

Questions and comments regarding the study may be directed to:
Steve Gramm at (605) 773-3281 (steve.gramm@state.sd.us) or
Paul Deutsch at (605) 323-6023 (paul.deutsch@ulteig.com) or
Brad Stangohr at (605) 323-6036 (brad.stangohr@ulteig.com).

Comments will be accepted until January 3, 2022, and may be submitted online through the study website, or directly to one of the project representatives.

Notice published twice at the total approximate cost of $45.21

Affidavit of Publication

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF UNION)

Allyson M. Hill, being duly sworn, says: the *Alcester Union & Hudsonite* is, and during all the times hereinafter mentioned was, a weekly legal newspaper as defined in SDCL 17-2-2, as amended, published at Alcester, Union County, South Dakota; that affiant is and during all of said times was, the publisher of such newspaper and has personal knowledge of the facts stated in this affidavit; that the notice, order or advertisement, a printed copy of which is attached, was published in said newspaper 2 successive issue(s), bearing the following date(s):

on Thursday the 25 day of November, 2021

and that the succeeding publications were severally

on Thursday, the 2 day of December, 2021

on Thursday, the _____ day of _____, 2021

on Thursday, the _____ day of _____, 2021

on Thursday, the _____ day of _____, 2021

that the full amount of the fee charged for publishing the same, to-wit, the sum of $45.21 insures solely to the benefit of the publisher of said newspaper; that no agreement or understanding for the division of the fee has been made with any person, and that no part of the fee has been agreed to be paid to any other person.

(x) Allyson M Hill, Allyson M. Hill

Subscribed and sworn to before me this 15th

day of Dec., 2021

Cheri Odell
Notary Public, South Dakota
My commission expires 03/12/2025

(SEAL)

Cheri O'Dell
SEAL NOTARY PUBLIC SOUTH DAKOTA SEAL

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION AND UNION COUNTY NOTICE OF PUBLIC OPEN HOUSE / INFORMATION MEETING FOR UNION COUNTY MASTER TRANSPORTATION PLAN

Date: December 15, 2021
Time: 5:30 PM to 7:00 PM
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209 E Main St
Elk Point, SD 57025
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www.ulteig.com/unioncountymtp/

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A brief presentation will take place at 5:45 PM. SDDOT, Union County, and consultant staff will be available after the presentation to discuss the study and answer questions. During this time, you will also have the opportunity to present written comments.

Those who cannot attend this public meeting in person may also view the meeting materials on the project website, which will be updated with the meeting materials presented at the public meeting no later than December 15, 2021. Comments and questions can also be submitted through the project website.

Notice is further given to individuals with disabilities that this open house is being held in a physically accessible place. Any individuals with disabilities who will require a reasonable accommodation in order to participate in the open house should submit a request to the department's ADA Coordinator at 605-773-3540 or 1-800-877-1113 (Telecommunication Relay Services for the Deaf). Please request the accommodations no later than 2 business days prior to the meeting to ensure accommodations are available.

Questions and comments regarding the study may be directed to:

Steve Gramm at (605) 773-3281 (steve.gramm@state.sd.us) or
Paul Deutsch at (605) 323-6023 (paul.deutsch@ulteig.com) or
Brad Stangohr at (605) 323-6036 (brad.stangohr@ulteig.com).

Comments will be accepted until January 3, 2022, and may be submitted online through the study website, or directly to one of the project representatives.

Notice published twice at the total approximate cost of $45.21

AFFIDAVIT OF PUBLICATION

State of South Dakota)
:ss
County of Union)

Bruce L. Odson,
the publisher of the Leader-Courier, deposes and says that

The Leader-Courier

is a legal weekly newspaper of a general circulation, printed and published in Elk Point, County of Union, State of South Dakota, and has been such legal newspaper during the time hereinafter mentioned, and that affiant is and was during all the time hereinafter mentioned in charge of the advertising department thereof, and has personal knowledge of all the facts stated in this affidavit: and that the notice and advertisement headed:

Notice of Public Open House/Information Meeting

a printed copy of which is hereunto attached and made a part hereof, was printed and published in the said newspaper at least once in

each week for 2 successive weeks; that said newspaper at the time of the first publication of said notice hereinafter stated, had, and still has, a bona fide circulation of over two hundred paid copies weekly, and had been published in the said County of Union for more than one year immediately prior to the date of the said publication of said notice, and that said newspaper during said times, was, and is, printed in part in an office maintained at said city of Elk Point, the said place of publication; that the first publication of said notice in said newspaper was

on Thursday, the 25 day of November, 2021

and that the succeeding publications were

on Thursday, the 2 day of December, 2021

on Thursday, the _____ day of _____, _____

on Thursday, the _____ day of _____, _____

that the fees for the printing and publishing of said notice and advertisement in said newspaper as aforesaid were

$ 51.99, that the full amount of the fee charged insures to the benefit of the publisher of the said newspaper, that no agreement or understanding for the division thereof has been made with any other person and that no part thereof has been agreed to be paid to any other person whomsoever.

B. L. Odson

Subscribed and sworn to before me

this 2 day of December, 2021

My commission expires 7-12-23

SUSAN ODSON
NOTARY PUBLIC
SOUTH DAKOTA

S Odson

Notary Public

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION
AND UNION COUNTY
NOTICE OF PUBLIC OPEN HOUSE / INFORMATION MEETING
FOR UNION COUNTY MASTER TRANSPORTATION PLAN

Date: December 15, 2021
Time: 5:30 PM to 7:00 PM
Place: Union County Courthouse
Office of Emergency Management (OEM) Room
209 E Main St
Elk Point, SD 57025
Website: www.ulteig.com/unioncountymtp/

The South Dakota Department of Transportation (SDDOT), in conjunction with Union County and the Siouxland Interstate Metropolitan Planning Council (SIMPCO), will hold an open house style public information meeting on the date listed above to receive public input on the Union County Master Transportation Plan. The open house will be informal allowing for one-on-one discussion with the study team. The purpose of the meeting is to present the findings of the study and receive public comments. Area residents and commuters are encouraged to attend and participate in the study.

A brief presentation will take place at 5:45 PM. SDDOT, Union County, and consultant staff will be available after the presentation to discuss the study and answer questions. During this time, you will also have the opportunity to present written comments.

Those who cannot attend this public meeting in person may also view the meeting materials on the project website, which will be updated with the meeting materials presented at the public meeting no later than December 15, 2021. Comments and questions can also be submitted through the project website

AFFIDAVIT OF PUBLICATION

State of South Dakota)

:ss

County of Union)

Bruce Odson,
the publisher of the Dakota Dunes / North Sioux City Times,
deposes and says that

The Dakota Dunes / North Sioux City Times

is a legal weekly newspaper of a general circulation, printed and published in North Sioux City, County of Union, State of South Dakota, and has been such legal newspaper during the time hereinafter mentioned, and that affiant is and was during all the time hereinafter mentioned in charge of the advertising department thereof, and has personal knowledge of all the facts stated in this affidavit: and that the notice and advertisement headed:

Notice of Public Open House/Information Meeting

a printed copy of which is hereunto attached and made a part hereof, was printed and published in the said newspaper at least once in

each week for 2 successive weeks; that said newspaper at the time of the first publication of said notice hereinafter stated, had, and still has, a bona fide circulation of over two hundred paid copies weekly, and had been published in the said County of Union for more than one year immediately prior to the date of the said publication of said notice, and that said newspaper during said times, was, and is, printed in part in an office maintained at said city of North Sioux City, the said place of publication; that the first publication of said notice in said newspaper was

on Thursday, the 25 day of November, 2021

and that the succeeding publications were

on Thursday, the 2 day of December, 2021

on Thursday, the _____ day of _____, _____

on Thursday, the _____ day of _____, _____

that the fees for the printing and publishing of said notice and advertisement in said newspaper as aforesaid were

$52.18, that the full amount of the fee charged insures to the benefit of the publisher of the said newspaper, that no agreement or understanding for the division thereof has been made with any other person and that no part thereof has been agreed to be paid to any other person whomsoever.

B Odson

Subscribed and sworn to before me

this 2 day of December, 2021

My commission expires 7-12-23

SUSAN ODSON
NOTARY PUBLIC
SOUTH DAKOTA

Notary Public

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION AND UNION COUNTY

NOTICE OF PUBLIC OPEN HOUSE / INFORMATION MEETING FOR UNION COUNTY MASTER TRANSPORTATION PLAN

Date: December 15, 2021
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A brief presentation will take place at 5:45 PM. SDDOT, Union County, and consultant staff will be available after the presentation to discuss the study and answer questions. During this time, you will also have the opportunity to present written comments.

Those who cannot attend this public meeting in person may also view the meeting materials on the project website, which will be updated with the meeting materials presented at the public meeting no later than December 15, 2021. Comments and

Appendix D
County Commission Meeting

COUNTY COMMISSION MEETING SUMMARY

Union County Master Transportation Plan

The findings and recommendations of the Union County Master Transportation Plan were presented to the Union County Commission on April 19, 2022.

Attendance

Union County Commissioners – 4
Union County Staff - 2
Public – 1

Summary of Materials Provided

Print outs of the presentation as well as major maps and tables were provided to the commissioners. A presentation was made using PowerPoint.

Comments and Questions

During the meeting, those present commented and asked questions about the study and materials presented:

- Do pedestrian and bicycle facilities along highways help acquire outside funding for projects?

  Response: Federal funding sources typically have funds available for projects with multimodal components, and there are opportunities for grants as well.

- How much do pavement condition inspections cost?

  Response: Costs will vary depending on various factors, but $10,000-$15,000 is about the minimum for manual PASER data collection. Cost estimates range to $50,000 for automated data collection featuring Pavement Condition Index (PCI), but this can vary quite a bit. There would be additional cost for detailed analysis of the results and recommendations, as well as the option to set up a pavement management system database for Union County to utilize.

Appendix E
Access Management Guidelines

Union County Access Management Guidelines

This document does not supersede the Union County Access Management Ordinance (Ordinance No. UCC2011-001). This document is to be used as additional guidance to the ordinance.

Step 1. Understand that the County regulates entrances on the Union County Road System to promote public safety, esthetic value, and engineering integrity of road systems. This ordinance shall be interpreted as minimum requirements necessary to promote and protect public health, safety, and general welfare.

Step 2. If proposed access is on the County Highway System, the applicant must prepare an Access Permit Application for each access location on the County Highway System and provide it to the County Highway Superintendent.

Step 3. Determine if Coordinated Access Planning has been conducted (Section 4.03). If yes, it shall supersede any determination for access that may be applied otherwise.

Step 4. Determine if the proposed access location falls under any other local jurisdictions. The County may choose to adopt and defer to local criteria on any County Highway facility located within the local jurisdiction if the access location criteria promulgated by the local unit of government are more stringent than those of the County, including consideration for variances by local jurisdictions

Step 5. Determine if a Traffic Impact Study (TIS) is required (Section 3.06) due to traffic generation or the opinion of the County Highway Superintendent due to safety or operational impacts. The TIS shall be sealed by a South Dakota registered professional engineer and it shall examine the functional relationship among existing, planned, and potential access points and shall use policies and design manual standards and guidance jointly determined by the County and the applicant. As a result of the traffic study recommendations, the proposed access may not be recommended at the proposed location due to public safety or other concerns

Step 6. Determine if the proposed access meets the minimum acceptable access-location criteria (Section 6.01 Table). If no, move to Step 7. If yes, move to Step 8.

Step 7. If the minimum acceptable access-location criteria are not met (Section 6.01 Table), the County may grant variance to the access-location criteria based on the results of an engineering study or proof of unique or special conditions that make strict application of the provisions impractical. Proof must be provided that:

(1) Reasonably convenient access cannot otherwise be obtained. For example, does the applicant already have an existing access to their property and why is it not considered to be reasonably convenient? Can the applicant modify or share an existing access within or adjacent to the property? Can the applicant relocate an existing access instead of constructing an additional access?

(2) No feasible engineering or construction solutions can be applied to mitigate the condition. For example, has the applicant defined why the criteria conditions are not met and the unique or special conditions that make strict application of the access-location criteria impractical? Has the applicant explored potential engineering solutions or mitigation strategies and presented the estimated costs and efforts of those solutions and mitigating strategies?

(3) No alternative access is available from a street other than the primary roadway. For example, is the property adjacent to a to another roadway? Is there an existing access on that roadway? If there is not an existing access on that roadway, has the applicant been denied an access permit on that roadway?

Step 8. The County may conduct an engineering study of sight distance, corner clearance, operational efficiency, safety, and adjacent land use before granting access and may alter the minimum acceptable access-location criteria.

Step 9. The County may attach reasonable and prudent stipulations as a condition of application approval. Stipulations shall indicate any access improvement or operating condition necessary to protect public health, safety, and welfare, including reference to applicable design standards.

Step 10. Any person aggrieved by a decision of the County on an access permit application may appeal in writing to the Board of County Commissioners.

Appendix F
Traffic Impact Study Guidelines

Union County Traffic Impact Study Guidelines

This document does not supersede the Union County Access Management Ordinance (Ordinance No. UCC2011-001). This document is to be used as additional guidance to the ordinance.

1. Responsibilities for Traffic Impact Study

Union County may require a Traffic Impact Study (TIS) to objectively assess the safety and operational impacts of new development or modified land use on the Union County Road System due to generation of new traffic trips or shifts in travel patterns. Refer to Union County's Access Management Ordinance to determine if a TIS is required and responsibility of cost. The requirements for triggering a TIS as stated in Ordinance No. UCC2011-001 are:

- For any residential development of more than twenty (20) dwelling units, or any office, commercial, industrial, or mixed-use development, with a building over 50,000 square feet, or
- An application for access to a property that is expected to generate an average daily traffic of one hundred (100) or more vehicles.
- Such other development that may pose traffic problems in the opinion of the County Highway Superintendent.

If a development or access application does not meet any of the above requirements, the developer shall submit a short memo to the County Highway Superintendent documenting why a TIS is not required or that the County Highway Superintendent has waived the requirements for a TIS.

When a TIS is required, the developer is responsible for assessing the traffic impacts, prepared by a licensed professional engineer with specific experience in traffic operations. The study shall be sealed by a South Dakota registered professional engineer. The County serves in a review and approval capacity.

Traffic impact study approvals granted by the County shall be valid for 2 years. If significant work on the development has not commenced within the approval period, the TIS shall be updated and resubmitted for review. Unless waived by the County Highway Superintendent, studies will be required to be updated within the 2-year approval period if the proposed land use(s) are significantly altered, or traffic volumes within the study area are increased by more than 15%.

Prior to starting the study, the developer or the engineer preparing the study shall schedule a pre-study conference with Union County. If there are other potential jurisdiction authorities within the study area, they should also be included in the pre-study conference to determine if there will be additional review agencies and requirements as part of the study. The purpose of pre-study conference is to discuss the development, definition of the study area, intersections requiring capacity analysis, data collection needs, design standards, traffic and trip analysis parameters, and other methods, requirements, and assumptions. Following the pre-study conference, the developer or the engineer preparing the study shall detail the agreed upon methods and assumptions in a

Methods and Assumptions document and distribute a copy to the Union County Highway Superintendent for review.

Before acceptance of the TIS, Union County will review a draft report of the study assumptions, methods, findings, and recommendations. Union County will provide comments in written form. All comments must be completely addressed and revisions to the traffic report must be provided as required by the County Highway Superintendent before acceptance. The Union County Highway Superintendent has the final say on approval or denial of all aspects of the TIS.

2. Methods and Assumptions

The Methods and Assumptions document should begin by reviewing the TIS format outlined in the South Dakota Department of Transportation (SDDOT) Road Design Manual, Chapter 15 Traffic. The Methods and Assumptions document shall detail the following subject areas (at a minimum):

1. Introduction and Project Descriptions
    a. Background Information
    b. Location
    c. Need for Study, Proposed Improvements Considered in Study
    d. Previous Studies
    e. TIS Reviewing or Approving Agencies
2. Study Area and Study Intersections
3. Study Years – Existing Conditions Year, Project Completion Year (Assumed Full Build-Out), 20-Year Horizon Year, Interim Analysis Year if Phased Construction
4. Data Collection
    a. Traffic Count Locations, Duration, and Type of Data
        i. Traffic counts must be collected only on a Tuesday, Wednesday, or Thursday on a non-precipitation day with dry roads, unless otherwise approved by the County Highway Superintendent
        ii. Traffic counts may also need to be collected on the weekend if background traffic or proposed development trips are expected to be higher
    b. Crash History and Number of Years (5 full years recommended)
    c. Other Relevant Data as required by the County Highway Superintendent
5. Trip Generation Methods and Assumptions (most recent edition of the ITE Trip Generation Manual)
6. Trip Distribution and Assignment Methods and Assumptions
7. Background Traffic Forecast Method
8. Traffic Operations Analysis
    a. Software
    b. Peak Hours
    c. Minimum Allowable Level of Service (most recent edition of the Highway Capacity Manual)
    d. Consideration for Heavy Vehicles

e. Peak Hour Factor
f. Saturation Flow Rate for Rural Areas
g. Other Variables

9. Turn Lane Warrants (SDDOT Road Design Manual)
10. Signal Warrants (most recent edition of the Manual on Uniform Traffic Control Devices) and Consideration for Intersection Control Alternatives
11. Consideration for Crash and Safety Analysis

3. Report Format and Contents

Specific requirements will vary depending on location of the proposed development and other factors; however, all traffic impact studies should begin by following the format outlined in the SDDOT Road Design Manual, Chapter 15 Traffic (summarized below). At the pre-study conference, reductions in complexity or variations from the SDDOT Road Design Manual shall be agreed upon by Union County and documented in the Methods and Assumptions document.

- Introduction
- Existing and Proposed Land Uses
- Existing and Proposed Roadways and Intersections
- Existing Traffic Volumes
- Existing Crash History
- Evaluation of Existing Traffic Operations
- Access Points
- Forecast Background Traffic Volumes
- Evaluation of Traffic Operations with Forecast Background Volumes
- Trip Generation
- Trip Distribution and Assignment
- Combined Background and Development Traffic Volumes
- Evaluation of traffic Operations with Combined Background & Development Traffic Volumes
- Traffic Signals
- Non-Motorized Traffic
- Conclusions and Recommendations

Appendix G

Jurisdictional Transfer Template – Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING
BETWEEN UNION COUNTY
AND [City/Township name here]
for the
Jurisdictional Transfer of [Road Name]

1) **Parties.** This Memorandum of Understanding (hereinafter "MOU") for the jurisdictional transfer of [Road Name] is made and entered into by and between Union County (hereinafter "County") [insert county address] and [City/Township name here] (hereinafter "City/Township"), [insert City/Township address] which may be referred to individually as "party" or collectively as "parties".

2) **Term.** The provisions in this MOU will commence upon execution of all necessary signature and shall remain in effect in perpetuity. The MOU may be terminated with the mutual written agreement of the County and the [City/Township].

3) **Purpose.** Establishing clear boundaries of ownership and maintenance are important when there is a jurisdictional transfer of [Road Name]. This MOU pertains to the maintenance and ownership of [Road Name] within the jurisdiction of the [County] and transferring that ownership and maintenance to the [City/Township]. The jurisdictional transfer of [Road Name] is necessary because [insert reasoning behind jurisdictional transfer].

4) **Limits of Jurisdictional Transfer.** This Agreement expressly includes x,xxx feet of [Road Name] between [point on road] and [point on road] and any all related property, responsibilities, obligations which were previously considered to be the responsibilities and obligations of the [County].

5) **Financial Requirements. [This section is used if financial compensation is part of the jurisdictional transfer]** The [City/Township] agrees to accept the following payment schedule: [describe any financial payments agreed by the two parties]. If for any reason financial requirements are not met within [x] years, maintenance obligations and responsibilities shall revert back to the [County] immediately.

6) **Required Documentation for Jurisdictional Transfer.** The parties agree that the following requirements were satisfied and that the transfer of ownership of [Road Name] is authorized:
    a. A memo stating the reasons for the requested change.
    b. A survey plan set, signed by a registered Professional Land Surveyor, that shows the limits of the jurisdictional transfer. The point of beginning of the survey shall be the nearest section corner. Included in this MOU as Exhibit 1.

c. A public notice sent to all directly affected landowners, responses from the landowners, and any resolutions that were required from the public notice period. Included in this MOU as Exhibit 2.

d. Notification to franchise utilities affected, contact information for each franchise utility, and any as-built drawings for existing infrastructure. Included in this MOU as Exhibit 3.

e. The as-builts of [Road Name], if available. Included in this MOU as Exhibit 4.

f. [Modify this section to only include relevant utilities] Storm, sanitary, and water utilities within and along [Road Name] that are being transferred with this MOU shall have as-builts drawings, if available (Included in this MOU as Exhibit 5). The general location and size of these public utilities explained below:

    i. [Insert general explanation of any utilities that are being fully transferred as part of the MOU, make sure to separate different utilities into a new bullet point]

g. [Modify this section to only include relevant utilities] Storm, sanitary, and water utilities within and along [Road Name] that are NOT being transferred shall require an easement agreement to ensure proper maintenance (Included in this MOU as Exhibit 6). The general location and size of these public utilities is explained below:

    i. [Insert general explanation of any utilities that will require an easement as part of the MOU, make sure to separate different utilities into a new bullet point]

h. Other pertinent information to the jurisdictional transfer of [Road Name] needed for this MOU is listed below:

    i. [Insert any other information required not already covered by this MOU]

7) **South Dakota Department of Transportation (SDDOT) Transmittal.** All information included as part of this agreement shall be submitted to the SDDOT in the form of a signed resolution. Contact SDDOT Office of Project Development for guidance on current laws and policies. Advanced notice may be required.

8) **Amendments.** Either party may request changes in this MOU. Any changes, modifications, revisions, or amendments to this MOU which are mutually agreed upon shall be incorporated by written instrument, executed, and signed by all parties to this MOU.

9) **Assignment.** Without prior written consent of the other party, neither party may assign this MOU. This MOU shall inure to the benefit of, and be binding upon, permitted successors and assigns of the parties.

10) **Entirety of MOU.** This MOU represents the entire and integrated MOU between the parties and supersedes all prior negotiations, representations and MOUs, whether written or oral.

11) **Sovereign Immunity.** The County and the [City/Township] do not waive their sovereign or governmental immunity by entering into this MOU, and fully retains all immunities and defenses provided by law with respect to any action based on or occurring as a result of this MOU.

12) **Indemnification.** Neither party shall indemnify, defend, or hold harmless the other for any cause of action, or claim or demand arising out of this MOU. Each party shall be responsible for their own negligent actions or omissions.

13) **Interpretation.** The construction, interpretation, and enforcement of this MOU shall be governed by the laws of the State of South Dakota. The courts of the State of South Dakota shall have jurisdiction over any arising out of this MOU and over the parties and the venue shall be the First Judicial Circuit Court, Union County, South Dakota.

14) **Third Part Beneficiary Rights.** The parties do not intend to create in any other individual or entity the status of third part beneficiary, and this MOU shall not be construed so as to create such status. The rights, duties, and obligations contained in this MOU shall operate only between the parties to this MOU and shall inure solely to the benefit of the parties to this MOU. The provisions of this MOU are intended only to assist the parties in determining and performing their obligations under this MOU. The parties to this MOU intend and expressly agree that only parties signatory to this MOU shall have any legal or equitable right to seek to enforce this MOU, to seek any remedy arising out of a party's performance or failure to perform any term or condition of this MOU, or to bring an action for the breach of this MOU.

15) **Legal Authority.** Each party to this MOU warrants that it possesses the legal authority to enter into this MOU and that it has taken all actions required by its regulations, procedures, bylaws, and/or applicable law to exercise that authority and to lawfully authorize its undersigned signatory to execute this MOU and to bind it to its terms. The person(s) executing this MOU on behalf of a party warrant(s) that such person(s) have full authorization to execute this MOU.

16) **Signatures.** In witness whereof, the parties to this MOU through their duly authorized representatives have executed this MOU on the days and dates set out below, and certify that they have read, understood, and agreed to the terms and conditions of this MOU as set forth herein.

APPROVED BY:

Union County

_____ _____

Signature Date

_____

Name

_____

Title

[City/Township Name]

_____ _____

Signature Date

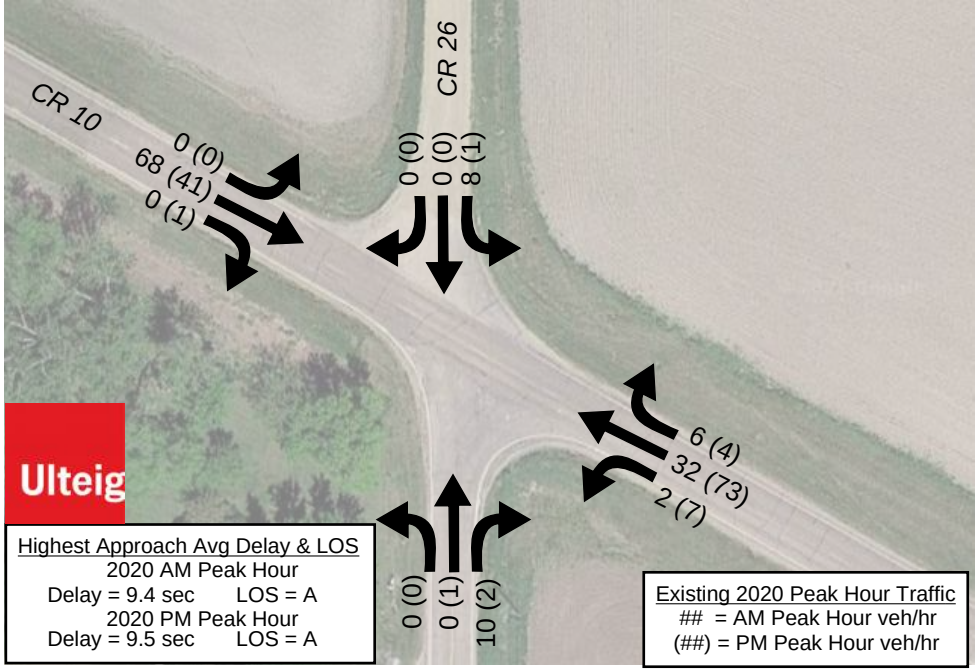
_____

Name

_____

Title

Appendix H
Intersection LOS Analysis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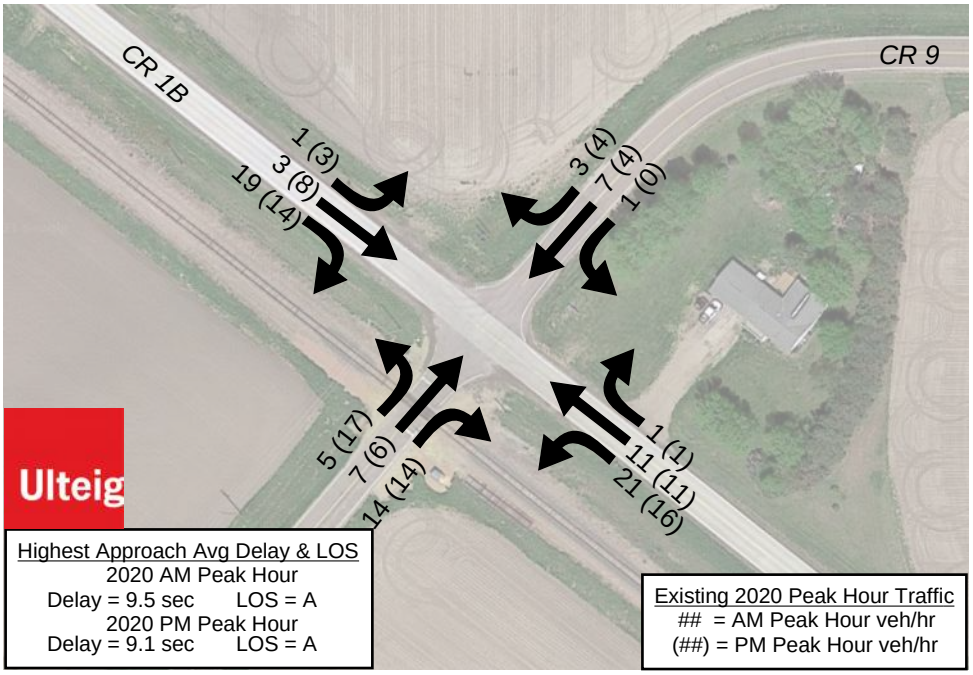
0 (1)
0 (0)
0 (0)
8 (1)
6 (4)
32 (73)
2 (7)
0 (0)
0 (1)
10 (2)
Ulteig
Highest Approach Avg Delay & LOS
2020 AM Peak Hour
Delay = 9.4 sec LOS = A
2020 PM Peak Hour
Delay = 9.5 sec LOS = A
Existing 2020 Peak Hour Traffic
= AM Peak Hour veh/hr
(##) = PM Peak Hour veh/hr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3 (8)
19 (14)
3 (4)
7 (4)
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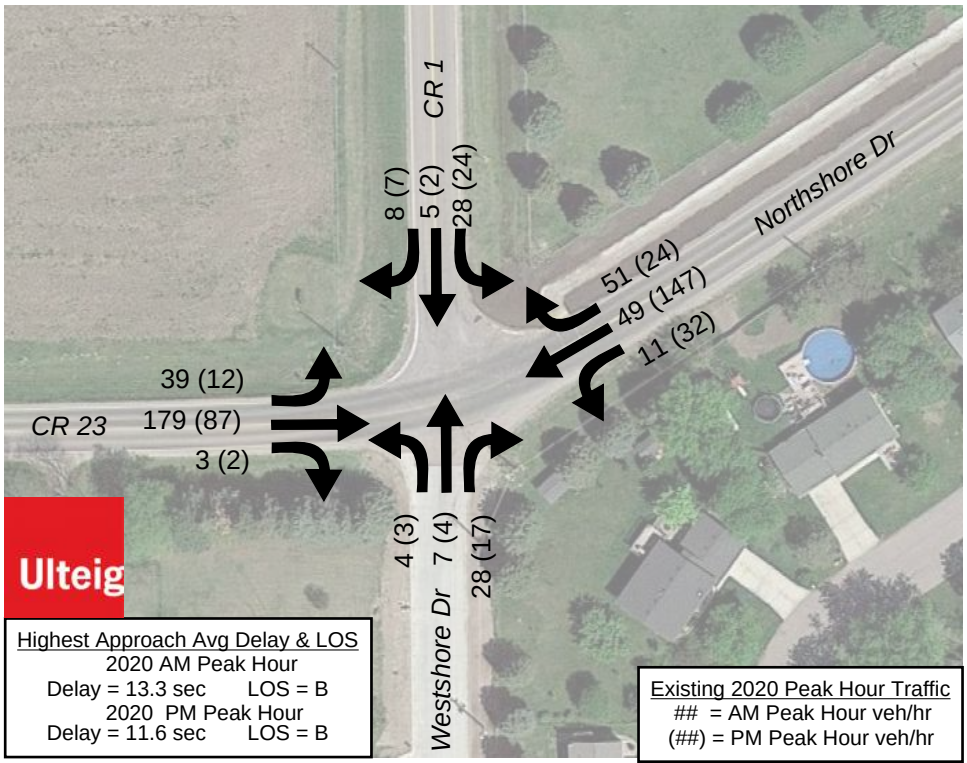
5 (17)
7 (6)
14 (14)
1 (1)
11 (11)
21 (16)
Ulteig
Highest Approach Avg Delay & LOS
2020 AM Peak Hour
Delay = 9.5 sec LOS = A
2020 PM Peak Hour
Delay = 9.1 sec LOS = A
Existing 2020 Peak Hour Traffic
= AM Peak Hour veh/hr
(##) = PM Peak Hour veh/hr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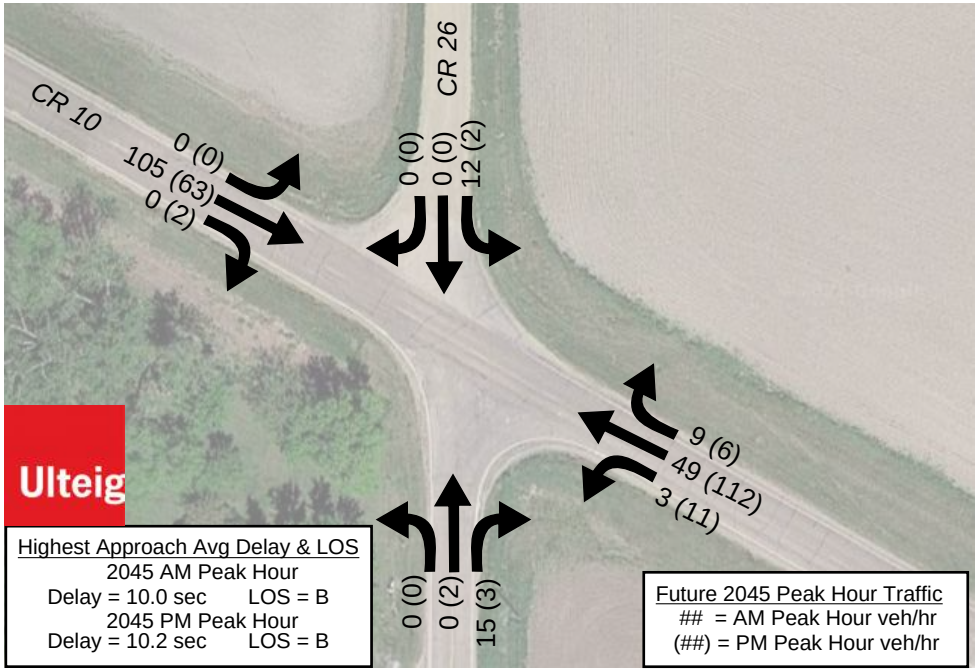
28 (24)
51 (24)
49 (147)
11 (32)
39 (12)
CR 23
179 (87)
3 (2)
4 (3)
7 (4)
28 (17)
Westshore Dr
Ulteig
Highest Approach Avg Delay & LOS
2020 AM Peak Hour
Delay = 13.3 sec LOS = B
2020 PM Peak Hour
Delay = 11.6 sec LOS = B
Existing 2020 Peak Hour Traffic
= AM Peak Hour veh/hr
(##) = PM Peak Hour veh/hr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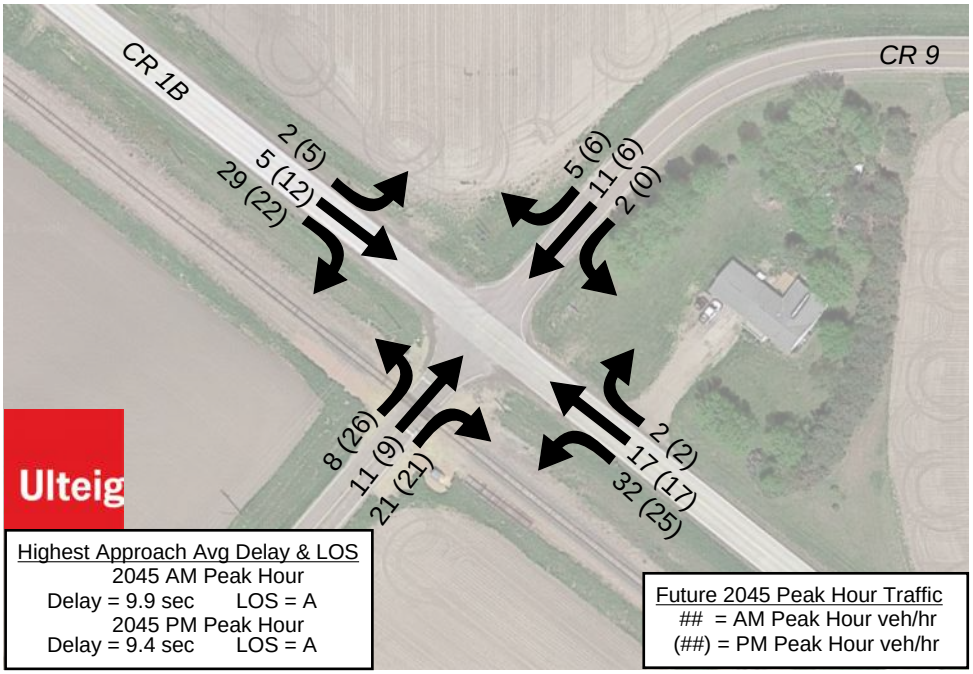
0 (0)
0 (2)
15 (3)
Ulteig
Highest Approach Avg Delay & LOS
2045 AM Peak Hour
Delay = 10.0 sec LOS = B
2045 PM Peak Hour
Delay = 10.2 sec LOS = B
Future 2045 Peak Hour Traffic
= AM Peak Hour veh/hr
(##) = PM Peak Hour veh/hr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8 (26)
11 (9)
21 (21)
2 (2)
17 (17)
32 (25)
Ulteig
Highest Approach Avg Delay & LOS
2045 AM Peak Hour
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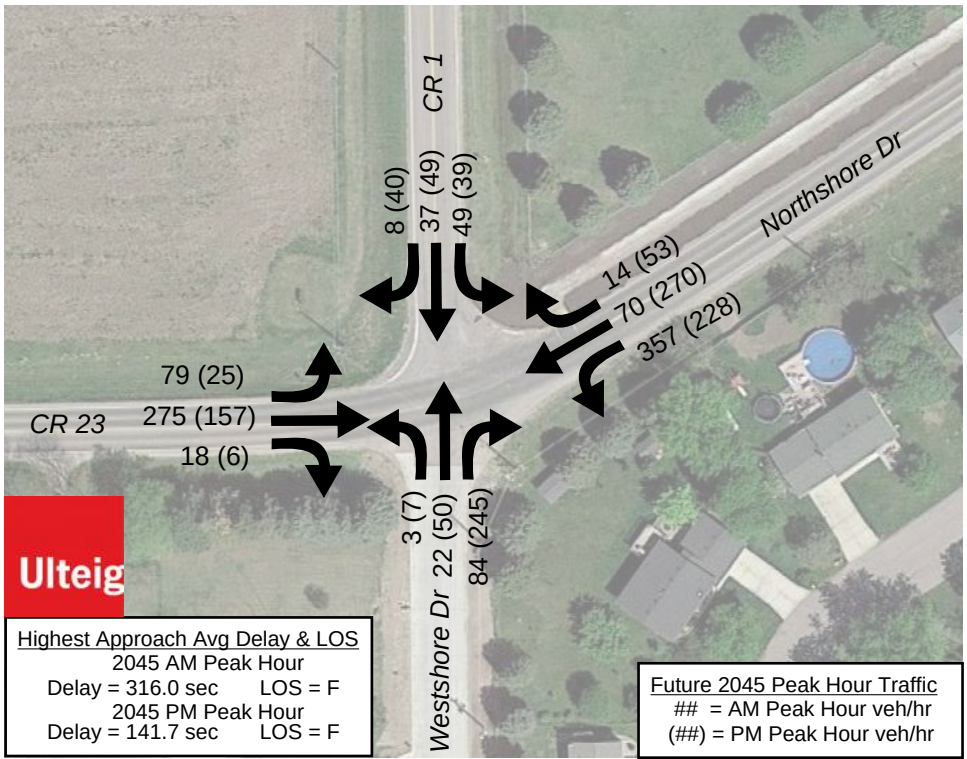
2045 PM Peak Hour
Delay = 9.4 sec LOS = A
Future 2045 Peak Hour Traffic
= AM Peak Hour veh/hr
(##) = PM Peak Hour veh/hr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357 (228)
79 (25)
CR 23
275 (157)
18 (6)
3 (7)
22 (50)
84 (245)
Westshore Dr
Ulteig
Highest Approach Avg Delay & LOS
2045 AM Peak Hour
Delay = 316.0 sec LOS = F
2045 PM Peak Hour
Delay = 141.7 sec LOS = F
Future 2045 Peak Hour Traffic
= AM Peak Hour veh/hr
(##) = PM Peak Hour veh/hr

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	68	0	2	32	6	0	0	10	8	0	0
Future Vol, veh/h	0	68	0	2	32	6	0	0	10	8	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	0	80	0	2	38	7	0	0	12	9	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	45	0	0	80	0	0	126	129	80	132	126	42
Stage 1	-	-	-	-	-	-	80	80	-	46	46	-
Stage 2	-	-	-	-	-	-	46	49	-	86	80	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.554	4.054	3.354
Pot Cap-1 Maneuver	1538	-	-	1493	-	-	838	754	969	831	757	1017
Stage 1	-	-	-	-	-	-	919	821	-	958	849	-
Stage 2	-	-	-	-	-	-	958	846	-	912	821	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1538	-	-	1493	-	-	837	753	969	820	756	1017
Mov Cap-2 Maneuver	-	-	-	-	-	-	837	753	-	820	756	-
Stage 1	-	-	-	-	-	-	919	821	-	958	848	-
Stage 2	-	-	-	-	-	-	957	845	-	901	821	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	8.8	9.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	969	1538	-	-	1493	-	-	820
HCM Lane V/C Ratio	0.012	-	-	-	0.002	-	-	0.011
HCM Control Delay (s)	8.8	0	-	-	7.4	0	-	9.4
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	41	1	7	73	4	0	1	2	1	0	0
Future Vol, veh/h	0	41	1	7	73	4	0	1	2	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	0	49	1	8	88	5	0	1	2	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	93	0	0	50	0	0	157	159	50	158	157	91
Stage 1	-	-	-	-	-	-	50	50	-	107	107	-
Stage 2	-	-	-	-	-	-	107	109	-	51	50	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.554	4.054	3.354
Pot Cap-1 Maneuver	1477	-	-	1531	-	-	800	726	1007	799	728	956
Stage 1	-	-	-	-	-	-	953	845	-	889	799	-
Stage 2	-	-	-	-	-	-	889	797	-	952	845	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1477	-	-	1531	-	-	796	722	1007	793	724	956
Mov Cap-2 Maneuver	-	-	-	-	-	-	796	722	-	793	724	-
Stage 1	-	-	-	-	-	-	953	845	-	889	794	-
Stage 2	-	-	-	-	-	-	884	792	-	948	845	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.6	9.1	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	890	1477	-	-	1531	-	-	793
HCM Lane V/C Ratio	0.004	-	-	-	0.006	-	-	0.002
HCM Control Delay (s)	9.1	0	-	-	7.4	0	-	9.5
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	105	0	3	49	9	0	0	15	12	0	0
Future Vol, veh/h	0	105	0	3	49	9	0	0	15	12	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	0	124	0	4	58	11	0	0	18	14	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	69	0	0	124	0	0	196	201	124	205	196	64
Stage 1	-	-	-	-	-	-	124	124	-	72	72	-
Stage 2	-	-	-	-	-	-	72	77	-	133	124	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.554	4.054	3.354
Pot Cap-1 Maneuver	1507	-	-	1438	-	-	754	688	916	744	692	989
Stage 1	-	-	-	-	-	-	870	786	-	928	827	-
Stage 2	-	-	-	-	-	-	928	823	-	861	786	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1507	-	-	1438	-	-	752	686	916	728	690	989
Mov Cap-2 Maneuver	-	-	-	-	-	-	752	686	-	728	690	-
Stage 1	-	-	-	-	-	-	870	786	-	928	825	-
Stage 2	-	-	-	-	-	-	925	821	-	844	786	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	9	10
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	916	1507	-	-	1438	-	-	728
HCM Lane V/C Ratio	0.019	-	-	-	0.002	-	-	0.019
HCM Control Delay (s)	9	0	-	-	7.5	0	-	10
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	63	2	11	112	6	0	2	3	2	0	0
Future Vol, veh/h	0	63	2	11	112	6	0	2	3	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	0	76	2	13	135	7	0	2	4	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	142	0	0	78	0	0	242	245	77	245	243	139
Stage 1	-	-	-	-	-	-	77	77	-	165	165	-
Stage 2	-	-	-	-	-	-	165	168	-	80	78	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.554	4.054	3.354
Pot Cap-1 Maneuver	1417	-	-	1495	-	-	704	650	973	701	652	899
Stage 1	-	-	-	-	-	-	922	823	-	828	754	-
Stage 2	-	-	-	-	-	-	828	752	-	919	822	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1417	-	-	1495	-	-	699	644	973	692	646	899
Mov Cap-2 Maneuver	-	-	-	-	-	-	699	644	-	692	646	-
Stage 1	-	-	-	-	-	-	922	823	-	828	747	-
Stage 2	-	-	-	-	-	-	821	745	-	913	822	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.6	9.5	10.2
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	808	1417	-	-	1495	-	-	692
HCM Lane V/C Ratio	0.007	-	-	-	0.009	-	-	0.003
HCM Control Delay (s)	9.5	0	-	-	7.4	0	-	10.2
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	5.4

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	3	19	21	11	1	5	7	14	1	7	3
Future Vol, veh/h	1	3	19	21	11	1	5	7	14	1	7	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	1	4	25	28	15	1	7	9	19	1	9	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	0	29	0	0	97	91	17	105	103	16
Stage 1	-	-	-	-	-	-	19	19	-	72	72	-
Stage 2	-	-	-	-	-	-	78	72	-	33	31	-
Critical Hdwy	4.22	-	-	4.22	-	-	7.22	6.62	6.32	7.22	6.62	6.32
Critical Hdwy Stg 1	-	-	-	-	-	-	6.22	5.62	-	6.22	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.22	5.62	-	6.22	5.62	-
Follow-up Hdwy	2.308	-	-	2.308	-	-	3.608	4.108	3.408	3.608	4.108	3.408
Pot Cap-1 Maneuver	1539	-	-	1522	-	-	862	780	1034	852	769	1035
Stage 1	-	-	-	-	-	-	975	860	-	913	816	-
Stage 2	-	-	-	-	-	-	907	816	-	958	850	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1539	-	-	1522	-	-	838	764	1034	816	754	1035
Mov Cap-2 Maneuver	-	-	-	-	-	-	838	764	-	816	754	-
Stage 1	-	-	-	-	-	-	974	859	-	912	800	-
Stage 2	-	-	-	-	-	-	876	800	-	930	849	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.3	4.7	9.1	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	907	1522	-	-	1539	-	- 820
HCM Lane V/C Ratio	0.038	0.018	-	-	0.001	-	- 0.018
HCM Control Delay (s)	9.1	7.4	0	-	7.3	0	- 9.5
HCM Lane LOS	A	A	A	-	A	A	- A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	- 0.1

Intersection	
Int Delay, s/veh	5.6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	8	14	16	11	1	17	6	14	0	4	4
Future Vol, veh/h	3	8	14	16	11	1	17	6	14	0	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	3	9	15	17	12	1	18	6	15	0	4	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	13	0	0	24	0	0	74	70	17	80	77	13
Stage 1	-	-	-	-	-	-	23	23	-	47	47	-
Stage 2	-	-	-	-	-	-	51	47	-	33	30	-
Critical Hdwy	4.22	-	-	4.22	-	-	7.22	6.62	6.32	7.22	6.62	6.32
Critical Hdwy Stg 1	-	-	-	-	-	-	6.22	5.62	-	6.22	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.22	5.62	-	6.22	5.62	-
Follow-up Hdwy	2.308	-	-	2.308	-	-	3.608	4.108	3.408	3.608	4.108	3.408
Pot Cap-1 Maneuver	1543	-	-	1528	-	-	892	802	1034	884	795	1039
Stage 1	-	-	-	-	-	-	970	857	-	942	836	-
Stage 2	-	-	-	-	-	-	937	836	-	958	851	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1543	-	-	1528	-	-	876	792	1034	857	785	1039
Mov Cap-2 Maneuver	-	-	-	-	-	-	876	792	-	857	785	-
Stage 1	-	-	-	-	-	-	968	855	-	940	827	-
Stage 2	-	-	-	-	-	-	918	827	-	935	849	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.9	4.2	9.1	9.1
HCM LOS			A	A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	913	1528	-	-	1543	-	-	894
HCM Lane V/C Ratio	0.043	0.011	-	-	0.002	-	-	0.01
HCM Control Delay (s)	9.1	7.4	0	-	7.3	0	-	9.1
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	5.6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	5	29	32	17	2	8	11	22	2	11	5
Future Vol, veh/h	2	5	29	32	17	2	8	11	22	2	11	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	3	7	39	43	23	3	11	15	29	3	15	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	26	0	0	46	0	0	155	145	27	166	163	25
Stage 1	-	-	-	-	-	-	33	33	-	111	111	-
Stage 2	-	-	-	-	-	-	122	112	-	55	52	-
Critical Hdwy	4.22	-	-	4.22	-	-	7.22	6.62	6.32	7.22	6.62	6.32
Critical Hdwy Stg 1	-	-	-	-	-	-	6.22	5.62	-	6.22	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.22	5.62	-	6.22	5.62	-
Follow-up Hdwy	2.308	-	-	2.308	-	-	3.608	4.108	3.408	3.608	4.108	3.408
Pot Cap-1 Maneuver	1526	-	-	1500	-	-	789	728	1020	776	712	1023
Stage 1	-	-	-	-	-	-	958	848	-	870	785	-
Stage 2	-	-	-	-	-	-	859	784	-	933	832	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1526	-	-	1500	-	-	753	705	1020	724	690	1023
Mov Cap-2 Maneuver	-	-	-	-	-	-	753	705	-	724	690	-
Stage 1	-	-	-	-	-	-	956	846	-	868	762	-
Stage 2	-	-	-	-	-	-	813	761	-	889	830	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.4	4.7	9.5	9.9
HCM LOS			A	A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	858	1500	-	-	1526	-	- 763
HCM Lane V/C Ratio	0.064	0.028	-	-	0.002	-	- 0.031
HCM Control Delay (s)	9.5	7.5	0	-	7.4	0	- 9.9
HCM Lane LOS	A	A	A	-	A	A	- A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	- 0.1

Intersection	
Int Delay, s/veh	5.7

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	12	22	25	17	2	26	9	22	0	6	6
Future Vol, veh/h	5	12	22	25	17	2	26	9	22	0	6	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	5	13	24	27	18	2	28	10	24	0	7	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	20	0	0	37	0	0	115	109	25	125	120	19
Stage 1	-	-	-	-	-	-	35	35	-	73	73	-
Stage 2	-	-	-	-	-	-	80	74	-	52	47	-
Critical Hdwy	4.22	-	-	4.22	-	-	7.22	6.62	6.32	7.22	6.62	6.32
Critical Hdwy Stg 1	-	-	-	-	-	-	6.22	5.62	-	6.22	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.22	5.62	-	6.22	5.62	-
Follow-up Hdwy	2.308	-	-	2.308	-	-	3.608	4.108	3.408	3.608	4.108	3.408
Pot Cap-1 Maneuver	1533	-	-	1511	-	-	839	763	1023	826	752	1031
Stage 1	-	-	-	-	-	-	956	846	-	912	815	-
Stage 2	-	-	-	-	-	-	904	814	-	936	836	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1533	-	-	1511	-	-	815	747	1023	786	736	1031
Mov Cap-2 Maneuver	-	-	-	-	-	-	815	747	-	786	736	-
Stage 1	-	-	-	-	-	-	953	843	-	909	800	-
Stage 2	-	-	-	-	-	-	875	799	-	901	833	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.9	4.2	9.4	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	871	1511	-	-	1533	-	- 859
HCM Lane V/C Ratio	0.071	0.018	-	-	0.004	-	- 0.015
HCM Control Delay (s)	9.4	7.4	0	-	7.4	0	- 9.3
HCM Lane LOS	A	A	A	-	A	A	- A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	- 0

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	39	179	3	11	49	51	4	7	28	28	5	8
Future Vol, veh/h	39	179	3	11	49	51	4	7	28	28	5	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	52	239	4	15	65	68	5	9	37	37	7	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	133	0	0	243	0	0	483	508	241	497	476	99
Stage 1	-	-	-	-	-	-	345	345	-	129	129	-
Stage 2	-	-	-	-	-	-	138	163	-	368	347	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336	3.536	4.036	3.336
Pot Cap-1 Maneuver	1440	-	-	1312	-	-	491	465	793	480	485	951
Stage 1	-	-	-	-	-	-	666	633	-	870	786	-
Stage 2	-	-	-	-	-	-	860	759	-	648	631	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1440	-	-	1312	-	-	461	440	793	432	459	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	461	440	-	432	459	-
Stage 1	-	-	-	-	-	-	638	606	-	833	777	-
Stage 2	-	-	-	-	-	-	833	750	-	582	604	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.8	11	13.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	651	1440	-	-	1312	-	-	487
HCM Lane V/C Ratio	0.08	0.036	-	-	0.011	-	-	0.112
HCM Control Delay (s)	11	7.6	0	-	7.8	0	-	13.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	87	2	32	147	24	3	4	17	24	2	7
Future Vol, veh/h	12	87	2	32	147	24	3	4	17	24	2	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	13	98	2	36	165	27	3	4	19	27	2	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	192	0	0	100	0	0	381	389	99	388	377	179
Stage 1	-	-	-	-	-	-	125	125	-	251	251	-
Stage 2	-	-	-	-	-	-	256	264	-	137	126	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336	3.536	4.036	3.336
Pot Cap-1 Maneuver	1370	-	-	1480	-	-	573	543	951	567	551	859
Stage 1	-	-	-	-	-	-	874	789	-	749	695	-
Stage 2	-	-	-	-	-	-	744	686	-	861	788	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1370	-	-	1480	-	-	550	523	951	536	531	859
Mov Cap-2 Maneuver	-	-	-	-	-	-	550	523	-	536	531	-
Stage 1	-	-	-	-	-	-	865	781	-	742	676	-
Stage 2	-	-	-	-	-	-	715	667	-	830	780	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	1.2	9.8	11.6
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	775	1370	-	-	1480	-	-	582
HCM Lane V/C Ratio	0.035	0.01	-	-	0.024	-	-	0.064
HCM Control Delay (s)	9.8	7.7	0	-	7.5	0	-	11.6
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	36.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	79	275	18	357	70	14	3	22	84	49	37	8
Future Vol, veh/h	79	275	18	357	70	14	3	22	84	49	37	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	86	299	20	388	76	15	3	24	91	53	40	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	91	0	0	319	0	0	1365	1348	309	1399	1351	84
Stage 1	-	-	-	-	-	-	481	481	-	860	860	-
Stage 2	-	-	-	-	-	-	884	867	-	539	491	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336	3.536	4.036	3.336
Pot Cap-1 Maneuver	1491	-	-	1230	-	-	123	149	726	117	149	970
Stage 1	-	-	-	-	-	-	562	550	-	348	370	-
Stage 2	-	-	-	-	-	-	337	367	-	523	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1491	-	-	1230	-	-	58	92	726	59	92	970
Mov Cap-2 Maneuver	-	-	-	-	-	-	58	92	-	59	92	-
Stage 1	-	-	-	-	-	-	523	512	-	324	247	-
Stage 2	-	-	-	-	-	-	186	245	-	405	507	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	7.5	28.7	$ 316
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	268	1491	-	-	1230	-	-	76
HCM Lane V/C Ratio	0.442	0.058	-	-	0.315	-	-	1.344
HCM Control Delay (s)	28.7	7.6	0	-	9.3	0	-	$ 316
HCM Lane LOS	D	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	2.1	0.2	-	-	1.4	-	-	8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	24.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	25	157	6	228	270	53	7	50	245	39	49	40
Future Vol, veh/h	25	157	6	228	270	53	7	50	245	39	49	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	27	171	7	248	293	58	8	54	266	42	53	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	351	0	0	178	0	0	1095	1076	175	1207	1050	322
Stage 1	-	-	-	-	-	-	229	229	-	818	818	-
Stage 2	-	-	-	-	-	-	866	847	-	389	232	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336	3.536	4.036	3.336
Pot Cap-1 Maneuver	1197	-	-	1386	-	-	189	217	863	159	225	714
Stage 1	-	-	-	-	-	-	769	711	-	367	387	-
Stage 2	-	-	-	-	-	-	345	375	-	631	709	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1197	-	-	1386	-	-	111	164	863	67	170	714
Mov Cap-2 Maneuver	-	-	-	-	-	-	111	164	-	67	170	-
Stage 1	-	-	-	-	-	-	750	693	-	358	300	-
Stage 2	-	-	-	-	-	-	207	291	-	392	691	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	3.4	29.6	141.7
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	463	1197	-	-	1386	-	-	138
HCM Lane V/C Ratio	0.709	0.023	-	-	0.179	-	-	1.008
HCM Control Delay (s)	29.6	8.1	0	-	8.2	0	-	141.7
HCM Lane LOS	D	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	5.5	0.1	-	-	0.7	-	-	7.3

Appendix I
Bridge Screening Ranking

In an effort to provide Union County a basic prioritization of all bridges regardless of condition, all 113 bridges were applied a basic screening using an equation of ADT x Detour Length to give the County an initial impression of the importance of each of its bridges, regardless of condition or size.

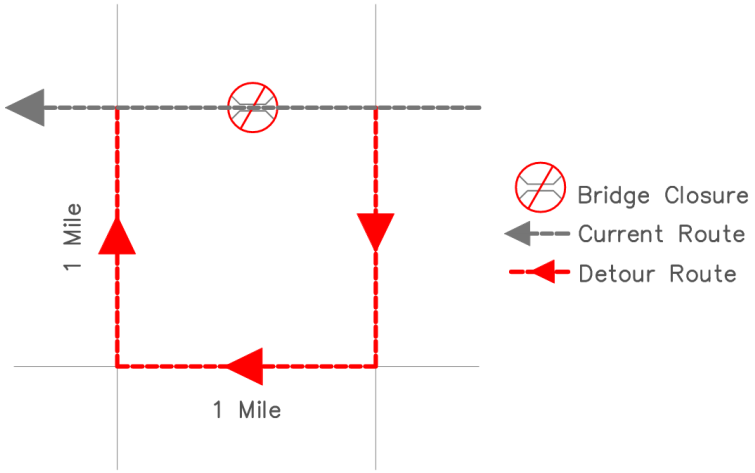

Figure 1: Bridge Detour Route Concept

The result of this basic screening is shown below in the form of two tables. The first table is sorted by bridge structure number and the second table is sorted by screening ranking. It should be noted that the data is completely dependent on the accuracy of the ADT and detour length information that has been entered into the NBI database, and those parameters are subject to change over time. The County should continue to perform maintenance on all bridges because of its beneficial returns on investment but focus on the most important bridges when funding is scarce.

These rankings can also be used as an initial screening for bridge candidates for closure as traffic volume and detour length are the same user impact variables considered in the BIG scoring criteria. The bridges near bottom of the list should be considered candidates for closure when they fall into disrepair, no longer safe to use, and funding is scarce. However, there are additional factors to consider that go beyond this screening ranking:

- Existing programmed improvements (Is the bridge already programmed in the 5-year Highway and Bridge Improvement Plan?)
- Jurisdiction (County Road or Township Road?)
- Functional classification (Major Collector, Minor Collector, or Local Road?)
- Major Roads Plan classification (County Paved – Priority Route, County Paved, County Gravel, or Local Road)
- Adequacy of alternate route (Does the alternate route have weight or vehicle width restrictions? Is the alternate route susceptible to flooding closures or other emergency service challenges? Is the nearest bridge crossing also a candidate for closure?)
- Cost (Is the bridge eligible for BIG funding assistance or is it on a minimum maintenance road? How much will it cost to repair/replace the bridge? Deck Area is a general indicator of relative cost to replace bridge)

Table 1: Alternative Bridge Prioritization Screening - Sorted by Structure Number (1 of 3)

Sorted by Structure Number									
Structure Number	Location	ADT (veh/day)	Deck Area (SF)	Year Built	Lowest Rating (1-9)	Bridge Condition	Detour (mile)	= ADT x Detour	Screening Ranking (1-113)*
64-010-112	10.2S BERESFORD	400	4430	2016	7	Good	4	1600	10
64-010-119	10.9S BERESFORD	400	4019	2017	8	Good	3	1200	12
64-010-175	16.5S BERESFORD	400	1541	1955	7	Good	4	1600	9
64-011-120	11S & 0.1E BERESFORD	25	3999	1989	6	Fair	4	100	91
64-016-050	5S BERESFORD	450	536	1960	5	Fair	4	1800	7
64-016-130	12S & 0.4E BERESFORD	35	1606	1970	5	Fair	3	105	85
64-018-140	13S & 0.8E BERESFORD	25	2961	2002	7	Good	4	100	94
64-019-100	1.5S & 2E ALSEN	235	3205	2013	7	Good	4	940	14
64-020-063	5.3S BERESFORD	30	557	1973	3	Poor	3	90	95
64-020-141	13.1S BERESFORD	35	2251	1985	5	Fair	4	140	61
64-020-218	4.0W & 5.2N ELK POINT	105	854	2006	7	Good	2	210	35
64-021-095	8.5S BERESFORD	30	3431	1989	7	Good	4	120	79
64-023-080	7S & 0.3E BERESFORD	45	904	1987	4	Poor	3	135	64
64-023-090	8S & 0.3E BERESFORD	35	2163	1979	4	Poor	3	105	83
64-025-030	2S & 0.5E BERESFORD	35	698	1950	5	Fair	3	105	84
64-026-140	13S & 0.6E BERESFORD	30	748	1991	6	Fair	3	90	100
64-028-220	5N & 3.2W ELK POINT	50	1283	1940	5	Fair	3	150	55
64-029-080	8S & 1.2E BERESFORD	40	2864	1994	7	Good	4	160	51
64-030-034	1E & 2.4S BERESFORD	50	888	1991	3	Poor	3	150	52
64-030-079	1E & 6.9S BERESFORD	75	1505	1940	6	Fair	4	300	29
64-030-093	1E & 8.3S BERESFORD	41	588	1978	8	Good	4	164	46
64-030-136	1E & 12.6S BERESFORD	40	437	1950	6	Fair	3	120	77
64-030-157	1E & 14.7S BERESFORD	30	2357	1976	4	Poor	3	90	97
64-032-070	6S & 1.2E BERESFORD	43	494	1970	4	Poor	3	129	70
64-032-080	7S & 2.2E BERESFORD	40	1691	1989	4	Poor	3	120	75
64-032-147	13.7S & 1.2E BERESFORD	20	499	1950	8	Good	3	60	108
64-034-090	8S & 1.4E BERESFORD	35	703	1948	4	Poor	3	105	82
64-034-130	12S & 1.4E BERESFORD	25	854	1935	5	Fair	4	100	90
64-038-040	3S & 1.8E BERESFORD	50	1161	2010	8	Good	3	150	56
64-038-147	13.7S & 1.8E BERESFORD	25	1132	2007	7	Good	4	100	92
64-038-171	1.8E & 16.1S BERESFORD	40	3285	1986	7	Good	3	120	78
64-040-037	2E & 2.7S BERESFORD	40	1353	1982	5	Fair	3	120	76
64-040-073	2E & 6.3S BERESFORD	36	1718	1986	5	Fair	3	108	81
64-040-089	2E & 7.9S BERESFORD	40	1152	1983	5	Fair	4	160	50
64-040-144	13.4S & 2E BERESFORD	5	605	1983	3	Poor	3	15	110
64-040-146	2E & 13.6S BERESFORD	35	676	1945	7	Good	3	105	86
64-042-050	4.8W & 1S ALCESTER	435	3619	1960	3	Poor	4	1740	8
64-046-010	2.6E BERESFORD	110	1039	2008	8	Good	3	330	27
64-046-070	6S & 2.6E BERESFORD	40	1403	1987	4	Poor	3	120	73
64-049-179	2.5N & 4E JUNCTION CITY	60	3717	1977	5	Fair	6	360	25
64-050-060	4W & 2S ALCESTER	280	3147	2017	8	Good	-	-	Unknown
64-050-082	4W & 4.2S ALCESTER	150	1029	2009	8	Good	4	600	16
64-050-092	4W & 5.2S ALCESTER	125	1008	1935	2	Poor	4	500	19
64-050-145	2E & 1.5N SPINK	97	965	1939	6	Fair	4	388	23
64-050-156	2MI E. & 0.5 N. OF SPINK	97	1085	2000	7	Good	3	291	30
64-050-235	1W & 3.5N ELK POINT	45	1896	1993	7	Good	2	90	101
64-056-150	14S & 3.6E BERESFORD	30	613	2007	8	Good	3	90	102
64-057-140	13S & 3.7E BERESFORD	30	1465	1955	4	Poor	3	90	96
64-058-050	3.2W & 1S ALCESTER	270	4802	1960	4	Poor	4	1080	13
64-060-090	8S & 4E BERESFORD	25	580	1965	4	Poor	4	100	89
64-060-124	4E & 11.4S BERESFORD	35	968	2016	8	Good	3	105	88

Table 1: Alternative Bridge Prioritization Screening - Sorted by Structure Number (2 of 3)

Sorted by Structure Number									
Structure Number	Location	ADT (veh/day)	Deck Area (SF)	Year Built	Lowest Rating (1-9)	Bridge Condition	Detour (mile)	= ADT x Detour	Screening Ranking (1-113)*
64-060-137	4E & 12.7S BERESFORD	35	1621	1963	3	Poor	4	140	57
64-060-148	3E & 1.2N SPINK	50	980	1993	5	Fair	3	150	54
64-060-189	8.1N ELK POINT	35	1170	2004	7	Good	3	105	87
64-061-130	12S & 4.1E BERESFORD	30	412	2020	9	Good	4	120	80
64-061-150	3E & 1N SPINK	50	679	1992	4	Poor	3	150	53
64-061-190	8.0N & 0.1E ELK POINT	32	3355	2006	7	Good	2	64	107
64-067-040	1.8W ALCESTER	50	2095	1944	5	Fair	4	200	39
64-067-230	4.0N & 0.7E ELK POINT	15	1791	2005	6	Fair	5	75	106
64-069-080	7S & 4.9E BERESFORD	15	1011	1989	5	Fair	2	30	109
64-069-130	8.5S & 2.1W ALCESTER	30	427	2020	9	Good	3	90	103
64-070-030	1N & 2W ALCESTER	35	764	1982	5	Fair	4	140	60
64-070-130	9S & 2W ALCESTER	300	742	1989	3	Poor	-	-	Unknown
64-070-179	4.3N JCT SD 50	300	550	1955	5	Fair	12	3600	3
64-070-210	1.2N JCT SD 50	300	686	1948	6	Fair	12	3600	4
64-070-217	0.5N JCT SD 50	300	968	1948	7	Good	12	3600	5
64-070-250	1E & 2N ELK POINT	40	1606	1968	4	Poor	3	120	74
64-073-120	7.5S & 1.7W ALCESTER	180	797	1977	5	Fair	3	540	18
64-073-231	3.9N & 1.3E ELK POINT	45	3240	1997	7	Good	3	135	69
64-074-220	5N & 2E ELK POINT	45	731	1977	5	Fair	2	90	98
64-076-040	1W ALCESTER	120	744	2004	7	Good	4	480	20
64-077-235	1.4S RICHLAND	50	2784	1983	7	Good	2	100	93
64-080-031	0.5W & 0.9N ALCESTER	45	1414	1982	4	Poor	3	135	66
64-080-034	0.5W & 0.6N ALCESTER	45	1144	1983	4	Poor	3	135	65
64-080-107	1W & 6.7S ALCESTER	35	501	1940	5	Fair	4	140	58
64-080-251	2E & 1.9N ELK POINT	40	1410	1940	4	Poor	5	200	38
64-084-030	1N & 0.6W ALCESTER	40	924	1997	3	Poor	3	120	72
64-085-020	2N & 0.5W ALCESTER	45	1844	1930	5	Fair	3	135	68
64-086-100	6S & 0.4W ALCESTER	500	650	1950	7	Good	4	2000	6
64-087-110	7S & 0.3W ALCESTER	35	1161	1957	6	Fair	4	140	62
64-088-090	5S & 0.2W ALCESTER	45	908	1950	3	Poor	4	180	40
64-091-020	2N & 0.1E ALCESTER	125	666	2004	8	Good	3	375	24
64-092-130	8.5S & 0.2E ALCESTER	40	475	2020	9	Good	2	80	104
64-093-140	9.5S & 0.3E ALCESTER	100	1144	1981	5	Fair	3	300	28
64-096-150	11.5S & 0.6E ALCESTER	40	2210	1986	4	Poor	4	160	48
64-100-112	1E & 6.2S ALCESTER	40	556	1935	4	Poor	4	160	47
64-102-120	7.5S & 1.2E ALCESTER	45	1128	1950	6	Fair	4	180	44
64-103-130	8.5S & 1.3E ALCESTER	40	1083	1948	5	Fair	4	160	49
64-104-150	10.5S & 1.4E ALCESTER	25	857	1950	5	Fair	5	125	71
64-105-140	9.5S & 1.5E ALCESTER	110	1285	1950	3	Poor	3	330	26
64-106-090	4S & 1.6E ALCESTER	45	770	1986	5	Fair	3	135	67
64-108-110	6.5S & 1.8E ALCESTER	35	708	1996	5	Fair	4	140	59
64-110-169	10.1N & 5E ELK POINT	140	3119	1976	6	Fair	3	420	21
64-114-150	10.5S & 2.4E ALCESTER	45	689	1940	4	Poor	3	135	63
64-115-160	11.5S & 2.5E ALCESTER	30	502	1950	6	Fair	3	90	99
64-119-110	6.5S & 2.9E ALCESTER	100	556	1940	5	Fair	4	400	22
64-120-031	3E & 0.9N ALCESTER	45	670	1982	4	Poor	5	225	33
64-120-062	3E & 2.2S ALCESTER	45	653	1983	5	Fair	4	180	41
64-125-035	3.5E & 0.5N ALCESTER	55	963	1991	4	Poor	5	275	31
64-129-100	5.5S & 3.9E ALCESTER	55	686	1977	5	Fair	3	165	45
64-130-061	4E & 2.1S ALCESTER	45	747	1983	5	Fair	4	180	42
64-131-060	1.5S & 4.1E ALCESTER	45	1015	1982	6	Fair	4	180	43

Table 1: Alternative Bridge Prioritization Screening - Sorted by Structure Number (3 of 3)

Sorted by Structure Number									
Structure Number	Location	ADT (veh/day)	Deck Area (SF)	Year Built	Lowest Rating (1-9)	Bridge Condition	Detour (mile)	= ADT x Detour	Screening Ranking (1-113)*
64-133-118	3E & 1.7S BIG SPRINGS	50	1438	1979	4	Poor	99	4950	2
64-134-040	3.4E ALCESTER	50	1022	1950	3	Poor	4	200	37
64-140-003	12E & 0.3S BERESFORD	25	1162	1983	3	Poor	3	75	105
64-144-055	5.4E & 1.5S ALCESTER	34	1390	1947	3	Poor	6	204	36
64-145-019	12.5E & 0.9S BERESFORD	70	693	1992	4	Poor	3	210	34
64-145-090	5S & 5.5E ALCESTER	325	1132	1989	6	Fair	-	-	Unknown
64-148-010	12.8E BERESFORD	55	1612	1987	5	Fair	5	275	32
64-148-058	1.8S & 5.8E ALCESTER	500	1782	1985	4	Poor	3	1500	11
64-148-063	2S & 5.3E ALCESTER	325	992	1972	5	Fair	2	650	15
64-151-020	6.1E & 2N ALCESTER	185	688	2020	9	Good	3	555	17
64-158-059	6.5E & 1.9S ALCESTER	500	20116	1979	5	Fair	99	49500	1

* Lowest number suggests bridge is the most important bridge, regardless of condition or size

Table 2: Alternative Bridge Prioritization Screening - Sorted by Screened Ranking (1 of 3)

Sorted by Screened Ranking									
Structure Number	Location	ADT (veh/day)	Deck Area (SF)	Year Built	Lowest Rating (1-9)	Bridge Condition	Detour (mile)	= ADT x Detour	Screening Ranking (1-113)*
64-158-059	6.5E & 1.9S ALCESTER	500	20116	1979	5	Fair	99	49500	1
64-133-118	3E & 1.7S BIG SPRINGS	50	1438	1979	4	Poor	99	4950	2
64-070-179	4.3N JCT SD 50	300	550	1955	5	Fair	12	3600	3
64-070-210	1.2N JCT SD 50	300	686	1948	6	Fair	12	3600	4
64-070-217	0.5N JCT SD 50	300	968	1948	7	Good	12	3600	5
64-086-100	6S & 0.4W ALCESTER	500	650	1950	7	Good	4	2000	6
64-016-050	5S BERESFORD	450	536	1960	5	Fair	4	1800	7
64-042-050	4.8W & 1S ALCESTER	435	3619	1960	3	Poor	4	1740	8
64-010-175	16.5S BERESFORD	400	1541	1955	7	Good	4	1600	9
64-010-112	10.2S BERESFORD	400	4430	2016	7	Good	4	1600	10
64-148-058	1.8S & 5.8E ALCESTER	500	1782	1985	4	Poor	3	1500	11
64-010-119	10.9S BERESFORD	400	4019	2017	8	Good	3	1200	12
64-058-050	3.2W & 1S ALCESTER	270	4802	1960	4	Poor	4	1080	13
64-019-100	1.5S & 2E ALSEN	235	3205	2013	7	Good	4	940	14
64-148-063	2S & 5.3E ALCESTER	325	992	1972	5	Fair	2	650	15
64-050-082	4W & 4.2S ALCESTER	150	1029	2009	8	Good	4	600	16
64-151-020	6.1E & 2N ALCESTER	185	688	2020	9	Good	3	555	17
64-073-120	7.5S & 1.7W ALCESTER	180	797	1977	5	Fair	3	540	18
64-050-092	4W & 5.2S ALCESTER	125	1008	1935	2	Poor	4	500	19
64-076-040	1W ALCESTER'	120	744	2004	7	Good	4	480	20
64-110-169	10.1N & 5E ELK POINT	140	3119	1976	6	Fair	3	420	21
64-119-110	6.5S & 2.9E ALCESTER	100	556	1940	5	Fair	4	400	22
64-050-145	2E & 1.5N SPINK	97	965	1939	6	Fair	4	388	23
64-091-020	2N & 0.1E ALCESTER	125	666	2004	8	Good	3	375	24
64-049-179	2.5N & 4E JUNCTION CITY	60	3717	1977	5	Fair	6	360	25
64-105-140	9.5S & 1.5E ALCESTER	110	1285	1950	3	Poor	3	330	26
64-046-010	2.6E BERESFORD	110	1039	2008	8	Good	3	330	27
64-093-140	9.5S & 0.3E ALCESTER	100	1144	1981	5	Fair	3	300	28
64-030-079	1E & 6.9S BERESFORD	75	1505	1940	6	Fair	4	300	29
64-050-156	2MI E. & 0.5 N. OF SPINK	97	1085	2000	7	Good	3	291	30
64-125-035	3.5E & 0.5N ALCESTER	55	963	1991	4	Poor	5	275	31
64-148-010	12.8E BERESFORD	55	1612	1987	5	Fair	5	275	32
64-120-031	3E & 0.9N ALCESTER	45	670	1982	4	Poor	5	225	33
64-145-019	12.5E & 0.9S BERESFORD	70	693	1992	4	Poor	3	210	34
64-020-218	4.0W & 5.2N ELK POINT	105	854	2006	7	Good	2	210	35
64-144-055	5.4E & 1.5S ALCESTER	34	1390	1947	3	Poor	6	204	36
64-134-040	3.4E ALCESTER	50	1022	1950	3	Poor	4	200	37
64-080-251	2E & 1.9N ELK POINT	40	1410	1940	4	Poor	5	200	38
64-067-040	1.8W ALCESTER	50	2095	1944	5	Fair	4	200	39
64-088-090	5S & 0.2W ALCESTER	45	908	1950	3	Poor	4	180	40
64-120-062	3E & 2.2S ALCESTER	45	653	1983	5	Fair	4	180	41
64-130-061	4E & 2.1S ALCESTER	45	747	1983	5	Fair	4	180	42
64-131-060	1.5S & 4.1E ALCESTER	45	1015	1982	6	Fair	4	180	43
64-102-120	7.5S & 1.2E ALCESTER	45	1128	1950	6	Fair	4	180	44
64-129-100	5.5S & 3.9E ALCESTER	55	686	1977	5	Fair	3	165	45
64-030-093	1E & 8.3S BERESFORD	41	588	1978	8	Good	4	164	46
64-100-112	1E & 6.2S ALCESTER	40	556	1935	4	Poor	4	160	47
64-096-150	11.5S & 0.6E ALCESTER	40	2210	1986	4	Poor	4	160	48
64-103-130	8.5S & 1.3E ALCESTER	40	1083	1948	5	Fair	4	160	49
64-040-089	2E & 7.9S BERESFORD	40	1152	1983	5	Fair	4	160	50
64-029-080	8S & 1.2E BERESFORD	40	2864	1994	7	Good	4	160	51

Table 2: Alternative Bridge Prioritization Screening - Sorted by Screened Ranking (2 of 3)

Sorted by Screened Ranking									
Structure Number	Location	ADT (veh/day)	Deck Area (SF)	Year Built	Lowest Rating (1-9)	Bridge Condition	Detour (mile)	= ADT x Detour	Screening Ranking (1-113)*
64-030-034	1E & 2.4S BERESFORD	50	888	1991	3	Poor	3	150	52
64-061-150	3E & 1N SPINK	50	679	1992	4	Poor	3	150	53
64-060-148	3E & 1.2N SPINK'	50	980	1993	5	Fair	3	150	54
64-028-220	5N & 3.2W ELK POINT	50	1283	1940	5	Fair	3	150	55
64-038-040	3S & 1.8E BERESFORD	50	1161	2010	8	Good	3	150	56
64-060-137	4E & 12.7S BERESFORD	35	1621	1963	3	Poor	4	140	57
64-080-107	1W & 6.7S ALCESTER'	35	501	1940	5	Fair	4	140	58
64-108-110	6.5S & 1.8E ALCESTER	35	708	1996	5	Fair	4	140	59
64-070-030	1N & 2W ALCESTER	35	764	1982	5	Fair	4	140	60
64-020-141	13.1S BERESFORD	35	2251	1985	5	Fair	4	140	61
64-087-110	7S & 0.3W ALCESTER'	35	1161	1957	6	Fair	4	140	62
64-114-150	10.5S & 2.4E ALCESTER	45	689	1940	4	Poor	3	135	63
64-023-080	7S & 0.3E BERESFORD'	45	904	1987	4	Poor	3	135	64
64-080-034	0.5W & 0.6N ALCESTER	45	1144	1983	4	Poor	3	135	65
64-080-031	0.5W & 0.9N ALCESTER'	45	1414	1982	4	Poor	3	135	66
64-106-090	4S & 1.6E ALCESTER'	45	770	1986	5	Fair	3	135	67
64-085-020	2N & 0.5W ALCESTER	45	1844	1930	5	Fair	3	135	68
64-073-231	3.9N & 1.3E ELK POINT	45	3240	1997	7	Good	3	135	69
64-032-070	6S & 1.2E BERESFORD	43	494	1970	4	Poor	3	129	70
64-104-150	10.5S & 1.4E ALCESTER	25	857	1950	5	Fair	5	125	71
64-084-030	1N & 0.6W ALCESTER'	40	924	1997	3	Poor	3	120	72
64-046-070	6S & 2.6E BERESFORD	40	1403	1987	4	Poor	3	120	73
64-070-250	1E & 2N ELK POINT	40	1606	1968	4	Poor	3	120	74
64-032-080	7S & 2.2E BERESFORD'	40	1691	1989	4	Poor	3	120	75
64-040-037	2E & 2.7S BERESFORD'	40	1353	1982	5	Fair	3	120	76
64-030-136	1E & 12.6S BERESFORD	40	437	1950	6	Fair	3	120	77
64-038-171	1.8E & 16.1S BERESFORD	40	3285	1986	7	Good	3	120	78
64-021-095	8.5S BERESFORD'	30	3431	1989	7	Good	4	120	79
64-061-130	12S & 4.1E BERESFORD'	30	412	2020	9	Good	4	120	80
64-040-073	2E & 6.3S BERESFORD'	36	1718	1986	5	Fair	3	108	81
64-034-090	8S & 1.4E BERESFORD	35	703	1948	4	Poor	3	105	82
64-023-090	8S & 0.3E BERESFORD	35	2163	1979	4	Poor	3	105	83
64-025-030	2S & 0.5E BERESFORD'	35	698	1950	5	Fair	3	105	84
64-016-130	12S & 0.4E BERESFORD	35	1606	1970	5	Fair	3	105	85
64-040-146	2E & 13.6S BERESFORD	35	676	1945	7	Good	3	105	86
64-060-189	8.1N ELK POINT	35	1170	2004	7	Good	3	105	87
64-060-124	4E & 11.4S BERESFORD'	35	968	2016	8	Good	3	105	88
64-060-090	8S & 4E BERESFORD'	25	580	1965	4	Poor	4	100	89
64-034-130	12S & 1.4E BERESFORD'	25	854	1935	5	Fair	4	100	90
64-011-120	11S & 0.1E BERESFORD	25	3999	1989	6	Fair	4	100	91
64-038-147	13.7S & 1.8E BERESFORD	25	1132	2007	7	Good	4	100	92
64-077-235	1.4S RICHLAND'	50	2784	1983	7	Good	2	100	93
64-018-140	13S & 0.8E BERESFORD	25	2961	2002	7	Good	4	100	94
64-020-063	5.3S BERESFORD	30	557	1973	3	Poor	3	90	95
64-057-140	13S & 3.7E BERESFORD	30	1465	1955	4	Poor	3	90	96
64-030-157	1E & 14.7S BERESFORD	30	2357	1976	4	Poor	3	90	97
64-074-220	5N & 2E ELK POINT	45	731	1977	5	Fair	2	90	98
64-115-160	11.5S & 2.5E ALCESTER	30	502	1950	6	Fair	3	90	99
64-026-140	13S & 0.6E BERESFORD	30	748	1991	6	Fair	3	90	100
64-050-235	1W & 3.5N ELK POINT	45	1896	1993	7	Good	2	90	101
64-056-150	14S & 3.6E BERESFORD	30	613	2007	8	Good	3	90	102

Table 2: Alternative Bridge Prioritization Screening - Sorted by Screened Ranking (3 of 3)

Sorted by Screened Ranking									
Structure Number	Location	ADT (veh/day)	Deck Area (SF)	Year Built	Lowest Rating (1-9)	Bridge Condition	Detour (mile)	= ADT x Detour	Screening Ranking (1-113)*
64-069-130	8.5S & 2.1W ALCESTER	30	427	2020	9	Good	3	90	103
64-092-130	8.5S & 0.2E ALCESTER	40	475	2020	9	Good	2	80	104
64-140-003	12E & 0.3S BERESFORD	25	1162	1983	3	Poor	3	75	105
64-067-230	4.0N & 0.7E ELK POINT'	15	1791	2005	6	Fair	5	75	106
64-061-190	8.0N & 0.1E ELK POINT	32	3355	2006	7	Good	2	64	107
64-032-147	13.7S & 1.2E BERESFORD	20	499	1950	8	Good	3	60	108
64-069-080	7S & 4.9E BERESFORD	15	1011	1989	5	Fair	2	30	109
64-040-144	13.4S & 2E BERESFORD	5	605	1983	3	Poor	3	15	110
64-050-060	4W & 2S ALCESTER	280	3147	2017	8	Good	-	-	Unknown
64-070-130	9S & 2W ALCESTER	300	742	1989	3	Poor	-	-	Unknown
64-145-090	5S & 5.5E ALCESTER	325	1132	1989	6	Fair	-	-	Unknown

* Lowest number suggests bridge is the most important bridge, regardless of condition or size

Appendix J
Existing Road Conditions - PASER

Table 1: Existing Road Conditions - Paved Roads - PASER Rating 2019 (1 of 4)

Surface Type	Street/Ave Route	County Route	Start	End	Roadway Width (ft)	Length (Miles)	Apparent Recent Management Strategy	Paser Rating (1-10)	Primary Distress Type	Primary Distress Severity	Date	Comment
Asphalt	484 Ave	CR 1	CR 1B	0.3 mi S of CR 1B	24	0.3	Crack Sealing	6	Transv. cracks	Mild	11/7/2019	
Asphalt	484 Ave	CR 1	0.3 mi S of CR 1B	334 St	27	1.3	Seal Coat/Chip Seal	8	Rutting	Mild	11/7/2019	
Asphalt	E Rose St	CR 1B	N Elm St	0.1 mi SE of N Elm St	25	0.1	Overlay	5	Transv. cracks	Moderate	11/6/2019	
Asphalt	E Rose St	CR 1B	0.1 mi SE of N Elm St	0.2 mi SE of N Elm St	28	0.1	Overlay	7	Transv. cracks	Moderate	11/6/2019	
Concrete	E Rose St	CR 1B	0.2 mi SE of N Elm St	325 St	24	0.5	Concrete Overlay	6	Joint spalling	Mild	11/6/2019	Joint spalling
Concrete	N/A	CR 1B	325 St	326 St	24	1.4	Concrete Overlay	7	Faulting	Mild	11/6/2019	Isolated meander cracks. Isolated Faulting. One utility patch.
Concrete	N/A	CR 1B	326 St	327 St	24	1.4	Concrete Overlay	7	Faulting	Mild	11/6/2019	Slight joint spalling. Isolated meander cracks. Isolated faulting. 1 or 2 patches
Concrete	N/A	CR 1B	327 St	328 St	24	1.6	Concrete Overlay	7	Patching	Mild	11/6/2019	Slight joint spalling. Isolated meander cracks. Some patching
Concrete	N/A	CR 1B	328 St	481 Ave	24	1.0	Concrete Overlay	7	Patching	Mild	11/6/2019	Slight joint spalling. Isolated meander cracks. Some patching
Asphalt	N/A	CR 1B	481 Ave	482 Ave	28	1.5	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	Recent seal coat/chip seal, but can feel the secondary cracking
Asphalt	N/A	CR 1B	482 Ave	330 St	28	0.4	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	Recent seal coat/chip seal, but can feel the secondary cracking
Asphalt	N/A	CR 1B	First St	331 St	26	0.9	Seal Coat/Chip Seal	4	Reflection Cracking	Moderate	11/6/2019	Extensive base repair planned next year
Asphalt	N/A	CR 1B	331 St	332 St (South)	26	1.6	Seal Coat/Chip Seal	4	Reflection Cracking	Moderate	11/6/2019	Extensive base repair planned next year
Asphalt	N/A	CR 1B	332 St (South)	E Authier Rd	26	0.9	Seal Coat/Chip Seal	4	Reflection Cracking	Moderate	11/6/2019	Extensive base repair planned next year
Asphalt	N/A	CR 1B	E Authier Rd	Northshore Dr	26	1.0	Seal Coat/Chip Seal	4	Reflection Cracking	Moderate	11/6/2019	Extensive base repair planned next year
Asphalt	471 Ave	CR 1C	298 St	299 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	299 St	300 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	300 St	301 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	301 St	302 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	302 St	303 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	303 St	304 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	304 St	305 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	305 St	306 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	306 St	307 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident. Some sections PASER 5.
Asphalt	471 Ave	CR 1C	307 St	308 St	27	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	308 St	309 St	27	1.0	Other	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident. Crack seal, chip seal. Overlay patching near bridge.
Asphalt	471 Ave	CR 1C	309 St	310 St	27	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	310 St	311 St	27	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	311 St	312 St	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	312 St	SD 48	28	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/4/2019	Transv. cracks widely spaced, but secondary cracking evident.
Asphalt	471 Ave	CR 1C	SD 48	314 St	28	1.0	Overlay	8	Transv. cracks	Mild	11/4/2019	Concrete underneath. Overlay and 4' shoulders 2018
Asphalt	471 Ave	CR 1C	314 St	315 St	28	1.0	Overlay	8	Transv. cracks	Mild	11/4/2019	Concrete underneath. Overlay and 4' shoulders 2018
Asphalt	471 Ave	CR 1C	315 St	316 St	28	1.0	Overlay	8	Transv. cracks	Mild	11/4/2019	Concrete underneath. Overlay and 4' shoulders 2018
Asphalt	471 Ave	CR 1C	316 St	317 St	28	1.0	Overlay	8	Transv. cracks	Mild	11/4/2019	Concrete underneath. Overlay and 4' shoulders 2018
Asphalt	471 Ave	CR 1C	317 St	0.4 mi S of 317 St	28	0.4	Overlay	8	Transv. cracks	Mild	11/4/2019	Concrete underneath. Overlay and 4' shoulders 2018
Concrete	471 Ave	CR 1C	0.4 mi S of 317 St	SD 50	28	0.1	Crack Sealing	6	Transv. slab cracks	Moderate	11/4/2019	
Asphalt	301 St	CR 1E	478 Ave	0.6 mi E of 478 Ave	24	0.6	Crack Sealing	7	Transv. cracks	Mild	11/8/2019	
Asphalt	301 St	CR 1E	0.5 mi E of SD 11	480 Ave	24	0.5	Crack Sealing	7	Transv. cracks	Mild	11/8/2019	
Asphalt	472 Ave	CR 1F	SD 11	298 St	22	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/5/2019	
Asphalt	N/A	CR 2	477 Ave	307 St	22	0.1	Crack Sealing	3	Block cracking	Severe	11/6/2019	Tangential curve
Asphalt	477 Ave	CR 2	307 St	308 St	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 2	308 St	309 St	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 2	309 St	310 St	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 2	310 St	311 St	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 2	311 St	312 St	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 2	312 St	SD 48	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 2	SD 48	314 St	24	1.0	Crack Sealing	8	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 2	314 St	315 St	24	1.0	Crack Sealing	8	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 2	315 St	316 St	24	0.9	Crack Sealing	8	Transv. cracks	Mild	11/5/2019	
Asphalt	477 Ave	CR 2	316 St	317 St	24	1.0	Crack Sealing	8	Transv. cracks	Mild	11/5/2019	
Asphalt	477 Ave	CR 2	317 St	1.0 mi S of 317 St	24	1.0	Crack Sealing	8	Transv. cracks	Mild	11/5/2019	
Asphalt	477 Ave	CR 2	1.0 mi S of 317 St	SD 50	25	1.2	Overlay	8	Transv. cracks	Mild	11/5/2019	
Asphalt	307 St	CR 3	479 Ave	480 Ave	27	1.0	Overlay	9	None		11/8/2019	Overlay 2019
Asphalt	307 St	CR 3	480 Ave	481 Ave	27	1.0	Overlay	9	None		11/8/2019	Overlay 2019
Asphalt	N/A	CR 3	307 St	481 Ave	27	0.2	Overlay	9	None		11/8/2019	Tangential curve. Overlay 2019
Asphalt	481 Ave	CR 3	0.2 mi S of 307 St	0.3 mi S of 307 St	28	0.1	Overlay	9	None		11/8/2019	Overlay 2019

Table 1: Existing Road Conditions - Paved Roads - PASER Rating 2019 (2 of 4)

Surface Type	Street/Ave Route	County Route	Start	End	Roadway Width (ft)	Length (Miles)	Apparent Recent Management Strategy	Paser Rating (1-10)	Primary Distress Type	Primary Distress Severity	Date	Comment
Asphalt	481 Ave	CR 3	0.3 mi S of 307 St	308 St	26	0.7	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5.
Asphalt	481 Ave	CR 3	308 St	309 St	26	1.0	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5.
Asphalt	481 Ave	CR 3	309 St	310 St	26	1.0	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5.
Asphalt	481 Ave	CR 3	310 St	311 St	26	1.0	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5.
Asphalt	482 Ave	CR 3	311 St	312 St	24	1.0	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5.
Asphalt	482 Ave	CR 3	312 St	313 St	24	1.0	Seal Coat/Chip Seal	5	Block cracking	Mild	11/8/2019	
Asphalt	482 Ave	CR 3	313 St	SD 48	24	0.7	Seal Coat/Chip Seal	2	Transv. cracks	Mild	11/8/2019	Parts are washed out. PASER 7 for intact sections.
Asphalt	311 St	CR 3	481 Ave	482 Ave	28	0.9	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5.
Asphalt	River Rd	CR 4	302 St	1.5 mi S of CR 13	24	1.5	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/8/2019	Some sections PASER 6. South of here is short gravel section.
Asphalt	River Rd	CR 4	0.1 mi N of 304 St	305 St	24	0.7	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/8/2019	
Asphalt	River Rd	CR 4	305 St	306 St	24	1.0	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections PASER 5
Asphalt	River Rd	CR 4	306 St	307 St	22	1.1	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/8/2019	
Asphalt	Flurie Rd	CR 5	Prairie Passage	N Shay Rd	27	0.8	Overlay	9	None		11/6/2019	Overlay 2019
Asphalt	N Shay Rd	CR 5	0.2 mi N of Flurie Rd	Flurie Rd	27	0.2	Overlay	9	None		11/6/2019	Overlay 2019
Asphalt	477 Ave	CR 6	0.2 mi N of 326 St	0.1 mi N of 326 St	24	0.1	Seal Coat/Chip Seal	8	None		11/6/2019	
Asphalt	477 Ave	CR 6	0.1 mi N of 326 St	326 St	24	0.1	Seal Coat/Chip Seal	5	Transv. cracks	Moderate	11/6/2019	
Asphalt	477 Ave	CR 6	326 St	327 St	25	1.0	Seal Coat/Chip Seal	5	Longitud. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 6	327 St	328 St	25	1.0	Seal Coat/Chip Seal	5	Longitud. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 6	328 St	329 St	26	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 6	329 St	0.2 mi N of 330 St	24	0.8	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	477 Ave	CR 6	0.2 mi N of 330 St	330 St	24	0.2	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/6/2019	
Asphalt	N/A	CR 6	477 Ave	330 St	30	0.1	Seal Coat/Chip Seal	8	None		11/6/2019	Tangential curve
Asphalt	330 St	CR 6	0.5 mi W of 476 Ave	476 Ave	21	0.5	Seal Coat/Chip Seal	5	Transv. cracks	Mild	11/6/2019	
Asphalt	330 St	CR 6	476 Ave	477 Ave	23	1.2	Seal Coat/Chip Seal	5	Transv. cracks	Mild	11/6/2019	
Asphalt	330 St	CR 6	477 Ave	478 Ave	30	1.0	Seal Coat/Chip Seal	8	None		11/6/2019	
Asphalt	330 St	CR 6	478 Ave	479 Ave	30	1.0	Seal Coat/Chip Seal	8	None		11/6/2019	
Asphalt	330 St	CR 6	479 Ave	480 Ave	30	1.0	Seal Coat/Chip Seal	8	None		11/6/2019	
Asphalt	330 St	CR 6	480 Ave	481 Ave	30	1.0	Seal Coat/Chip Seal	8	None		11/6/2019	
Asphalt	330 St	CR 6	481 Ave	0.3 mi E of 481 Ave	30	0.3	Seal Coat/Chip Seal	8	None		11/6/2019	
Asphalt	330 St	CR 6	0.3 mi E of 481 Ave	0.4 mi E of 481 Ave	30	0.1	Seal Coat/Chip Seal	5			11/6/2019	
Asphalt	330 St	CR 6	CR 1B	483 Ave	22	0.8	Overlay	5	Block cracking	Mild	11/6/2019	
Asphalt	483 Ave	CR 7	330 St	CR 1B	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	483 Ave	CR 7	329 St	330 St	25	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	
Asphalt	483 Ave	CR 7	CR 7	329 St	25	0.5	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	
Asphalt	N/A	CR 7	483 Ave	0.8 mi E of 483 Ave	26	0.8	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	
Asphalt	N/A	CR 7	0.8 mi E of 483 Ave	Big Sioux River	26	0.7	Overlay	8	Transv. cracks	Mild	11/6/2019	
Asphalt	325 St	CR 9	E Main St	CR 1B	24	0.1	Seal Coat/Chip Seal	7			11/7/2019	
Asphalt	325 St	CR 9	CR 1B	478 Ave	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	325 St	CR 9	478 Ave	479 Ave	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	325 St	CR 9	479 Ave	480 Ave	23	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	325 St	CR 9	480 Ave	481 Ave	23	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	481 Ave	CR 9	325 St	326 St	23	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	Major culv. patching, maybe washed out
Asphalt	481 Ave	CR 9	326 St	327 St	23	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	481 Ave	CR 9	327 St	328 St	23	1.1	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	481 Ave	CR 9	328 St	CR 1B	23	0.7	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	Burbank Rd	CR 10	470 Ave	471 Ave	26	1.2	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/4/2019	
Asphalt	Burbank Rd	CR 10	471 Ave	472 Ave	26	1.1	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/4/2019	
Asphalt	Burbank Rd	CR 10	472 Ave	473 Ave	26	1.1	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/4/2019	
Asphalt	Burbank Rd	CR 10	473 Ave	474 Ave	26	1.1	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/4/2019	
Asphalt	Burbank Rd	CR 10	474 Ave	475 Ave	26	1.1	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/4/2019	
Asphalt	Burbank Rd	CR 10	475 Ave	476 Ave	26	0.5	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/4/2019	
Asphalt	298 St	CR 11	472 Ave	473 Ave	21	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/5/2019	Some full width overlay patching
Asphalt	298 St	CR 11	473 Ave	474 Ave	22	1.0	Seal Coat/Chip Seal	5	Patching	Mild	11/5/2019	Some full width overlay patching
Asphalt	298 St	CR 11	474 Ave	475 Ave	28	1.0	Seal Coat/Chip Seal	7	Raveling	Mild	11/5/2019	
Asphalt	300 St	CR 11	470 Ave	471 Ave	25	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/4/2019	
Asphalt	299 St	CR 12	SD 11	480 Ave	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/12/2019	
Asphalt	299 St	CR 12	480 Ave	481 Ave	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/12/2019	
Asphalt	299 St	CR 12	481 Ave	482 Ave	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/12/2019	

Table 1: Existing Road Conditions - Paved Roads - PASER Rating 2019 (3 of 4)

Surface Type	Street/Ave Route	County Route	Start	End	Roadway Width (ft)	Length (Miles)	Apparent Recent Management Strategy	Paser Rating (1-10)	Primary Distress Type	Primary Distress Severity	Date	Comment
Asphalt	299 St	CR 12	482 Ave	483 Ave	24	0.8	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/12/2019	
Asphalt	299 St	CR 12	483 Ave	Boyer Ave	24	1.7	Seal Coat/Chip Seal	5	Transv. cracks	Mild	11/12/2019	
Asphalt	299 St	CR 12	Boyer Ave	485 Ave	24	0.8	Seal Coat/Chip Seal	5	Transv. cracks	Mild	11/12/2019	
Asphalt	299 St	CR 12	485 Ave	SD 46	24	0.8	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/12/2019	
Asphalt	302 St	CR 13	470 Ave	471 Ave	26	1.0	Seal Coat/Chip Seal	5	Longitud. cracks	Mild	11/7/2019	
Asphalt	302 St	CR 13	471 Ave	472 Ave	27	1.0	Crack Sealing	8	Transv. cracks	Mild	11/7/2019	
Asphalt	302 St	CR 13	472 Ave	0.7 mi E of 472 Ave	27	0.7	Crack Sealing	8	Transv. cracks	Mild	11/7/2019	
Asphalt	302 St	CR 13	0.7 mi E of 472 Ave	473 Ave	26	0.3	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	302 St	CR 13	473 Ave	474 Ave	26	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	302 St	CR 13	474 Ave	475 Ave	26	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/7/2019	
Asphalt	302 St	CR 13	475 Ave	476 Ave	26	1.0	Overlay	8	Transv. cracks	Mild	11/7/2019	Overlay 2018
Asphalt	302 St	CR 13	476 Ave	477 Ave	26	1.0	Overlay	8	Transv. cracks	Mild	11/7/2019	Overlay 2018
Asphalt	302 St	CR 13	477 Ave	478 Ave	26	1.0	Overlay	8	Transv. cracks	Mild	11/7/2019	Overlay 2018
Asphalt	302 St	CR 13	478 Ave	SD 11	26	1.0	Overlay	8	Transv. cracks	Mild	11/7/2019	Overlay 2018
Asphalt	302 St	CR 13	479 Ave	480 Ave	26	1.0	Overlay	7	Transv. cracks	Mild	11/8/2019	Isolated fatigue cracking
Asphalt	302 St	CR 13	480 Ave	481 Ave	26	1.0	Overlay	7	Transv. cracks	Mild	11/8/2019	
Asphalt	302 St	CR 13	481 Ave	482 Ave	26	1.0	Overlay	7	Transv. cracks	Mild	11/8/2019	Occasional fatigue cracking
Asphalt	302 St	CR 13	482 Ave	1.2 mi E of 482 Ave	26	1.2	Overlay	7	Transv. cracks	Mild	11/8/2019	Isolated fatigue cracking
Asphalt	302 St	CR 13	1.2 mi E of 482 Ave	484 Ave	27	1.3	Overlay	9	None		11/8/2019	Overlay 2019
Asphalt	302 St	CR 13	484 Ave	River Rd	27	0.5	Overlay	9	None		11/8/2019	Overlay 2019
Asphalt	302 St	CR 13	River Rd	0.8 mi E of River Rd	28	0.8	Overlay	9	None		11/8/2019	Overlay 2019
Asphalt	306 St	CR 15	470 Ave	I-29 bridge	25	0.5	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/12/2019	
Asphalt	306 St	CR 15	I-29 bridge	471 Ave	25	0.5	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/12/2019	
Asphalt	307 St	CR 15	471 Ave	472 Ave	25	1.0	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/12/2019	
Asphalt	307 St	CR 15	472 Ave	473 Ave	25	1.0	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/12/2019	
Asphalt	307 St	CR 15	473 Ave	474 Ave	25	1.0	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/12/2019	
Asphalt	307 St	CR 15	474 Ave	475 Ave	27	1.0	Seal Coat/Chip Seal	8	Transv. cracks	Mild	11/12/2019	
Asphalt	307 St	CR 15	475 Ave	476 Ave	24	1.0	Crack Sealing	4	Block cracking	Moderate	11/12/2019	Two full width overlay patches
Asphalt	307 St	CR 15	476 Ave	0.6 mi E of 476 Ave	24	0.6	Crack Sealing	4	Block cracking	Moderate	11/12/2019	
Asphalt	307 St	CR 15	0.6 mi E of 476 Ave	0.8 mi E of 476 Ave	25	0.2	Overlay	9	None		11/12/2019	Overlay 2019
Asphalt	307 St	CR 15	0.8 mi E of 476 Ave	477 Ave	24	0.2	Crack Sealing	4	Block cracking	Moderate	11/12/2019	
Asphalt	307 St	CR 15	477 Ave	0.4 mi E of 477 Ave	24	0.0	Crack Sealing	4	Block cracking	Moderate	11/8/2019	
Asphalt	307 St	CR 15	0.4 mi E of 477 Ave	0.3 mi E of 478 Ave	25	0.9	Overlay	9	None		11/8/2019	Overlay 2019
Asphalt	307 St	CR 15	0.3 mi E of 478 Ave	0.6 mi E of 478 Ave	25	0.3	Crack Sealing	4	Block cracking	Moderate	11/8/2019	
Asphalt	307 St	CR 15	0.6 mi E of 478 Ave	0.9 mi E of 478 Ave	25	0.3	Overlay	9	None		11/8/2019	Overlay 2019
Asphalt	307 St	CR 15	0.9 mi E of 478 Ave	479 Ave	25	0.1	Crack Sealing	5	Block cracking	Moderate	11/8/2019	
Asphalt	473 Ave	CR 21	SD 48	0.2 mi S of SD 48	24	0.2	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/4/2019	
Asphalt	473 Ave	CR 21	0.2 mi S of SD 48	0.5 mi S of SD 48	24	0.3	Overlay	8	Transv. cracks	Mild	11/4/2019	
Asphalt	473 Ave	CR 21	0.5 mi S of SD 48	314 St	24	0.5	Seal Coat/Chip Seal	6	Block cracking	Mild	11/4/2019	
Asphalt	473 Ave	CR 21	314 St	0.6 mi S of 314 St	24	0.6	Overlay	8	Transv. cracks	Mild	11/4/2019	
Asphalt	473 Ave	CR 21	0.6 mi S of 314 St	315 St	24	0.4	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/4/2019	
Asphalt	473 Ave	CR 21	315 St	316 St	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/4/2019	
Asphalt	473 Ave	CR 21	316 St	317 St	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/4/2019	
Asphalt	473 Ave	CR 21	317 St	318 St	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/4/2019	
Asphalt	472 Ave	CR 21	SD 50	319 St	28	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/7/2019	Major patch overlay
Asphalt	472 Ave	CR 21	319 St	320 St	24	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/7/2019	
Asphalt	472 Ave	CR 21	320 St	321 St	24	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/7/2019	Major patch overlay
Asphalt	472 Ave	CR 21	321 St	Burbank Rd	22	1.0	Seal Coat/Chip Seal	5	Block cracking	Mild	11/7/2019	Major patch overlay
Asphalt	480 Ave	CR 23	CR 1B	328 St	24	0.2	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	480 Ave	CR 23	328 St	329 St	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Mild	11/6/2019	
Asphalt	480 Ave	CR 23	329 St	330 St	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	
Asphalt	480 Ave	CR 23	330 St	331 St	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	
Asphalt	480 Ave	CR 23	331 St	332 St	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	
Asphalt	480 Ave	CR 23	332 St	333 St	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	
Asphalt	480 Ave	CR 23	333 St	334 St	24	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	
Asphalt	334 St	CR 23	480 Ave	Dakota Ave	28	0.5	Seal Coat/Chip Seal	8	Rutting	Mild	11/6/2019	
Asphalt	334 St	CR 23	Dakota Rd	482 Ave	28	1.6	Seal Coat/Chip Seal	8	Rutting	Mild	11/6/2019	
Asphalt	334 St	CR 23	482 Ave	Deer Run Cir (West)	28	1.0	Seal Coat/Chip Seal	8	Rutting	Mild	11/6/2019	

Table 1: Existing Road Conditions - Paved Roads - PASER Rating 2019 (4 of 4)

Surface Type	Street/Ave Route	County Route	Start	End	Roadway Width (ft)	Length (Miles)	Apparent Recent Management Strategy	Paser Rating (1-10)	Primary Distress Type	Primary Distress Severity	Date	Comment
Asphalt	334 St	CR 23	Deer Run Cir (West)	Westshore Dr	28	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/6/2019	
Asphalt	475 Ave	CR 25	SD 46	298 St	28	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	475 Ave	CR 25	298 St	299 St	28	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	475 Ave	CR 25	299 St	300 St	28	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	475 Ave	CR 25	300 St	301 St	28	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	475 Ave	CR 25	301 St	302 St	28	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	475 Ave	CR 25	302 St	303 St	28	1.0	Seal Coat/Chip Seal	4	Longitud. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	303 St	304 St	28	1.0	Seal Coat/Chip Seal	3	Block cracking	Severe	11/7/2019	Major patch overlay
Asphalt	475 Ave	CR 25	304 St	305 St	24	1.0	Seal Coat/Chip Seal	4	Longitud. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	305 St	306 St	24	1.0	Seal Coat/Chip Seal	4	Longitud. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	306 St	307 St	24	1.0	Seal Coat/Chip Seal	3	Longitud. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	307 St	308 St	24	1.0	Seal Coat/Chip Seal	4	Longitud. cracks	Moderate	11/7/2019	Major patch overlay
Asphalt	475 Ave	CR 25	308 St	309 St	24	1.0	Seal Coat/Chip Seal	4	Longitud. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	309 St	310 St	24	1.0	Seal Coat/Chip Seal	4	Longitud. cracks	Moderate	11/7/2019	Major patch overlay
Asphalt	475 Ave	CR 25	310 St	311 St	24	1.0	Seal Coat/Chip Seal	4	Longitud. cracks	Moderate	11/7/2019	Major patch overlay
Asphalt	475 Ave	CR 25	311 St	312 St	24	1.0	Seal Coat/Chip Seal	4	Transv. cracks	Moderate	11/7/2019	2 Major patch overlays
Asphalt	475 Ave	CR 25	312 St	SD 48	24	1.0	Seal Coat/Chip Seal	5	Transv. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	SD 48	1.0 mi S of SD 48	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	1.0 mi S of SD 48	315 St (north)	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	315 St (north)	316 St (north)	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	316 St (north)	317 St	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	317 St	SD 50	24	1.0	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/7/2019	
Asphalt	475 Ave	CR 25	SD 50	319 St	24	1.0	Seal Coat/Chip Seal	5	Transv. cracks	Moderate	11/7/2019	
Asphalt	319 St	CR 25	475 Ave	SD 11	24	1.2	Seal Coat/Chip Seal	6	Transv. cracks	Moderate	11/7/2019	
Asphalt	471 Ave	CR 26	Burbank Rd	322 St	23	1.0	Seal Coat/Chip Seal	7	Transv. cracks	Mild	11/7/2019	
Asphalt	471 Ave	CR 26	322 St	323 St	23	1.0	Seal Coat/Chip Seal	6	Block cracking	Mild	11/7/2019	
Asphalt	471 Ave	CR 26	323 St	324 St	23	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/7/2019	
Asphalt	324 St	CR 26	471 Ave	472 Ave	23	1.0	Seal Coat/Chip Seal	6	Block cracking	Mild	11/7/2019	
Asphalt	324 St	CR 26	472 Ave	473 Ave	24	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/7/2019	
Asphalt	324 St	CR 26	473 Ave	1.0 mi E of 473 Ave	24	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/7/2019	
Asphalt	324 St	CR 26	1.0 mi E of 473 Ave	475 Ave	24	1.0	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/7/2019	
Asphalt	475 Ave	CR 26	Burbank Rd	324 St	24	0.3	Seal Coat/Chip Seal	5	Block cracking	Moderate	11/7/2019	
Asphalt	481 Ave	CR 27	302 St	303 St	29	1.0	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5
Asphalt	481 Ave	CR 27	303 St	304 St	29	1.0	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5.
Asphalt	481 Ave	CR 27	304 St	305 St	29	1.0	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5
Asphalt	481 Ave	CR 27	305 St	306 St	29	1.0	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5.
Asphalt	481 Ave	CR 27	306 St	0.2 mi S of 307 St	30	1.2	Seal Coat/Chip Seal	4	Block cracking	Moderate	11/8/2019	Some sections are PASER 5.

Table 2: Existing Road Conditions - Unpaved Roads - PASER Rating 2019 (1 of 2)

Owner	Surface Type	Street/Ave Route	County Route	Start	End	Roadway Width (ft)	Length (Miles)	Apparent Recent Management Strategy	PASER Rating (1-5)	Comfortably Drive > 25mph	Primary Distress Type	Primary Distress Severity	Date	Comment
County Pri.	Gravel	307 St	CR 1G	481 Ave	482 Ave	26	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	307 St	CR 1G	482 Ave	483 Ave (East)	27	0.9	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	307 St	CR 1G	483 Ave (East)	River Rd	26	1.1	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	481 Ave	CR 3	0.1 mi N of 311 St	311 St	27	0.1	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	Tangent to CR 3 curve
County Pri.	Gravel	River Rd	CR 4	0.3 mi N of 304 St	0.1 mi N of 304 St	28	0.2	None	4	Yes	Washboarding	Mild	11/8/2019	
County Pri.	Gravel	River Rd	CR 4	307 St	1.0 mi S of 307 St	24	1.0	New Aggregate	3	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	483 Ave	CR 4	307 St	308 St	32	1.0	None	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	308 St	CR 4	308 St	0.8 mi S of 308 St	24	0.8	None	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	River Rd	CR 4	0.8 mi S of 308 St	1.2 mi S of 308 St	24	0.4	New Aggregate	3	Yes	Rutting	Mild	11/8/2019	
County Pri.	Gravel	River Rd	CR 4	1.2 mi S of 308 St	2.4 mi S of 308 St	23	1.2	None	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	River Rd	CR 4	2.4 mi S of 308 St	Renken St	25	1.2	None	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	River Rd	CR 4	Renken St	1.0 mi S of Renken St	21	1.0	None	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	River Rd	CR 4	1.0 mi S of Renken St	482 Ave	22	1.2	None	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Unsurfaced	330 St	CR 6	0.6 mi W of 476 Ave	0.5 mi W of 476 Ave	20	0.1	None	4	Yes	Loose Agg.	Mild	11/6/2019	Minimum Maintenance
County Pri.	Gravel	304 St	CR 14	SD 11	480 Ave	25	1.0	Regrading	3	Yes	Crown	Moderate	11/12/2019	Secondary ditches on hillsides
County Pri.	Gravel	304 St	CR 14	480 Ave	481 Ave	27	1.0	Regrading	3	Yes	Crown	Moderate	11/12/2019	Secondary ditches on hillsides
County Pri.	Gravel	304 St	CR 14	481 Ave	482 Ave	26	1.0	Regrading	3	Yes	Crown	Moderate	11/12/2019	
County Pri.	Gravel	304 St	CR 14	482 Ave	483 Ave	25	1.0	Regrading	3	Yes	Crown	Moderate	11/12/2019	Secondary ditches on hillsides
County Pri.	Gravel	304 St	CR 14	483 Ave	1.0 mi E of 483 Ave	24	1.0	Regrading	3	Yes	Washboarding	Mild	11/12/2019	Secondary ditches on hillsides
County Pri.	Gravel	304 St	CR 14	1.0 mi E of 483 Ave	River Rd	26	0.8	Regrading	3	Yes	Washboarding	Moderate	11/12/2019	Secondary ditches on hillsides
County Pri.	Gravel	315 St	CR 17	477 Ave	478 Ave	24	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Pri.	Gravel	315 St	CR 17	478 Ave	479 Ave	24	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Pri.	Gravel	315 St	CR 17	479 Ave	Sargeant Ed	24	0.7	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Pri.	Gravel	315 St	CR 17	Sargeant Rd	481 Ave	20	1.2	None	1	No	Drainage Ditches	Severe	11/5/2019	Washed out
County Pri.	Gravel	481 Ave	CR 17	314 St	315 St	18	1.0	None	1	No	Drainage Ditches	Severe	11/5/2019	Washed out
County Pri.	Gravel	481 Ave	CR 17	SD 48	314 St	22	0.6	None	4	Yes	Loose Agg.	Mild	11/5/2019	
County Pri.	Gravel	477 Ave	CR 19	SD 50	320 St	24	0.8	Regrading	5	Yes	Loose Agg.	Mild	11/5/2019	
County Pri.	Gravel	477 Ave	CR 19	320 St	321 St	22	1.0	Regrading	5	Yes	None		11/5/2019	
County Pri.	Gravel	321 St	CR 19	476 Ave	477 Ave	24	1.4	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Pri.	Gravel	311 St	CR 24	477 Ave	478 Ave	26	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	311 St	CR 24	478 Ave	SD 11	26	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	311 St	CR 24	SD 11	480 Ave	26	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	311 St	CR 24	480 Ave	481 Ave	27	1.1	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	481 Ave	CR 27	SD 46	298 St	23	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	481 Ave	CR 27	298 St	299 St	27	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	481 Ave	CR 27	299 St	300 St	31	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	481 Ave	CR 27	300 St	301 St	27	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Pri.	Gravel	481 Ave	CR 27	301 St	302 St	28	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/8/2019	
County Sec.	Unsurfaced	315 St	N/A	476 Ave	477 Ave	18	1.1	None	1	No	Drainage Ditches	Severe	11/5/2019	Min. Maintenance. No gravel
County Sec.	Gravel	316 St	N/A	476 Ave	477 Ave	21	1.1	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Unsurfaced	316 St	N/A	480 Ave	Maynard Rd	Unk.	0.5	None	1	No	Washed Out	Severe	11/5/2019	Inaccessible, washed out
County Sec.	Unsurfaced	317 St	N/A	0.4 mi W of 477 Ave	477 Ave	12	0.4	None	1	No	Drainage Ditches	Severe	11/5/2019	Min. Maintenance. No gravel
County Sec.	Gravel	317 St	N/A	Henke Rd	480 Ave	18	1.2	None	1	No	Drainage Ditches	Severe	11/5/2019	Washed out
County Sec.	Gravel	318 St	N/A	476 Ave	0.3 mi E of 476 Ave	17	0.3	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	320 St	N/A	476 Ave	477 Ave	17	1.4	New Aggregate	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	321 St	N/A	477 Ave	478 Ave	20	0.5	None	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	478 Ave	N/A	315 St	1.0 mi S of 315 St	20	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	478 Ave	N/A	1.0 mi S of 315 St	2.0 mi S of 315 St	20	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	478 Ave	N/A	2.0 mi S of 315 St	Staum Rd	20	0.7	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	478 Ave	N/A	SD 50	State St	17	0.2	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	478 Ave	N/A	State St	321 St	21	1.5	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	479 Ave	N/A	315 St	Sargeant Rd	24	0.9	None	3	Yes	Crown	Mild	11/5/2019	Secondary ditches on shldrs
County Sec.	Unsurfaced	480 Ave	N/A	316 St	317 St	Unk.	1.0	None	1	No	Washed Out	Severe	11/5/2019	Inaccessible, washed out
County Sec.	Gravel	Groethe Rd	N/A	SD 50	SD 11	17	1.2	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	Henke Rd	N/A	Sargeant Rd	317 St	22	1.0	None	4	Yes	Washboarding	Mild	11/5/2019	
County Sec.	Gravel	Henke Rd	N/A	317 St	1.0 mi N of SD 50	25	1.5	None	4	Yes	Washboarding	Mild	11/5/2019	

Table 2: Existing Road Conditions - Unpaved Roads - PASER Rating 2019 (2 of 2)

Owner	Surface Type	Street/Ave Route	County Route	Start	End	Roadway Width (ft)	Length (Miles)	Apparent Recent Management Strategy	PASER Rating (1-5)	Comfortably Drive > 25mph	Primary Distress Type	Primary Distress Severity	Date	Comment
County Sec.	Gravel	Henke Rd	N/A	1.0 mi N of SD 50	SD 50	25	1.0	None	3	Yes	Washboarding	Moderate	11/5/2019	
County Sec.	Gravel	Lawrence Rd	N/A	Staum Rd	1.0 mi S of Staum Rd	20	1.0	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	Lawrence Rd	N/A	1.0 mi S of Staum Rd	SD 50	21	0.8	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Unsurfaced	Maynard Rd	N/A	315 St	316 St	Unk.	0.9	None	1	No	Washed Out	Severe	11/5/2019	Inaccessible, washed out
County Sec.	Gravel	Sargeant Rd	N/A	315 St	479 Ave	19	1.4	None	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	Staum Rd	N/A	477 Ave	478 Ave	18	0.7	Regrading	4	Yes	Loose Agg.	Mild	11/5/2019	
County Sec.	Gravel	Center St	N/A	Fourth Ave	478 Ave	16	0.2	None	4	Yes	None		11/5/2019	Richland Town Road
County Sec.	Gravel	Fourth Ave	N/A	SD 50	State St	22	0.3	None	4	Yes	None		11/5/2019	Richland Town Road
County Sec.	Gravel	Richland St	N/A	Fourth Ave	478 Ave	14	0.2	None	4	Yes	Loose Agg.	Mild	11/5/2019	Richland Town Road
County Sec.	Gravel	Second Ave	N/A	SD 50	State St	15	0.2	None	3	Yes	Loose Agg.	Mild	11/5/2019	Richland Town Road
County Sec.	Gravel	State St	N/A	Fourth Ave	478 Ave	14	0.2	None	3	Yes	Potholes	Moderate	11/5/2019	Richland Town Road
County Sec.	Gravel	Third Ave	N/A	SD 50	State St	17	0.2	None	4	Yes	None		11/5/2019	Richland Town Road