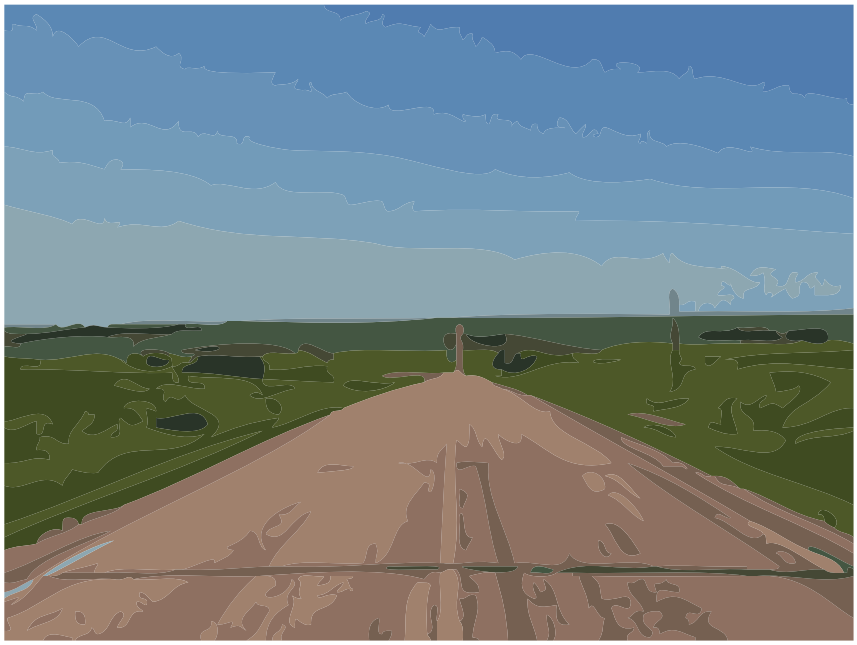
August 2013

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN











Brookings County
Master Transportation Plan

FOR
FHWA, SDDOT, Brookings County

HP5510 (15) 3616 P
Work Order PD-07-12

Prepared by: HR Green

Acknowledgements

The 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 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.

The South Dakota Department of Transportation provides services without regard to race, color, gender, religion, national origin, age or disability, according to provisions contained in SDCL 20-13, Title VI of the Civil Rights Act of 1964, the Rehabilitation Act of 1973, as amended, the Americans With Disabilities Act of 1990 and Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations, 1994. To request additional information on the SDDOT's Title VI/Nondiscrimination policy or the file a discrimination complaint, please contact the Department's Civil Rights Office at 605-773-3540.

Project Managers

Steve Gramm, PE
Data Analysis Engineer
South Dakota Department of Transportation

Dick Birk
Highway Superintendent
Brookings County Highway Department

Study Advisory Team

Mark Hoines, Federal Highway Administration
Steve Gramm, South Dakota Department of Transportation
Jeff Brosz, South Dakota Department of Transportation
Wade Dahl, South Dakota Department of Transportation
Dick Birk, Brookings County
Robert Hill, Brookings County
Meghan Thoreau, Brookings County
Dennis Falken, Brookings County
Jason Meusburger, Brookings County
Jackie Lanning, City of Brookings
Thad Drietz, City of Brookings

HR Green, Inc.

Ross Harris, AICP – Consultant Project Manager
Dan Edgerton, AICP – Transportation Planner
Ryan Allers, PE, PTOE – Traffic Engineer
Molly Stewart, PE – Design Engineer
Pete Lovell – GIS Technician

Table of Contents

1. Introduction 1
2. Existing Conditions and Needs Assessment 8
Existing Conditions Inventory 8
Existing Conditions Traffic and Operations Analysis 15
Future Conditions Traffic Capacity and Operations Analysis 17
Stakeholder Engagement Summary 20
Summary of Needs 28
3. Major Roads Plan 29
Major Roads Plan Classifications 29
Proposed Major Roads Plan 30
Access Management 31
4. Roadway Design and Policy Guidelines 36
Typical Roadway Designs (cross sections) 36
Pavement Standards 36
Roadway System Asset Management Guidelines and Policy Considerations 41
Pedestrian and Bicycle Facilities – Policy and Design Guidelines 42
5. Implementation Plan 44
Project Recommendations List 44

List of Figures

Figure 1: Study Area 2
Figure 2: Study Timeline and Process 7
Figure 3: Existing Brookings County Major Roads Plan 8
Figure 4: Brookings County Crash History (2009 – 2011) 10
Figure 5: Existing Traffic Operations (2012) 16
Figure 6: Existing (2012) and Forecast (2032) Traffic Volumes 18
Figure 7: Future Year (2032) Traffic Operations 19
Figure 8a: Brookings County Issues Map 22
Figure 8b: Brookings County Issues Map 23
Figure 8c: Brookings County Issues Map 24
Figure 8d: Brookings County Issues Map 25
Figure 9: Access Mobility Relationship 29
Figure 10: Proposed Major Roads Plan 32
Figure 11: Typical Cross Sections for Major Roads Plan Designations 38
Figure 12: Shared Use Path Typical Cross Section 43
Figure 13: Implementation Plan Map 46

List of Tables

Table 1: Brookings County Population Trends (1990 – 2010) 1
Table 2: Brookings County Crash History 11
Table 3: Top Intersection Crash Locations 11
Table 4: Railroad Crossing Inventory 14
Table 5: Planning Level Traffic Capacity Thresholds 15
Table 6: Level of Service (LOS) Definitions 17
Table 7: Brookings County Access Spacing Guidelines 33
Table 8: Minimum Pavement Thickness Requirements 39
Table 9: Recommended Gravel Thickness for New or Reconstructed Rural Roads 39
Table 10: Recommended Gravel Thickness for New or Reconstructed Rural Roads 40
Table 11: Planning Level Maintenance Schedule 42
Table 12: Minimum Pavement Thickness Requirements – Shared Use Path 43
Table 13: Section A - Intersection Projects 47
Table 14: Section B - Roadway Segment Projects 48
Table 15: Section C - Multimodal Network Enhancement Projects 49
Table 16: Section D - System Management and Policy Recommendations 50

List of Attached Appendices

Appendix A - Methods and Assumptions Technical Memorandum
Appendix B - Traffic Data Collection and Forecast Technical Memorandum
Appendix C - Early Stakeholder Coordination Summary Memorandum
Appendix D - Internet Survey
Appendix E - Implementation Plan – Project Profiles
Appendix F - Stakeholder and Public Meeting Summaries Draft Brookings County Master Transportation Plan
Appendix G - Model Road Use Agreement

1. Introduction

This section provides an overview of the background, purpose, and process for the study, including an overview of population trends, general context for the transportation plan, and plan goals.

Brookings County, South Dakota - Background and Demographics

With its history as an early rail center and its rich landscape, Brookings County has developed as both a regional activity center with dynamic urban areas, and as a rural community serving vital agricultural, industrial, and recreational needs. Given the diverse character of the area, the transportation system of the County must strive to balance the needs of a comprehensive range of users. This includes providing and maintaining the infrastructure for transportation carriers and industries that depend on an appropriate combination of intermodal transportation systems to sustain economic activity, and serving residents and visitors who demand high quality facilities to efficiently and sustainably deliver the best transportation services to local motorists, transit users, and bicyclists/pedestrians.

Figure 1 illustrates the Brookings County limits, which is the Master Transportation Plan Study Area. While the City of Brookings falls within the limits of the study area, the focus of this plan is on the county's transportation system, so this effort largely excluded the City of Brookings, except for the growth areas on the urban fringes. The City of Brookings recently completed (June 2011) its own Master Transportation Plan and the findings and recommendations of that plan are acknowledged and included herein, unless specifically stated otherwise.

Population Trends

Brookings County and several of its incorporated communities have experienced moderate population growth since the 2000 Census. Brookings County is one of the few South Dakota counties able to retain and attract new opportunities to sustain this growth. Growth has been welcomed, but brings new challenges. Growth makes "old problems" in the transportation system more evident, and brings the need for solutions more quickly to the forefront. Table 1 illustrates trends in population growth in Brookings County and its municipalities.

Table 1: Brookings County Population Trends (1990 – 2010)

Jurisdiction	1990	2000	2010	Percent Change, 1990-2010
Arlington	908	992	915	0.77%
Aurora	619	500	532	-14.05%
Brookings	16,270	18,504	22,056	35.56%
Bruce	235	272	204	-13.19%
Bushnell	81	75	65	-19.75%
Elkton	602	677	736	22.26%
Sinai	120	133	120	0.00%
Volga	1,263	1,435	1,768	39.98%
White	536	530	485	-9.51%
Brookings County	*25,207*	*28,220*	*31,965*	*26.81%*
South Dakota	*696,004*	*754,844*	*814,180*	*16.98%*

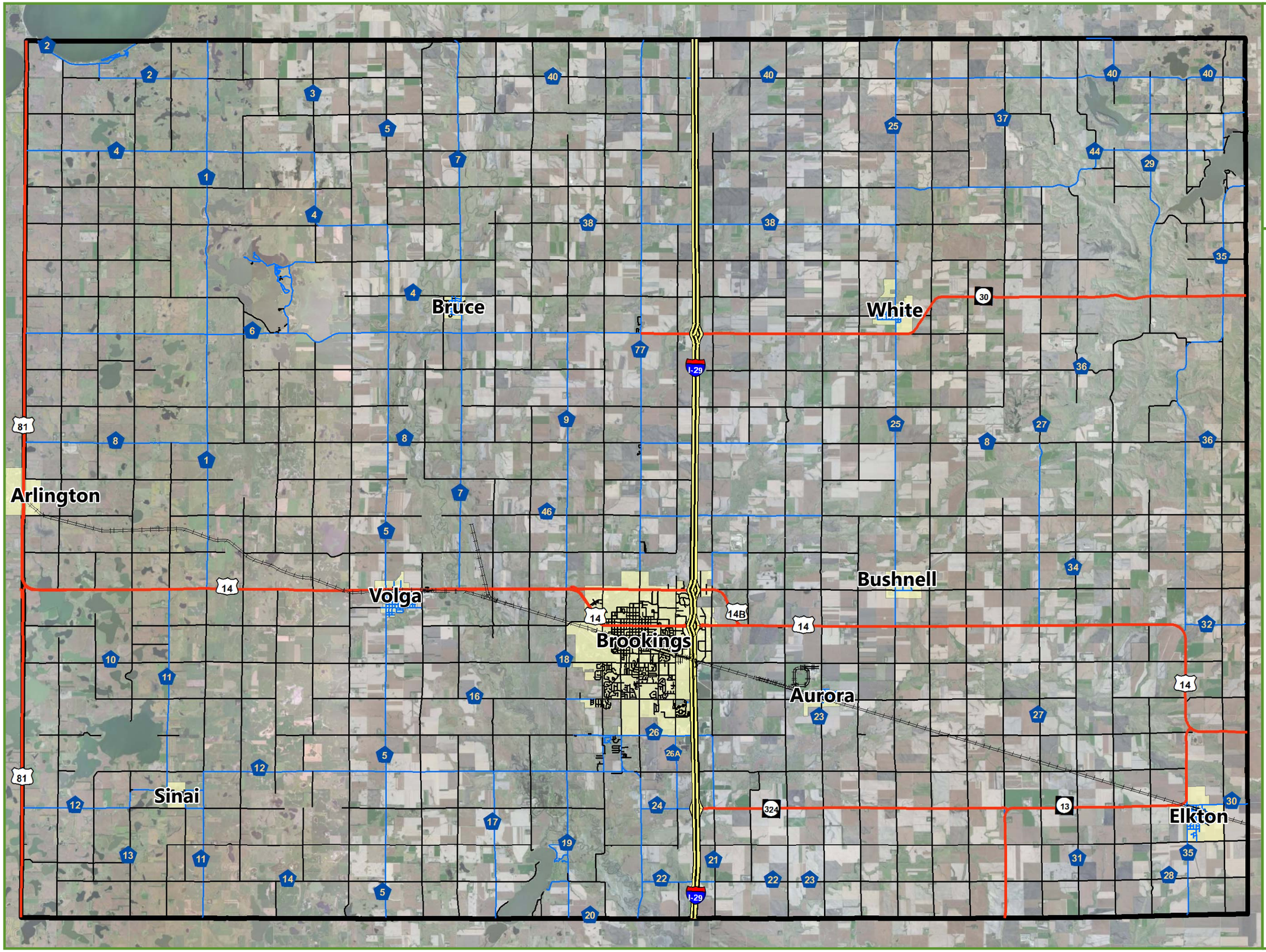
Source: United States Census Bureau, US Department of Commerce

As shown in Table 1, the City of Brookings has experienced steady growth over the past two decades. Neighboring cities, such as Volga and Elkton, are continuing to grow as well. Other towns around the area, after a decline from 1990 to 2000, are on the rise since the 2000 U.S. census. The population of Brookings County is increasing with each passing year.

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 1

Study Area



Legend

- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- City Limits
- Brookings County Limits

N
W E
S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

Population forecasts prepared by the South Dakota Rural Life and Census Data Center at South Dakota State University (SDSU) indicated a 2020 population total in Brookings County of 32,825. This indicates a modest increase from 2010, with likely growth in the Brookings area and the communities located within a short commute to it.

The Role of the Master Transportation Plan in Brookings County

As both the City of Brookings and Brookings County grow and the economy becomes more diversified, traffic levels and patterns are anticipated to change. Of the many transportation challenges that Brookings County will need to address, the Master Transportation Plan examines the current and projected state of the county's roadway, railroad, and trails systems, and makes recommendations for the maintenance, safety, capacity, and mobility improvements to each of these components.



Typical Brookings County Highway

The Brookings County roadway system comprises a well-laid out network of state, county, city, and township roads which distribute trips and provide adequate mobility throughout the county. The roadway system is generally in good repair, but there are a number of on-going preservation and expansion needs. There are also a number of unpaved roads and partially paved routes, which necessitate on-going maintenance. The county is interested in prioritizing preservation and reconstruction needs and identifying standard roadway designs based on a comprehensive functional classification system, in order to efficiently guide infrastructure investment decisions.

Traveler safety in Brookings County is generally well-managed; however, there are some problematic areas. The county has identified several locations with observed safety and operational issues, such as excessive traffic congestion, heavy truck volumes, and/or difficult truck turning movements. In addition, new industrial development has led to increased traffic in some areas, creating new safety and congestion concerns. For example, Bel Brands USA is constructing a 170,000 square-foot Cheese Manufacturing facility on the east side of the City of Brookings, east of I-29 and north of 6th Street. This facility will create as many as 400 new jobs, adding a significant amount of traffic to the county roadway system. The Master Transportation Plan includes a traffic analysis to diagnose safety and operational issues such as these, as well as recommendations for system management and potential access or capacity improvements to reduce points of conflict. The Future Needs Analysis identifies deficiencies in roadway capacity, geometry, right-of-way, and other transportation elements for key roadway routes for the 20-year time frame. The Future Needs Analysis also includes a prioritized list of recommended projects based on expected benefits and costs.

Highway and rail freight transport is of critical importance to the economic vitality of Brookings County. Freight transportation needs in the Brookings area are met by a combination of truck and rail services. The primary routes for intrastate and interstate truck traffic through the county are I-29 and US-14. Some trucks also use other state and county roads to access commercial, agricultural, and industrial areas throughout the county.



Bel Brands USA is constructing a large scale manufacturing facility in Brookings County

The Huron Subdivision is a railway line owned and operated by the Dakota, Minnesota and Eastern Railroad (DM&E) subsidiary of Canadian Pacific Railway. The line stretches for 136 miles (219 km) across southwestern Minnesota and eastern South Dakota, forming the major artery of DM&E's freight traffic. The line is dark territory, meaning that it is not signaled and not equipped with centralized traffic control or automatic block signaling systems. The line is dispatched via radio using track warrant control. The railroad travels east and

west through Brookings County and provides connections to the Canadian Pacific rail network and other railroad systems. There are several spur lines on the DM&E within the City of Brookings and Brookings County used to provide access to grain, sand/gravel, warehoused goods and ethanol. Railroad crossings on paved roads are generally equipped with signals, but many lack gates and active warning devices. Crossings on unpaved roads often lack crossing controls altogether. The Master Transportation Plan includes an assessment of the existing at-grade crossings within the county, including identification of possible safety issues.

Most of the existing pedestrian and bicycle facilities within Brookings County fall within the City of Brookings and other urban areas within the County. As a result, pedestrian and bicycle facility planning efforts have primarily focused on system improvements within or around the City of Brookings. Extensive planning of bicycle and multi-user recreational facilities for the Brookings area was completed as part of the Brookings Area Master Transportation Plan (2011), which identifies a number of pedestrian and bicycle facilities improvements; however, there is a need to evaluate pedestrian and bicycle facilities at a countywide level in order to identify potential needs, opportunities, gaps, and barriers. Pedestrian and bicycle travel should also be a consideration for any future expansion of the transportation network and should be addressed in the Master Transportation Plan where appropriate.



Brookings Area Transit Authority Bus

The primary transit service provider in Brookings County is the Brookings Area Transit Authority (BATA), which provides advance-reservation transit service in the City of Brookings and weekly service to other communities. BATA has conducted an extensive system assessment and planning for the future. Their current plan calls for establishment of a new fixed route system serving the SDSU campus and other schools, commercial destinations in the downtown and outlying areas, and employment destinations, as well as possible expansion of service to other areas throughout the county.

General aviation services are provided at the Brookings Municipal Airport through a fixed-base operator. The closest commercial passenger service is located in Watertown or Sioux Falls, South Dakota. A recent airport planning effort resulted in a new master plan which identifies the realignment of the existing runways in the future. The Master Transportation Plan will examine proposed changes in the airport layout plan and how they may affect the future ground transportation street network needs surrounding the airport.

The Master Transportation Plan examines the transportation facility needs and potential solutions in the community. The Master Transportation Plan is intended to be a living document that can be used as a blueprint, or "road map" to accommodate the interests or desires of private land developers, elected and appointed local officials, and members of the traveling public.

The importance of the Brookings County Master Transportation Plan in defining current system deficiencies, identifying future system needs, and ultimately prioritizing the transportation needs for Brookings County are the key outputs of the planning process. With limited budgets for transportation infrastructure maintenance and construction, available funding for planning level documents meant to guide future system improvements must be efficiently used to achieve the intended benefit. It is therefore very important for the county and the South Dakota Department of Transportation (SDDOT) to have up-to-date, reliable (documented) transportation system needs sorted by priority and ability to deliver (costs and other considerations), especially in the competition for available Federal and State improvement funding.

Study Guidance (Study Advisory Team)

The Brookings County Master Transportation Plan was guided by a Study Advisory Team (SAT) comprised of technical staff and elected officials from SDDOT, Federal Highway Administration (FHWA), Brookings County, and the City of Brookings. The SAT met five times during the development of the Master Transportation Plan, and provided input, feedback, and comments on the components of the plan's chapters. The SAT also provided available background data from which to assess and evaluate transportation system issues and needs. The SAT was instrumental in selecting the list of improvement needs associated with the plan, including a prioritization (short-, medium-, or long-term) of improvements and their estimated costs.

The Master Plan's Goals

Three major goals were established for the Brookings County Master Transportation Plan. These goals are as follows:

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

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

Method and Assumptions

The Master Transportation Plan was completed over a 10-month schedule. There were three phases to the project schedule:

1. Inventory and analysis of existing and future conditions and identification of problems and needs.

2. Application of the "toolbox" – development of strategies, alternatives, and possible solutions to potentially solve problems and fulfill needs.

3. Selection of alternatives for further study and development, provide for integration with other investments, and prioritization of planned improvements. The Study timeline and process is shown in Figure 2. Refer to Appendix A for a technical memorandum documenting the SAT approved methods and assumptions for the study.

Recognition of Previous, Related Studies

The Brookings County Master Transportation Plan was prepared in coordination with the City of Brookings Master Transportation Plan, completed in 2011. Of particular importance in this plan was the integration of roadway and multimodal planning in the growth area of Brookings and surrounding communities. Transportation system investments have been ongoing in the Brookings area since the completion of the City's master transportation plan, so it is critical that the Brookings County Master Transportation Plan be consistent with previous policy and improvement decisions.

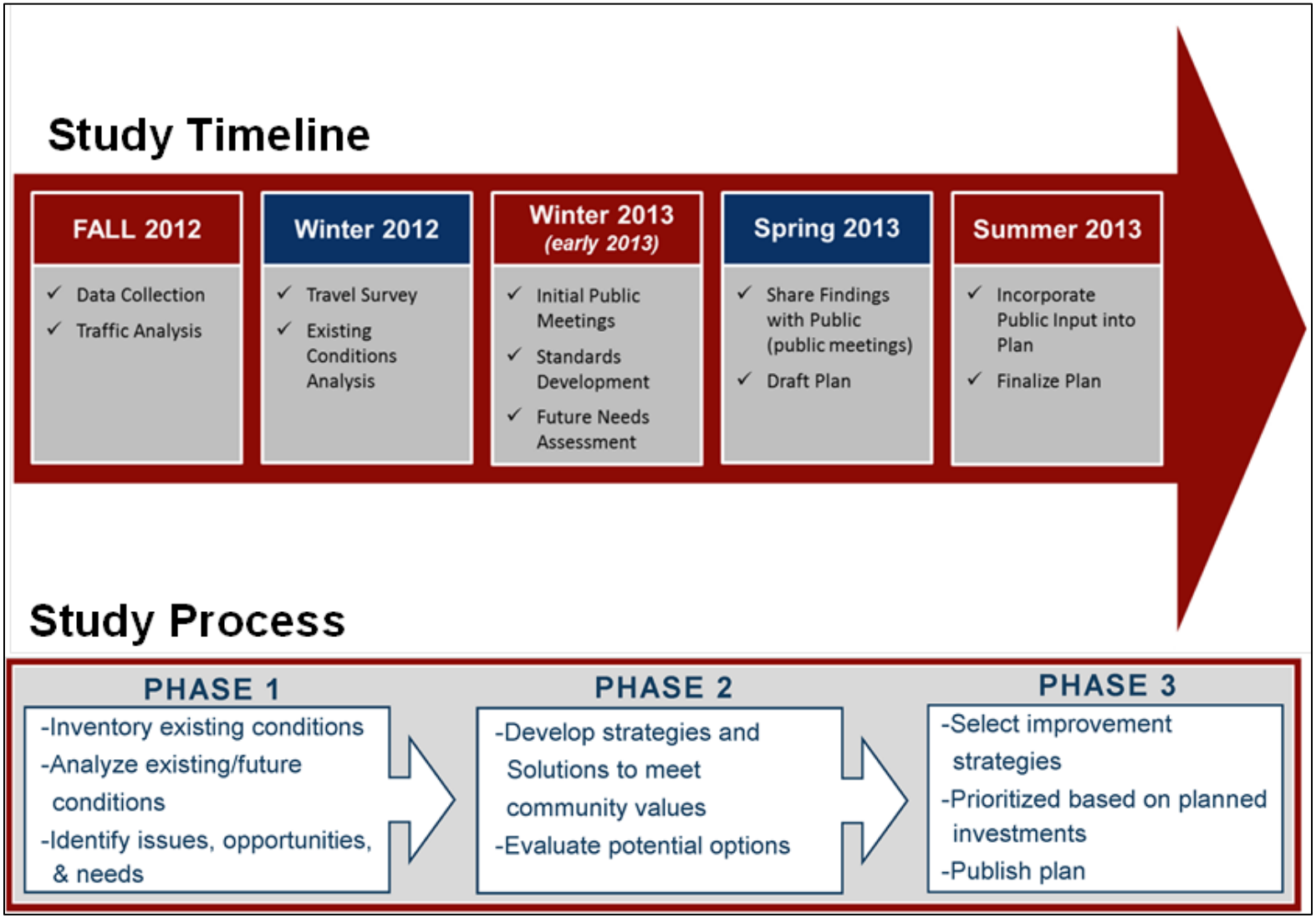


Brookings County continues to evolve from its origins as an agricultural community



Railroad Bridge in Brookings County

Figure 2: Study Timeline and Process



2. Existing Conditions and Needs Assessment

This section highlights the existing conditions of the Brookings County transportation system and summarizes the needs identified as part of the planning process.

Existing Conditions Inventory

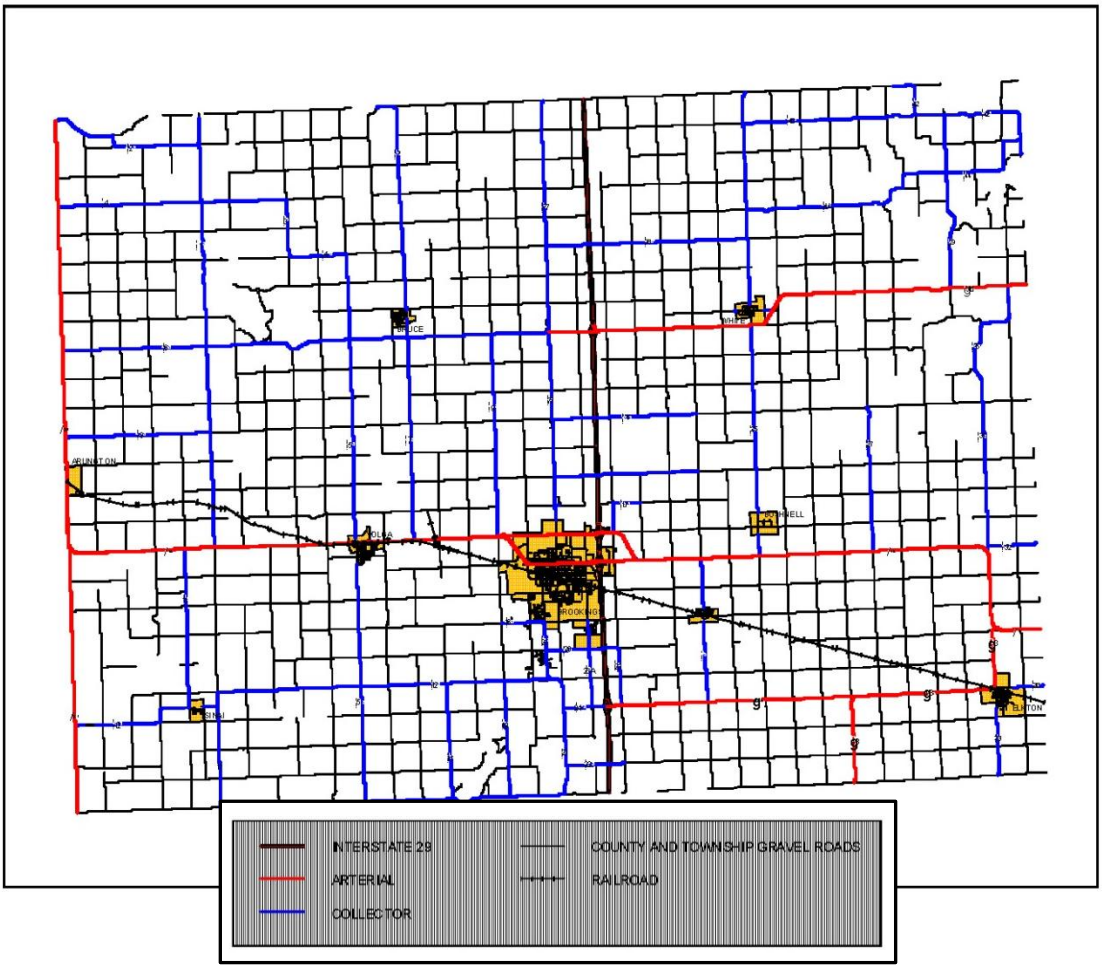
An inventory of the existing conditions for the transportation infrastructure within Brookings County was completed in order to help identify transportation-related issues and opportunities. This included a review of the existing roadway network, traffic volumes and operations, crash history, non-motorized transportation facilities, transit service, airport, and freight facilities. The following sections summarize the key findings of this review.

Existing Roadway Network

The primary routes for intrastate and interstate traffic through Brookings County are I-29, US-14, US-14 Bypass and US-81. These routes carry the highest amount of traffic through the county. Near the City of Brookings US-14 splits into two routes; one route is designated as US-14 Bypass, which is a bypass of the urban area of Brookings along the northern edge of the city limits and the other route designated as US-14 traveling through the urban core of Brookings

Brookings County has an existing Major Roads Plan which was developed in 2004. This plan classifies US-14, US-14 Bypass, US-81, SD-13, SD-324, and SD-30 as "arterials." I-29 is classified separately as an "interstate." Figure 3 shows the existing (2004) Major Roads Plan for Brookings County.

Figure 3: Existing Brookings County Major Roads Plan



Note that it is the intent of this Master Plan to update/revise the existing Major Roads Plan to better serve the traveling public. The proposed Major Roads Plan is presented in Section 3.

These US and SD routes provide the backbone of the roadway network within the county; however, there is an unbalanced distribution as all SD routes are located in the eastern part of the county, east of I-29 providing a strong network of east/west routes. The western portion of Brookings County only has two arterials: US-14 serving as an east/west route and US-81 serving as a north/south route. With no SD routes in the western part of the county, a more robust county road system is needed to fill in the existing network and connect the rural communities to the urban areas and principal arterials.

Traffic Counts

As part of the existing traffic analysis, turning movement counts were collected from 11 intersections identified by the Study Advisory Team as key intersections in Brookings County. The 11 intersections where turning movement counts were collected from are as follows:

1. County Road 6 and County Road 7
2. County Road 6 and County Road 77
3. County Road 8 and County Road 5
4. County Road 26 and County Road 77
5. County Road 26 and County Road 21
6. County Road 12 and County Road 5

7a. County Road 77 and Main Avenue

7b. County Road 12 and Main Avenue

8. County Road 12 and County Road 11
9. County Road 30 and County Road 33
10. County Road 10 and County Road 13

The turning movement counts were collected on Tuesday, October 2, 2012. This date was chosen to account for the traffic generated by fall harvest and to incorporate traffic generated by schools. Data was collected during the AM (7am to 9am) and PM (3pm to 6pm) peak periods by using Miovision video camera equipment. The turning movement counts were used to establish current year intersection operations and to provide the basis to determine future year intersection operations (presented later in this section). A summary of the turning movement counts is included in the Traffic Data Collection Forecast Technical Memorandum found in Appendix B.

Historic Crash Data Analysis

One way an existing roadway network performance is measured is by traveler safety. Traveler safety was measured by a review of the total amount of crashes occurring on a roadway and the severity of those crashes. The goal is to improve traveler safety by locating high crash locations and determining safety improvements to reduce severity and amount of crashes. For this analysis, a review of Brookings County crash history was completed to identify crash patterns and problematic locations.

Historical crash data for the most recently available three-year period (2009-2011) was reviewed (provided by SDDOT). Shown in Table 2 is a summary of the total number of crashes in Brookings County by severity.

Of the total crashes in Brookings County, 78 percent resulted in no injury or wild animal hit, 21 percent resulted in an injury and less than 1 percent resulted in a fatality. Figure 4 includes a map showing the location of all of the crashes identified. A review of the fatal crashes on the map shows half of the locations are spread throughout Brookings County, whereas the other half are located either in the City of Brookings or between the cities of Brookings and Volga. With the recent completion of the City of Brookings Area Master Transportation Plan (2011) the historical crash data within the limits of the City of Brookings was not analyzed as a part of this study.

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 4

Crash History

Legend

Crash Locations*
by Injury Severity

- Fatal injury (10)
- Incapacitating (57)
- Non-incapacitating (127)
- Possible (179)
- Wild animal hit (322)
- No injury (1,036)
- Intersections - Top 11
- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- City Limits
- Brookings County Limits

*Crashes shown are from 2009 - 2011.

Top 11 Intersection Crash Locations* (Not Including the City of Brookings)		
	Location	# of Crashes
1	US 81 & US 14	12
2	22nd Ave (472nd St) & CR 26 (32nd St)	6
3	US 14 Bypass & US 14 North T-intersection	6
4	Railroad Crossing (west of 467th Ave) & US 14	5
5	467th Ave & US 14	5
6	US 14 Bypass & US 14 (6th St) T-intersection	4
7	CR 23 (476th Ave) & US 14	4
8	Hansina Ave & US 14	3
9	465th Ave (Caspian Ave) & US 14	3
10	CR 29 (485th Ave) & SD Hwy 30 (203rd St)	3
11	CR 77 (471st Ave) & CR 24 (217th St) T-intersection	3
* Crashes from 2009 - 2011		

N W E S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

Table 2: Brookings County Crash History

Brookings County Crash Severity	# of Crashes
Fatal Injury	10
Incapacitating Injury	57
Non-capacitating Injury	127
Possible Injury	179
Wild Animal Hit	322
No Injury	1,036
Total Crashes	**1,731**

In addition to the severity of crashes, the top intersection crash locations were determined for Brookings County (intersections in the City of Brookings were omitted). Shown in Table 3 below is a summary of the top intersection crash locations in Brookings County for the years of 2009, 2010, and 2011.

Table 3: Top Intersection Crash Locations

	Location	# of Crashes
1	US-81 & US-14	12
2	22nd Ave (472nd St) & CR-26 (32nd St)	6
3	US-14 Bypass & US-14 North T-intersection	6
4	Railroad Crossing (west of 467th Ave) & US-14	5
5	467th Ave & US-14	5
6	US-14 Bypass & US-14 (6th St) T-intersection	4
7	CR-23 (476th Ave) & US-14	4
8	Hansina Ave & US-14	3
9	465th Ave (Caspian Ave) & US-14	3
10	CR-29 (485th Ave) & CR-30 (203rd St)	3
11	CR-77 (471st Ave) & CR-24 (217th St) T-intersection	3

Note: Excludes City of Brookings

Of the top 11 crash locations, 8 are located along US-14 and of those 8 intersections, 5 are located on US-14 between Volga and the City of Brookings. Two of the locations along US-14 between Volga and the City of Brookings have fatal crashes (locations 3 and 4). The following is a summary of the critical factors identified at the top five crash locations.

US-81 and US-14 – Location 1

Crash patterns occurring at this location show 10 of the 12 crashes occurred during daylight hours, 8 of 12 occurred during dry conditions and 5 of 12 were right-angle crashes. A contributing cause of the crashes is the horizontal geometry and having an intersection in the middle of a horizontal curve. An additional factor contributing to crashes is the reflection of the sun off of the lake east of the intersection.



US-81 and US-14 – Location 1
Source: Google Earth

22nd Ave (472nd Ave) and CR-26 (32nd St) – Location 2

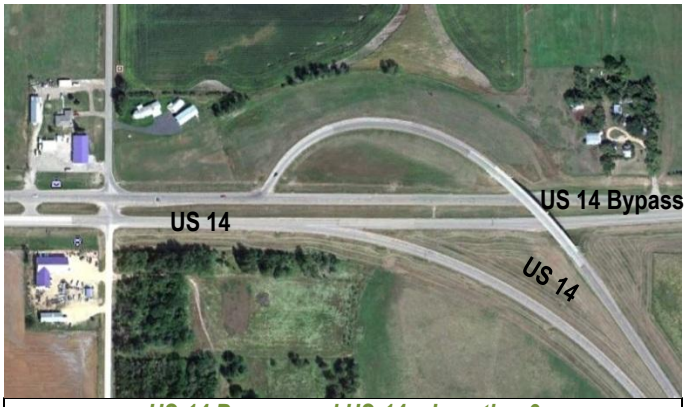
Location 2 is the intersection of 22nd Avenue (472nd Avenue) and CR-26 (32nd Street/215th Street) where 22nd Avenue is stop controlled and CR-26 is free flowing. Crash patterns occurring at this intersection have shown 5 of the 6 crashes occurred during daylight hours in dry conditions and all 6 crashes were right-angle crashes. Based on a visual review of the intersection coupled with the crash patterns, one contributing cause of the crashes may be drivers expecting the intersection to be all-way stop controlled instead of two-way stop controlled as 5 of 6 crashes had drivers issued citations for failing to yield. Inadequate sight lines may also be an issue as there are trees blocking the view shed at the intersection.



22nd Ave & CR-26 – Location 2
Source: Google Earth

US-14– Location 3

A review of crashes at this location indicates 5 of the 6 crashes occurred during daylight hours (including the fatality) in dry conditions and all 6 crashes were right-angle crashes. These crashes tend to be related to driver confusion due to unexpected conditions and driver inattention. The design of the entrance for traffic is stop controlled; however, the roadway design leading up to the intersection gives the driver an expectation of a freeway operation with a merge condition where US-14 and US-14 Bypass come together.



US-14 Bypass and US-14 – Location 3
Source: Google Earth

US-14 Railroad Crossing (west of 467th Ave) – Location 4

At this fatal crash location there is an at-grade railroad crossing of US-14. Crash patterns shown 3 of the 5 crashes occurred during nighttime hours on an unlit roadway, 3 of the 5 crashes were during snow/wet surface conditions and 3 of the 5 crashes resulted in injuries. There are no railroad vehicle gates at this location.

467th Ave and US-14 – Location 5

Location 5 is the intersection of US-14 and 467th Avenue where 467th Avenue is stop controlled and US-14 is free flowing. Crash patterns occurring at this intersection have shown 5 of 5 crashes resulted in no injuries and 3 of 5 crashes occurred during daylight hours in dry conditions. Each crash type for this location was different with 2 crashes due to driver error and 2 crashes due to wild animal hits. The crash frequency at this location appears to be a result of the random nature of crashes as no specific issue was identified.



US-14 Railroad Crossing – Location 4
Source: Google Earth

Existing Non-Motorized Transportation Network (pedestrian and bicycle facilities)

Most of the existing pedestrian and bicycle facilities within Brookings County fall within the City of Brookings and other urban areas within the county. As a result, pedestrian and bicycle facility planning efforts have primarily focused on system improvements within or around the City of Brookings.

Extensive planning of bicycle and multi-user recreational facilities for the Brookings area was completed as part of the Brookings Area Master Transportation Plan (2011), which identifies a number of pedestrian and bicycle facilities improvements for the City of Brookings.



467th Ave and US-14 – Location 5
Source: Google Earth

There are currently no cross county routes or routes which connect an urban area to an urban area or an urban area to a lake or park.

Existing and Planned Transit Services and Facilities

The primary transit service provider in Brookings County is the BATA, which provides advance-reservation transit service in the City of Brookings and weekly service to other communities. BATA has conducted an extensive system assessment and planning for the future. Their current plan calls for establishment of a new fixed route system serving the SDSU campus and other schools, commercial destinations in the downtown and outlying areas, and employment destinations, as well as possible expansion of service to other areas throughout the county.

Existing Airport and Freight Facilities

General aviation services are provided at the Brookings Regional Airport through a fixed-base operator. The closest commercial passenger service is located in Watertown or Sioux Falls, South Dakota. A recent airport planning effort resulted in a new master plan for the Brookings Regional Airport which identifies three alternatives requiring further investigation – new airport at a new location, or two runway realignment/expansion options for the airport at the existing location. Realignment options at the existing location resolves critical Federal Aviation Association (FAA) compliance issues but also impacts the roadway network surrounding the airport. The two realignment options will require a permanent closure of 469th Avenue between 212th Street and 213th Street. The preferred alternative identified in the Brookings Regional Airport Expansion Environmental Assessment, approved by FAA in March 2012, is known as the "BKS Expansion Alternative". Therefore, 469th Avenue between 212th Street and 213th Street would need to be closed for the proposed airport improvement.

Freight services are provided through two transportation modes – railroad and roadway. The existing roadway network has been discussed previously so the focus here is on railroad. The DM&E railroad serves Brookings County crossing through the cities of Arlington, Volga, Brookings, Aurora, and Elkton. The DM&E railroad through Brookings County is part of the east/west railroad route through South Dakota connecting Wyoming to Minnesota and passing through major cities of Rapid City, Pierre, Huron, and Brookings. Grain is the major commodity hauled by the DM&E through Brookings County with small amounts of bentonite, cement, and wood chips (according to the South Dakota Rail Plan).

<u>Railroad Crossing Analysis</u>

Based on a review of SDDOT and USDOT railroad crossing inventory data, the DM&E railroad carries approximately 4 to 6 trains per day through Brookings County with additional switching movements occurring within the industrial areas throughout the county. There are approximately 40 at-grade railroad crossings within Brookings County, excluding the City of Brookings. Many of the at-grade crossings within the county are equipped with only a minimum level of crossing control, such as stop signs and cross-bucks. There is a need for additional study at the busiest crossings to identify potential safety and operational issues, such as vehicle and pedestrian crashes and vehicle delays due to blocked crossings.

Table 4 lists the 10 busiest crossings in Brookings County (excluding the City of Brookings) based on vehicle exposures. Vehicle exposure is a common measure of railroad crossing volume which is calculated as a function of average daily train volumes and average daily traffic volumes (i.e., train volumes X traffic volumes), which can be used to prioritize railroad crossing investments.

Table 4: Railroad Crossing Inventory

Name	Location	Train/Vehicle Exposures	Crossing Control	Crashes
US-14	West of Volga	18,250	Cross-bucks	1
Caspian Ave	Volga	15,438	Gates, cross-bucks	0
Hansina St	Volga	12,150	Cross-bucks	3
US-14	East of Volga (spur line)	8,026	Cross-bucks, pavement markings	4
Kasan Ave	Volga	7,470	Cross-bucks	3
CR-33 (486th Ave)	Elkton	6,665	Cross-bucks, pavement markings	2
SD-13	Elkton	6,585	Gates	0
Samara Ave	Volga	6,450	Cross-bucks	2
N Broadway/ 476th Ave	Aurora	5,075	Gates, cross-bucks	2
N Elk St	Elkton	4,000	Cross-bucks, stop signs	1

Source: US DOT Grade Crossing Inventory Forms

There are a number of potential contributing factors to safety and operational issues at these railroad crossings. The following is a brief list of the most common issues:

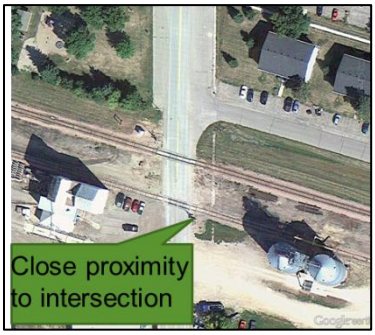
- Crossing geometrics: Intersection skew, proximity to driveways, etc.
- Crossing control: Vehicle gates, flashing lights, cross bucks, train activated warning, etc.

Potential crossing control improvements include but are not limited to the following:

- Closure or Grade separation (railroad underpass or overpass).
- Vehicle Gates.
- Raised center medians or channelization.
- Pedestrian gates or channelization.
- Advanced warning signs and pavement markings.
- Flashing lights and wayside horns.
- Stop signs and cross-bucks.
- Railroad quiet zone (requires feasibility study).



US-14 (West of Volga)
Source: Google Earth



CR-23 (Broadway Ave, Aurora)
Source: Google Earth

Existing Conditions Traffic and Operations Analysis

In order to better understand existing traffic operations within Brookings County, traffic capacity and operations analyses were conducted based on 2012 traffic volumes provided by SDDOT and commonly used engineering standards. The following is a summary of this analysis.

Existing (2012) Route Volume to Capacity

The ratio of volume to capacity provides a measure of congestion along a stretch of roadway and can help identify where roadway improvements might be needed. Congestion along a roadway is judged to exist when the ratio of traffic volume to roadway capacity approaches or exceeds 1.0. As a route's volume increases and approaches the planning level capacity, traffic operations will deteriorate.

A volume to capacity analysis was completed for select roadway segments. The routes selected for the analysis were those where the SDDOT provided existing average daily traffic (ADT) data over multiple years. The existing 2012 ADT volumes for selected routes in Brookings County are shown in Figure 5. Also displayed on the map are planning level volume to capacity ranges for the selected routes. The planning level capacity for a route is determined by the number of lanes along the route and as the number of lanes on a roadway increase so does the roadway capacity. Table 6 summarizes the planning level capacity vehicles per day (VPD) based on number of lanes.

Table 5: Planning Level Traffic Capacity Thresholds

Number of Lanes	Planning Level Capacity (VPD)
2	8,000
3	16,000
4	20,000
5	30,000

Source: South Dakota Road Design Manual

For the existing (2012 base) year no roadway segments are above their planning level capacity threshold and only one segment, the US-14 Bypass route between I-29 and 16th Avenue is operating in the 80 percent to 100 percent capacity range. The majority of the routes in Brookings County are operating below 60 percent capacity. These results indicate that there are no roadway capacity deficiencies within Brookings County, based on existing (2012) traffic volumes.

Existing (2012) Intersection Level of Service

The transportation industry defines the quality of service offered by highway facilitates under specific traffic demands by using Level of Service (LOS) rating. LOS is measured on a scale of A through F, representing the operating conditions of the roadway facility based on speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience measures. LOS A represents traffic that is free flowing on an uncongested roadway while LOS F represents traffic that is creeping or stopped due to a severely congested roadway. Table 7 displays the general definitions of each LOS and the associated delay ranges for signalized, two-way stop controlled and all-way stop controlled intersections. For the purposes of this study, LOS D is considered to be the primary mobility goal.

Intersections Studied

County Road 6 & County Road 7
LOS: A/A
A/A | A/A | A/A | A/A

County Road 6 & County Road 77
LOS: NA/NA
A/A | A/B | B/A | A/A

County Road 8 & County Road 5
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 26 & County Road 77
LOS: NA/NA
A/A | B/C | C/C | A/A

County Road 26 & County Road 21
LOS: NA/NA
A/A | A/A | A/A

County Road 12 & County Road 5
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 77 & Main Avenue
LOS: NA/NA
A/A | A/A | B/B

County Road 12 & Main Avenue
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 12 & County Road 11
LOS: NA/NA
A/A | A/A | A/A

County Road 30 & County Road 33
LOS: A/A
A/A | A/A | A/A | A/A

County Road 10 & County Road 13
LOS: NA/NA
A/A | A/A

Inset Legend
- Intersection
- Stop Sign
- X/X Existing AM/PM Level of Service

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 5
Existing (2012) Year Traffic Volumes & Level of Service

Legend

Intersection

Volume to Capacity Ratio
- Above Capacity Threshold (1.0+)
- Between 80% and 100% of Capacity (0.8 - 1.0)
- Between 60% and 80% of Capacity (0.6 - 0.8)
- Below 60% of Capacity (0.0 - 0.6)

Rail Roads
Interstate
State Highways
County Highways (paved)
County & Township Roads (gravel)
City Limits
Brookings County Limits
X,XXX Average Daily Traffic (ADT)

N W E S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

Table 6: Level of Service (LOS) Definitions

Level of Service	Operating Conditions	Delay Range for Signalized Intersections	Delay Range for Two way / all way stop Intersections
A	Primarily Free Flow Operations/Exceptional Progression/Short Cycle Length	Less than or equal to 10.0 seconds	Less than or equal to 10.0 seconds
B	Reasonably Unimpeded Operation/Highly Favorable Progression/ Short Cycle Length	10.1 seconds to 20.0 seconds	10.1 seconds to 15.0 seconds
C	Stable Operation/Favorable Progression/Moderate Cycle Length	20.1 seconds to 35.0 seconds	15.1 seconds to 25.0 seconds
D	Less Stable Operation/Ineffective Progression/Cycle Length is Long	35.1 seconds to 55.0 seconds	25.1 seconds to 35.0 seconds
E	Unstable Operation/ Unfavorable Progression/Long Cycle Lengths	55.1 seconds to 80.0 seconds	35.1 seconds to 50.0 seconds
F	Low Speed/Congestion/Poor Progression/Long Cycle Lengths/Unable to Clear Queues	Greater than 80.1 seconds	Greater than 50.1 seconds

Source: Highway Capacity Manual (HCM)

The 11 study intersections were analyzed to determine the delay and LOS under existing conditions (2012). Each of the 11 intersections analyzed had operations at a LOS of C or better. See Figure 5 for the results of each individual intersection. These results indicate the 11 key intersections selected for study in Brookings County have no existing operational issues. The Highway Capacity Software output report sheets are provided in the Traffic Forecast Memorandum found in Appendix B.

Future Conditions Traffic Capacity and Operations Analysis

In order to better understand how projected future traffic volumes might impact traffic operations within Brookings County, a future year traffic operations analysis was conducted based on the forecasted 2032 traffic volumes. The following is a summary of this analysis.

Traffic Forecasts

In order to understand how traffic might operate in the future based on expected increases in traffic volumes, future traffic projections were developed for the selected roadway segments and 11 key intersections included in the traffic analysis. The future traffic projections were developed using a linear regression analysis are based on historical ADT and known future development plans within Brookings County. Figure 6 includes a comparison of the existing (2012) year and forecast (2032) year traffic volumes and illustrates the anticipated growth over 20 years from the existing year to the forecast year. Refer to Appendix B for additional detail on the development of traffic forecasts.

Projected (2032) Route Volume to Capacity

See Figure 7 for the forecast (2032) year traffic volumes and the planning level volume to capacity ranges for the roadway segments evaluated. Of these, only the US-14 bypass between I-29 and 16th Avenue is in the “above capacity threshold” which means the volume exceeds the planning level capacity threshold. Even though this route has exceeded the planning level capacity threshold, it will still be able to serve the traveling public, however more unstable conditions will occur including longer queues and delays at intersections and longer travel times through this segment. Additionally, 3 segments of US-14/US-14 Bypass are in the 80 percent to 100 percent volume to capacity range and 1 segment of US-14 Bypass is in the 60 percent to 80 percent volume to capacity range. All other roadway segments are below the 60 percent volume to capacity range. These results indicate nearly all routes for the forecast (2032) year in Brookings County have no capacity issues with the exception being one segment of the US-14 Bypass in the City of Brookings.

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 6
Existing (2012) and Forecast (2032) Year Traffic Volumes

Legend

- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- City Limits
- Brookings County Limits
- X,XXX Existing Average Daily Traffic (ADT)
- (X,XXX) Forecast Average Daily Traffic (ADT)

N W E S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

Intersections Studied

County Road 6 & County Road 7
LOS: A/A
A/A | A/A | A/A | A/A

County Road 6 & County Road 77
LOS: NA/NA
A/A | B/B | B/B | A/A

County Road 8 & County Road 5
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 26 & County Road 77
LOS: NA/NA
A/A | C/D | F/C | A/A

County Road 26 & County Road 21
LOS: NA/NA
A/A | A/A | A/A

County Road 12 & County Road 5
LOS: NA/NA
A/A | A/A | B/A | A/A

County Road 77 & Main Avenue
LOS: NA/NA
A/A | A/A | B/B

County Road 12 & Main Avenue
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 12 & County Road 11
LOS: NA/NA
A/A | A/A

County Road 30 & County Road 33
LOS: A/A
A/A | A/A | A/A | A/A

County Road 10 & County Road 13
LOS: NA/NA
A/A | A/A

Inset Legend
- Intersection
- Stop Sign
- X/X Existing AM/PM Level of Service

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 7
Forecast (2032) Year Traffic Volumes & Level of Service

Legend

Intersection

Volume to Capacity Ratio
- Above Capacity Threshold (1.0+)
- Between 80% and 100% of Capacity (0.8 - 1.0)
- Between 60% and 80% of Capacity (0.6 - 0.8)
- Below 60% of Capacity (0.0 - 0.6)

Rail Roads
Interstate
State Highways
County Highways (paved)
County & Township Roads (gravel)
City Limits
Brookings County Limits
X,XXX Average Daily Traffic (ADT)

N W E S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

Projected (2032) Intersection Level of Service

See Figure 7 for traffic operations analysis for forecast (2032) year. Based on the results of the forecast (2032) year intersection operational analysis only the CR-26/CR-77 intersection has an approach with operations at LOS F during the AM peak hour. All other intersections and their approaches had acceptable operations with LOS of D or better. The Highway Capacity Software output report sheets are provided in the Traffic Forecast Memorandum found in Appendix B.

Traffic Operations Analysis Summary

From a traffic operations and capacity perspective, none of the 11 key intersections or the roadway segments studied as part of this analysis will require operational or capacity improvements for the existing (2012) year. For the forecast (2032) year, one intersection (CR-26 and CR-77) and one roadway segment (US-14 Bypass between I-29 and 16th Avenue) are anticipated to require improvements due to operational or capacity issues.

Stakeholder Engagement Summary

A key emphasis in the development of the Brookings County Master Transportation Plan was to promote effective decision-making by fostering a cooperative spirit among state, regional and local partners, as well as the general public. To that end, a comprehensive stakeholder engagement program was developed. The stakeholder engagement program included two rounds of meetings and a comprehensive online travel survey. The first phase of the stakeholder engagement program concluded in January of 2013 and the second phase concluded in June 2013. The following is a summary of the stakeholder engagement efforts. Refer to Appendices C and F for a detailed memorandum documenting each meeting.

Stakeholder and Public Meeting Results

As part of the development of the Brookings County Master Transportation Plan, stakeholder and public meetings were held by the Study Advisory Team to engage participants in the planning of their future transportation network. This effort was conducted twice, in January 2013 and again in June 2013, and included a series of individual meetings or focus groups with key stakeholders, including the following:



Public open house, January 2013

- Brookings County Highway Department
- Brookings County Planning, Zoning, and Drainage Department
- Brookings County Emergency Services (ambulance).
- City of Brookings (community development and public works)
- City of Brookings Emergency Services (police and fire)
- City of Volga
- Richland Township
- Oak Lake Township
- SDSU – Local Transportation Assistance Program (LTAP)
- South Dakota State University (SDSU) – Innovation Campus Research Park
- Brookings Area Economic Development Corporation (EDC)
- East Brookings Business and Industry Association (EBBIA)
- Daktronics (major employer)

In addition, a series of three public open house meetings were held to present the existing conditions and needs assessment at separate locations throughout the county, including:

- City of Elkton
- City of Volga
- City of White

The following is a summary of the general comments and input received at the initial meetings held in January 2013. See Figure 8a through 8d for the location specific issues and opportunities identified as part of the initial stakeholder engagement activities.

Roadway Geometry Issues:

A number of roadway and intersection geometric issues were identified throughout the county. This includes issues generally related to growth and development at the edges of the City of Brookings and issues within the rural or small urban areas of the county. The following is a summary of the key problem locations identified:

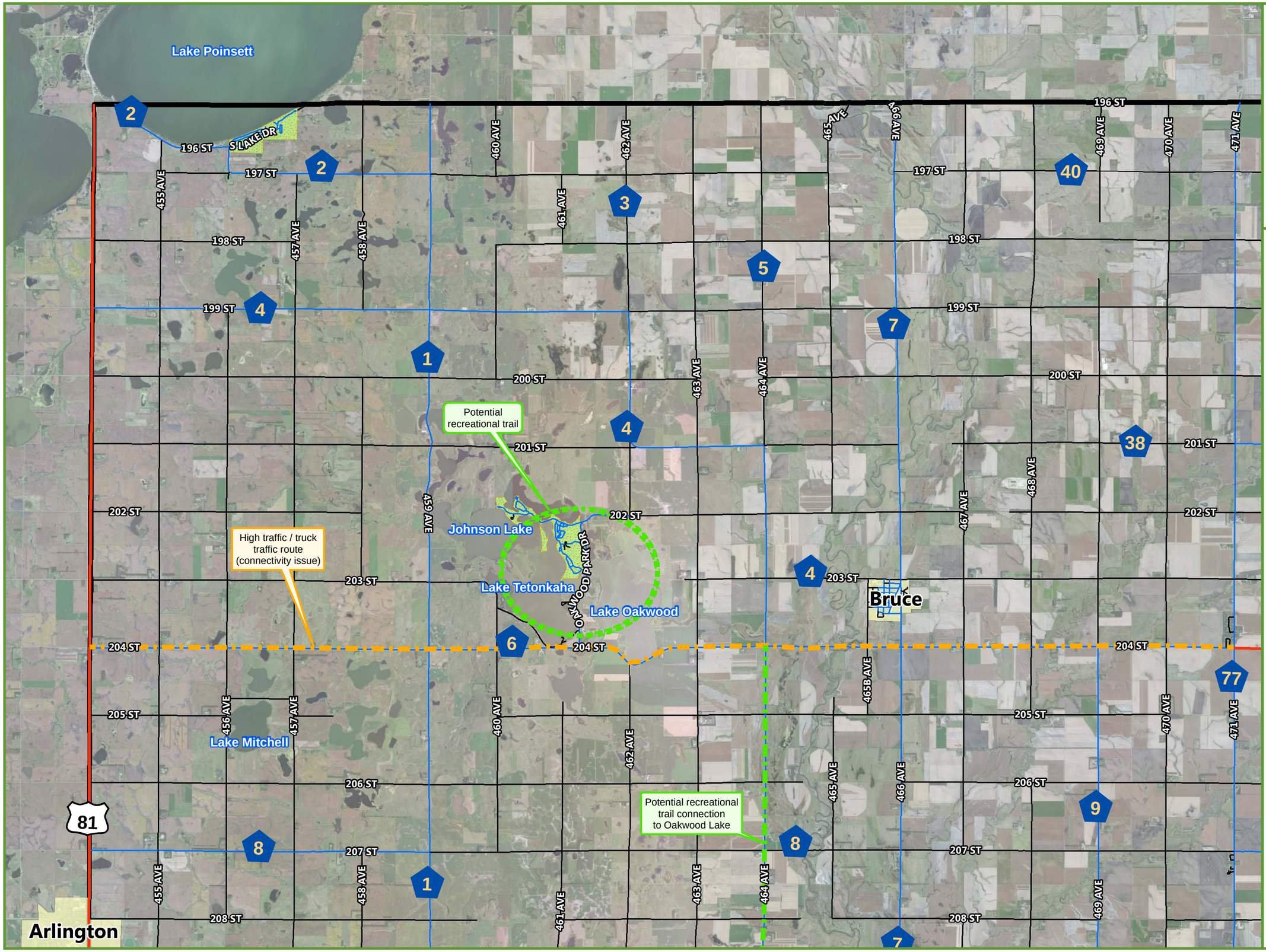
- City of Brookings Expansion Areas – Typical issues are related to network connectivity, roadway safety, or traffic operations (volume, speed, etc.).
    - CR-16 (20th Street) bridge – I-29 is a major barrier to east-west connectivity. Local plans have identified a bridge and/or interchange at CR-16 as a future project.
    - 34th Street paving – 34th Street is a parallel route east of I-29 connecting existing interchanges at SD-324/CR-24 (217th St) and US-14 (6th St). A two-mile segment is unpaved gravel, limiting connectivity for trucks and commuters.
    - US-14 bypass – as a result of traffic increases, congestion and delay are becoming problematic (particularly during special events).
    - CR-77 (Main Ave)/CR-12 (216th St) – S-curve and intersection sightline problems.
    - Western Avenue – high truck traffic and speeding issues.

- Brookings County/Small Urban – typical issues include intersection geometrics (skew, curves, etc.), flooding, and maintenance of gravel roads.
    - 217th St/Cornell Ave intersection (Elkton) – skewed intersection on a curve.
    - Hwy-13/US-14 intersection (north of Elkton) – skewed intersection, sightline issues.
    - Hwy-30 (204th St)/CR-25 (475th Ave) intersection (White) – sightline and topography issues.
    - Big Sioux River bridges (southwest quadrant of County) – many old/obsolete bridges in need of repair or removal.
    - Hwy-13/Hwy-324 intersection (west of Elkton) – skewed intersection on a curve.
    - 484th Ave (Richland Township) – needs maintenance to correct soft/low spots.
    - 214th St (Richland Township) – needs maintenance to accommodate increased truck traffic (New Dale manufacturing operations).
    - CR-27 (482nd Ave) (Richland Township) – through route connecting US-14 and Hwy-13. Gravel segment should be paved.
    - 483rd Ave (Oak Lake Township) – roadway maintenance issues.
    - CR-47 (481st Ave) from CR-44 (200th St) to Hwy-30 (203rd St) (Oak Lake Township) – high traffic gravel route. Should be paved.
    - Caspian Ave/US-14 Intersection (Volga) – safety and operation (delay) issues.
    - US-14 (Volga) – speeding issues.
    - 213th St (south of Volga) – interest in paving to create an alternative connection to City of Brookings.
    - CR-6/Hwy-30 (204th St) (west side of county) – high traffic highway.
    - CR-12 (southwest side of county) – high traffic highway.
    - CR-35 (east side of county) – wind farm access route.
    - CR-26 (215th Street) (west side of county) – flooding issues.
    - 214th St (Aurora) – pave to improve connection to City of Brookings.

Railroad Crossings:

There is an east-west railroad mainline crossing Brookings County. Safety issues were identified at the following at-grade railroad/roadway crossings:

- US-14, west of Volga.
- US-14, east of Volga.
- 34th Street, east of Brookings.



BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 8a
Issues Map

Legend

Issue Types

- Safety / Operational
- Connectivity / Maintenance
- Pedestrian / Bicycle
- Railroad

Potential Development Areas

- Energy
- Industrial
- Residential
- Flood Prone Areas

- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- Parks
- City Limits
- Brookings County Limits

N
W E
S

0 3,500 7,000 Feet

1 inch = 7,000 feet

HRGreen

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 8b
Issues Map

Roadway maintenance

Oak Lake

Potential recreational trail / trail connection to Lincoln Co., MN

Lake Hendricks

Planned energy development corridor
- Wind turbine farms
- High voltage transmission lines

Unpaved (gravel) route (connectivity issue)

High truck traffic / wind turbine access route (connectivity issue)

White

Intersection safety / geometric issue

196 ST
197 ST
198 ST
199 ST
199A ST
200 ST
201 ST
202 ST
203 ST
203A ST
204 ST
205 ST
206 ST
207 ST
208 ST
SD HWY 30
I-29

471 AVE
472 AVE
473 AVE
474 AVE
475 AVE
476 AVE
477 AVE
478 AVE
479 AVE
480 AVE
481 AVE
482 AVE
483 AVE
483B AVE
484 AVE
484 AVE
485 AVE
486 AVE
486 AVE
487 AVE
487B AVE

Legend

Issue Types
- Safety / Operational
- Connectivity / Maintenance
- Pedestrian / Bicycle
- Railroad

Potential Development Areas
- Energy
- Industrial
- Residential

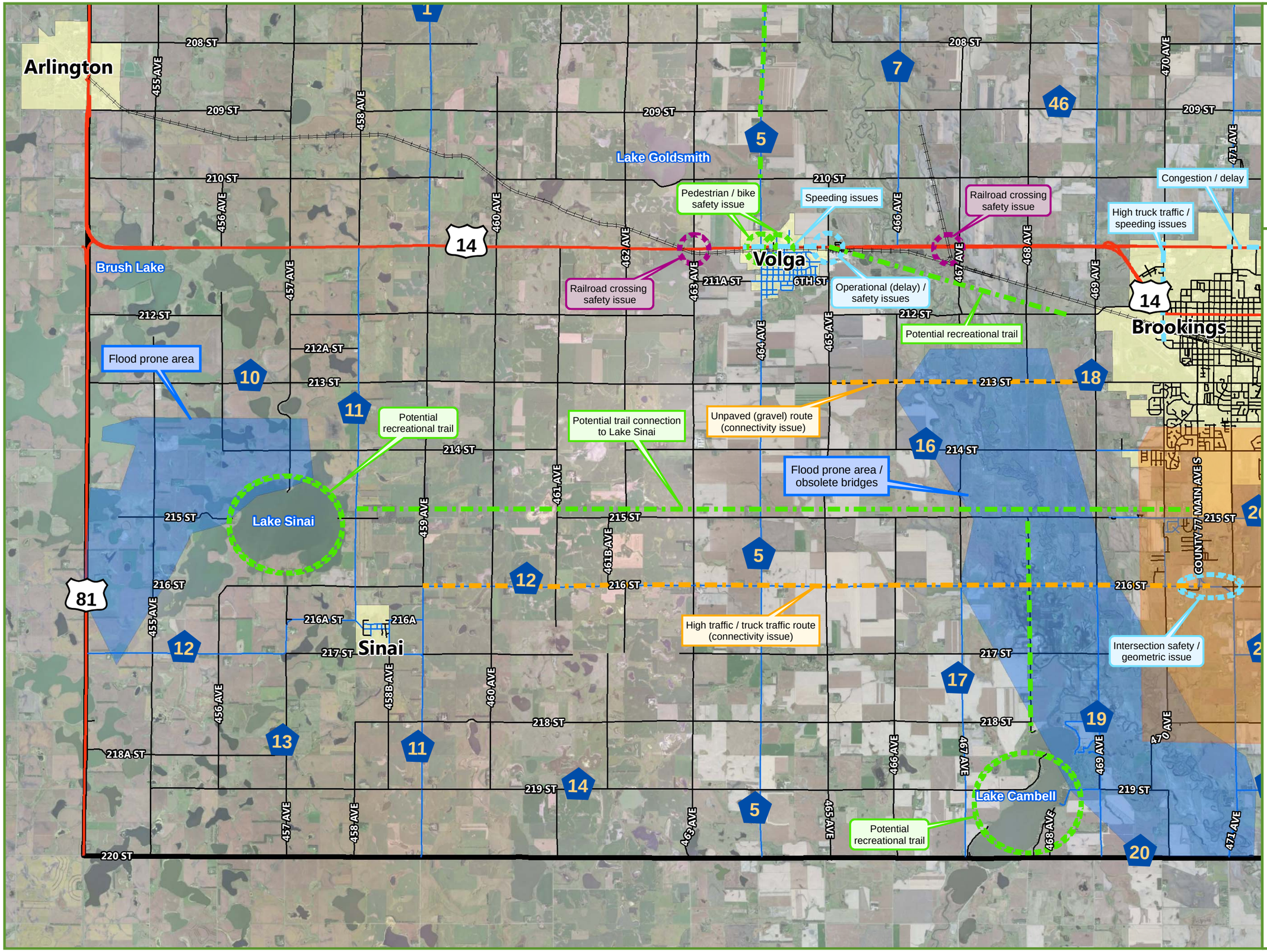
Other
- Flood Prone Areas
- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- Parks
- City Limits
- Brookings County Limits

N
W
E
S

0 3,500 7,000 Feet

1 inch = 7,000 feet

HRGreen



BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 8c
Issues Map

Legend

Issue Types

- Safety / Operational
- Connectivity / Maintenance
- Pedestrian / Bicycle
- Railroad

Potential Development Areas

- Energy
- Industrial
- Residential
- Flood Prone Areas

- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- Parks
- City Limits
- Brookings County Limits

N
W E
S

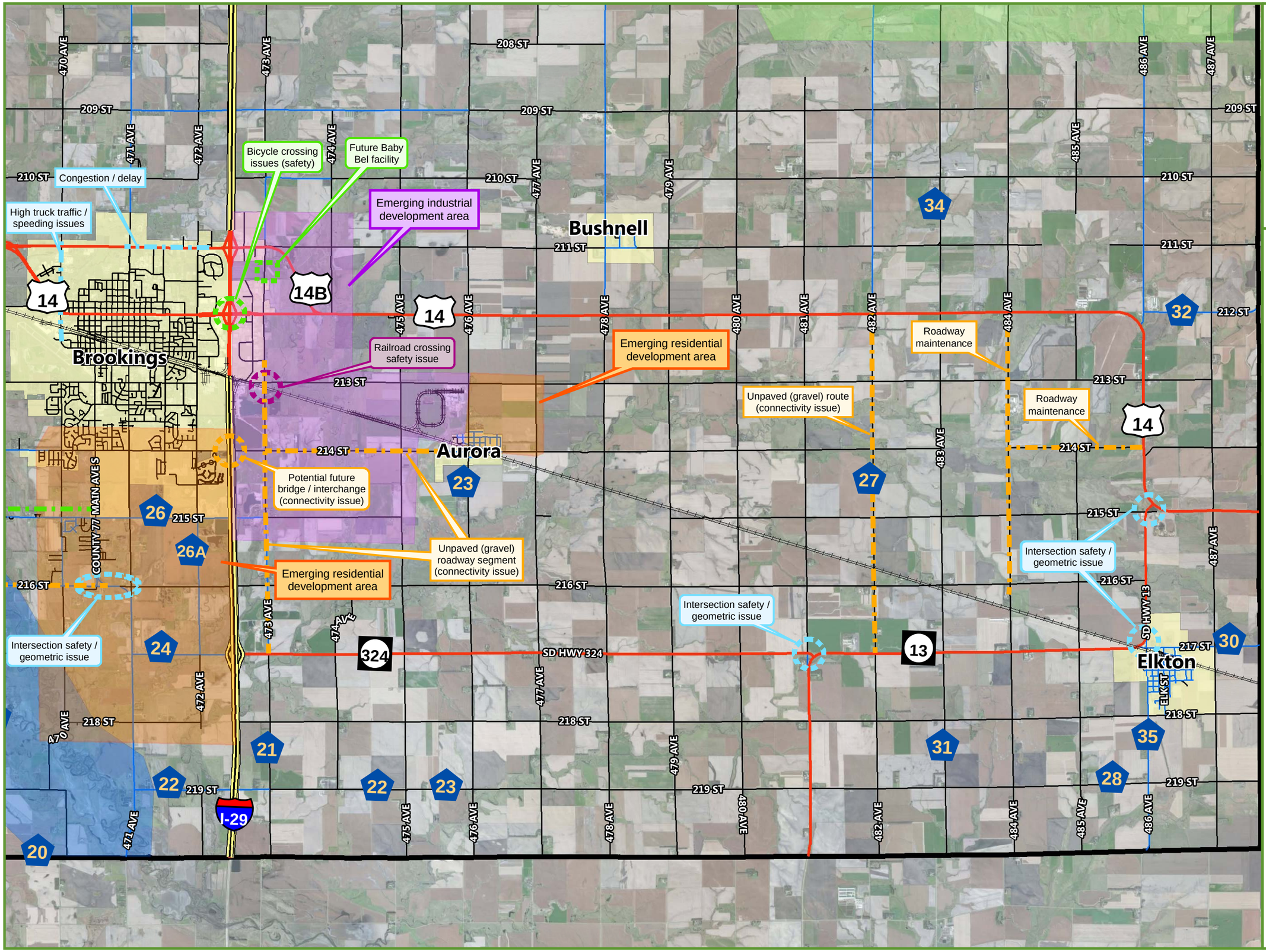
0 3,500 7,000
Feet

1 inch = 7,000 feet

HRGreen

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 8d
Issues Map



Legend

Issue Types

- Safety / Operational
- Connectivity / Maintenance
- Pedestrian / Bicycle
- Railroad

Potential Development Areas

- Energy
- Industrial
- Residential
- Flood Prone Areas

- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- Parks
- City Limits
- Brookings County Limits

N
W E
S

0 3,500 7,000
Feet

1 inch = 7,000 feet

HRGreen

Bicycle and Pedestrian System:

Outside of the City of Brookings, there is a general lack of bicycle and pedestrian facilities within the county. There is interest in developing a well-connected and comprehensive non-motorized transportation system. The follow are specific improvements identified:

- Recreational bicycle trail – City of Brookings to Volga.
- Improved bicycle accommodations along US-14, crossing I-29.
- Caspian Ave (Volga) – pedestrian/bicycle accommodations.
- Sumara Ave (CR-5) (Volga) – pedestrian/bicycle accommodations.
- US-14/Hansina Ave intersection (Volga) – improve pedestrian crossing.
- Recreational trails – connecting to and around major lakes.

Development and Land Use:

The following issues and constraints with regard to emerging development and land use were identified:

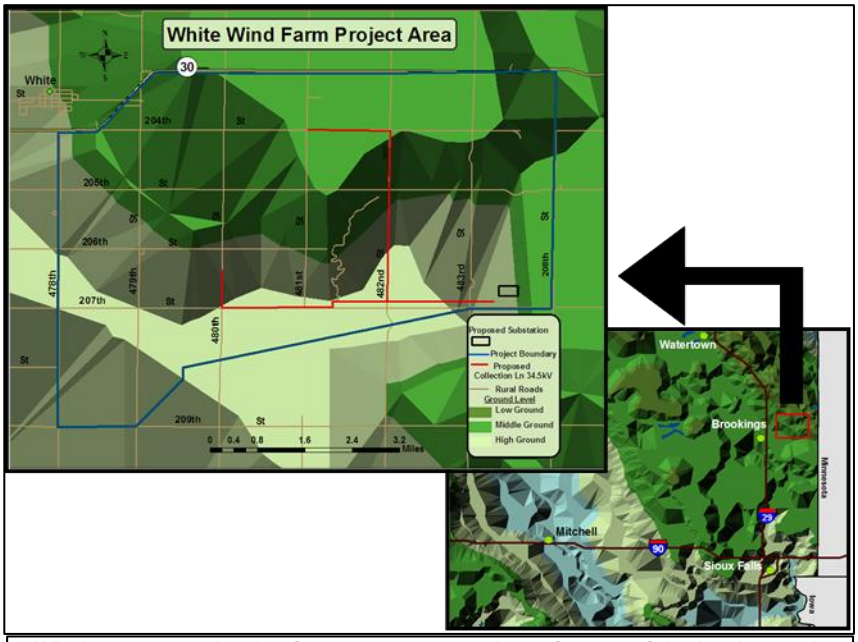
- City of Brookings development is generally limited to the south for residential and east for industrial. Growth is bounded by floodplains to the west and protected agricultural/research land to the north.
- Baby Bel brand has plans to open a large scale manufacturing facility west of I-29. This facility will add significant truck traffic to the roadway network.
- Recent wind turbine development has added truck traffic to the county and city roadway system. The next phase of wind turbine expansion (Buffalo Ridge 2) is planned for 2015.
- There is a planned transmission line project (CapX2020), which will cross the county in 2014.
- There is a general perception that new wind turbine and dairy farm development is increasing the burden on township roads without a corresponding increase in funding.
- Township roads were not built to accommodate the heavy truck traffic associated with wind turbine and dairy farm development, or large scale farming operations.
- Many employees of the industries east of I-29 travel across I-29 via US-14 and then south through town to their homes daily. There is a need to improve the roadway network south of the City of Brooking to increase safety and efficiency for these trips. This is a priority for local employers.
- There is a need for a truck stop facility along I-29 in the Brookings area.
- Lake Campbell (south portion of the county) and Oakwood Lake (northeast) are popular recreation areas.

Transit/Bus Service:

BATA provides dial-a-ride service throughout the county. BATA provides rides for children, elderly, and adults. There is currently no fixed route transit service in Brookings; however, there is interest (particularly in collaboration with SDSU).

Roadway Design Standards:

There are currently no roadway design standards in place for county or township roads. As a result, re-built roads may not



Wind energy production features are a prominent feature of the landscape in Northeast Brookings County

properly accommodate their use (i.e., heavy vehicles, etc.). There is interest in development benchmarks, standards, and policies to support the county and township roadway system.

Asset Inventory and Management:

There is a need for a comprehensive county-wide asset management system in order to better understand the location and condition of assets such as roads, culverts, and bridges.

Township Funding and Project Prioritization:

A major concern for some townships is funding for repair and maintenance of township roads. Given the limited availability of funding, townships are often unable to meet maintenance needs.

Internet Survey Results

As part of the existing conditions and needs assessment – the project team surveyed citizens about their travel patterns, Brookings County transportation needs, and suggestions for improvements. The survey was also distributed to several stakeholders (local and state agencies, schools, and businesses) who were contacted to discuss transportation system issues and concerns. The survey was accessible via the project website and through a flyer sent via email or regular mail for approximately six weeks during mid-December 2012 and January 2013, during which time 450 surveys were submitted. Some of the key findings from the internet survey include:

- 75 percent live within the City of Brookings.
- 96 percent work in the City of Brookings.
- 97 percent travel to work via personnel vehicle.
- Travel time to work is less than 20 minutes for nearly 80 percent of the respondents who work in Brookings County.
- Most people travel between 5:30-9:00 am and 3:30-6:00pm Monday through Friday.

The internet survey also asked citizens to identify the most pressing transportation needs or issues for the study area and the top 5 issues identified are as follows:

- Better access and more overpasses onto I-29 to alleviate traffic congestion and improve overall travel in the area. Respondents repeatedly requested additional overpasses for I-29, most often mentioned is a 20th Street overpass.
- Conditions and quality of existing roads – respondents remarked that roads are in need of regular repair and maintenance, and that some need to be replaced more often.
- Improved access and better road quality near the Daktronics development.
- Improvements to 22nd Avenue – respondents repeatedly identified issues with 22nd Avenue and called for traffic flow improvements and road widening along this high-traffic corridor.
- Better access to the east side of I-29.

Each respondent then had the opportunity to choose what they thought were the three most important areas of transportation improvements. Out of 418 responses, the following were most often selected:

- Roadway traffic capacity improvements (260).
- City street maintenance (248).
- Roadway traffic safety improvements (125).
- State Highway or I-29 maintenance (119).

When asked which transportation improvements they thought would be beneficial to Brookings County in the next 20 – 30 years, about 68% of the respondents answered and the following topics were mentioned most often:

- More overpasses on I-29 to improve travel and congestion.
- Interstate overpass on 20th Street South.
- Expand bike paths and lanes and pedestrian accommodations.

- Road maintenance and repair – more frequent/regular resurfacing and/or reconstruction of roads.

The internet survey provided information and highlighted transportation issues and needs from the public perspective with most issues and needs centered around roadways in and entering the City of Brookings with a new grade separated cross of I-29 one of the most common requests. See Appendix D for the Internet Survey Summary Report, including full documentation of the survey responses.

Summary of Needs

The following is a brief summary of the critical needs identified as a result of the existing conditions inventory and needs assessment. This list forms the basis for the plan recommendations, including the proposed Major Roads Plan, Roadway Design and Policy Guidance, and Implementation Plan.

- Roadway Network: With most of the state highways within the county east of I-29, there is an unbalanced distribution of higher functioning routes. A more robust county road system is needed to fill in the existing network and connect the rural communities to the urban areas and principal arterials in the western portion of the county.
- Crash History: While roadway safety is not a major problem in Brookings County, there are safety deficiencies at select locations that should be corrected. A majority are located along higher volume roadways such as US-14. Typical issues include geometric deficiencies such as skewed intersection approaches and blocked sight. Typical solutions include intersection reconstruction, addition of channelization such as a raised center median, and improved roadside clear zones.
- Non-Motorized Facilities: There are currently no cross-county trail routes or routes which connect an urban area to an urban area or an urban area to a lake or park.
- Transit Service: Transit service outside of the City of Brookings is limited. The Brookings Area Transit Authority has plans to establishment a new fixed route system serving the county.
- Airport: The recently completed master plan for the Brookings Municipal Airport calls for the future expansion of the facility. Any expansion will need to be coordinated with corresponding roadway improvements.
- Railroad Crossings: There is a need for additional study at the busiest crossings to identify potential safety and operational issues, such as vehicle and pedestrian crashes and vehicle delays due to blocked crossings.
- Traffic Operations Analysis: From a traffic operations and capacity perspective, none of the 11 key intersections or the roadway segments studied as part of this analysis will require operational or capacity improvements for the existing (2012) year. For the forecast (2032) year, one intersection (County Road 26 and County Road 77) and one roadway segment (US-14 Bypass between I-29 and 16th Avenue) are anticipated to require improvements due to operational or capacity issues.
- Connectivity: There are some gaps in the county roadway network and some important through routes are gravel. These gaps and pavement conditions can limit mobility.
- Brookings County is facing increasing development pressure in the growth areas around the City of Brookings, from wind farm development in the eastern portion of the county, and from expanding dairy and agriculture operations throughout the county.

3. Major Roads Plan

This section provides an overview of the proposed Major Roads Plan, including a roadway classification hierarchy, roadway system map, and related access management guidelines.

The roadway network in Brookings County comprises an interconnected network of highways and roads, including one interstate highway (I-29), two US highways (US-14 and US-81), three state highways (SD-30, SD-13, and SD-324), several county roads, and a system of local and township roadways linking the overall network. The county's existing roadway network and roadway jurisdictions are shown in Figure 3.



Freight hauler on Brookings CR-21. Gravel roads limit network connectivity

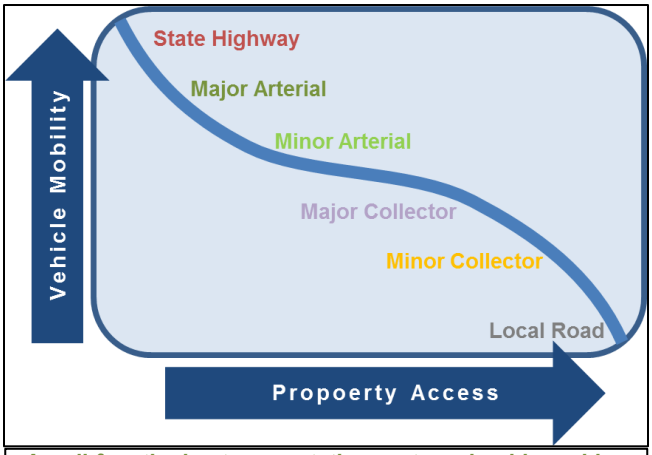
The transportation network generally includes a well-connected grid which effectively serves local and regional traffic; however, there are some limiting issues. Many of the township roads and some of the county roads have gravel or otherwise unimproved surfaces which may not be suitable for all trips, such as heavy freight hauling. This can limit network connectivity in areas where there is demand for this type of service. In addition, the north – south running Big Sioux River and east – west DM&E line also create barriers to connectivity within the county, limiting the ability to connect the county wide roadway grid. In an effort to address these issues, and to promote effective long range planning, the following Major Roads Plan was developed.

Major Roads Plan Classifications

The purpose of the Major Roads Plan is to define a roadway hierarchy to support the collection and distribution of traffic throughout the county and state. The Major Roads Plan is used to guide programming and planning for the more significant roadways within the county and to provide a framework for the development and implementation of a system of standards and guidelines to ensure the maximum utility of roadway investments.

As part of the Major Roads Plan, roadways are classified based on their relative function in the roadway network, ranging from an emphasis on regional mobility (i.e., high traffic volumes, high speeds) to serving the local access needs of the community (i.e., lower volumes and speeds). Roadways with a higher classification – state highways and major arterials for example, generally provide for longer trips, place more of an emphasis on mobility, have limited access, and connect larger population centers. Roadways with a lower level classification – such as minor collectors and local roads, generally provide for shorter trips, have lower mobility, have more access points, and connect to higher functioning roadways. A balance of all roadways functions (i.e., access and mobility) is important to any transportation network. Figure 9 shows the relationship between access and mobility as they relate to the various Major Roads Plan classifications. The roadway categories used in the Proposed Brookings County Major Roads Plan are described on the following page.

Figure 9: Access Mobility Relationship



A well-functioning transportation system should provide a balanced network serving both mobility and access needs

State Highways

In the context of the Major Roads Plan, the State Highway classification consists of Interstate, US, and South Dakota highways. State Highways are the highest functioning roadways within Brookings County and are intended to provide the highest level of speed and mobility, connecting large activity centers across the state and region. Brookings County has five state highways, including I-29, US-14/US-14 Bypass, US-81, SD-30, SD-324, and SD-13.



Example State Highway
US-14, Eastern Brookings County

Major Arterials

Major arterials also emphasize mobility over land access, serving to connect larger population areas, regional centers, and the State Highway system with higher speed routes. Major business concentrations and other important traffic generators are located on major arterial roadways. Major arterials are generally spaced at least five miles apart in Brookings County, providing higher functioning routes to connect to the State Highway system. Major Arterials should have a wider eight-foot shoulder which is consistent with SDDOT standards for rural roads.

Minor Arterials

Minor Arterials connect smaller activity centers with higher functioning routes and serve medium-length to long distance trips. Minor Arterials are spaced throughout the county rural/urban areas to connect communities to state highways. These roads typically have lower volumes and narrower shoulders (six-feet) than Major Arterials.



Example Major Arterial
Main Ave, South of City of Brookings

Major Collectors

Major Collectors are intended to serve medium to long distance trips, connecting smaller rural communities, carrying intra-county traffic, and provide access from neighborhoods to the arterial system. They supplement the arterial system by emphasizing mobility, but are lower volume roads and provide a higher degree of access than arterials. Major collectors typically have cross road access, but limited private driveway access and medium to high speeds.

Minor Collectors

Minor collector routes provide supplementary interconnection among rural growth centers and connection to major collector and arterial routes. Their emphasis is on land access, and because of their location they also carry lower-volumes than arterial routes. Minor collectors can be paved or gravel roads and they typically have no limitations to road or driveway access.



Example Local Road
480th Ave, South of White

Local Roads (low maintenance)

Local Roads provide access to adjacent properties and neighborhoods. Local roads are generally low speed, and designed to discourage through traffic. Local Roads carry the lowest traffic volume. They are designed to offer access to farms and residences connecting driveways to collectors or arteries. These roads are not designed to be a maintenance priority for the county.

Proposed Major Roads Plan

The Proposed Major Road Plan was developed in partnership with Brookings County and SDDOT staff, building on the existing Major Roads Plan (refer to Figure 3) which was developed as part of the last Brookings County Transportation Plan update in 2004. The existing plan was updated and expanded as part of this effort to reflect the latest guidance from SDDOT and FHWA, to make logical connections between roadway hierarchies, and to better coordinate with the Major Roads Plan for the City of

Brookings in emerging growth areas. Several factors were considered as part of the development process for the proposed Major Roads Plan, including the following:



Large dairy operation in eastern Brookings County. *Dairies can be major traffic generators and should be served by higher functioning roadways.*

- The trip length characteristics of the route as indicated by length of route, type and size of traffic generators served (i.e., freight and farm trucks), and route continuity.
- The ability of the route to serve regional population centers, regional activity centers and other traffic generators.
- The spacing of the route to serve different functions (need to provide access and mobility functions for entire county).
- The role of the route in providing mobility or land access (number of access points, access spacing, speed, traffic control, etc.).
- The relationship of the route to adjacent land uses (location of towns, growth areas, industrial areas, and neighborhoods, etc.).

In addition, the federal function classification map and categories for Brookings County were referenced in order to help bring the county's roadway classification system (Major Roads Plan) closer to the Federal Functional Classification Standards to better align with future funding opportunities.

Given the agricultural landscape, existing densities and the limited types of land development planned in Brookings County in future, the road mileage should remain balanced with higher functioning roads such as Major and Minor Arterials to lower functioning routes such as local roads. The interstate and US/State highway network will continue to serve regional trips entering and exiting the county, while the county highways are planned to serve shorter distance trips based on classification in the Major Roads Plan. The proposed Major Roads Plan is shown on Figure 10.

Access Management

Access management is the process of providing safe, efficient ways of getting on and off our roads and highways.[1] Access management entails the planning, design and implementation of land use and transportation strategies in an effort to maintain a safe flow of traffic while accommodating the access needs of adjacent development. Management of roadway access, both in terms of cross-street spacing and driveway placement, is a critical means of preserving and enhancing a roadway's intended function and its efficient operation. In addition, providing access management in some form, whether through grade-separated crossings, frontage and backage roads or right-in/right-out access, reduces the number of vehicle conflict points resulting in improved safety. A number of studies have demonstrated a direct relationship between the number of access points and the rate of crashes, showing a positive correlation between access density (access points per mile) and the frequency of crashes (crash rates).[2] Given this relationship, access management is an important roadway safety tool and can provide multiple benefits to the roadway, such as the following:

- Reduce crashes.
- Preserve road capacity and postpone the need for roadway widening or other improvements.
- Improve travel times for the delivery of goods and services.
- Ease movement between destinations.
- Support local economic development.

[1] *South Dakota DOT Roadway Design Manual, Chapter 17 – Access Management, pg. 17-2*
[2] *FHWA Access Research Report No. FHWA-RD-91-044*

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 10
Proposed Major Roads Plan

Legend

- State Highway
- Major Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local Roads

N
W E
S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

Brookings County Access Management Guidelines

Access management guidelines provide a means to balance private property concerns with the need for a safe and efficient transportation system. In addition, standardized guidelines facilitate clear communications between the agencies and individuals involved (developers, agency staff, and landowners) in the process. Transportation agencies regularly receive requests for additional access (e.g. new public streets, commercial driveways, residential and field access points), which are evaluated by numerous agencies. Because of the number of individuals and agencies involved, it is easy to have inconsistent access decisions. This can result in confusion between agencies, developers and property owners as well as long-term safety and mobility problems. Standard access management guidelines can be used to improve communication, enhance safety and maintain the capacity and mobility of the important transportation corridors. In addition, access management guidelines may be used to respond to access requests and to promote good access practices, such as:

- Aligning access with other existing access points.
- Providing adequate spacing to separate and reduce conflicts.
- Encouraging indirect access (frontage roads, consolidated driveways, etc.) over direct access on high-speed, high-volume arterial routes.

The access spacing guidelines developed as part of this planning process reflect the guidelines adopted by SDDOT as reported in the SDDOT Roadway Design Manual. The SDDOT access management guidelines were expanded for this effort, to address the range of roadway types (i.e., arterials, collectors, etc.) in Brookings County. Through this coordination with the state access management guidelines, access management policies in Brookings County will be consistent with SDDOT best practices. The following table presents the Brookings County Access Spacing Guidelines, including direction for signal spacing, intersection spacing, driveway access density, and direct property access.

Table 7: Brookings County Access Spacing Guidelines

	Signal Spacing (miles)	Unsignalized Cross Street (feet)*	Access Density	Direct Access
State Highway (freeway)	N/A	N/A	N/A	No
State Highway	1/2	2,640	at half-mile increments	Exception Only
Major Arterial (urban)	1/2	2,640 full 1,320 partial	at quarter-mile increments	Exception Only
Minor Arterial (urban)	1/2	1,320 full 660 partial	1 access/block face, right in/right out preferred	Exception Only
Major Collector (urban)	1/4	1,320 (full/partial)	2 accesses/block face	Yes
Minor Collector (urban)	1/4	1,320 (full/partial)	5 accesses/side/mile	Yes
Major Arterial (rural)	1/4	1,000 (full/partial)	5 accesses/side/mile	Exception Only
Minor Arterial (rural)	1/4	1,000 (full/partial)	5 accesses/side/mile	Exception Only
Major Collector (rural)	1/4	1,000 (full/partial)	5 accesses/side/mile	Yes
Minor Collector (rural)	1/4	1,000 (full/partial)	5 accesses/side/mile	Yes

**'Full' denotes a standard full-movement intersection. 'Partial' denotes a restricted movement intersection (i.e., right-in/right-out).*
Source: Adapted from South Dakota DOT Roadway Design Manual, Chapter 17 – Access Management, Figure 17-1

Access management guidelines and practices should generally be implemented at the county and local levels (cities and townships with active land use planning programs) as these agencies are typically involved at the planning stages of development proposals. However, effective access management requires mutual support and effective communication at all governmental levels. Therefore, it is important to consider how access management guidelines are implemented as part of county planning and development review procedures. The following are key considerations when implementing access management guidelines:

- Access management guidelines apply primarily to routes with a collector functional classification or above; however, partner agencies (i.e., cities and townships) may also use the guidelines on some local roads.
- Access management guidelines should be used as long-term goals, not as absolute rules. Maintaining some flexibility is important in promoting access consolidation. Existing physical barriers or constraints need to be considered.

Access Management Implementation

As discussed in greater detail in the Existing Conditions and Needs Assessment Chapter, Brookings County is facing increasing development pressure in the growth areas around the City of Brookings, from wind farm development in the eastern portion of the county, and from expanding dairy and agriculture operations throughout the county. These development pressures will ultimately lead to requests for new access onto the county and local roadway system. This presents an opportunity to promote good access practices in both the rural and urbanizing areas of the county.

Implementation of access management practices in rural areas differs from urban areas. Access management efforts in urban areas typically focus on addressing mobility concerns while balancing access needs of local businesses and residents. In these areas, new access points should be minimized while existing access points are consolidated or reduced as development occurs. Best practices for access management in urban and developing areas include the following:

<u>Access Management Best Practices – Urban Areas</u>

- Encourage shared driveways and internal circulation plans.
- Restrict turning movements to reduce conflicts.
- Develop good parallel street systems for carrying local traffic.
- Develop proper setbacks for future frontage roads.
- Develop proper secondary street spacing.
- Encourage proper lot layout to minimize access points.
- Encourage connectivity between developments.
- Consider an official map process for important corridors.



High-voltage transmission line/wind farm in eastern Brookings Co. *The county is facing increasing development pressure from the energy sector.*

Roadways in rural areas typically serve low-density land uses and usually have lower traffic volumes and therefore should be treated differently than roadways in urban areas. Access management in rural areas should focus on increasing/maintaining safety (i.e., sight distance, number of conflict areas, and severity of crashes when vehicles run off the road) and minimizing operational/maintenance costs such as snow removal, resurfacing and drainage. Industry best practices for access management in rural areas include the following:

Access Management Best Practices – Rural Areas

- Develop a formal policy that ensures an agency has processes in place to determine the need for and evaluate the use, location, spacing and design characteristics of the requested access points.
- Encourage coordination of roadway access during the zoning and platting process.
- Give access permits for a specific use.
- Encourage adequate spacing of access points.
- Protect the functional area of intersections.
- Ensure adequate sight distance at entrances.
- Avoid offset or dogleg intersections and entrances.
- Encourage development of turn lanes and entrances.
- Consider consolidating access or relocating existing access.
- Encourage good driveway and intersection design characteristics (i.e., driveway width and turning radii, corner clearance, approach grade, intersection alignment/skew, entrance in-slopes and culvert openings, sight triangles, clear zones, etc.).

4. Roadway Design and Policy Guidelines

This section covers a range of roadway design standards, guidance, and policy. This includes typical sections, pavement standards, maintenance performance standards, pedestrian and bicycle considerations, and guidance on asset management policy.

Typical Roadway Designs (cross sections)

The roadway cross-section standards for the Brookings County Master Transportation Plan are based on engineering concepts from Association of State and Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets (AASHTO Green Book), AASHTO's Guidelines for Geometric Design of Very Low-Volume Local Roadways, as well as the South Dakota Department of Transportation Road Design Manual, and South Dakota Department of Transportation Local Roads Plan. Typical cross-sections have been developed to ensure roadways are built consistently and in a way that meets the needs of the community. It should be noted that the typical cross-sections are merely a guide and the designer should use his or her professional judgment when determining the final roadway design.

The cross-section standards for Brookings County are defined in five categories by major road plan classification: major arterial, minor arterial, major collector, minor collector, and local road. As described in greater detail in the Major Roads Plan (previous section), arterial roadways are designed to serve higher volumes of traffic at higher speeds, while collector and local roadways are designed to provide connectivity between arterial roadways and server lower volumes at lower speeds. Figure 11 includes typical cross sections for each classification. It is noted that U.S. and State highways are outside of the jurisdictional authority of Brookings County and therefore are not represented in the typical cross sections.

According to the SDDOT's Local Roads Plan, the right-of-way width should not be less than that required for all elements of the design cross sections, utility accommodation, and appropriate border areas. The SDDOT's Local Roads Plan and SDDOT road design manuals provide for flexibility for typical right of way widths. To justify the large rights of way needed (or proposed) on Brookings County roads, and in addition to the pavement/gravel for the roadway, ditches for drainage would be needed on one or both sides of the roadway. At a minimum, these ditches would require (if they were one foot deep) 19 feet on both sides of the roadway. Ditches that are two feet deep will require 28 feet of right-of-way. Adding a trail would require an additional 15 feet of right-of-way on each side, assuming the inside shoulder of the trail could be in the ditch of the roadway. However, the trail could be added adjacent to the roadway which would then require no inside shoulder for the trail. To avoid having such large right-of-widths, drainage easements could be obtained for ditches outside of the right-of-way. Additionally, an easement could also be obtained for any trails or sidewalks outside of the right-of-way.

Pavement Standards

Pavement type should be carefully considered in all roadway construction or reconstruction projects. Typical pavement types used in Brookings County are Asphaltic Concrete (Bituminous), Portland Cement Concrete (PCC) and Gravel. The following is a description of some key considerations for each:

Asphaltic Concrete (Bituminous) and Portland Cement Concrete (PCC) Roadway Design

Design of pavement thickness for arterial, collector and local roads in both urban and rural areas should be based on AASHTO Guide for Design of Pavement, latest edition. For traffic conditions where the equivalent 18 kip/single axle loading is less than 1,000,000, the low-volume road design method may be used and should be based on AASHTO's Guidelines for Geometric Design of Very Low-Volume Local Roadways.



Typical gravel road. Source: SDLTAP Gravel Road Manual

Gravel Roadway Design

AASHTO's Guidelines for Geometric Design of Very Low-Volume Local Roadways and the SD LTAP Gravel Roads Maintenance and Design Manual should be used when designing gravel roadways in Brookings County. Generally, the thickness of the gravel layer depends on equivalent single axle loads (ESAL), number of heavy trucks, quality of gravel available, and the existing soil or subgrade.

Design Considerations

There are many factors that should be considered when deciding whether to pave a road or not. The SD LTAP Gravel Roads Maintenance and Design Manual provides a detailed step by step process to aid in the decision making process. Tables 8 through 10 display the recommended thickness based on truck volumes and daily traffic volumes, with regards to various subgrade conditions according to SD LTAP Gravel Roads Maintenance and Design Manual. Actual traffic count data and traffic projections should be used along with geotechnical data when determining pavement design for a given project. A geotechnical exploration and engineering review should be performed by a qualified geotechnical engineer to establish the soil type in the area and to provide recommendations for pavement section, on a project by project basis. Truck load should also be considered.

Figure 11: Typical Cross Sections for Major Roads Plan Designations

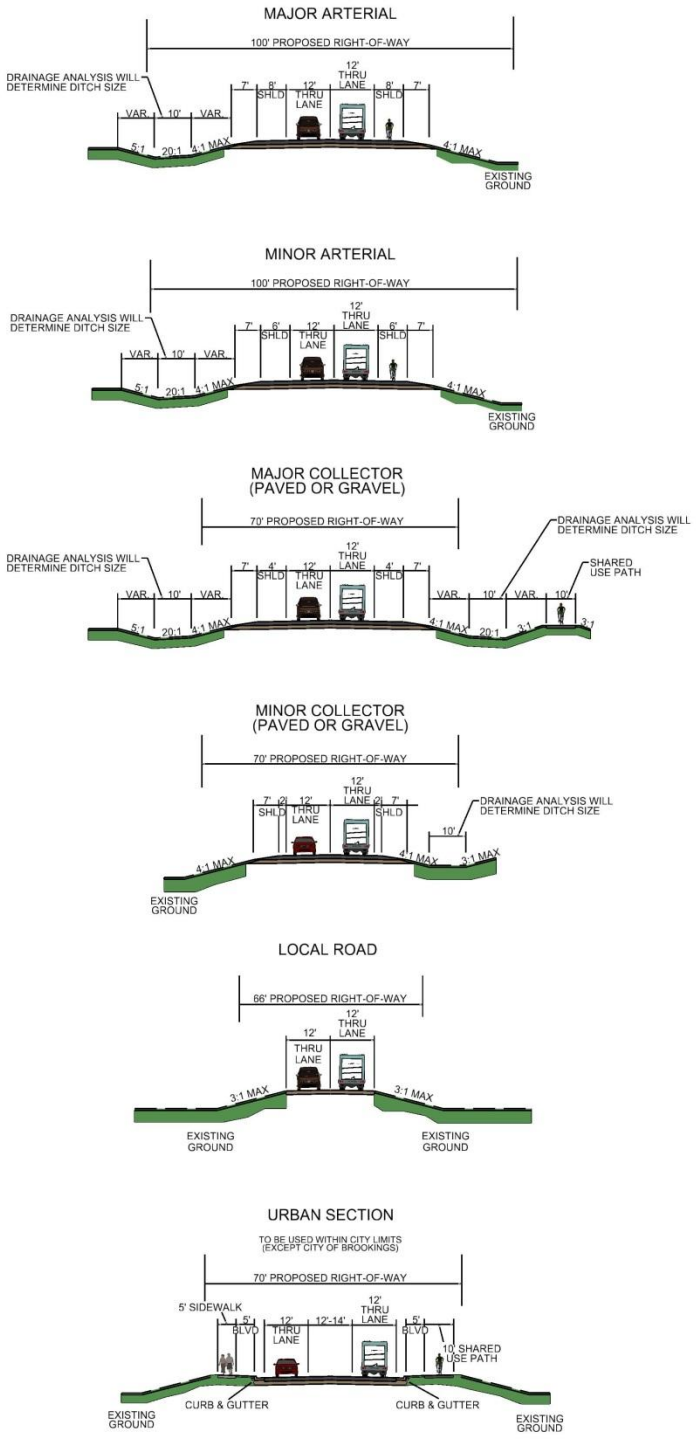


Table 8: Minimum Pavement Thickness Requirements

	Local Residential Roads	Commercial, Industrial & Collector Roads	Arterial Roads
Portland Cement Concrete over Aggregate Cushion	6”	8”	8”
Asphaltic Concrete (Bituminous) with Aggregate Base	4” AC 6” Aggregate	6” AC 12” Aggregate	6” AC 12” Aggregate

Table 9: Recommended Gravel Thickness for New or Reconstructed Rural Roads (Based on Heavy Trucks)

Estimated Daily Number of Heavy Trucks	Subgrade Support Condition (Based on California Bearing Ratio (CBR))	Suggested Minimum Gravel Layer Thickness (in.)
0 to 5	Less than or equal to 3 percent	6.5
	3.1 percent to 10 percent	5.5
	Greater than 10 percent	4.5
5 to 10	Less than or equal to 3 percent	8.5
	3.1 percent to 10 percent	7.0
	Greater than 10 percent	5.5
10 to 25	Less than or equal to 3 percent	11.5
	3.1 percent to 10 percent	9.0
	Greater than 10 percent	7.0
25 to 50	Less than or equal to 3 percent	14.5
	3.1 percent to 10 percent	11.5
	Greater than 10 percent	8.5

Source: SD LTAP Gravel Roads Maintenance and Design Manual (2000)

Table 10: Recommended Gravel Thickness for New or Reconstructed Rural Roads (Based on ESALs)

18-kip ESAL Traffic Loads	Subgrade Support Condition	Suggested Minimum Gravel Layer Thickness (in.)
10,000 – 30,000	Very Poor	10
	Poor	9
	Fair	7
	Good	7
	Very Good	6
30,000 - 60,000	Very Poor	Higher Type Pavement Design Recommended
	Poor	Higher Type Pavement Design Recommended
	Fair	12
	Good	12
	Very Good	11
60,000 – 100,000	Very Poor	Higher Type Pavement Design Recommended
	Poor	Higher Type Pavement Design Recommended
	Fair	17
	Good	17
	Very Good	15

Source: SD LTAP Gravel Roads Maintenance and Design Manual (2000)

Roadway System Asset Management Guidelines and Policy Considerations

A system of Asset Management preservation tools will be an important step for Brookings County to preserve and protect its roadway system investments. It will be important for the county to review existing management tools and create modifications to inventory and classification hierarchy and performance systems. The following key methods can be adopted to implement such an improvement:

1. Asset Management Rating System:
   If not already in place, the county should adopt a condition rating system for like segments of the various elements (i.e. benchmark) such that a minimum target service condition rating can be established, based on functional classification or service level assigned to the roadway facility. For example, a minimum service level of 70 of 100 points for arterial roadways would be assigned as an acceptable level of performance, depending on the standards set for the facility.

2. Systematic Coordination:
   Coordination of GIS system improvements and electronic mapping should occur to develop a systematic means of sorting and organizing future improvements. This approach can then be applied to encourage a systematic means of identifying, prioritizing, and programming improvements associated with the following.
   a. Cost estimating tracking systems
   b. Source and reliability of funding streams
   c. Prioritization of improvements

3. Operations Plan:
   The creation of an Operation and Management Plan (to accompany Capital Improvement Plan) should also be established with the goal of improving and maintaining the system at minimum established thresholds. This should include a well-defined program for pavement maintenance and replacement in order to maximize the lifespan of transportation assets. Periodic pavement maintenance and replacements, when warranted, should be performed to keep the network functioning properly.

   In order to establish an effective maintenance schedule, an up to date inventory of all roadways in Brookings County should be established and maintained. In addition, it is important to understand that each roadway element has a different design life and various roadway elements require periodic maintenance and timely replacement to keep the system in adequate condition. Below are approximate design lives for various roadway elements, based on common industry practice:

   - Bridges and concrete culverts – 75 years.
   - Asphalt pavement – 20 years.
   - Concrete pavement – 30 years.
   - Seal coats – 7 years.
   - Gravel surfacing – 4 to 6 years.
   - Signs – 10 years.
   - Pavement markings – 1 year for paint, 2 to 3 years for plastic.

4. Maintenance Program:
   It is also important to establish an ongoing and sustainable maintenance funding program for the Brookings County roadway network. While more detailed programming should be completed, the first step towards defining maintenance funding needs is to understand the approximate annual costs associated with maintenance of typical roadway types within the county. Table 11 lists the approximate annual costs to maintain the Brookings County roadway network based on a cost per mile and typical maintenance/rehabilitation cycle.

Table 11: Planning Level Maintenance Schedule

Surface Type	Total Miles*	Preservation Cost/Frequency	Annual Cost
Asphalt	243	$300,000/15 years	$4,860,000
Concrete	5	$420,000/22.5 years	$93,333
Gravel	138	$25,000/5 years	$690,000
Total	386		**$5,643,333**

**Source: SDDOT Non-State Truck Road Inventory (2013). Total miles include county highways in the following cities: Aurora, Brookings, Bruce, Bushnell, Elkton, Sinai, Volga, and White.*

5. Traffic Impacts Assessments/ Road Use Agreements:
In order to ensure future developers in Brookings County pay an equitable share of the burden they place on transportation infrastructure, the county should require developers to assess their potential traffic impacts to the surrounding roadways. This will allow county staff to determine whether a Traffic Impact Study (TIS) is required prior to development. A TIS is a comprehensive analysis of before and after operational traffic impacts to a road system resulting from proposed development and associated traffic movements and volumes.

   Another tool to balance roadway preservation and potential impact assessment with economic development is the engagement of a Road Use Agreement. Such an agreement can be applied to developers as a part of a permit application or annual agreement to help Brookings County preserve and protect investments made in its roadway system. The agreement must be enacted in accordance with local, state, and federal laws and should therefore be thoroughly reviewed by appropriate legal counsel. A model Road Use Agreement is included in Appendix G.

Pedestrian and Bicycle Facilities – Policy and Design Guidelines

One objective of the Brookings County Transportation Plan is to ensure safe and efficient movement of people and goods throughout the county. This includes not only traditional automobile and freight mobility, but also non-motorized transportation such as walking and biking. To that end, Brookings County should actively strive to promote walking and bicycling as viable alternative modes of transportation, in order to enhance the overall transportation network. In Brookings County, this means supporting the development of a well-connected recreational trail system in rural areas and installing proper pedestrian and bicycle facilities where appropriate in urban areas. In order to achieve this goal, the county should pursue the following:

- Provide an interconnected system of paths, trails, lanes and routes that are multipurpose, accessible, convenient and connected to activities centers such as towns, residential neighborhoods, parks, schools, workplaces, major open spaces, and other destinations.

- Form mutually beneficial partnerships with and among the public, cities and townships, and private sector partners to expand and improve the provision of multimodal services and facilities.

- Sustain and improve the quality condition and attractive appearance of public areas and facilities with an aggressive maintenance program in order to support and encourage multimodal transportation.

Pedestrian and bicycle facilities should also be a consideration in the planning design for all roadway construction and reconstruction projects, and dedicated non-motorized facilities should be included where there is demand. Pedestrians and bicyclist may use shoulders and travel lanes where specific facilities do not exist. However, in many cases the use of shoulders and travel lanes are not appropriate and a designated facility for pedestrians and bicyclists should be considered. Refer to AASHTO's A Policy on Geometric Design of Highways and Streets (AASHTO Green Book), latest edition when designing

pedestrian and bicycle facilities. AASHTO's Guide for Planning, Design and Operation of Pedestrian Facilities and Guide for the Development of Bicycle Facilities provide further guidance for designing pedestrian and bicycle facilities, respectively.

Figure 12 includes a typical cross section for a Shared Use Path and Table 12 presents minimum pavement thickness requirements.

Figure 12: Shared Use Path Typical Cross Section

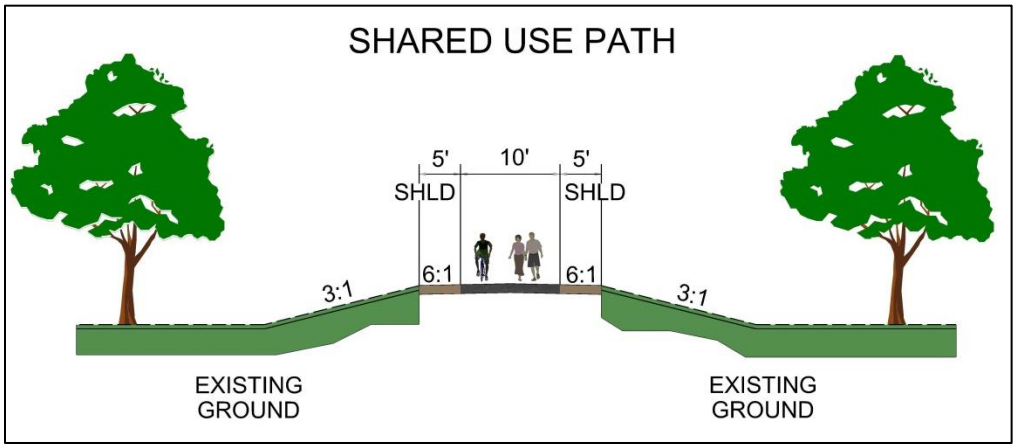


Table 12: Minimum Pavement Thickness Requirements – Shared Use Path

	Shared Use Path
Asphaltic Concrete (Bituminous) with Aggregate Base	2.5" AC 4" Aggregate

5. Implementation Plan

This section provides an overview of the proposed Implementation Plan, including recommended projects organized by type of project and priority of project.

Project Recommendations List

This implementation plan was developed based on stakeholder and public input and the needs analysis completed as part of the planning process. Data sources include SAT input, discussions with local stakeholders (city and township officials, agency representatives, etc.), public comments, and technical data from the traffic and safety evaluations conducted as part of the needs analysis. The goal of this implementation program is to provide recommendations which balance stakeholder needs with regulatory requirements and technical constraints.

The following pages include a series of tables (Tables 13 – 16) summarizing the implementation plan recommendations, as well as a map (Figure 13) illustrating the location of the proposed capital projects. The plan includes recommendations organized into the four categories as listed below. Within each category recommendations are tied to a "need" as identified in the needs analysis phase of the planning process. For the purpose of the summary tables herein, the needs are grouped into general categories for each recommendation type. Definitions for the" recommendation" and "need" categories are provided below:

Recommendation Categories and Need Definitions:

A. **Intersection Projects** – Capital projects to address safety and operational issues at a specific location or intersection.

Needs Addressed

a. Geometric Deficiency – Improvements to correct potential safety and operational issues (i.e., intersection skew, sight-lines, etc.).
b. Capacity Constraints – Improvements to improve capacity to enhance operations and minimize congestion (i.e., through lanes, turn lanes, new routes, etc.).
c. Traffic Control – Intersection control improvements to improve safety and operations (i.e., new intersection control, signal timing updates, etc.).

B. **Roadway Segment Projects** – Capital projects to improve roadway safety and mobility along roadway segments.

Needs Addressed

a. Capacity Constraints – Improvements to improve capacity to enhance operations and minimize congestion (i.e., through lanes, turn lanes, new routes, etc.).
b. Connectivity Issues – Improvements to improve local or regional connectivity by enhancing mobility on significant county and local routes (i.e., new through routes, pave gravel road, etc.).

C. **Multimodal Network Enhancement Projects** – Capital projects and planning/policy initiatives to improve safety and mobility for pedestrians and bicyclists.

Needs Addressed

a. Non-motorized Safety, Mobility, and Recreation – Trail and sidewalk improvements, needs analysis and studies, etc.
b. Railroad Crossing Safety – Improvements and studies to identify and correct critical safety issues (i.e., crossing gates, flashing lights, vehicle and pedestrian channelization, etc.
c. Transit Services – Study to determine the feasibility of enhancement transit service and facilities.

D. **System Management and Policy Recommendations** – Policy level recommendations to identify and prioritize projects and to implement best practices with regard to development policy.

Needs Addressed

a. Funding and Maintenance – Strategies to leverage outside funding opportunities.
b. System Inventory, Prioritization, and Standards – Strategies to improve asset management and capital planning.

The implementation tables include planning level cost estimates are based on SDDOT and Brookings County input, as well as by gathering estimates from similar projects in other states. Estimated costs have been provided for all projects except those found in the System Management and Policy Recommendations, which are comprised of largely administrative or technical analysis rather than capital projects. Also included is a proposed priority level for each recommendation. The priority levels are defined as follows:

- Short Term (S): 0 – 5 years.
- Medium Term (M): 6 – 10 years.
- Long Term (L): 11 – 20+ years.

In addition to the implementation tables and map, the implementation plan includes a series of short "project profiles" to provide additional information on each of the project recommendations to assist the Brooking County in its capital planning efforts. The project profiles can be found in Appendix E.

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 13 Implementation Recommendations Location Map

Legend

- Intersection Project
- Multimodal Network Enhancement Project
- Roadway Segment Project
- Potential Trail Project
- Railroads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- City Limits
- Brookings County Limits

N
W E
S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

Table 13: Section A - Intersection Projects

Intersection	Estimated Cost	Priority*	Need Addressed	Description/Comments
1. US-14/Caspian Ave Intersection (Volga)	*$450,000*	S	Capacity Constraint	Identified as a high crash location. Reconstruct intersection to add capacity (turn lanes) and provide intersection lighting.
2. SD Hwy-30/CR-25 Intersection (White)	*$25,000*	S	Geometric Deficiency	Identified as a local priority. Reconfigure intersections to correct geometric issues (skewed intersection).
3. US-81/US-14 Intersection	*$75,000*	S	Geometry Deficiency/Traffic Control	Identified as a high crash location. Evaluate potential traffic control change/ geometric improvements to improve safety
4. CR-77/Main Ave/Medary Ave Intersection (south of Brookings)	*$3,000,000*	M	Geometric Deficiency	Identified as a local priority and a safety concern. Reconfigure two intersections to remove s-curve.
5. SD Hwy-13/Cornell Ave Intersection (Elkton)	*$1,500,000*	M	Geometric Deficiency	Identified as a local priority. Reconfigure intersections to correct geometric issues.
6. CR-26/CR-77 Intersection (Brookings)	*$2,000*	M	Capacity Constraint/Geometric Deficiency/Traffic Control	Improve intersection operations to alleviate potential future congestion. Potential traffic control change/ geometric improvements
7. 22nd Ave/CR-26 Intersection	*$52,000*	M	Geometry Deficiency/Traffic Control	Identified as a high crash location. Evaluate potential traffic control change/ geometric improvements to improve safety
8. US-14 bypass/US -14 North T-Intersection	*$1,750,000*	M	Geometry Deficiency/Traffic Control	Identified as a high crash location. Evaluate potential traffic control change/ geometric improvements to improve safety
9. US-14/467th Ave Intersection	*$25,000*	M	Geometry Deficiency/Traffic Control	Identified as a high crash location. Evaluate potential traffic control change/ geometric improvements to improve safety
10. US-14 Bypass/US-14 (6th St) T-intersection	*$1,750,000*	M	Geometry Deficiency/Traffic Control	Identified as a high crash location. Evaluate potential traffic control change/ geometric improvements to improve safety
11. CR-23/US-14 Intersection	*$75,000*	M	Geometry Deficiency/Traffic Control	Identified as a high crash location. Evaluate potential traffic control change/ geometric improvements to improve safety
12. SD Hwy-324/SD Hwy-13 Intersection (w. of Elkton)	*$25,000*	L	Geometric Deficiency	Identified as a local priority. Reconfigure intersections to correct geometric issues.
13. SD Hwy-13/US-14 Intersection (n. of Elkton)	*$25,000*	L	Geometric Deficiency	Identified as a local priority. Reconfigure intersections to correct geometric issues.
14. US-14/Hansina Ave Intersection (Volga)	*$25,000*	L	Geometry Deficiency/Traffic Control	Identified as a high crash location. Evaluate potential traffic control change/ geometric improvements to improve safety
15. CR-29/SD Hwy-30 Intersection	*$25,000*	L	Geometry Deficiency/Traffic Control	Identified as a high crash location. Evaluate potential traffic control change/ geometric improvements to improve safety
16. CR-77/CR-24 T-intersection	*$25,000*	L	Geometry Deficiency/Traffic Control	Identified as a high crash location. Evaluate potential traffic control change/ geometric improvements to improve safety
17. Western Ave S/32nd St Intersection	*$25,000*	L	Geometry Deficiency/Traffic Control	Identified as a local priority. Evaluate potential traffic control change/ geometric improvements to improve safety

*S = Short Term (0-5 years) | M = Medium Term (6-10 years) | L = Long Term (11-20+ years)

Table 14: Section B - Roadway Segment Projects

Route	Termini		Length (miles)	Estimated Cost	Priority*	Need Addressed	Description/Comments
	From	To					
1. US-14 (Brookings)	22nd Ave	34th Ave	1.0	*$7,163,000*	S	Capacity Constraint	SDDOT has proposed a project currently under study from 22nd Avenue to 34th Avenue to revise access, provide turn lanes, and trails along US-14. This was also recommended in Brookings Area Master Transportation Plan.
2. CR-21 (34th Ave) (Brookings	32nd St S	Prince Dr	2.3	*$2,300,000*	S	Connectivity Issue	Pave roadway. Recommendation from Brookings Area Master Transportation Plan.
3. CR-16 (20th St S)	22nd Ave	34th Ave	1.0	*$300,000*	M	Connectivity Issue	Conduct a study to determine location of future County Road crossing/interchange with I-29. (City of Brookings Plan suggests crossing at 20th Street).
4. US-14 Bypass (Brookings)	I-29	16th Ave	1.0	*$5,000,000*	M	Capacity Constraint	Provide additional lane in each direction. (SDDOT currently designing a project to add turn lanes and lighting at key intersections along US 14 Bypass for construction in 2015)
5. 213th St/214th St (Aurora)	CR-21	476th Ave	6.0	*$8,400,000*	M	Connectivity Issue	Pave roadway to improve this regional connectivity. High priority project for locals.
6. Western Ave S (470th Ave)	Trail Ridge Rd	216th St	2.4	*$12,404,994*	M	Connectivity Issue	Pave roadway. Recommendation from Brookings Area Master Transportation Plan
7. CR-77 (Medary Ave N)	US-14 Bypass	42nd St N	2.0	*$2,800,000*	M	Connectivity Issue	Reconstruct to correct poor pavement condition and enhance this important connection to the City of Brookings. High priority project for locals.
8. CR-27 (east Brookings Co.)	209th St	SD Hwy 30	6.0	*$8,400,000*	L	Connectivity Issue	Pave roadway to improve this regional connectivity. High priority project for locals.
9. CR-27 (e. of White)	SD Hwy-30	200th St	3.0	*$4,200,000*	L	Connectivity Issue	Pave roadway to improve this regional connectivity. High priority project for locals.

*S = Short Term (0-5 years) | M = Medium Term (6-10 years) | L = Long Term (11-20+ years)

Table 15: Section C - Multimodal Network Enhancement Projects (Pedestrian, Bicycle, Transit, and Rail)

Recommendation	Est. Cost	*Priority**	Need Addressed	Description/Comments
1 – 4. Pedestrian and Bicycle Facility Needs Analysis/County Trails Master Plan – *Potential trail locations or study area identified below:*	*$150,000*	*S*	Non-Motorized	Prepare Trails Master Plan and evaluate feasibility of potential recreational trail connections throughout Brookings County.
1. – Lake Hendricks Trail: *Connection between City of Brookings and Lake Hendricks area*		*S*	*Non-motorized*	1.a – Lake Benton (Lincoln, MN) Connection
				1.b – Elkton Connection
				1.c – Lake Hendricks Connection
2. – Volga/Lake Poinsett Trail: Connection between City of Brookings and Lake Poinsett**.**		*S*	*Non-motorized*	2.a – Volga Connection
				2.b – Lake Tetonkaha Connection
				2.c – Lake Poinsett Connection
3. – Lake Campbell/Sinai Kingsbury County Trail: Connection between City of Brookings and areas west.		*S*	*Non-motorized*	3.a – Lake Campbell Connection
				3.b – Lake Sinai Connection
				3.c – Brush Lake/Kingsbury County Connection
4. – Aurora Trail: Connection between Cities of Aurora and Brookings		*S*	*Non-motorized*	4.a – Aurora Connection
5. Railroad Crossing Safety Improvement - US-14 West of Volga (mainline crossing)	*$250,000*	*S*	Railroad Crossing Safety	High vehicle train exposure. Improve crossing control to enhance safety
6. Railroad Crossing Safety Improvement - Projects – US-14 East of Volga (spur crossing)	*$255,000*	*M*	Railroad Crossing Safety	High vehicle train exposure. Improve crossing control to enhance safety (recommended from Brookings Area Master Transportation Plan).
7. County Road 21 (34th Avenue) East of Brookings	*$25,000*	*M*	Non-Motorized	City of Brookings, Lincoln County MN
8. Coordinate bicycle and pedestrian facility planning with other jurisdictions	*$50,000*	*M*	Transit Service	Continue to coordinate with BATA on proposed County-wide needs and programs for BATA customers. Monitor frequently traveled BATA routes for mobility and safety needs.
9. BATA Program and Facility Coordination	*$100,000*	*M*	Railroad Crossing Safety	Complete an assessment of the existing at-grade crossings using inventory data from SDDOT and FRA. Identify and prioritize potential railroad crossing safety improvements.
10. Conduct a Study of the at-grade railroad crossings in Brookings County	*$50,000*	*L*	Connectivity/Railroad Crossing Safety	As the industrial area east of I-29 continuous to expand, the feasibility of a grade-separated railroad crossing should be evaluated. Candidate street could be CR-21. (Recommended from Brookings Area Master Transportation Plan)
11. Grade-Separated Crossing of Railroad east of I-29 – Feasibility Study	*$50,000*	*L*	Transit Service	Study to evaluate options for expansion of transit service within Brookings County.
12. Transit Needs/Feasibility Study				

*S = Short Term (0-5 years) | M = Medium Term (6-10 years) | L = Long Term (11-20+ years)

Table 16: Section D - System Management and Policy Recommendations

Recommendation	Estimated Cost	Priority*	Need Addressed	Description/Comments
1. Engage Traffic Impact Ordinance/Road Use Agreements	*TBD*	S	Funding & Maintenance	A traffic impact ordinance and/or a road use agreement provide methods to preserve and protect roadway infrastructure and, if needed, impact mitigation measures. See Appendix G for an example model Road Use Agreement.
2. Asset Management Strategy/GIS coordination	*TBD*	S	System Inventory, Prioritization, & Standards	Integrates GIS into all data collection and management systems, integrate asset management strategies of roadway engineering/public works decision-making.
3. Design Standardization and Review Procedures	*TBD*	S	Funding & Maintenance	Typical Sections – determine when to apply and coordinated with what type of roadway Pavement Standards
4. Follow SDDOT Road Design Manual for left/right turn lane criteria.	*TBD*	S	System Inventory, Prioritization, & Standards	SDDOT Road Design Manual provides warrants on when to provide a left turn lane and a right turn lane. See Chapter 15.
5. Additional Studies for "Green Infrastructure" Streetscape Improvements and Complete Streets	*TBD*	S	Funding & Maintenance; System Inventory, Prioritization, & Standards	Studies for "green infrastructure" should be conducted to determine appropriate plans and specifications that could be incorporated into future design standards, such as best practices for drainage and pavement materials. "Complete Streets" studies will provide an assessment of roadway users and allow the County to make better decisions for providing appropriate transportation facilities for the identified populations.
6. County Road Inventory and Assessment	*TBD*	M	System Inventory, Prioritization, & Standards	Conduct systematic inventory and condition assessment of all County Roads. Develop a project list begin with neediest areas in terms of safety issues and roadway quality.
7. Township Road Inventory and Assessment	*TBD*	M	System Inventory, Prioritization, & Standards	Conduct systematic inventory and condition assessment of all Township Roads. Begin with neediest areas identified by constituents, followed by township-by-township facility.

*S = Short Term (0-5 years) | M = Medium Term (6-10 years) | L = Long Term (11-20+ years)

Appendix A

Methods and Assumptions Technical Memorandum

BROOKINGS
COUNTY MASTER TRANSPORTATION
PLAN

Methods & Assumptions for the Brookings County Master Transportation Plan

FOR

FHWA, SDDOT, Brookings County

HP5510 (15) 3616 P
Work Order PD-07-12

October 17, 2012

Prepared by: HR Green

HRGreen

Stakeholder Acceptance

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

SDDOT:

Signature

Data Analysis Engineer

Title

10-23-2012

Date

FHWA:

Signature

Planning/Civil Rights Specialist

Title

10/25/12

Date

(1) Participation on the Study Advisory Team and/or signing of this document does not constitute approval of the Brookings 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

I. INTRODUCTION AND PROJECT DESCRIPTION I-1
A. BACKGROUND INFORMATION, NEED FOR STUDY I-1
B. STUDY ADVISORY TEAM MEMBERS I-3
C. STUDY SCHEDULE I-3
D. STUDY AREA I-3
II. ANALYSIS YEARS/PERIODS II-5
III. DATA COLLECTION III-6
IV. TRAVEL OPERATIONS ANALYSIS IV-8
A. VARIABLES TO BE USED IV-8
V. TRAVEL FORECAST V-8
VI. SAFETY ISSUES VI-8
VII. SELECTION OF MEASURES OF EFFECTIVENESS (MOE) VII-8
VIII. DEVIATIONS/JUSTIFICATIONS VIII-8
IX. CONCLUSION X-9

LIST OF FIGURES

Figure 1 – Study Schedule I-4
Figure 2 – Study Location I-5
Figure 3 – Traffic Data Collection Locations III-57

I. INTRODUCTION AND PROJECT DESCRIPTION

A. BACKGROUND INFORMATION, NEED FOR STUDY

With its history as an early rail center and its rich landscape, Brookings County has developed as both a regional activity center with dynamic urban areas, and as a rural community serving vital agricultural, industrial, and recreational needs. Given the diverse character of the area, the transportation system of the County must strive to balance the needs of a comprehensive range of users. This includes providing and maintaining the infrastructure for transportation carriers and industries that depend on an appropriate combination of intermodal transportation systems to sustain economic activity, and serving residents and visitors who demand high quality facilities to efficiently and sustainably deliver the best transportation services to local motorists, transit users, and bicyclists/pedestrians.

Brookings County has experienced moderate population growth since the 2000 Census, and has been one of only a few counties in South Dakota able to retain and attract new opportunities to sustain this growth. Growth is welcomed, but brings new challenges to the community and frequently exacerbates "old problems" that still need solutions, only now more acutely. In addition, as both the City of Brookings and Brookings County grow and the economy becomes more diversified, traffic levels and patterns are anticipated to change. Our understanding of many of the transportation challenges that Brookings County will need to address in the Master Transportation Plan are as follows.

The Brookings County roadway system comprises a well-laid out network of state, county, city, and township roads which distribute trips and provide adequate mobility throughout the county. The roadway system is generally in good repair, but there are a number of ongoing preservation and expansion needs. There are also a number of unpaved streets and partially paved routes, which necessitate ongoing maintenance. The County is interested in prioritizing preservation and reconstruction needs and identifying standard roadway designs based on a comprehensive functional classification system, in order to efficiently guide infrastructure investment decisions.

Traveler safety in Brookings County is generally well-managed; however, there are some problematic areas. The County has identified several locations with observed safety and operational issues, such as excessive traffic congestion, heavy truck volumes, and/or difficult truck turning movements. In addition, new industrial development has led to increased traffic in some areas, creating new safety and congestion concerns. For example Bel Brands USA recently announced plans to construct a 170,000 square-foot Cheese Manufacturing facility on the east side of the City of Brookings, just east of I-29 and north of 6th Street. This facility will create as many as 400 new jobs, adding a significant amount of traffic to the County roadway system.

The Master Transportation Plan will need to include traffic analysis to diagnose safety and operational issues such as these, as well as recommendations for system management and potential access or capacity improvements to reduce points of conflict. The Future Needs Analysis will identify deficiencies in capacity, geometric, right of way, and other transportation elements for key roadway routes for the 20-year time frame. The Future Needs Analysis will also include a prioritized list of recommended projects based on expected benefits and costs.

Highway and rail freight transport is of critical importance to the economic vitality of Brookings County. Freight transportation needs in the Brookings area are met by a combination of truck and rail services. The primary routes for intrastate and interstate truck traffic through the County are Interstate 29 and US 14. Some trucks also use other state and county roads to access commercial, agricultural, and industrial areas throughout the County. The Master Transportation Plan should include an assessment of potential issues and opportunities with regard to providing and maintaining safe and efficient highway freight movement through and within the county.

Freight rail service is provided by the Dakota, Minnesota and Eastern (DM&E) railroad which travels east and west through Brookings County and provides connections to the Canadian Pacific rail network and other railroad systems. There are several spur lines on the DM&E within the City of Brookings and Brookings County used to provide access to grain, sand/gravel, warehoused goods and ethanol. Railroad crossings on paved roads are generally equipped with signals, but many lack gates and active warning devices. Crossings on unpaved roads often lack crossing controls altogether. The Master Transportation Plan should include an assessment of the existing at-grade crossings within the County, including identification of possible safety issues.

Most of the existing pedestrian and bicycle facilities within Brookings County fall within the City of Brookings and other urban areas within the County. As a result, pedestrian and bicycle facility planning efforts have primarily focused on system improvements within or around the City of Brookings. Extensive planning of bicycle and multi-user recreational facilities for the Brookings area was completed as part of the Brookings Area Master Transportation Plan (2011), which identifies a number of pedestrian and bicycle facilities improvements; however, there is a need to evaluate pedestrian and bicycle facilities at a countywide level, in order to identify potential needs, opportunities, gaps, and barriers. Pedestrian and bicycle travel should also be a consideration for any future expansion of the transportation network and should be addressed in the Master Transportation Plan where appropriate.

The primary transit service provider in Brookings County is the Brookings Area Transit Authority (BATA), which provides advance-reservation transit service in the City of Brookings and weekly service to other communities. BATA has conducted extensive system assessment and planning for the future. Their current plans calls for establishment of a new fixed route system serving the SDSU campus and other schools, commercial destinations in the downtown and outlying areas, and employment destinations, as well as possible expansion of service to other areas throughout the County.

General aviation services are provided at the Brookings Municipal Airport through a fixed-base operator. The closest commercial passenger service is located in Watertown or Sioux Falls, South Dakota. A recent airport planning effort resulted in a new master plan which identifies the realignment of the existing runways in the future. The Master Transportation Plan will examine proposed changes in the airport layout plan and how they may affect the future ground transportation street network needs surrounding the airport.

The Master Transportation Plan will examine the transportation facility needs and potential solutions in the community. The Master Transportation Plan is intended to be a

living document that can be used as a blueprint, or "road map" to accommodate the interests or desires of private land developers, elected and appointed local officials, and members of the traveling public.

HR Green recognizes the importance of the Brookings County Master Transportation Plan in defining current system deficiencies, identifying future system needs, and ultimately prioritizing the transportation needs for Brookings County. With limited budgets for transportation infrastructure maintenance and construction, available funding for planning level documents meant to guide future system improvements must be efficiently used to achieve the intended benefit. It is therefore very important for the County (and SDDOT) to have up-to-date, reliable (documented) transportation system needs sorted by priority and ability to deliver (costs and other considerations), especially in the competition for available Federal and State improvement funding.

B. STUDY ADVISORY TEAM MEMBERS

Dennis Clark: Brookings County Highway Department
Robert Hill: Brookings County – Planning & Zoning
Jason Meusburger: Brookings County – GIS
Alan Gregg: Brookings County Commission
Jackie Lanning: City of Brookings – Engineering
Thad Drietz: City of Brookings - Engineering
Mark Hoines: FHWA
Jeff Brosz: SDDOT –Transportation Inventory Management
Steve Gramm: SDDOT - Project Development
Wade Dahl: SDDOT – Local Government Assistance

C. STUDY SCHEDULE

The Master Transportation Plan will be substantially completed over a 10-month schedule, with additional "float" time through summer and early fall 2013 if needed to resolve outstanding issues or concerns. The Study Schedule is shown on Figure 1.

There are three phases to the project schedule: 1) Inventory and analysis of existing and future conditions and identification of problems and needs; 2) Application of the "toolbox" – development of strategies, alternatives, and potential solutions to potentially solve problems and fulfill needs; and 3) selection of alternatives for further study and development, provide for integration with other investments, and prioritization of planned improvements.

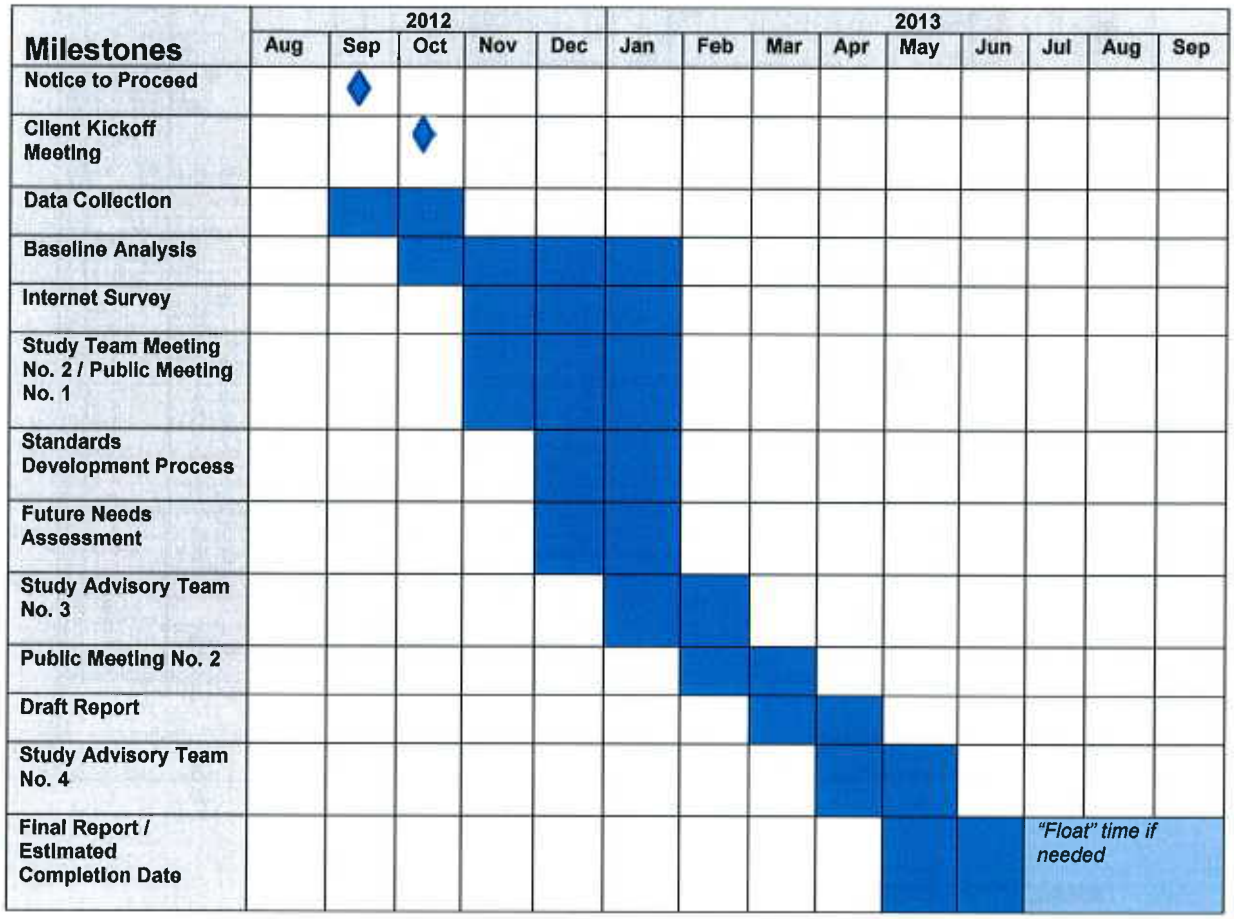


Figure 1 – Study Schedule

D. STUDY AREA

The Study Area includes the incorporated and unincorporated cities and townships of Brookings County, with the exception of the City of Brookings. The City of the City of Brookings recently completed a Master Transportation Plan in 2011, the recommendations of which will be coordinated in the Brookings County Master Transportation Plan as appropriate. The Study Area limits are illustrated in Figure 2.

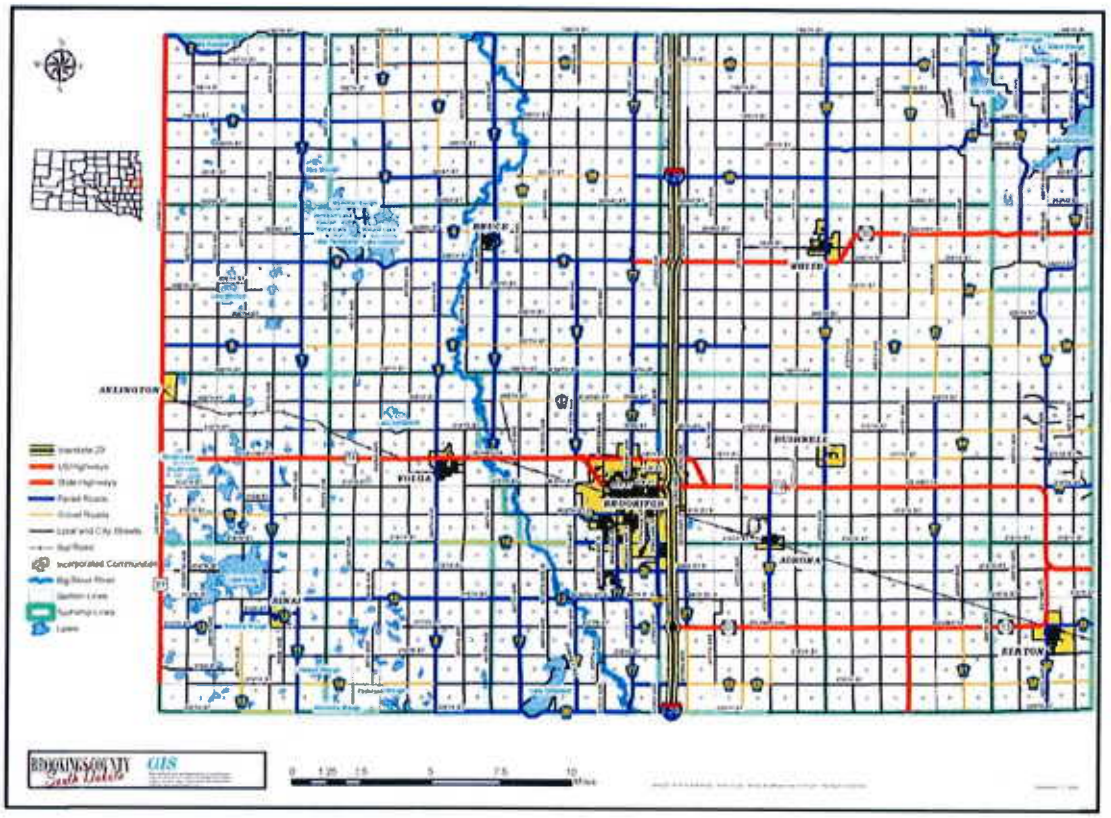


Figure 2 – Study Location

II. ANALYSIS YEARS/PERIODS

It is estimated that completing intersection traffic counts at ten (10) intersections will be necessary. Traffic counts will occur in October following the start of area schools. Traffic counts for each intersection identified will be from 7:00 a.m. to 9:00 a.m. and from 3:00 p.m. to 6:00 p.m. The camera records traffic, including pedestrian and bicycle traffic, at an intersection which is then uploaded to Miovision for processing.

Utilizing existing data gathered and the standards development process, the analysis of the future needs can be completed.

- Incorporate changes in forecasted land use to forecast traffic for 20 years along key routes, assuming a base year of 2012 and a forecast year of 2032.
- Establish the future levels of service and operating conditions along key routes and intersections without improvements.
- Identify deficiencies in capacity, geometric, right-of-way, and other transportation elements for key roadway routes for the 20-year timeframe.
- Identify roadway, airport, transit, freight, pedestrian, and bicycle transportation needs.

III. DATA COLLECTION

Many sources of data are required to establish the current baseline conditions assessment and identify existing issues affecting the transportation system. The data collection effort includes:

- Obtain and review current ordinances and guidelines
- Gather available mapping data from agencies
- Obtain current design standards from agencies
- Obtain existing traffic volumes
- Obtain and inventory existing crash history data
- Obtain and review existing City and County development practices within the County
- Obtain and review existing agencies capital improvement plans for planned roadway improvements
- Inventory Existing Transportation Systems
  - Functionally Classify Existing Roadway Network
  - Identify existing bicycle and pedestrian facilities
  - Identify existing transit systems
  - Identify existing airport capabilities
  - Identify existing freight capabilities
- Complete additional traffic counts at the following numbered intersections, corresponding with Figure 3:

1. County Road 6 (204th Street) and County Road 7 (466th Street), south of Bruce
2. County Road 6 (204th Street) and County Road 77 (471st Street), Sterling Township
3. County Road 8 (207th Street) and County Road 5 (464th Street, Oakwood Township
4. County Road 26 (32nd Street South) and County Road 77 (Main Avenue South), Medary Township
5. County Road 26 (32nd Street South) and County Road 21 (34th Avenue South), Trenton Township
6. County Road 12 (44th Street South) and County Road 5 (464th Street), Oslo Township
7. County Road 12 (44th Street South) and County Road 77 (Main Avenue South), Medary Township
8. County Road 12 (216A Street) and County Road 11 (458th Street), northwest of Sinai (Lake Sinai Township)
9. County Road 30 (E North Drive) and County Road 33 (Comell Street), Elkton
10. County Road 10 (220th Street) and County Road 13 (465th Avenue), Oslo Township

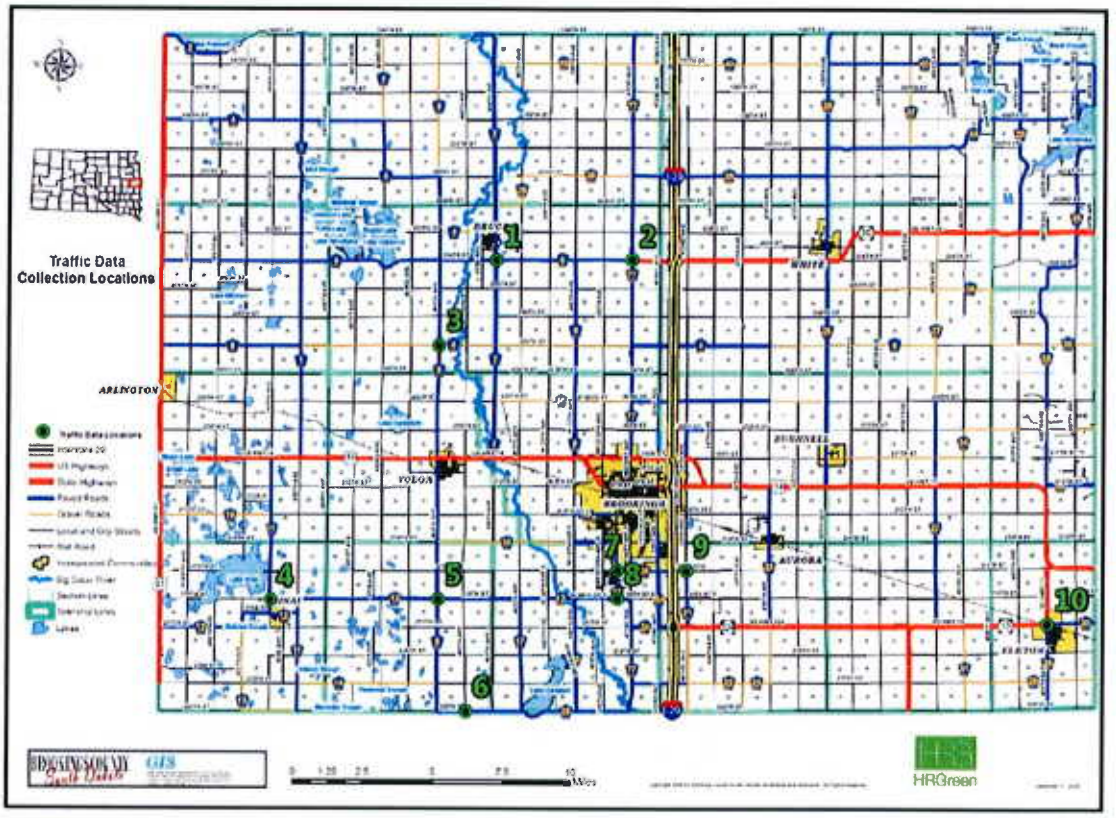


Figure 3 – Traffic Data Collection Locations

While much of this data is expected to be obtained from local government entities, the collection of some data is will occur in the field including intersection turning movement counts. HR Green will make a site visit to Brookings County to complete field data collection activities. Current and historical traffic counts from Brookings County and the SDDOT will be reviewed. These counts will be factored up to the base year of 2012 and then analyzed and compared to new counts that will be taken as part of the data collection effort at the ten additional intersections to establish values for peak hour turning movements. Traffic counts shall occur in October after local schools have commenced classes. Traffic counts for each intersection identified will be from 7:00 a.m. to 9:00 a.m. and from 3:00 p.m. to 6:00 p.m. The camera records traffic, including pedestrian and bicycle traffic, at an intersection which is then uploaded to Miovision for processing.

Exact locations may vary out in the field depending on available structures to attach the cameras to. Cameras are to be located within 35 feet of the respective survey lane. Rental of tripods is not included.

An internet survey will be used to query origins and destinations of survey respondents. Internet survey questions will be tailored to obtain specific information relative to travel

destinations of survey respondents according to time of day, day of week, and beginning-ending destinations.

IV. TRAVEL OPERATIONS ANALYSIS

HR Green will predominantly use Highway Capacity Software (HCS2010) to complete travel operations analysis. This analysis will maintain compliance with the standard default parameters listed in Chapter 15 of the SDDOT Road Design Manual.

A. VARIABLES TO BE USED

Default values to be used for Highway Capacity Software analysis include:

- Flow Rate = 1,600 vphpl
- Peak Hour Factor = 0.92

V. TRAVEL FORECAST

A regional travel demand model is not available for Brookings County. For this reason, traffic forecasts will be based on trend lines calculated from historical traffic volume data available from the South Dakota DOT. The traffic forecasts will be supplemented by analyzing anticipated growth areas provided by the County's Planning and Zoning office and the City of Brookings to adjust the 20-year forecast volumes.

VI. SAFETY ISSUES

Crash History data for the most recently available three (3) complete years will be analyzed to identify crash trends at key intersections. Key intersections include those where peak hour traffic counts are being conducted.

VII. SELECTION OF MEASURES OF EFFECTIVENESS (MOE)

The primary measures of effectiveness recorded for key study intersections will include average delay per vehicle and Level-of-Service. Measures of effectiveness for roadway segments will include arterial Level-of-Service and volume/capacity ratio. The primary mobility goal for the study will be Level-of-Service D.

VIII. DEVIATIONS/JUSTIFICATIONS

There are no known deviations from study standards at this time. If deviations are deemed necessary during the study process, these issues will be documented and presented to the Study Advisory Team.

IX. CONCLUSION

The aforementioned approach to the Brookings County Master Transportation Plan will accomplish the following goals:

- Complete a list of transportation issues and needs facing Brookings County.

- 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 Brookings County residents.

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

Appendix B

Traffic Data Collection and Forecast Technical Memorandum

MEMO

To:	Brookings County Master Transportation Plan Study Advisory Team
From:	Ross Harris, AICP – HR Green Ryan Allers, PE, PTOE, – HR Green
Subject:	Traffic Forecast Memorandum
Date:	May 6, 2013

As part of the Brookings County Master Transportation Plan traffic data was collected to gain an understanding of the existing conditions and determine future conditions. The Study Advisory Team (SAT) provided historical average daily traffic (ADT) volumes dating back to 1998 and up through 2012 for selected roadway segments. HR Green collected turning movement counts at selected intersections determined by the SAT.

Forecast Methodology

For this study only a select portion of roadway segments were analyzed within Brookings County. The historical ADT volumes were reviewed by roadway segment over the years of available data to check for abnormalities. An abnormality is defined when a roadway segment, with rather consistent volumes, has a year where the volume spikes either high or low and then is followed by more consistent volumes. For this study the spiked year was not included as part of the historical data and was not included in the linear regression analysis. Once these abnormalities were identified and removed, the linear regression trendline equations were calculated using the remaining historical ADT volumes by roadway segment. Using the trendline equation a growth rate was calculated by roadway segment. Some of the roadway segments did not have a minimum of three years of historical ADT information and therefore trendlines could not be calculated. For these roadway segments the average growth rate was used. The average growth rate was determined by averaging the growth rates calculated from each of the trendlines developed for all roadway segments. The average growth rate within Brookings County for all roadway segments is 1.76 percent.

The calculated growth rates for roadway segments were further refined to incorporate the construction of the new Bel Brands Cheese manufacturing facility. The growth rates were adjusted slightly higher in locations where the development is expected to occur. The range of growth rates used for this study in Brookings County is from 0.24 percent to 3.11 percent.

Existing Analysis

Route Volume to Capacity

As described in the methods and assumptions memorandum the existing year for the purposes of this study is 2012. The most recent year of historical ADT data for a roadway segment was used and if any historical ADT was not collected in 2012, it was forecast to 2012 levels. The growth rates determined from the trendline analysis were used and applied to the most recent historical ADT information to forecast 2012 traffic volumes.

The existing (2012 base) ADT volumes for selected roadway segments in Brookings County are shown in **Figure 1 Existing (2012) Year Traffic Volumes & Level of Service**. Also displayed on the map are planning level volume to capacity ranges for the roadway segments. A color coding system is used to display the varying ranges of the volume to capacity ratio by roadway segment. Segments shaded in green are operating below 60 percent planning level capacity, segments shaded in yellow are operating at 60 to 80 percent planning level capacity, segments shaded in orange are operating at 80 to 100 percent planning level capacity and segments shaded in red are operating above the planning level capacity threshold. As a segment's volume increases and approaches the planning level capacity threshold traffic operations will deteriorate.

The roadway segment planning level capacity is based on criteria set forth in the South Dakota Department of Transportation (SDDOT) Road Design Manual. Shown in **Table 1** below is a summary of the planning level capacity vehicles per day (VPD) based on number of lanes.

Table 1

Number of Lanes	Planning Level Capacity (VPD)
2	8,000
3	16,000
4	20,000
5	30,000

For the existing (2012 base) year no roadway segments are above their planning level capacity threshold (volume to capacity ratio greater than 1) and only one segment, the US 14 bypass between I-29 and 16th Avenue is operating in the 80 percent to 100 percent planning level capacity range.

Intersection Level of Service

As part of the existing conditions analysis 11 intersections within Brookings County were studied to determine the intersection Level of Service (LOS). The 11 intersections studied are as follows:

1. County Road 6 and County Road 7
2. County Road 6 and County Road 77
3. County Road 8 and County Road 5
4. County Road 26 and County Road 77
5. County Road 26 and County Road 21
6. County Road 12 and County Road 5

7a. County Road 77 and Main Avenue

7b. County Road 12 and Main Avenue

8. County Road 12 and County Road 11
9. County Road 30 and County Road 33
10. County Road 10 and County Road 13

The turning movement counts were collected over the AM (7am to 9am) and PM (3pm to 6pm) peak periods on October 2nd, 2012 by using Miovision video camera equipment. Car, truck and pedestrian count information was collected. The turning movement count data sheets are provided in **Appendix A**.

Using the peak period data, the peak hours for the AM and PM were determined. The peak hour factor and truck percentage information was calculated from the data collected. The intersection configuration and geometry were determined by reviewing internet website aerial mapping. Roadway speed limits were determined by reviewing internet website street views of the intersections. All of this data for each intersection was incorporated into and analyzed by using Highway Capacity Software.

The transportation industry defines the quality of service offered by highway facilitates under specific traffic demands by using LOS rating. LOS is measured on a scale of A through F, representing the operating conditions of the roadway facility based on speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience measures. LOS A represents traffic that is free flowing on an uncongested roadway while LOS F represents traffic that is creeping or stopped due to a severely congested roadway. **Table 2** displays the general definitions of each LOS and the delay ranges used by the Highway Capacity Manual (HCM) for signalized, two-way stop controlled (TWSC), and all-way stop controlled (AWSC) intersections.

Table 2

Level of Service	Operating Conditions	Delay Range for Signalized Intersections	Delay Range for TWSC/AWSC Intersections
A	Primarily Free Flow Operation/Exceptional Progression/Short Cycle Length	Less than or equal to 10 seconds	Less than or equal to 10 seconds
B	Reasonably Unimpeded Operation/Highly Favorable Progression/ Short Cycle Length	10.1 seconds to 20.0 seconds	10.1 seconds to 15.0 seconds
C	Stable Operation/Favorable Progression/Moderate Cycle Length	20.1 seconds to 35.0 seconds	15.1 seconds to 25.0 seconds
D	Less Stable Operation/Ineffective Progression/Cycle Length is Long	35.1 seconds to 55.0 seconds	25.1 seconds to 35.0 seconds
E	Unstable Operation/Unfavorable Progression/Long Cycle Lengths	55.1 seconds to 80.0 seconds	35.1 seconds to 50.0 seconds
F	Low Speed/Congestion/Poor Progression/Long Cycle Lengths/Unable to Clear Queues	Greater than 80.1 seconds	Greater than 50.1 seconds

For the purposes of this study LOS D is considered to be the primary mobility goal.

For the existing (2012 base) year the 11 intersections had turning movement counts completed and then analyzed to determine the LOS. All of the 11 intersections analyzed had operations at a LOS of C or better. See **Figure 1 Existing (2012) Year Traffic Volumes & Level of Service** for the results of each individual intersection. The Highway Capacity Software output report sheets are provided in **Appendix B**.

Forecast Analysis

Route Volume to Capacity

The forecast (2032) traffic volumes were determined by taking the existing (2012 base) year ADT volumes and applying the trendline determined growth rate to get the forecast (2032) year volumes. See **Figure 2 Forecast (2032) Year Traffic Volumes & Level of Service**. Also displayed on the map are planning level volume to capacity ranges for the roadway segments for the forecast (2032) year. Of the roadway segments only the US 14 bypass between I-29 and 16th Avenue is in the "above capacity threshold" which means the volume exceeds the planning level capacity threshold. Even though this route has exceeded the planning level capacity threshold, it will still be able to serve the traveling public, however more unstable conditions will occur including longer queues and delays at intersections and longer travel times through this segment.

Intersection Level of Service

In a similar fashion the turning movement counts collected in the fall of 2012 had growth rates applied to get the forecast (2032) turning movement counts. See **Figure 2 Forecast (2032) Year Traffic Volumes & Level of Service**. The growth rates used for the turning movement counts were the same growth rates used for the roadway segments. Where there was an intersection that did not have a segment growth rate for an approach, an average segment growth rate of the other approaches was calculated and used for the approach.

Once the forecast (2032) turning movement count volumes were determined, an operational analysis was completed using the Highway Capacity Software to determine the intersection LOS. The only difference between the existing (2012 base) year and the forecast (2032) year in the operational analysis is the volumes used. Based on the results of the analysis one intersection (County Road 26/County Road 77) has an approach with operations

at a LOS F during the AM peak hour. All other intersections and their approaches had acceptable operations with a LOS of D or better. The Highway Capacity Software output report sheets are provided in **Appendix B**.

Summary

A summary figure has been included to compare the existing (2012 base) year and forecast (2032) year ADT for the roadway segments. See **Figure 3 Existing (2012) and Forecast (2032) Year Traffic Volumes**.

Overall Brookings County has acceptable traffic operations and routes below capacity thresholds. One intersection and one roadway segment have been identified as potential locations with traffic operations or capacity issues for the forecast (2032) year.

Intersections Studied

County Road 6 & County Road 7
LOS: A/A
A/A | A/A | A/A | A/A

County Road 6 & County Road 77
LOS: NA/NA
A/A | A/B | B/A | A/A

County Road 8 & County Road 5
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 26 & County Road 77
LOS: NA/NA
A/A | B/C | C/C | A/A

County Road 26 & County Road 21
LOS: NA/NA
A/A | A/A | A/A

County Road 12 & County Road 5
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 77 & Main Avenue
LOS: NA/NA
A/A | A/A | B/B

County Road 12 & Main Avenue
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 12 & County Road 11
LOS: NA/NA
A/A | A/A | A/A

County Road 30 & County Road 33
LOS: A/A
A/A | A/A | A/A | A/A

County Road 10 & County Road 13
LOS: NA/NA
A/A | A/A

Inset Legend
- Intersection
- Stop Sign
- X/X Existing AM/PM Level of Service

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 1
Existing (2012) Year Traffic Volumes & Level of Service

Legend

- Intersection

Volume to Capacity Ratio
- Above Capacity Threshold (1.0+)
- Between 80% and 100% of Capacity (0.8 - 1.0)
- Between 60% and 80% of Capacity (0.6 - 0.8)
- Below 60% of Capacity (0.0 - 0.6)
- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- City Limits
- Brookings County Limits
- X,XXX Average Daily Traffic (ADT)

N / W / E / S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

Intersections Studied

County Road 6 & County Road 7
LOS: A/A
A/A | A/A | A/A | A/A

County Road 6 & County Road 77
LOS: NA/NA
A/A | B/A | B/B | A/A

County Road 8 & County Road 5
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 26 & County Road 77
LOS: NA/NA
A/A | C/D | F/C | A/A

County Road 26 & County Road 21
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 12 & County Road 5
LOS: NA/NA
A/A | A/A | B/A | A/A

County Road 77 & Main Avenue
LOS: NA/NA
A/A | A/A | A/A | B/B

County Road 12 & Main Avenue
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 12 & County Road 11
LOS: NA/NA
A/A | A/A | A/A | A/A

County Road 30 & County Road 33
LOS: A/A
A/A | A/A | A/A | A/A

County Road 10 & County Road 13
LOS: NA/NA
A/A | A/A | A/A | A/A

Inset Legend
- Intersection
- Stop Sign
- X/X Existing AM/PM Level of Service

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 2
Forecast (2032) Year Traffic Volumes & Level of Service

Legend

- Intersection

Volume to Capacity Ratio
- Above Capacity Threshold (1.0+)
- Between 80% and 100% of Capacity (0.8 - 1.0)
- Between 60% and 80% of Capacity (0.6 - 0.8)
- Below 60% of Capacity (0.0 - 0.6)
- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- City Limits
- Brookings County Limits
- X,XXX Average Daily Traffic (ADT)

N W E S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 3
Existing (2012) and Forecast (2032) Year Traffic Volumes

Legend

- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- City Limits
- Brookings County Limits
- X,XXX Existing Average Daily Traffic (ADT)
- (X,XXX) Forecast Average Daily Traffic (ADT)

N W E S

0 6,500 13,000 Feet

1 inch = 13,000 feet

HRGreen

APPENDIX A – Turning Movement Counts

APPENDIX B – Highway Capacity Software Operations Reports

Existing (2012) Year
Future (2032) Year

Location # 1 - County Road 6 and County Road 7

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 7					County Road 6					County Road 7					County Road 6				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	2	6	1	0	0	0	2	1	0	0	0	1	0	0	0	1	4	0	0	0
7:15 AM	2	1	0	0	0	0	2	1	0	0	0	1	0	0	0	2	6	1	0	0
7:30 AM	9	19	1	0	0	0	1	1	0	0	1	0	0	0	0	0	3	0	0	0
7:45 AM	2	8	2	0	0	1	2	3	0	0	0	2	0	0	0	3	7	1	0	0
8:00 AM	1	4	1	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0	0	0
8:15 AM	2	3	0	0	0	0	1	1	0	0	0	2	0	0	0	0	1	0	0	0
8:30 AM	5	9	2	0	0	1	2	2	0	0	0	4	0	0	0	1	1	1	0	0
8:45 AM	0	5	2	0	0	0	1	1	0	0	0	0	0	0	0	1	3	1	0	0
3:00 PM	1	4	0	0	0	0	2	2	0	0	1	0	0	0	0	2	1	0	0	0
3:15 PM	1	3	1	0	0	0	1	1	0	0	1	7	1	0	0	0	0	0	0	0
3:30 PM	0	1	0	0	0	0	4	2	0	0	0	4	1	0	0	3	2	0	0	0
3:45 PM	3	2	0	0	0	0	2	3	0	0	2	6	1	0	0	0	2	0	0	0
4:00 PM	4	2	3	0	0	0	1	6	0	0	2	6	1	0	0	0	2	0	0	0
4:15 PM	2	4	0	0	0	0	3	4	0	0	3	4	0	0	0	0	5	1	0	0
4:30 PM	2	1	0	0	0	0	1	9	0	0	1	3	1	0	0	2	1	2	0	0
4:45 PM	0	2	2	0	0	0	3	9	0	0	2	9	0	0	0	2	0	0	0	0
5:00 PM	3	6	1	0	0	0	3	8	0	0	0	9	0	0	0	3	1	1	0	0
5:15 PM	2	2	1	0	0	0	6	11	0	0	0	10	0	0	0	2	0	0	0	0
5:30 PM	2	5	0	0	0	0	3	9	0	0	2	11	0	0	0	1	2	0	0	0
5:45 PM	1	5	0	0	0	0	7	6	0	0	0	10	1	0	0	0	3	0	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 7					County Road 6					County Road 7					County Road 6				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
7:15 AM	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	1	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
3:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
3:30 PM	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	1	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0
4:00 PM	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 7					County Road 6					County Road 7					County Road 6				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	2	6	1	0	0	0	2	1	0	0	0	2	0	0	0	1	5	0	0	0
7:15 AM	2	4	0	0	0	0	2	1	0	0	0	2	0	0	0	2	6	1	0	0
7:30 AM	9	19	2	0	0	0	3	1	0	0	1	0	0	0	0	0	3	0	0	0
7:45 AM	2	8	2	0	0	2	2	3	0	0	0	2	0	0	0	3	7	1	0	0
Peak Hour Total	**15**	**37**	**5**	**0**	**0**	**2**	**9**	**6**	**0**	**0**	**1**	**6**	**0**	**0**	**0**	**6**	**21**	**2**	**0**	**0**
Peak Hour Factor	**0.42**	**0.49**	**0.62**	**0.00**	**NA**	**0.25**	**0.75**	**0.50**	**0.00**	**NA**	**0.25**	**0.75**	**0.00**	**0.00**	**NA**	**0.50**	**0.75**	**0.50**	**0.00**	**NA**
Truck %	**0%**	**8%**	**20%**	**0%**	**NA**	**50%**	**22%**	**0%**	**0%**	**NA**	**0%**	**33%**	**0%**	**0%**	**NA**	**0%**	**5%**	**0%**	**0%**	**NA**
8:00 AM	1	4	1	0	0	0	1	0	0	0	1	0	1	0	0	0	4	0	0	0
8:15 AM	2	3	0	0	0	1	3	2	0	0	0	2	0	0	0	0	2	0	0	0
8:30 AM	5	9	2	0	0	1	2	2	0	0	0	4	0	0	0	1	1	1	0	0
8:45 AM	0	5	2	0	0	1	2	2	0	0	0	1	0	0	0	1	3	1	0	0
3:00 PM	1	4	0	0	0	0	2	2	0	0	1	0	0	0	0	2	2	0	0	0
3:15 PM	1	3	1	0	0	0	2	1	0	0	1	7	1	0	0	1	0	0	0	0
3:30 PM	0	1	0	0	0	4	4	2	0	0	0	5	1	0	0	3	3	0	0	0
3:45 PM	3	2	0	0	0	0	2	3	0	0	2	7	2	0	0	0	3	0	0	0
4:00 PM	4	2	4	0	0	0	1	7	0	0	2	6	1	0	0	0	2	0	0	0
4:15 PM	2	4	1	0	0	0	3	4	0	0	3	4	0	0	0	0	5	1	0	0
4:30 PM	2	1	0	0	0	3	1	9	0	0	1	3	1	0	0	2	2	2	0	0
4:45 PM	0	2	2	0	0	0	3	9	0	0	2	9	0	0	0	2	0	0	0	0
5:00 PM	3	6	1	0	0	0	3	9	0	0	0	9	0	0	0	3	1	1	0	0
5:15 PM	2	2	1	0	0	0	6	11	0	0	0	10	0	0	0	2	0	0	0	0
5:30 PM	2	5	0	0	0	3	3	9	0	0	2	11	0	0	0	1	2	0	0	0
5:45 PM	1	5	0	0	0	2	9	7	0	0	0	10	1	0	0	0	3	0	0	0
Peak Hour Total	**8**	**18**	**2**	**0**	**0**	**5**	**21**	**36**	**0**	**0**	**2**	**40**	**1**	**0**	**0**	**6**	**6**	**1**	**0**	**0**
Peak Hour Factor	**0.67**	**0.75**	**0.50**	**0.00**	**NA**	**0.42**	**0.58**	**0.82**	**0.00**	**NA**	**0.25**	**0.91**	**0.25**	**0.00**	**NA**	**0.50**	**0.50**	**0.25**	**0.00**	**NA**
Truck %	**0%**	**0%**	**0%**	**0%**	**NA**	**100%**	**10%**	**6%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 2 - County Road 6 and County Road 77

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 77					County Road 6					County Road 77					County Road 6				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	3	2	0	0	0	1	0	2	0	0	0	4	2	0	0	1	7	0	0	0
7:15 AM	7	2	0	0	0	0	2	4	0	0	2	3	4	0	0	1	12	1	0	0
7:30 AM	12	2	0	0	0	1	5	1	0	0	0	5	8	0	0	3	14	1	0	0
7:45 AM	8	1	0	0	0	1	5	2	0	0	0	6	4	0	0	0	10	1	0	0
8:00 AM	4	2	1	0	0	0	0	3	0	0	0	3	4	0	0	1	7	0	0	0
8:15 AM	4	1	0	0	0	1	2	1	0	0	0	1	2	0	0	1	7	1	0	0
8:30 AM	2	1	2	0	0	0	3	4	0	0	0	1	3	0	0	2	6	1	0	0
8:45 AM	0	1	0	0	0	0	2	1	0	0	0	3	2	0	0	1	4	0	0	0
3:00 PM	0	2	0	0	0	1	2	0	0	0	0	8	3	0	0	0	1	1	0	0
3:15 PM	0	1	1	0	0	2	1	1	0	0	1	3	1	0	0	0	2	3	0	0
3:30 PM	0	5	0	0	0	2	3	0	0	0	4	9	1	0	0	0	1	3	0	0
3:45 PM	0	6	1	0	0	0	3	0	0	0	0	4	1	0	0	1	2	2	0	0
4:00 PM	0	2	0	0	0	4	4	1	0	0	1	5	0	0	0	0	1	2	0	0
4:15 PM	1	5	0	0	0	1	2	2	0	0	3	6	9	0	0	1	4	1	0	0
4:30 PM	0	6	0	0	0	2	5	0	0	0	3	7	4	0	0	0	1	2	0	0
4:45 PM	0	1	1	0	0	2	6	1	0	0	4	10	4	0	0	1	1	0	0	0
5:00 PM	1	4	0	0	0	1	5	0	0	0	5	11	11	0	0	1	0	3	0	0
5:15 PM	2	1	1	0	0	2	5	2	0	0	6	19	8	0	0	0	2	1	0	0
5:30 PM	0	2	2	0	0	2	6	0	0	0	4	15	4	0	0	0	3	0	0	0
5:45 PM	0	0	1	0	0	0	4	2	0	0	1	11	5	0	0	3	1	1	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 77					County Road 6					County Road 77					County Road 6				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	1	0	0
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
7:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	1	0	0
7:45 AM	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
8:15 AM	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
8:30 AM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0
8:45 AM	1	0	0	0	0	0	1	3	0	0	0	1	0	0	0	0	0	1	0	0
3:00 PM	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
3:15 PM	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0
3:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
4:00 PM	0	0	0	0	0	0	1	0	0	0	0	3	1	0	0	0	1	0	0	0
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0
4:30 PM	0	1	1	0	0	0	3	0	0	0	0	1	0	0	0	0	1	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
5:30 PM	0	1	1	0	0	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0
5:45 PM	0	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 77					County Road 6					County Road 77					County Road 6				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	3	2	0	0	0	1	0	2	0	0	0	6	3	0	0	1	7	1	0	0
7:15 AM	7	3	0	0	0	0	2	4	0	0	2	3	4	0	0	1	13	1	0	0
7:30 AM	12	2	0	0	0	2	5	1	0	0	0	5	9	0	0	3	15	2	0	0
7:45 AM	8	2	0	0	0	1	6	3	0	0	0	6	4	0	0	0	10	1	0	0
8:00 AM	4	3	1	0	0	1	1	3	0	0	0	4	4	0	0	1	7	0	0	0
Peak Hour Total	**31**	**10**	**1**	**0**	**0**	**4**	**14**	**11**	**0**	**0**	**2**	**18**	**21**	**0**	**0**	**5**	**45**	**4**	**0**	**0**
Peak Hour Factor	**0.65**	**0.83**	**0.25**	**0.00**	**NA**	**0.50**	**0.58**	**0.69**	**0.00**	**NA**	**0.25**	**0.75**	**0.58**	**0.00**	**NA**	**0.42**	**0.75**	**0.50**	**0.00**	**NA**
Truck %	**0%**	**30%**	**0%**	**0%**	**NA**	**50%**	**14%**	**9%**	**0%**	**NA**	**0%**	**6%**	**5%**	**0%**	**NA**	**0%**	**4%**	**25%**	**0%**	**NA**
8:15 AM	4	4	0	0	0	1	2	1	0	0	1	1	2	0	0	1	7	2	0	0
8:30 AM	2	1	2	0	0	0	4	4	0	0	0	2	3	0	0	3	6	1	0	0
8:45 AM	1	1	0	0	0	0	3	4	0	0	0	4	2	0	0	1	4	1	0	0
3:00 PM	0	4	0	0	0	1	3	0	0	0	0	8	3	0	0	0	2	1	0	0
3:15 PM	0	2	1	0	0	2	5	1	0	0	1	3	1	0	0	0	2	3	0	0
3:30 PM	0	5	0	0	0	2	5	0	0	0	4	9	1	0	0	0	2	3	0	0
3:45 PM	0	6	1	0	0	0	4	0	0	0	0	4	1	0	0	1	3	2	0	0
4:00 PM	0	2	0	0	0	4	5	1	0	0	1	8	1	0	0	0	2	2	0	0
4:15 PM	1	5	0	0	0	2	2	2	0	0	3	8	9	0	0	1	4	1	0	0
4:30 PM	0	7	1	0	0	2	8	0	0	0	3	8	4	0	0	0	2	2	0	0
4:45 PM	0	1	1	0	0	2	6	1	0	0	4	10	5	0	0	1	1	0	0	0
5:00 PM	1	5	0	0	0	1	5	0	0	0	5	12	11	0	0	1	0	3	0	0
5:15 PM	2	1	1	0	0	2	5	2	0	0	6	19	12	0	0	0	2	1	0	0
5:30 PM	0	3	3	0	0	2	10	0	0	0	4	16	4	0	0	0	3	0	0	0
5:45 PM	0	2	1	0	0	0	5	2	0	0	2	11	5	0	0	3	1	1	0	0
Peak Hour Total	**3**	**11**	**5**	**0**	**0**	**5**	**25**	**4**	**0**	**0**	**17**	**58**	**32**	**0**	**0**	**4**	**6**	**5**	**0**	**0**
Peak Hour Factor	**0.38**	**0.55**	**0.42**	**0.00**	**NA**	**0.62**	**0.62**	**0.50**	**0.00**	**NA**	**0.71**	**0.76**	**0.67**	**0.00**	**NA**	**0.33**	**0.50**	**0.42**	**0.00**	**NA**
Truck %	**0%**	**36%**	**20%**	**0%**	**NA**	**0%**	**20%**	**0%**	**0%**	**NA**	**6%**	**3%**	**13%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 3 - County Road 8 and County Road 5

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 5					County Road 8					County Road 5					County Road 8				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	4	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
7:15 AM	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0
7:30 AM	0	9	0	0	0	2	0	1	0	0	0	1	1	0	0	0	0	1	0	0
7:45 AM	0	16	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	2	0	0
8:00 AM	0	5	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0
8:30 AM	0	3	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
8:45 AM	0	1	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	1	0	2	0	0	1	0	0	0	0	0	1	0	0	0
3:30 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	4	0	0	0	1	0	0	0	0	0	6	0	0	0	0	0	0	0	0
4:00 PM	0	4	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0
4:15 PM	0	1	0	0	0	1	0	0	0	0	1	5	0	0	0	0	0	1	0	0
4:30 PM	0	7	0	0	0	0	1	0	0	0	1	6	0	0	0	0	0	1	0	0
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
5:00 PM	0	3	0	0	0	0	0	0	0	0	1	9	0	0	0	0	0	0	0	0
5:15 PM	0	2	0	0	0	0	0	0	0	0	1	9	0	0	0	0	0	2	0	0
5:30 PM	0	3	0	0	0	0	0	0	0	0	2	8	1	0	0	0	0	1	0	0
5:45 PM	0	2	0	0	0	1	0	0	0	0	0	10	0	0	0	0	0	1	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 5					County Road 8					County Road 5					County Road 8				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
3:15 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
3:30 PM	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 5					County Road 8					County Road 5					County Road 8				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	4	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
7:15 AM	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0
7:30 AM	0	10	0	0	0	2	0	1	0	0	0	1	1	0	0	0	0	1	0	0
7:45 AM	0	17	0	0	0	1	0	0	0	0	0	5	0	0	0	0	0	2	0	0
8:00 AM	0	5	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Peak Hour Total	**0**	**35**	**0**	**0**	**0**	**5**	**0**	**1**	**0**	**0**	**0**	**8**	**3**	**0**	**0**	**0**	**0**	**5**	**0**	**0**
Peak Hour Factor	**0.00**	**0.51**	**0.00**	**0.00**	**NA**	**0.62**	**0.00**	**0.25**	**0.00**	**NA**	**0.00**	**0.40**	**0.38**	**0.00**	**NA**	**0.00**	**0.00**	**0.62**	**0.00**	**NA**
Truck %	**0%**	**6%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**13%**	**67%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**
8:15 AM	0	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0
8:30 AM	0	3	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0
8:45 AM	0	1	1	0	0	2	0	0	0	0	0	4	1	0	0	0	0	1	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	1	0	0
3:15 PM	0	1	0	0	0	1	0	2	0	0	1	1	0	0	0	0	1	0	0	0
3:30 PM	0	4	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
3:45 PM	0	4	0	0	0	1	0	0	0	0	1	7	0	0	0	0	0	1	0	0
4:00 PM	0	4	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0
4:15 PM	0	1	0	0	0	1	0	0	0	0	1	5	0	0	0	0	0	2	0	0
4:30 PM	0	8	0	0	0	0	1	0	0	0	1	6	1	0	0	0	0	2	0	0
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
5:00 PM	0	3	0	0	0	0	0	1	0	0	1	10	0	0	0	0	0	0	0	0
5:15 PM	0	2	0	0	0	0	0	0	0	0	1	10	0	0	0	0	0	2	0	0
5:30 PM	0	4	0	0	0	0	0	0	0	0	2	8	1	0	0	0	0	1	0	0
5:45 PM	0	3	0	0	0	1	0	0	0	0	0	11	0	0	0	0	0	1	0	0
Peak Hour Total	**0**	**12**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**4**	**39**	**1**	**0**	**0**	**0**	**0**	**4**	**0**	**0**
Peak Hour Factor	**0.00**	**0.75**	**0.00**	**0.00**	**NA**	**0.25**	**0.00**	**0.25**	**0.00**	**NA**	**0.50**	**0.89**	**0.25**	**0.00**	**NA**	**0.00**	**0.00**	**0.50**	**0.00**	**NA**
Truck %	**0%**	**17%**	**0%**	**0%**	**NA**	**0%**	**0%**	**100%**	**0%**	**NA**	**0%**	**8%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 4 - County Road 26 and County Road 77

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 77					County Road 26					County Road 77					County Road 26				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	25	1	0	0	1	2	1	0	0	0	23	5	0	0	6	3	1	0	0
7:15 AM	1	18	3	0	0	1	0	1	0	0	0	42	19	0	0	13	4	0	0	0
7:30 AM	2	11	3	0	0	3	0	3	0	0	0	66	16	0	0	35	20	2	0	0
7:45 AM	2	13	3	0	0	6	3	4	0	0	0	58	15	0	0	34	16	0	0	0
8:00 AM	1	23	4	0	0	2	2	4	0	0	1	56	7	0	0	8	4	0	0	0
8:15 AM	1	18	2	0	0	1	0	0	0	0	0	31	5	0	0	7	5	0	0	0
8:30 AM	1	15	7	0	0	2	0	2	0	0	0	19	9	0	0	6	3	0	0	0
8:45 AM	1	15	2	0	0	3	2	1	0	0	0	19	4	0	0	6	2	0	0	0
3:00 PM	0	31	3	0	0	8	3	4	0	0	2	25	1	0	0	11	2	1	0	0
3:15 PM	3	21	4	0	0	7	0	2	0	0	3	28	3	0	0	5	1	0	0	0
3:30 PM	2	34	17	0	0	15	5	1	0	0	0	20	1	0	0	4	1	1	0	0
3:45 PM	0	23	12	0	0	7	4	1	0	0	0	28	3	0	0	3	6	1	0	0
4:00 PM	2	36	7	0	0	9	5	2	0	0	0	32	7	0	0	3	3	0	0	0
4:15 PM	1	31	11	0	0	6	5	3	0	0	1	20	5	0	0	3	2	0	0	0
4:30 PM	1	41	10	0	0	13	9	2	0	0	0	26	5	0	0	4	1	0	0	0
4:45 PM	4	44	19	0	0	14	6	2	0	0	2	23	2	0	0	10	2	1	0	0
5:00 PM	1	64	12	0	0	16	12	5	0	0	2	28	8	0	0	9	3	0	0	0
5:15 PM	3	59	28	0	0	19	7	4	0	0	0	33	5	0	0	3	5	0	0	0
5:30 PM	1	43	14	0	0	10	11	1	0	0	2	29	7	0	0	7	5	0	0	0
5:45 PM	2	36	10	0	0	13	6	1	0	0	1	29	8	0	0	3	3	2	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 77					County Road 26					County Road 77					County Road 26				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
8:00 AM	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
8:15 AM	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	1	1	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0
8:45 AM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
3:00 PM	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	1	0	0	0	0	0	0	1	0	0	0	1	2	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	1	0	0	1	3	1	0	0	0	0	0	0	0
3:45 PM	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
4:00 PM	2	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	1	0	0	0	6	1	0	0	1	0	0	0	0
4:30 PM	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
4:45 PM	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 77					County Road 26					County Road 77					County Road 26				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	26	1	0	0	1	2	1	0	0	0	24	5	0	0	6	3	1	0	0
7:15 AM	1	19	3	0	0	1	0	1	0	0	0	42	19	0	0	13	4	0	0	0
7:30 AM	2	11	3	0	0	3	0	3	0	0	0	66	16	0	0	35	20	2	0	0
7:45 AM	2	13	3	0	0	6	3	4	0	0	0	58	15	0	0	34	17	0	0	0
8:00 AM	1	26	4	0	0	2	2	4	0	0	1	58	7	0	0	8	4	0	0	0
Peak Hour Total	**6**	**69**	**13**	**0**	**0**	**12**	**5**	**12**	**0**	**0**	**1**	**224**	**57**	**0**	**0**	**90**	**45**	**2**	**0**	**0**
Peak Hour Factor	**0.75**	**0.66**	**0.81**	**0.00**	**NA**	**0.50**	**0.42**	**0.75**	**0.00**	**NA**	**0.25**	**0.85**	**0.75**	**0.00**	**NA**	**0.64**	**0.56**	**0.25**	**0.00**	**NA**
Truck %	**0%**	**6%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**1%**	**0%**	**0%**	**NA**	**0%**	**2%**	**0%**	**0%**	**NA**
8:15 AM	2	21	2	0	0	1	0	0	0	0	0	31	5	0	0	7	5	0	0	0
8:30 AM	2	16	7	0	0	2	0	3	0	0	0	21	9	0	0	6	3	0	0	0
8:45 AM	1	16	2	0	0	3	2	1	0	0	0	20	4	0	0	6	2	0	0	0
3:00 PM	1	33	3	0	0	8	3	4	0	0	2	25	1	0	0	11	2	1	0	0
3:15 PM	4	21	4	0	0	7	0	3	0	0	3	29	5	0	0	5	1	0	0	0
3:30 PM	2	34	17	0	0	15	5	2	0	0	1	23	2	0	0	4	1	1	0	0
3:45 PM	0	25	12	0	0	7	4	1	0	0	0	29	3	0	0	3	6	1	0	0
4:00 PM	4	37	7	0	0	10	6	2	0	0	0	33	7	0	0	3	3	0	0	0
4:15 PM	1	31	11	0	0	6	5	4	0	0	1	26	6	0	0	4	2	0	0	0
4:30 PM	2	42	10	0	0	13	9	2	0	0	0	27	5	0	0	5	1	0	0	0
4:45 PM	5	45	20	0	0	14	6	3	0	0	2	23	2	0	0	10	2	1	0	0
5:00 PM	1	65	12	0	0	16	12	5	0	0	2	28	8	0	0	10	3	0	0	0
5:15 PM	3	59	28	0	0	19	7	4	0	0	0	33	5	0	0	3	5	0	0	0
5:30 PM	1	43	15	0	0	10	11	1	0	0	2	29	7	0	0	7	5	1	0	0
Peak Hour Total	**10**	**212**	**75**	**0**	**0**	**59**	**36**	**13**	**0**	**0**	**6**	**113**	**22**	**0**	**0**	**30**	**15**	**2**	**0**	**0**
Peak Hour Factor	**0.50**	**0.82**	**0.67**	**0.00**	**NA**	**0.78**	**0.75**	**0.65**	**0.00**	**NA**	**0.75**	**0.86**	**0.69**	**0.00**	**NA**	**0.75**	**0.75**	**0.50**	**0.00**	**NA**
Truck %	**10%**	**1%**	**3%**	**0%**	**NA**	**0%**	**0%**	**8%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**3%**	**0%**	**50%**	**0%**	**NA**
5:45 PM	2	36	10	0	0	13	6	1	0	0	1	29	8	0	0	3	3	2	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 5 - County Road 26 and County Road 21

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name						County Road 26					County Road 21					County Road 26				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM					0	0	2		0	0	2		0	0	0		2	3	0	0
7:15 AM					0	0	3		0	0	3		0	0	0		4	0	0	0
7:30 AM					0	0	2		0	0	9		0	0	0		4	2	0	0
7:45 AM					0	0	2		0	0	6		0	0	0		6	2	0	0
8:00 AM					0	0	2		0	0	3		0	0	0		1	0	0	0
8:15 AM					0	0	3		0	0	0		0	0	0		1	1	0	0
8:30 AM					0	0	3		0	0	1		0	0	0		1	1	0	0
8:45 AM					0	0	1		0	0	0		0	0	0		2	0	0	0
3:00 PM					0	0	2		0	0	1		0	0	0		1	1	0	0
3:15 PM					0	0	0		0	0	2		0	0	0		0	1	0	0
3:30 PM					0	0	1		0	0	3		0	0	0		0	3	0	0
3:45 PM					0	0	1		0	0	0		0	0	0		1	1	0	0
4:00 PM					0	0	3		0	0	2		0	0	0		2	3	0	0
4:15 PM					0	0	3		0	0	0		0	0	0		0	2	0	0
4:30 PM					0	0	9		0	0	0		0	0	0		2	2	0	0
4:45 PM					0	0	4		0	0	4		0	0	0		1	1	0	0
5:00 PM					0	0	14		0	0	1		0	0	0		5	6	0	0
5:15 PM					0	0	7		0	0	1		0	0	0		2	9	0	0
5:30 PM					0	0	5		0	0	4		0	0	0		6	4	0	0
5:45 PM					0	0	0		0	0	3		0	0	0		1	6	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name						County Road 26					County Road 21					County Road 26				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM					0	0	1		0	0	0		0	0	0		1	0	0	0
7:15 AM					0	0	1		0	0	0		0	0	0		0	0	0	0
7:30 AM					0	0	1		0	0	0		0	0	0		0	0	0	0
7:45 AM					0	0	1		0	0	0		0	0	0		0	0	0	0
8:00 AM					0	0	1		0	0	0		0	0	0		1	0	0	0
8:15 AM					0	0	0		0	0	0		0	0	0		0	0	0	0
8:30 AM					0	0	0		0	0	0		0	0	0		0	0	0	0
8:45 AM					0	0	0		0	0	1		0	0	0		0	0	0	0
3:00 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
3:15 PM					0	0	0		0	0	0		0	0	0		1	0	0	0
3:30 PM					0	0	1		0	0	0		0	0	0		0	0	0	0
3:45 PM					0	0	0		0	0	0		0	0	0		1	0	0	0
4:00 PM					0	0	0		0	0	0		0	0	0		0	1	0	0
4:15 PM					0	0	0		0	0	1		0	0	0		0	0	0	0
4:30 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
4:45 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
5:00 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
5:15 PM					0	0	1		0	0	0		0	0	0		3	0	0	0
5:30 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
5:45 PM					0	0	0		0	0	0		0	0	0		1	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name						County Road 26					County Road 21					County Road 26				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM					0	0	3	0	0	0	2	0	0	0	0	0	3	3	0	0
7:15 AM					0	0	4	0	0	0	3	0	0	0	0	0	4	0	0	0
7:30 AM					0	0	3	0	0	0	9	0	0	0	0	0	4	2	0	0
7:45 AM					0	0	3	0	0	0	6	0	0	0	0	0	6	2	0	0
Peak Hour Total					**0**	**0**	**13**	**0**	**0**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**17**	**7**	**0**	**0**
Peak Hour Factor					**NA**	**NA**	**0.81**	**0.00**	**0.00**	**NA**	**0.56**	**0.00**	**0.00**	**0.00**	**NA**	**0.00**	**0.71**	**0.58**	**0.00**	**NA**
Truck %					**NA**	**NA**	**31%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**6%**	**0%**	**0%**	**NA**
8:00 AM					0	0	3	0	0	0	3	0	0	0	0	0	2	0	0	0
8:15 AM					0	0	3	0	0	0	0	0	0	0	0	0	1	1	0	0
8:30 AM					0	0	3	0	0	0	1	0	0	0	0	0	1	1	0	0
8:45 AM					0	0	1	0	0	0	1	0	0	0	0	0	2	0	0	0
3:00 PM					0	0	2	0	0	0	1	0	0	0	0	0	1	1	0	0
3:15 PM					0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0
3:30 PM					0	0	2	0	0	0	3	0	0	0	0	0	0	3	0	0
3:45 PM					0	0	1	0	0	0	0	0	0	0	0	0	2	1	0	0
4:00 PM					0	0	3	0	0	0	2	0	0	0	0	0	2	4	0	0
4:15 PM					0	0	3	0	0	0	1	0	0	0	0	0	0	2	0	0
4:30 PM					0	0	9	0	0	0	0	0	0	0	0	0	2	2	0	0
4:45 PM					0	0	4	0	0	0	4	0	0	0	0	0	1	1	0	0
5:00 PM					0	0	14	0	0	0	1	0	0	0	0	0	5	6	0	0
5:15 PM					0	0	8	0	0	0	1	0	0	0	0	0	5	9	0	0
5:30 PM					0	0	5	0	0	0	4	0	0	0	0	0	6	4	0	0
5:45 PM					0	0	0	0	0	0	3	0	0	0	0	0	2	6	0	0
Peak Hour Total					**0**	**0**	**27**	**0**	**0**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**18**	**25**	**0**	**0**
Peak Hour Factor					**NA**	**0.00**	**0.48**	**0.00**	**0.00**	**NA**	**0.56**	**0.00**	**0.00**	**0.00**	**NA**	**0.00**	**0.75**	**0.69**	**0.00**	**NA**
Truck %					**NA**	**0%**	**4%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**22%**	**0%**	**0%**	**NA**

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Note: Only Wesbound traffic has a stop sign. This is a "T" intersection that is skewed. In order to model this intersection in HCS Westbound TMC data was modeled as a Southbound movement and Northbound TMC data was modeled as a Westbound movement. EBT (TMC) = EBL (HCS), EBR (TMC) = EBT (HCS), NBL (TMC) = WBT (HCS), NBR (TMC) = WBR (HCS), WBL (TMC) = SBL (HCS), WBT (TMC) = SBR (HCS)

Location # 6 - County Road 12 and County Road 5

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 5					County Road 12					County Road 5					County Road 12				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	1	0	0	0	1	2	0	0	0	0	1	2	0	0	3	6	0	0	0
7:15 AM	5	0	1	0	0	0	2	0	0	0	0	1	1	0	0	1	10	0	0	0
7:30 AM	1	1	0	0	0	0	1	4	0	0	0	6	3	0	0	4	4	0	0	0
7:45 AM	1	0	1	0	0	0	1	8	0	0	0	4	0	0	0	5	3	0	0	0
8:00 AM	1	2	2	1	0	1	1	3	1	2	0	2	0	0	2	4	5	3	1	0
8:15 AM	2	2	0	0	0	0	3	0	0	0	0	2	1	0	0	1	2	0	0	0
8:30 AM	0	0	0	0	0	0	2	1	0	0	0	1	1	0	0	2	2	0	0	0
8:45 AM	1	0	3	0	0	0	1	2	0	0	1	0	0	0	0	0	1	0	0	0
3:00 PM	1	2	0	0	0	0	3	2	1	0	2	1	1	0	0	0	4	0	0	0
3:15 PM	0	3	0	0	0	1	1	2	0	0	0	1	1	0	0	0	1	1	0	0
3:30 PM	1	2	0	0	0	3	2	1	0	0	0	2	3	0	0	0	1	1	0	0
3:45 PM	3	2	0	0	0	3	2	1	0	0	2	5	0	0	0	0	1	1	0	0
4:00 PM	0	1	0	0	0	1	0	4	0	0	0	2	2	0	0	0	0	0	0	0
4:15 PM	1	1	0	0	0	1	0	4	0	0	1	4	1	0	0	0	2	0	0	0
4:30 PM	1	2	0	0	0	5	1	4	0	0	3	1	1	0	0	0	2	1	0	0
4:45 PM	4	4	0	0	0	1	0	0	0	0	3	3	4	0	0	0	1	2	0	0
5:00 PM	2	1	0	0	0	2	2	2	0	0	1	4	2	0	0	0	1	2	0	0
5:15 PM	1	0	0	0	0	2	6	7	0	0	1	7	2	0	0	0	1	0	0	0
5:30 PM	3	2	1	0	0	1	2	3	0	0	1	7	1	0	0	0	0	1	0	0
5:45 PM	2	5	0	0	0	1	1	3	0	0	2	8	2	0	0	1	2	0	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 5					County Road 12					County Road 5					County Road 12				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0
7:30 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0
8:00 AM	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0
8:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	1	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	1	0	0
3:15 PM	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0	0
4:00 PM	0	1	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	1	2	0	0	0	2	0	0	0
4:30 PM	1	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1	0	0
4:45 PM	0	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0
5:00 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 5					County Road 12					County Road 5					County Road 12				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	1	1	1	0	0	1	2	0	0	0	0	2	2	0	0	3	6	0	0	0
7:15 AM	5	0	1	0	0	0	2	0	0	0	0	1	1	0	0	2	10	2	0	0
7:30 AM	3	1	0	0	0	0	1	4	0	0	0	6	3	0	0	4	4	0	0	0
7:45 AM	1	1	1	0	0	0	1	8	0	0	1	5	0	0	0	6	3	0	0	0
8:00 AM	1	3	2	1	0	1	2	3	1	2	0	3	0	0	2	4	5	4	1	0
Peak Hour Total	**10**	**5**	**4**	**1**	**0**	**1**	**6**	**15**	**1**	**2**	**1**	**15**	**4**	**0**	**2**	**16**	**22**	**6**	**1**	**0**
Peak Hour Factor	**0.50**	**0.42**	**0.50**	**0.00**	**NA**	**0.25**	**0.75**	**0.47**	**0.00**	**NA**	**0.25**	**0.62**	**0.33**	**0.00**	**NA**	**0.67**	**0.55**	**0.38**	**0.00**	**NA**
Truck %	**20%**	**40%**	**0%**	**0%**	**NA**	**0%**	**17%**	**0%**	**0%**	**NA**	**100%**	**13%**	**0%**	**0%**	**NA**	**13%**	**0%**	**50%**	**0%**	**NA**
8:15 AM	2	2	1	0	0	0	3	0	0	0	0	2	1	0	0	1	2	0	0	0
8:30 AM	0	0	0	0	0	0	3	4	0	0	0	1	1	0	0	2	2	0	0	0
8:45 AM	1	1	3	0	0	0	1	2	0	0	1	0	0	0	0	0	1	0	0	0
3:00 PM	2	2	0	0	0	0	4	4	1	0	2	1	1	0	0	0	4	1	0	0
3:15 PM	1	4	0	0	0	1	1	2	0	0	0	2	1	0	0	0	1	1	0	0
3:30 PM	1	2	0	0	0	4	2	1	0	0	0	2	3	0	0	0	1	1	0	0
3:45 PM	3	3	0	0	0	3	2	1	0	0	2	5	2	0	0	0	2	2	0	0
4:00 PM	0	2	0	0	0	1	0	4	0	0	1	5	3	0	0	0	0	0	0	0
4:15 PM	1	2	0	0	0	1	0	4	0	0	1	5	3	0	0	0	4	0	0	0
4:30 PM	2	2	0	0	0	5	2	5	0	0	3	1	2	0	0	0	2	2	0	0
4:45 PM	4	6	0	0	0	1	0	1	0	0	4	3	4	0	0	0	1	3	0	0
5:00 PM	2	1	0	0	0	2	3	2	0	0	1	5	2	0	0	0	1	2	0	0
5:15 PM	1	0	0	0	0	3	6	9	0	0	1	7	2	0	0	0	1	0	0	0
5:30 PM	4	3	1	0	0	1	2	3	0	0	1	7	1	0	0	0	0	1	0	0
5:45 PM	4	5	0	0	0	1	1	4	0	0	2	8	2	0	0	1	2	0	0	0
Peak Hour Total	**11**	**9**	**1**	**0**	**0**	**7**	**12**	**18**	**0**	**0**	**5**	**27**	**7**	**0**	**0**	**1**	**4**	**3**	**0**	**0**
Peak Hour Factor	**0.69**	**0.45**	**0.25**	**0.00**	**NA**	**0.58**	**0.50**	**0.50**	**0.00**	**NA**	**0.62**	**0.84**	**0.88**	**0.00**	**NA**	**0.25**	**0.50**	**0.38**	**0.00**	**NA**
Truck %	**27%**	**11%**	**0%**	**0%**	**NA**	**14%**	**8%**	**17%**	**0%**	**NA**	**0%**	**4%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 7a - County Road 77 and Main Avenue

Cars and Pedestrians

	Southbound					Westbound					Northbound					Eastbound				
					West Leg Crosswalk					North Leg Crosswalk					East Leg Crosswalk					South Leg Crosswalk
Street Name	County Road 77 (Main Ave)					County Road 77					Main Avenue									
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	23	6		0	0	0		5	0	0		18	0	0	0					0
7:15 AM	10	6		0	0	0		10	0	0		36	0	0	0					0
7:30 AM	9	5		0	0	0		26	0	0		44	0	0	0					0
7:45 AM	6	7		0	0	0		17	0	0		37	0	0	0					0
8:00 AM	13	11		0	0	0		18	0	0		33	0	0	0					0
8:15 AM	12	7		0	0	0		11	0	0		18	0	0	0					0
8:30 AM	5	5		0	0	0		6	0	0		14	0	0	0					0
8:45 AM	5	9		0	0	0		7	0	0		13	0	0	0					0
3:00 PM	13	19		0	0	0		11	0	0		14	0	0	0					0
3:15 PM	9	11		0	0	0		7	0	0		16	0	0	0					0
3:30 PM	11	28		0	0	0		6	0	0		12	0	0	0					0
3:45 PM	13	12		0	0	0		9	0	0		13	0	0	0					0
4:00 PM	12	25		0	0	0		11	0	0		17	0	0	0					0
4:15 PM	11	15		0	0	0		13	0	0		11	0	0	0					0
4:30 PM	15	24		0	0	0		14	0	0		10	0	0	0					0
4:45 PM	13	27		0	0	0		12	0	0		9	0	0	0					0
5:00 PM	31	31		0	0	0		14	0	0		4	0	0	0					0
5:15 PM	24	34		0	0	0		16	0	0		14	0	0	0					0
5:30 PM	16	28		0	0	0		18	0	0		19	0	0	0					0
5:45 PM	11	25		0	0	0		17	0	0		13	0	0	0					0

Trucks

	Southbound					Westbound					Northbound					Eastbound				
					West Leg Crosswalk					North Leg Crosswalk					East Leg Crosswalk					South Leg Crosswalk
Street Name	County Road 77 (Main Ave)					County Road 77					County Road 77 (Main Ave)					County Road 77				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0		0	0	0		0	0	0		1	0	0	0					0
7:15 AM	0	1		0	0	0		0	0	0		0	0	0	0					0
7:30 AM	1	0		0	0	0		0	0	0		1	0	0	0					0
7:45 AM	0	1		0	0	0		0	0	0		0	0	0	0					0
8:00 AM	1	1		0	0	0		1	0	0		1	0	0	0					0
8:15 AM	0	3		0	0	0		0	0	0		0	0	0	0					0
8:30 AM	0	1		0	0	0		1	0	0		1	0	0	0					0
8:45 AM	0	1		0	0	0		1	0	0		1	0	0	0					0
3:00 PM	2	0		0	0	0		0	0	0		0	0	0	0					0
3:15 PM	0	0		0	0	0		2	0	0		0	0	0	0					0
3:30 PM	0	0		0	0	0		4	0	0		1	0	0	0					0
3:45 PM	1	0		0	0	0		2	0	0		2	0	0	0					0
4:00 PM	0	3		0	0	0		1	0	0		1	0	0	0					0
4:15 PM	0	1		0	0	0		5	0	0		2	0	0	0					0
4:30 PM	1	0		0	0	0		0	0	0		1	0	0	0					0
4:45 PM	1	0		0	0	0		0	0	0		0	0	0	0					0
5:00 PM	1	0		0	0	0		0	0	0		0	0	0	0					0
5:15 PM	0	0		0	0	0		1	0	0		0	0	0	0					0
5:30 PM	1	0		0	0	0		0	0	0		0	0	0	0					0
5:45 PM	0	0		0	0	0		0	0	0		0	0	0	0					0

Total Vehicles & Pedestrians

	Southbound					Westbound					Northbound					Eastbound				
					West Leg Crosswalk					North Leg Crosswalk					East Leg Crosswalk					South Leg Crosswalk
Street Name	County Road 77 (Main Ave)					County Road 77					County Road 77 (Main Ave)					County Road 77				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	23	6		0	0	0		5	0	0		19	0	0	0					0
7:15 AM	10	7		0	0	0		10	0	0		36	0	0	0					0
7:30 AM	10	5		0	0	0		26	0	0		45	0	0	0					0
7:45 AM	6	8		0	0	0		17	0	0		37	0	0	0					0
8:00 AM	14	12		0	0	0		19	0	0		34	0	0	0					0
Peak Hour Total	**40**	**32**		**0**	**0**	**0**		**72**	**0**	**0**		**152**	**0**	**0**	**0**					**0**
Peak Hour Factor	**0.71**	**0.67**		**0.00**	**NA**	**0.00**		**0.69**	**0.00**	**NA**		**0.84**	**0.00**	**0.00**	**NA**					**NA**
Truck %	**5%**	**9%**		**0%**	**NA**	**0%**		**1%**	**0%**	**NA**		**1%**	**0%**	**0%**	**NA**					**NA**
8:15 AM	12	10		0	0	0		11	0	0		18	0	0	0					0
8:30 AM	5	6		0	0	0		7	0	0		15	0	0	0					0
8:45 AM	5	10		0	0	0		8	0	0		14	0	0	0					0
3:00 PM	15	19		0	0	0		11	0	0		14	0	0	0					0
3:15 PM	9	11		0	0	0		9	0	0		16	0	0	0					0
3:30 PM	11	28		0	0	0		10	0	0		13	0	0	0					0
3:45 PM	14	12		0	0	0		11	0	0		15	0	0	0					0
4:00 PM	12	28		0	0	0		12	0	0		18	0	0	0					0
4:15 PM	11	16		0	0	0		18	0	0		13	0	0	0					0
4:30 PM	16	24		0	0	0		14	0	0		11	0	0	0					0
4:45 PM	14	27		0	0	0		12	0	0		9	0	0	0					0
5:00 PM	32	31		0	0	0		14	0	0		4	0	0	0					0
5:15 PM	24	34		0	0	0		17	0	0		14	0	0	0					0
5:30 PM	17	28		0	0	0		18	0	0		19	0	0	0					0
5:45 PM	11	25		0	0	0		17	0	0		13	0	0	0					0
Peak Hour Total	**84**	**118**		**0**	**0**	**0**		**66**	**0**	**0**		**50**	**0**	**0**	**0**					**0**
Peak Hour Factor	**0.66**	**0.87**		**0.00**	**NA**	**0.00**		**0.92**	**0.00**	**NA**		**0.66**	**0.00**	**0.00**	**NA**					**NA**
Truck %	**2%**	**0%**		**0%**	**NA**	**0%**		**2%**	**0%**	**NA**		**0%**	**0%**	**0%**	**NA**					**NA**

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Note: Only Northbound traffic has a stop sign. This is a "T" intersection on a skewed approach. In order to model this intersection in HCS Soutbound TMC data was modeled as a Eastbound movement SBL (TMC) = EBT (HCS), SBT (TMC) = EBR (HCS), NBT (TMC) = NBL (HCS), NBR (TMC) = NBR (HCS), WBL (TMC) = WBL (HCS), WBR (TMC) = WBT (HCS)

Location # 7b - County Road 12 and Main Avenue

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Main Avenue					County Road 12					Main Avenue/Twin Oaks Lane					County Road 12				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
7:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0
7:30 AM	0	0	0	0	0	0	3	0	0	0	0	2	0	0	0	0	2	0	0	0
7:45 AM	0	0	0	0	0	0	3	0	0	0	0	2	0	0	0	0	5	0	0	0
8:00 AM	0	2	0	0	0	0	1	0	0	0	0	2	0	0	0	0	2	0	0	0
8:15 AM	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
8:45 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0
3:00 PM	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0
3:30 PM	0	1	0	0	0	1	2	1	0	0	0	1	0	0	0	0	1	0	0	0
3:45 PM	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	1	0	0	0
4:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	4	0	0	0
4:15 PM	0	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	1	0	0	0
4:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	1	0	0	0
4:45 PM	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	3	0	0	0
5:00 PM	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0
5:15 PM	0	1	0	0	0	0	4	0	0	0	0	6	0	0	0	0	2	0	0	0
5:30 PM	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1	0	0	0
5:45 PM	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	1	0	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Main Avenue					County Road 12					Main Avenue/Twin Oaks Lane					County Road 12				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
8:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
8:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0
8:45 AM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0
3:00 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	0	0	0
3:15 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0
3:30 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	0	0	0
3:45 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	0	0	0
4:00 PM	0	1	0	0	0	1	3	0	0	0	0	0	0	0	0	0	2	0	0	0
4:15 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	0	0	0
4:30 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
5:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	Main Avenue					County Road 12					Main Avenue/Twin Oaks Lane					County Road 12				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
7:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2	0	0	0
7:30 AM	0	0	0	0	0	0	4	0	0	0	0	2	0	0	0	0	3	0	0	0
7:45 AM	0	0	0	0	0	0	3	0	0	0	0	2	0	0	0	0	7	0	0	0
8:00 AM	0	2	0	0	0	0	2	0	0	0	0	2	0	0	0	0	3	0	0	0
8:15 AM	0	1	0	0	0	0	2	0	0	0	0	1	0	0	0	0	2	0	0	0
Peak Hour Total	**0**	**3**	**0**	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**0**	**15**	**0**	**0**	**0**
Peak Hour Factor	**0.00**	**0.38**	**0.00**	**0.00**	**NA**	**0.00**	**0.69**	**0.00**	**0.00**	**NA**	**0.00**	**0.88**	**0.00**	**0.00**	**NA**	**0.00**	**0.54**	**0.00**	**0.00**	**NA**
Truck %	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**27%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**27%**	**0%**	**0%**	**NA**
8:30 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	5	0	0	0
8:45 AM	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	3	0	0	0
3:00 PM	1	1	1	0	0	0	4	0	0	0	0	0	0	0	0	0	3	0	0	0
3:15 PM	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	2	0	0	0
3:30 PM	0	1	0	0	0	1	6	1	0	0	0	1	0	0	0	0	3	0	0	0
3:45 PM	0	0	0	0	0	0	6	0	0	0	0	1	0	0	0	0	5	0	0	0
4:00 PM	0	1	0	0	0	1	5	0	0	0	0	0	0	0	0	0	6	0	0	0
4:15 PM	0	1	0	0	0	0	5	0	0	0	0	2	0	0	0	0	3	0	0	0
Peak Hour Total	**0**	**3**	**0**	**0**	**0**	**2**	**22**	**1**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**17**	**0**	**0**	**0**
Peak Hour Factor	**0.00**	**0.75**	**0.00**	**0.00**	**NA**	**0.50**	**0.92**	**0.25**	**0.00**	**NA**	**0.00**	**0.50**	**0.00**	**0.00**	**NA**	**0.00**	**0.71**	**0.00**	**0.00**	**NA**
Truck %	**0%**	**33%**	**0%**	**0%**	**NA**	**50%**	**68%**	**0%**	**0%**	**NA**	**0%**	**0%**	**0%**	**0%**	**NA**	**0%**	**59%**	**0%**	**0%**	**NA**
4:30 PM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	2	4	0	0	0
4:45 PM	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	4	0	0	0
5:00 PM	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1	0	0	0
5:15 PM	0	1	0	0	0	0	5	0	0	0	0	6	0	0	0	0	2	0	0	0
5:30 PM	0	1	0	0	0	0	6	0	0	0	0	0	0	0	0	0	3	0	0	0
5:45 PM	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	4	0	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 8 - County Road 12 and County Road 11

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	**County Road 11**										**County Road 12**									
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM		1	1	0	0					0	1	0		0	0	0		0	0	0
7:15 AM		0	1	0	0					0	1	3		0	0	0		0	0	0
7:30 AM		0	3	0	0					0	1	1		0	0	2		0	0	0
7:45 AM		0	2	0	0					0	1	1		0	0	1		0	0	0
8:00 AM		1	0	0	0					0	1	2		0	0	0		0	0	0
8:15 AM		1	1	0	0					0	0	3		0	0	1		0	0	0
8:30 AM		0	2	0	0					0	1	1		0	0	0		0	0	0
8:45 AM		0	0	0	0					0	0	0		0	0	1		0	0	0
3:00 PM		0	0	0	0					0	0	0		0	0	0		1	0	0
3:15 PM		0	0	0	0					0	0	0		0	0	0		1	0	0
3:30 PM		0	0	0	0					0	1	1		0	0	0		0	0	0
3:45 PM		3	0	0	0					0	1	3		0	0	0		0	0	0
4:00 PM		3	0	0	0					0	3	1		0	0	0		2	0	0
4:15 PM		0	0	0	0					0	1	0		0	0	0		0	0	0
4:30 PM		4	0	0	0					0	2	0		0	0	0		0	0	0
4:45 PM		2	0	0	0					0	1	1		0	0	0		1	0	0
5:00 PM		1	0	0	0					0	1	1		0	0	0		1	0	0
5:15 PM		1	0	0	0					0	1	0		0	0	0		0	0	0
5:30 PM		2	0	0	0					0	0	2		0	0	0		2	0	0
5:45 PM		1	0	0	0					0	3	1		0	0	1		1	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	**County Road 11**										**County Road 12**									
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM		0	0	0	0					0	0	0		0	0	1		0	0	0
7:15 AM		0	0	0	0					0	0	1		0	0	0		0	0	0
7:30 AM		1	0	0	0					0	0	0		0	0	1		0	0	0
7:45 AM		0	0	0	0					0	0	0		0	0	1		0	0	0
8:00 AM		0	1	0	0					0	0	0		0	0	1		0	0	0
8:15 AM		0	1	0	0					0	0	0		0	0	0		0	0	0
8:30 AM		0	0	0	0					0	0	0		0	0	0		0	0	0
8:45 AM		0	0	0	0					0	0	1		0	0	0		0	0	0
3:00 PM		0	0	0	0					0	0	0		0	0	0		0	0	0
3:15 PM		0	0	0	0					0	0	1		0	0	0		0	0	0
3:30 PM		0	0	0	0					0	0	0		0	0	0		2	0	0
3:45 PM		1	0	0	0					0	1	1		0	0	0		0	0	0
4:00 PM		3	0	0	0					0	0	0		0	0	0		0	0	0
4:15 PM		0	0	0	0					0	0	0		0	0	0		1	0	0
4:30 PM		0	0	0	0					0	0	1		0	0	0		2	0	0
4:45 PM		0	0	0	0					0	2	0		0	0	0		1	0	0
5:00 PM		0	0	0	0					0	0	0		0	0	0		0	0	0
5:15 PM		0	0	0	0					0	0	0		0	0	0		2	0	0
5:30 PM		0	0	0	0					0	0	0		0	0	0		1	0	0
5:45 PM		0	0	0	0					0	1	0		0	0	0		0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	**County Road 11**										**County Road 12**									
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM		1	1	0	0					0	1	0		0	0	1		0	0	0
7:15 AM		0	1	0	0					0	1	4		0	0	0		0	0	0
7:30 AM		1	3	0	0					0	1	1		0	0	3		0	0	0
7:45 AM		0	2	0	0					0	1	1		0	0	2		0	0	0
8:00 AM		1	1	0	0					0	1	2		0	0	1		0	0	0
8:15 AM		1	2	0	0					0	0	3		0	0	1		0	0	0
Peak Hour Total		**3**	**8**	**0**	**0**					**0**	**3**	**7**		**0**	**0**	**7**		**0**	**0**	**0**
Peak Hour Factor		**0.75**	**0.67**	**0.00**	**NA**					**NA**	**0.75**	**0.58**		**0.00**	**NA**	**0.58**		**0.00**	**0.00**	**NA**
Truck %		**33%**	**25%**	**0%**	**NA**					**NA**	**0%**	**0%**		**0%**	**NA**	**43%**		**0%**	**0%**	**NA**
8:30 AM		0	2	0	0					0	1	1		0	0	0		0	0	0
8:45 AM		0	0	0	0					0	0	1		0	0	1		0	0	0
3:00 PM		0	0	0	0					0	0	0		0	0	0		1	0	0
3:15 PM		0	0	0	0					0	0	1		0	0	0		1	0	0
3:30 PM		0	0	0	0					0	1	1		0	0	0		2	0	0
3:45 PM		4	0	0	0					0	2	4		0	0	0		0	0	0
4:00 PM		6	0	0	0					0	3	1		0	0	0		2	0	0
4:15 PM		0	0	0	0					0	1	0		0	0	0		1	0	0
4:30 PM		4	0	0	0					0	2	1		0	0	0		2	0	0
Peak Hour Total		**14**	**0**	**0**	**0**					**0**	**8**	**6**		**0**	**0**	**0**		**5**	**0**	**0**
Peak Hour Factor		**0.58**	**0.00**	**0.00**	**NA**					**NA**	**0.67**	**0.38**		**0.00**	**NA**	**0.00**		**0.62**	**0.00**	**NA**
Truck %		**29%**	**0%**	**0%**	**NA**					**NA**	**13%**	**33%**		**0%**	**NA**	**0%**		**60%**	**0%**	**NA**
4:45 PM		2	0	0	0					0	3	1		0	0	0		2	0	0
5:00 PM		1	0	0	0					0	1	1		0	0	0		1	0	0
5:15 PM		1	0	0	0					0	1	0		0	0	0		2	0	0
5:30 PM		2	0	0	0					0	0	2		0	0	0		3	0	0
5:45 PM		1	0	0	0					0	4	1		0	0	1		1	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 9 - County Road 30 and County Road 33

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	**County Road 33**					**County Road 30 (North Drive)**					**County Road 33**					**County Road 30 (North Drive)**				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	2	5	0	0	0	1	4	0	0	0	6	10	1	0	0	0	0	3	0	0
7:15 AM	2	4	0	0	0	1	1	0	0	0	4	11	0	0	0	0	2	2	0	0
7:30 AM	2	3	0	0	0	2	3	0	0	0	5	9	0	0	0	0	3	3	0	0
7:45 AM	1	5	0	0	0	1	0	0	0	0	4	10	1	0	0	0	3	7	0	0
8:00 AM	1	10	0	0	0	1	0	0	0	0	8	14	1	0	0	1	2	5	0	0
8:15 AM	1	9	0	0	0	0	0	0	0	0	5	8	1	0	0	0	2	4	0	0
8:30 AM	0	1	0	0	0	0	1	0	0	0	5	6	1	0	0	0	0	2	0	0
8:45 AM	0	4	0	0	0	0	0	0	0	0	7	5	0	0	0	0	0	2	0	0
3:00 PM	0	3	0	0	0	5	3	2	0	0	0	1	4	0	0	3	1	0	0	0
3:15 PM	1	0	0	0	0	3	1	0	0	0	0	0	3	0	0	0	3	0	0	0
3:30 PM	0	3	1	0	0	5	3	0	0	0	0	1	3	0	0	0	7	0	0	0
3:45 PM	0	2	0	0	0	5	7	3	0	0	0	0	4	0	0	2	5	0	0	0
4:00 PM	0	2	0	0	0	1	14	0	0	0	0	0	2	0	0	0	7	0	0	0
4:15 PM	1	0	0	0	0	4	5	0	0	0	0	4	4	0	0	1	7	0	0	0
4:30 PM	0	12	0	0	0	3	4	1	0	0	0	1	4	0	0	2	8	0	0	0
4:45 PM	0	1	0	0	0	9	4	0	0	0	0	2	6	0	0	2	9	0	0	0
5:00 PM	0	3	0	0	0	7	5	1	0	0	0	1	4	0	0	3	8	0	0	0
5:15 PM	3	0	1	0	0	3	3	2	0	0	0	3	13	0	0	3	10	0	0	0
5:30 PM	1	4	0	0	0	2	6	0	0	0	0	2	8	0	0	3	15	0	0	0
5:45 PM	2	0	0	0	0	2	4	2	0	0	0	0	6	0	0	0	14	0	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	**County Road 33**					**County Road 30 (North Drive)**					**County Road 33**					**County Road 30 (North Drive)**				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2	0	0
7:30 AM	2	1	0	0	0	0	1	0	0	0	1	3	0	0	0	0	1	1	0	0
7:45 AM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0
8:00 AM	0	1	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	1	0	0
8:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0
8:30 AM	1	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	2	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
3:00 PM	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
3:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
4:45 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
5:15 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	**County Road 33**					**County Road 30 (North Drive)**					**County Road 33**					**County Road 30 (North Drive)**				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM	2	5	0	0	0	1	4	0	0	0	6	11	1	0	0	0	0	3	0	0
7:15 AM	2	4	0	0	0	1	2	0	0	0	4	12	0	0	0	0	2	4	0	0
7:30 AM	4	4	0	0	0	2	4	0	0	0	6	12	0	0	0	0	4	4	0	0
7:45 AM	1	6	0	0	0	1	0	0	0	0	5	10	1	0	0	0	4	8	0	0
8:00 AM	1	11	0	0	0	2	1	0	0	0	9	15	2	0	0	1	2	6	0	0
8:15 AM	1	9	0	0	0	0	1	0	0	0	5	8	1	0	0	0	3	5	0	0
Peak Hour Total	**7**	**30**	**0**	**0**	**0**	**5**	**6**	**0**	**0**	**0**	**25**	**45**	**4**	**0**	**0**	**1**	**13**	**23**	**0**	**0**
Peak Hour Factor	**0.44**	**0.68**	**0.00**	**0.00**	**NA**	**0.62**	**0.38**	**0.00**	**0.00**	**NA**	**0.69**	**0.75**	**0.50**	**0.00**	**NA**	**0.25**	**0.81**	**0.72**	**0.00**	**NA**
Truck %	**29%**	**10%**	**0%**	**0%**	**NA**	**20%**	**50%**	**0%**	**0%**	**NA**	**12%**	**9%**	**25%**	**0%**	**NA**	**0%**	**23%**	**17%**	**0%**	**NA**
8:30 AM	1	1	0	0	0	0	3	0	0	0	5	6	2	0	0	0	2	2	0	0
8:45 AM	0	4	0	0	0	0	0	0	0	0	7	5	0	0	0	0	1	2	0	0
3:00 PM	0	4	1	0	0	5	3	2	0	0	0	2	4	0	0	3	1	0	0	0
3:15 PM	1	1	0	0	0	3	1	0	0	0	0	0	3	0	0	0	3	0	0	0
3:30 PM	0	3	1	0	0	5	3	0	0	0	0	1	3	0	0	0	7	0	0	0
3:45 PM	0	2	0	0	0	5	8	4	0	0	0	0	4	0	0	2	5	0	0	0
4:00 PM	0	2	0	0	0	1	14	0	0	0	0	1	2	0	0	0	7	0	0	0
4:15 PM	1	0	0	0	0	4	5	0	0	0	0	4	6	0	0	2	7	0	0	0
4:30 PM	0	12	0	0	0	3	4	1	0	0	0	1	5	0	0	2	8	0	0	0
4:45 PM	0	3	0	0	0	9	4	0	0	0	0	2	6	0	0	3	9	0	0	0
5:00 PM	0	3	0	0	0	8	5	1	0	0	0	1	4	0	0	3	9	0	0	0
5:15 PM	3	0	2	0	0	3	4	2	0	0	0	3	13	0	0	3	10	0	0	0
5:30 PM	1	4	0	0	0	2	6	0	0	0	0	3	8	0	0	3	15	0	0	0
Peak Hour Total	**4**	**10**	**2**	**0**	**0**	**22**	**19**	**3**	**0**	**0**	**0**	**9**	**31**	**0**	**0**	**12**	**43**	**0**	**0**	**0**
Peak Hour Factor	**0.33**	**0.62**	**0.25**	**0.00**	**NA**	**0.61**	**0.79**	**0.38**	**0.00**	**NA**	**0.00**	**0.75**	**0.60**	**0.00**	**NA**	**1.00**	**0.72**	**0.00**	**0.00**	**NA**
Truck %	**0%**	**20%**	**50%**	**0%**	**NA**	**5%**	**5%**	**0%**	**0%**	**NA**	**0%**	**11%**	**0%**	**0%**	**NA**	**8%**	**2%**	**0%**	**0%**	**NA**
5:45 PM	2	0	0	0	0	2	4	2	0	0	0	0	6	0	0	1	14	0	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

Location # 10 - County Road 10 and County Road 13

Cars and Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 77					County Road 6					County Road 77					County Road 6				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM					0	0	0		0	0	0		6	0	0		0	0	0	0
7:15 AM					0	0	0		0	0	0		5	0	0		1	0	0	0
7:30 AM					0	2	0		0	0	0		5	0	0		0	1	0	0
7:45 AM					0	1	0		0	0	1		4	0	0		0	0	0	0
8:00 AM					0	1	2		0	0	0		1	0	0		1	2	0	0
8:15 AM					0	1	1		0	0	0		1	0	0		0	1	0	0
8:30 AM					0	1	1		0	0	0		2	0	0		1	0	0	0
8:45 AM					0	0	0		0	0	0		0	0	0		0	0	0	0
3:00 PM					0	2	0		0	0	0		2	0	0		1	0	0	0
3:15 PM					0	1	1		0	0	0		1	0	0		0	0	0	0
3:30 PM					0	3	0		0	0	0		2	0	0		1	0	0	0
3:45 PM					0	6	0		0	0	0		0	0	0		0	0	0	0
4:00 PM					0	0	1		0	0	0		2	0	0		0	0	0	0
4:15 PM					0	1	1		0	0	0		1	0	0		0	0	0	0
4:30 PM					0	2	0		0	0	0		0	0	0		0	0	0	0
4:45 PM					0	4	1		0	0	0		2	0	0		1	0	0	0
5:00 PM					0	2	0		0	0	0		0	0	0		0	0	0	0
5:15 PM					0	5	2		0	0	0		0	0	0		1	0	0	0
5:30 PM					0	4	2		0	0	0		0	0	0		1	0	0	0
5:45 PM					0	1	2		0	0	0		0	0	0		0	0	0	0

Trucks

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 77					County Road 6					County Road 77					County Road 6				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM					0	0	0		0	0	0		0	0	0		0	0	0	0
7:15 AM					0	0	2		0	0	0		1	0	0		0	0	0	0
7:30 AM					0	0	0		0	0	0		0	0	0		0	0	0	0
7:45 AM					0	0	0		0	0	0		0	0	0		0	0	0	0
8:00 AM					0	0	0		0	0	0		0	0	0		1	0	0	0
8:15 AM					0	0	1		0	0	0		0	0	0		0	0	0	0
8:30 AM					0	0	0		0	0	0		0	0	0		1	0	0	0
8:45 AM					0	0	0		0	0	0		0	0	0		0	0	0	0
3:00 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
3:15 PM					0	1	0		0	0	0		1	0	0		0	0	0	0
3:30 PM					0	1	0		0	0	0		0	0	0		0	0	0	0
3:45 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
4:00 PM					0	0	0		0	0	0		1	0	0		0	0	0	0
4:15 PM					0	0	1		0	0	0		0	0	0		0	0	0	0
4:30 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
4:45 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
5:00 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
5:15 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
5:30 PM					0	0	0		0	0	0		0	0	0		0	0	0	0
5:45 PM					0	0	0		0	0	0		0	0	0		0	0	0	0

Total Vehicles & Pedestrians

	Southbound				West Leg Crosswalk	Westbound				North Leg Crosswalk	Northbound				East Leg Crosswalk	Eastbound				South Leg Crosswalk
Street Name	County Road 77					County Road 6					County Road 77					County Road 6				
Start Time	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped	Left	Thru	Right	U-turn	Ped
7:00 AM					0	0	0		0	0	0		6	0	0		0	0	0	0
7:15 AM					0	0	2		0	0	0		6	0	0		1	0	0	0
7:30 AM					0	2	0		0	0	0		5	0	0		0	1	0	0
7:45 AM					0	1	0		0	0	1		4	0	0		0	0	0	0
8:00 AM					0	1	2		0	0	0		1	0	0		2	2	0	0
Peak Hour Total					**0**	**4**	**4**		**0**	**0**	**1**		**16**	**0**	**0**		**3**	**3**	**0**	**0**
Peak Hour Factor					**NA**	**0.50**	**0.50**		**0.00**	**NA**	**0.25**		**0.67**	**0.00**	**NA**		**0.38**	**0.38**	**0.00**	**NA**
Truck %					**NA**	**0%**	**50%**		**0%**	**NA**	**0%**		**6%**	**0%**	**NA**		**33%**	**0%**	**0%**	**NA**
8:15 AM					0	1	2		0	0	0		1	0	0		0	1	0	0
8:30 AM					0	1	1		0	0	0		2	0	0		2	0	0	0
8:45 AM					0	0	0		0	0	0		0	0	0		0	0	0	0
3:00 PM					0	2	0		0	0	0		2	0	0		1	0	0	0
3:15 PM					0	2	1		0	0	0		2	0	0		0	0	0	0
3:30 PM					0	4	0		0	0	0		2	0	0		1	0	0	0
3:45 PM					0	6	0		0	0	0		0	0	0		0	0	0	0
4:00 PM					0	0	1		0	0	0		3	0	0		0	0	0	0
4:15 PM					0	1	2		0	0	0		1	0	0		0	0	0	0
4:30 PM					0	2	0		0	0	0		0	0	0		0	0	0	0
4:45 PM					0	4	1		0	0	0		2	0	0		1	0	0	0
5:00 PM					0	2	0		0	0	0		0	0	0		0	0	0	0
5:15 PM					0	5	2		0	0	0		0	0	0		1	0	0	0
5:30 PM					0	4	2		0	0	0		0	0	0		1	0	0	0
Peak Hour Total					**0**	**15**	**5**		**0**	**0**	**0**		**2**	**0**	**0**		**3**	**0**	**0**	**0**
Peak Hour Factor					**NA**	**0.75**	**0.62**		**0.00**	**NA**	**0.00**		**0.25**	**0.00**	**NA**		**0.75**	**0.00**	**0.00**	**NA**
Truck %					**NA**	**0%**	**0%**		**0%**	**NA**	**0%**		**0%**	**0%**	**NA**		**0%**	**0%**	**0%**	**NA**
5:45 PM					0	1	2		0	0	0		0	0	0		0	0	0	0

Data Source: MioVision - 2012 Count Data

AM Peak Hour

PM Peak Hour

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/20/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #1*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project ID

East/West Street: *CR 6* North/South Street: *CR 7*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*6*	*21*	*2*	*2*	*9*	*6*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*6*	*0*	*15*	*37*	*5*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.58*		*0.50*		*0.33*		*0.51*	
Flow Rate (veh/h)	*49*		*34*		*21*		*110*	
% Heavy Vehicles	*3*		*18*		*29*		*7*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*0.1*		*0.1*		*0.3*	
Prop. Right-Turns	*0.1*		*0.4*		*0.0*		*0.1*	
Prop. Heavy Vehicle	*0.0*		*0.2*		*0.3*		*0.1*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*		*0.1*		*0.5*		*0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.04*		*0.03*		*0.02*		*0.10*	
hd, final value (s)	*4.29*		*4.37*		*4.73*		*4.24*	
x, final value	*0.06*		*0.04*		*0.03*		*0.13*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.3*		*2.4*		*2.7*		*2.2*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*299*		*284*		*271*		*360*	
Delay (s/veh)	*7.56*		*7.56*		*7.86*		*7.87*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.56*		*7.56*		*7.86*		*7.87*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.75*							
Intersection LOS	*A*							

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6 Generated: 4/23/2013 4:02 PM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/20/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #1*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project ID

East/West Street: *CR 6* North/South Street: *CR 7*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*6*	*6*	*1*	*5*	*21*	*36*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*2*	*40*	*1*	*8*	*18*	*2*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.42*		*0.61*		*0.47*		*0.64*	
Flow Rate (veh/h)	*30*		*101*		*91*		*43*	
% Heavy Vehicles	*0*		*15*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.5*		*0.1*		*0.0*		*0.3*	
Prop. Right-Turns	*0.1*		*0.6*		*0.0*		*0.1*	
Prop. Heavy Vehicle	*0.0*		*0.1*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*		*-0.1*		*-0.0*		*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.03*		*0.09*		*0.08*		*0.04*	
hd, final value (s)	*4.36*		*4.16*		*4.23*		*4.30*	
x, final value	*0.04*		*0.12*		*0.11*		*0.05*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.4*		*2.2*		*2.2*		*2.3*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*280*		*351*		*341*		*293*	
Delay (s/veh)	*7.53*		*7.70*		*7.74*		*7.54*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.53*		*7.70*		*7.74*		*7.54*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.67*							
Intersection LOS	*A*							

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6 Generated: 4/23/2013 4:04 PM

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*R Allers*	Intersection	*Location # 2*
Agency/Co.	*HR Green*	Jurisdiction	*Brookings County*
Date Performed	*11/27/2012*	Analysis Year	*2012*
Analysis Time Period	*AM Peak Hour*		

Project Description

East/West Street: *CR 6* | North/South Street: *CR 77*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*2*	*18*	*21*	*31*	*10*	*1*
Peak-Hour Factor, PHF	*0.25*	*0.75*	*0.58*	*0.65*	*0.83*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*8*	*24*	*36*	*47*	*12*	*4*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*5*	*45*	*4*	*4*	*14*	*11*
Peak-Hour Factor, PHF	*0.42*	*0.75*	*0.50*	*0.50*	*0.58*	*0.69*
Hourly Flow Rate, HFR (veh/h)	*11*	*60*	*8*	*8*	*24*	*15*
Percent Heavy Vehicles	*0*	*4*	*25*	*50*	*14*	*9*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*1*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration		*LTR*		*LT*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*8*	*47*	*32*		*15*		*79*	
C (m) (veh/h)	*1615*	*1556*	*674*		*1033*		*712*	
v/c	*0.00*	*0.03*	*0.05*		*0.01*		*0.11*	
95% queue length	*0.01*	*0.09*	*0.15*		*0.04*		*0.37*	
Control Delay (s/veh)	*7.2*	*7.4*	*10.6*		*8.5*		*10.7*	
LOS	*A*	*A*	*B*		*A*		*B*	
Approach Delay (s/veh)	--	--	*9.9*			*10.7*		
Approach LOS	--	--	*A*			*B*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/23/2013 4:04 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*R Allers*
Agency/Co.	*HR Green*
Date Performed	*11/27/2012*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Location # 2*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 6* North/South Street: *CR 77*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*17*	*58*	*32*	*3*	*11*	*5*
Peak-Hour Factor, PHF	*0.71*	*0.76*	*0.67*	*0.38*	*0.55*	*0.42*
Hourly Flow Rate, HFR (veh/h)	*23*	*76*	*47*	*7*	*19*	*11*
Percent Heavy Vehicles	*6*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*6*	*5*	*5*	*25*	*4*
Peak-Hour Factor, PHF	*0.33*	*0.50*	*0.42*	*0.62*	*0.62*	*0.50*
Hourly Flow Rate, HFR (veh/h)	*12*	*12*	*11*	*8*	*40*	*8*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*20*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*1*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration		*LTR*		*LT*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*23*	*7*	*48*		*8*		*35*	
C (m) (veh/h)	*1557*	*1477*	*694*		*991*		*777*	
v/c	*0.01*	*0.00*	*0.07*		*0.01*		*0.05*	
95% queue length	*0.04*	*0.01*	*0.22*		*0.02*		*0.14*	
Control Delay (s/veh)	*7.3*	*7.4*	*10.6*		*8.7*		*9.9*	
LOS	*A*	*A*	*B*		*A*		*A*	
Approach Delay (s/veh)	--	--	*10.3*			*9.9*		
Approach LOS	--	--	*B*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/20/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #3*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 8* North/South Street: *CR 5*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*8*	*3*	*0*	*35*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.40*	*0.38*	*0.92*	*0.51*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*19*	*7*	*0*	*68*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*5*	*5*	*0*	*1*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.62*	*0.62*	*0.92*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*8*	*8*	*0*	*4*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*0*		*12*			*8*	
C (m) (veh/h)	*1546*	*1601*		*938*			*1001*	
v/c	*0.00*	*0.00*		*0.01*			*0.01*	
95% queue length	*0.00*	*0.00*		*0.04*			*0.02*	
Control Delay (s/veh)	*7.3*	*7.2*		*8.9*			*8.6*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*8.9*			*8.6*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/20/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #3*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 8* North/South Street: *CR 5*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*4*	*39*	*1*	*0*	*12*	*0*
Peak-Hour Factor, PHF	*0.50*	*0.89*	*0.25*	*0.92*	*0.75*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*8*	*43*	*4*	*0*	*16*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*4*	*1*	*0*	*1*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.50*	*0.25*	*0.92*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*8*	*4*	*0*	*4*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*100*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*8*	*0*		*8*			*8*	
C (m) (veh/h)	*1615*	*1573*		*850*			*1069*	
v/c	*0.00*	*0.00*		*0.01*			*0.01*	
95% queue length	*0.01*	*0.00*		*0.03*			*0.02*	
Control Delay (s/veh)	*7.2*	*7.3*		*9.3*			*8.4*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.3*			*8.4*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/23/2013 4:06 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/20/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #4*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 26* North/South Street: *CR 77*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*224*	*57*	*6*	*69*	*13*
Peak-Hour Factor, PHF	*0.25*	*0.85*	*0.75*	*0.75*	*0.66*	*0.81*
Hourly Flow Rate, HFR (veh/h)	*4*	*263*	*76*	*8*	*104*	*16*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*90*	*45*	*2*	*12*	*5*	*12*
Peak-Hour Factor, PHF	*0.64*	*0.56*	*0.25*	*0.50*	*0.42*	*0.75*
Hourly Flow Rate, HFR (veh/h)	*140*	*80*	*8*	*24*	*11*	*16*
Percent Heavy Vehicles	*0*	*2*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*4*	*8*		*51*			*228*	
C (m) (veh/h)	*1480*	*1231*		*514*			*501*	
v/c	*0.00*	*0.01*		*0.10*			*0.46*	
95% queue length	*0.01*	*0.02*		*0.33*			*2.34*	
Control Delay (s/veh)	*7.4*	*7.9*		*12.8*			*18.0*	
LOS	*A*	*A*		*B*			*C*	
Approach Delay (s/veh)	--	--	*12.8*			*18.0*		
Approach LOS	--	--	*B*			*C*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/20/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #4*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 26* North/South Street: *CR 77*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*113*	*22*	*10*	*212*	*75*
Peak-Hour Factor, PHF	*0.75*	*0.86*	*0.69*	*0.50*	*0.82*	*0.67*
Hourly Flow Rate, HFR (veh/h)	*8*	*131*	*31*	*20*	*258*	*111*
Percent Heavy Vehicles	*0*	--	--	*10*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*30*	*15*	*2*	*59*	*36*	*13*
Peak-Hour Factor, PHF	*0.75*	*0.75*	*0.50*	*0.78*	*0.75*	*0.65*
Hourly Flow Rate, HFR (veh/h)	*40*	*20*	*4*	*75*	*48*	*20*
Percent Heavy Vehicles	*3*	*0*	*50*	*0*	*0*	*8*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*8*	*20*		*143*			*64*	
C (m) (veh/h)	*1201*	*1370*		*464*			*414*	
v/c	*0.01*	*0.01*		*0.31*			*0.15*	
95% queue length	*0.02*	*0.04*		*1.29*			*0.54*	
Control Delay (s/veh)	*8.0*	*7.7*		*16.2*			*15.3*	
LOS	*A*	*A*		*C*			*C*	
Approach Delay (s/veh)	--	--	*16.2*			*15.3*		
Approach LOS	--	--	*C*			*C*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #5*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR26 (32nd St)/CR21 (34th Ave)* North/South Street: *CR 26 (32nd St)*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*17*	*7*			*20*	*0*
Peak-Hour Factor, PHF	*0.71*	*0.58*	*1.00*	*1.00*	*0.56*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*23*	*12*	*0*	*0*	*35*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*0*		*13*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*1.00*	*0.81*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*16*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*31*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*23*						*16*	
C (m) (veh/h)	*1589*						*961*	
v/c	*0.01*						*0.02*	
95% queue length	*0.04*						*0.05*	
Control Delay (s/veh)	*7.3*						*8.8*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*8.8*		
Approach LOS	--	--				*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #5*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR26 (32nd St)/CR21 (34th Ave)* North/South Street: *CR 26 (32nd St)*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*18*	*25*			*9*	*0*
Peak-Hour Factor, PHF	*0.75*	*0.69*	*1.00*	*1.00*	*0.56*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*24*	*36*	*0*	*0*	*16*	*0*
Percent Heavy Vehicles	*22*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*0*		*27*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*1.00*	*0.48*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*56*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*4*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*24*						*56*	
C (m) (veh/h)	*1481*						*1057*	
v/c	*0.02*						*0.05*	
95% queue length	*0.05*						*0.17*	
Control Delay (s/veh)	*7.5*						*8.6*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*8.6*		
Approach LOS	--	--				*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #6*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 12 (44th St)* North/South Street: *CR 5 (464th Ave)*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*15*	*4*	*10*	*5*	*4*
Peak-Hour Factor, PHF	*0.25*	*0.62*	*0.33*	*0.50*	*0.42*	*0.50*
Hourly Flow Rate, HFR (veh/h)	*4*	*24*	*12*	*20*	*11*	*8*
Percent Heavy Vehicles	*100*	--	--	*20*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*16*	*22*	*6*	*1*	*6*	*15*
Peak-Hour Factor, PHF	*0.67*	*0.55*	*0.38*	*0.25*	*0.75*	*0.47*
Hourly Flow Rate, HFR (veh/h)	*23*	*39*	*15*	*4*	*8*	*31*
Percent Heavy Vehicles	*13*	*0*	*50*	*0*	*17*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*4*	*20*		*43*			*77*	
C (m) (veh/h)	*1140*	*1462*		*946*			*810*	
v/c	*0.00*	*0.01*		*0.05*			*0.10*	
95% queue length	*0.01*	*0.04*		*0.14*			*0.31*	
Control Delay (s/veh)	*8.2*	*7.5*		*9.0*			*9.9*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.0*			*9.9*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #6*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 12 (44th St)* North/South Street: *CR 5 (464th Ave)*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*5*	*27*	*7*	*11*	*9*	*1*
Peak-Hour Factor, PHF	*0.62*	*0.84*	*0.88*	*0.69*	*0.45*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*8*	*32*	*7*	*15*	*20*	*4*
Percent Heavy Vehicles	*0*	--	--	*27*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*1*	*4*	*3*	*7*	*12*	*18*
Peak-Hour Factor, PHF	*0.25*	*0.50*	*0.38*	*0.58*	*0.50*	*0.50*
Hourly Flow Rate, HFR (veh/h)	*4*	*8*	*7*	*12*	*24*	*36*
Percent Heavy Vehicles	*0*	*0*	*0*	*14*	*8*	*17*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*8*	*15*		*72*			*19*	
C (m) (veh/h)	*1604*	*1424*		*874*			*863*	
v/c	*0.00*	*0.01*		*0.08*			*0.02*	
95% queue length	*0.02*	*0.03*		*0.27*			*0.07*	
Control Delay (s/veh)	*7.3*	*7.6*		*9.5*			*9.3*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.5*			*9.3*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:22 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #7a*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR77 (Main Ave)/CR 77* North/South Street: *Main Ave*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*40*	*32*	*0*	*72*	
Peak-Hour Factor, PHF	*1.00*	*0.71*	*0.67*	*0.92*	*0.69*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*56*	*47*	*0*	*104*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*152*		*0*			
Peak-Hour Factor, PHF	*0.84*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*180*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*1*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*0*		*180*				
C (m) (veh/h)		*1502*		*808*				
v/c		*0.00*		*0.22*				
95% queue length		*0.00*		*0.85*				
Control Delay (s/veh)		*7.4*		*10.7*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*10.7*					
Approach LOS	--	--	*B*					

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #7a*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR77 (Main Ave)/CR 77*

North/South Street: *Main Ave*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*84*	*118*	*0*	*66*	
Peak-Hour Factor, PHF	*1.00*	*0.66*	*0.87*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*127*	*135*	*0*	*71*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*50*		*0*			
Peak-Hour Factor, PHF	*0.66*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*75*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*0*		*75*				
C (m) (veh/h)		*1314*		*728*				
v/c		*0.00*		*0.10*				
95% queue length		*0.00*		*0.34*				
Control Delay (s/veh)		*7.7*		*10.5*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--		*10.5*				
Approach LOS	--	--		*B*				

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #7b*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 12/44th St*	North/South Street:
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*15*	*0*	*0*	*11*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.54*	*0.92*	*0.92*	*0.69*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*27*	*0*	*0*	*15*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*7*	*0*	*0*	*3*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.88*	*0.92*	*0.92*	*0.38*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*7*	*0*	*0*	*7*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*0*		*7*			*7*	
C (m) (veh/h)	*1616*	*1600*		*854*			*854*	
v/c	*0.00*	*0.00*		*0.01*			*0.01*	
95% queue length	*0.00*	*0.00*		*0.02*			*0.02*	
Control Delay (s/veh)	*7.2*	*7.3*		*9.3*			*9.3*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.3*			*9.3*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #7b*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 12/44th St*	North/South Street:
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*17*	*0*	*2*	*22*	*1*
Peak-Hour Factor, PHF	*0.92*	*0.71*	*0.92*	*0.50*	*0.92*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*0*	*23*	*0*	*4*	*23*	*4*
Percent Heavy Vehicles	*0*	--	--	*50*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*4*	*0*	*0*	*3*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.50*	*0.92*	*0.92*	*0.75*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*8*	*0*	*0*	*4*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*33*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*4*		*8*			*4*	
C (m) (veh/h)	*1600*	*1330*		*834*			*777*	
v/c	*0.00*	*0.00*		*0.01*			*0.01*	
95% queue length	*0.00*	*0.01*		*0.03*			*0.02*	
Control Delay (s/veh)	*7.3*	*7.7*		*9.4*			*9.7*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.4*			*9.7*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #8*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 12 (216A St)*

North/South Street: *CR12(216A St)/CR11(458th Ave)*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*3*	*7*			*3*	*8*
Peak-Hour Factor, PHF	*0.75*	*0.58*	*1.00*	*1.00*	*0.75*	*0.67*
Hourly Flow Rate, HFR (veh/h)	*4*	*12*	*0*	*0*	*4*	*11*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*		*0*			
Peak-Hour Factor, PHF	*0.58*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*12*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*43*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*4*						*12*	
C (m) (veh/h)	*1616*						*887*	
v/c	*0.00*						*0.01*	
95% queue length	*0.01*						*0.04*	
Control Delay (s/veh)	*7.2*						*9.1*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*9.1*		
Approach LOS	--	--				*A*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:26 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #8*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 12 (216A St)* North/South Street: *CR12(216A St)/CR11(458th Ave)*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*8*	*6*			*14*	*0*
Peak-Hour Factor, PHF	*0.67*	*0.38*	*1.00*	*1.00*	*0.58*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*11*	*15*	*0*	*0*	*24*	*0*
Percent Heavy Vehicles	*13*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*		*5*			
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.62*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*8*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*60*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*11*						*8*	
C (m) (veh/h)	*1522*						*907*	
v/c	*0.01*						*0.01*	
95% queue length	*0.02*						*0.03*	
Control Delay (s/veh)	*7.4*						*9.0*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*9.0*		
Approach LOS	--	--				*A*		

Copyright © 2010 University of Florida, All Rights Reserved *HCS+*™ Version 5.6 Generated: 4/24/2013 7:28 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #9*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project ID

East/West Street: *CR 30 (E North Dr)* North/South Street: *CR 33 (Comell St)*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*13*	*23*	*5*	*6*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*25*	*45*	*4*	*7*	*30*	*0*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.59*		*0.33*		*0.65*		*0.37*	
Flow Rate (veh/h)	*61*		*33*		*113*		*99*	
% Heavy Vehicles	*19*		*36*		*11*		*14*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.5*		*0.3*		*0.2*	
Prop. Right-Turns	*0.6*		*0.0*		*0.1*		*0.0*	
Prop. Heavy Vehicle	*0.2*		*0.4*		*0.1*		*0.1*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.0*		*0.7*		*0.2*		*0.3*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.05*		*0.03*		*0.10*		*0.09*	
hd, final value (s)	*4.40*		*5.18*		*4.47*		*4.53*	
x, final value	*0.07*		*0.05*		*0.14*		*0.12*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.4*		*3.2*		*2.5*		*2.5*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*311*		*283*		*363*		*349*	
Delay (s/veh)	*7.75*		*8.44*		*8.19*		*8.18*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.75*		*8.44*		*8.19*		*8.18*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*8.13*							
Intersection LOS	*A*							

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6 Generated: 4/24/2013 7:29 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #9*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project ID

East/West Street: *CR 30 (E North Dr)* North/South Street: *CR 33 (Comell St)*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*12*	*43*	*0*	*22*	*19*	*3*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*9*	*31*	*4*	*10*	*2*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.57*		*0.59*		*0.45*		*0.40*	
Flow Rate (veh/h)	*96*		*74*		*88*		*37*	
% Heavy Vehicles	*4*		*5*		*3*		*19*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*0.5*		*0.0*		*0.2*	
Prop. Right-Turns	*0.0*		*0.1*		*0.8*		*0.1*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.2*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*		*0.1*		*-0.4*		*0.3*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.09*		*0.07*		*0.08*		*0.03*	
hd, final value (s)	*4.37*		*4.42*		*3.92*		*4.69*	
x, final value	*0.12*		*0.09*		*0.10*		*0.05*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.4*		*2.4*		*1.9*		*2.7*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*346*		*324*		*338*		*287*	
Delay (s/veh)	*7.94*		*7.87*		*7.34*		*7.93*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.94*		*7.87*		*7.34*		*7.93*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.74*							
Intersection LOS	*A*							

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6 Generated: 4/24/2013 7:29 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #10*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 10 (220th St)* North/South Street: *CR 13 (465th St)*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*3*	*3*	*4*	*4*	
Peak-Hour Factor, PHF	*1.00*	*0.38*	*0.38*	*0.50*	*0.50*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*7*	*7*	*8*	*8*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*1*		*16*			
Peak-Hour Factor, PHF	*0.25*	*1.00*	*0.67*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*23*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*6*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*8*		*27*				
C (m) (veh/h)		*1617*		*1047*				
v/c		*0.00*		*0.03*				
95% queue length		*0.01*		*0.08*				
Control Delay (s/veh)		*7.2*		*8.5*				
LOS		*A*		*A*				
Approach Delay (s/veh)	--	--	*8.5*					
Approach LOS	--	--	*A*					

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6 Generated: 4/24/2013 7:30 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*11/21/2012*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #10*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 10 (220th St)* North/South Street: *CR 13 (465th St)*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*3*	*0*	*15*	*5*	
Peak-Hour Factor, PHF	*1.00*	*0.75*	*0.92*	*0.75*	*0.62*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*4*	*0*	*20*	*8*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*		*2*			
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.25*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*8*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*20*		*8*				
C (m) (veh/h)		*1631*		*1085*				
v/c		*0.01*		*0.01*				
95% queue length		*0.04*		*0.02*				
Control Delay (s/veh)		*7.2*		*8.3*				
LOS		*A*		*A*				
Approach Delay (s/veh)	--	--		*8.3*				
Approach LOS	--	--		*A*				

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:30 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #1*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project ID

East/West Street: *CR 6* North/South Street: *CR 7*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*9*	*30*	*3*	*3*	*13*	*9*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*9*	*0*	*21*	*52*	*7*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.58*		*0.50*		*0.33*		*0.51*	
Flow Rate (veh/h)	*71*		*50*		*30*		*155*	
% Heavy Vehicles	*3*		*18*		*29*		*7*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*0.1*		*0.1*		*0.3*	
Prop. Right-Turns	*0.1*		*0.4*		*0.0*		*0.1*	
Prop. Heavy Vehicle	*0.0*		*0.2*		*0.3*		*0.1*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*		*0.1*		*0.5*		*0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.06*		*0.04*		*0.03*		*0.14*	
hd, final value (s)	*4.45*		*4.53*		*4.87*		*4.35*	
x, final value	*0.09*		*0.06*		*0.04*		*0.19*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.4*		*2.5*		*2.9*		*2.3*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*321*		*300*		*280*		*405*	
Delay (s/veh)	*7.87*		*7.84*		*8.08*		*8.34*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.87*		*7.84*		*8.08*		*8.34*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*8.13*							
Intersection LOS	*A*							

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6 Generated: 4/24/2013 7:31 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #1*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project ID

East/West Street: *CR 6* North/South Street: *CR 7*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*9*	*9*	*1*	*7*	*30*	*51*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*3*	*57*	*1*	*11*	*26*	*3*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.42*		*0.61*		*0.47*		*0.64*	
Flow Rate (veh/h)	*44*		*143*		*129*		*61*	
% Heavy Vehicles	*0*		*15*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	*0.5*		*0.1*		*0.0*		*0.3*	
Prop. Right-Turns	*0.0*		*0.6*		*0.0*		*0.1*	
Prop. Heavy Vehicle	*0.0*		*0.1*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*		*-0.1*		*-0.0*		*0.0*	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.04*		*0.13*		*0.11*		*0.05*	
hd, final value (s)	*4.58*		*4.32*		*4.41*		*4.50*	
x, final value	*0.06*		*0.17*		*0.16*		*0.08*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.6*		*2.3*		*2.4*		*2.5*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*294*		*393*		*379*		*311*	
Delay (s/veh)	*7.85*		*8.21*		*8.23*		*7.87*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.85*		*8.21*		*8.23*		*7.87*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*8.12*							
Intersection LOS	*A*							

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Location # 2*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 6* North/South Street: *CR 77*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*3*	*24*	*28*	*42*	*14*	*1*
Peak-Hour Factor, PHF	*0.25*	*0.75*	*0.58*	*0.65*	*0.83*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*12*	*32*	*48*	*64*	*16*	*4*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*	*61*	*5*	*5*	*19*	*15*
Peak-Hour Factor, PHF	*0.42*	*0.75*	*0.50*	*0.50*	*0.58*	*0.69*
Hourly Flow Rate, HFR (veh/h)	*16*	*81*	*10*	*10*	*32*	*21*
Percent Heavy Vehicles	*0*	*4*	*25*	*50*	*14*	*9*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*1*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration		*LTR*		*LT*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*12*	*64*	*42*		*21*		*107*	
C (m) (veh/h)	*1609*	*1531*	*609*		*1022*		*645*	
v/c	*0.01*	*0.04*	*0.07*		*0.02*		*0.17*	
95% queue length	*0.02*	*0.13*	*0.22*		*0.06*		*0.59*	
Control Delay (s/veh)	*7.3*	*7.5*	*11.3*		*8.6*		*11.7*	
LOS	*A*	*A*	*B*		*A*		*B*	
Approach Delay (s/veh)	--	--	*10.4*			*11.7*		
Approach LOS	--	--	*B*			*B*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*M Stewart*	Intersection	*Location # 2*
Agency/Co.	*HR Green*	Jurisdiction	*Brookings County*
Date Performed	*2/13/13*	Analysis Year	*2032*
Analysis Time Period	*PM Peak Hour*		

Project Description

East/West Street: *CR 6* North/South Street: *CR 77*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*23*	*79*	*43*	*4*	*15*	*7*
Peak-Hour Factor, PHF	*0.71*	*0.76*	*0.67*	*0.38*	*0.55*	*0.42*
Hourly Flow Rate, HFR (veh/h)	*32*	*103*	*64*	*10*	*27*	*16*
Percent Heavy Vehicles	*6*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*1*	*0*	*1*	*0*
Configuration	*LT*		*R*	*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*5*	*8*	*7*	*7*	*34*	*5*
Peak-Hour Factor, PHF	*0.33*	*0.50*	*0.42*	*0.62*	*0.62*	*0.50*
Hourly Flow Rate, HFR (veh/h)	*15*	*16*	*16*	*11*	*54*	*10*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*20*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*1*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration		*LTR*		*LT*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*	*LTR*	*LT*		*R*		*LTR*	
v (veh/h)	*32*	*10*	*65*		*10*		*47*	
C (m) (veh/h)	*1540*	*1423*	*630*		*957*		*710*	
v/c	*0.02*	*0.01*	*0.10*		*0.01*		*0.07*	
95% queue length	*0.06*	*0.02*	*0.34*		*0.03*		*0.21*	
Control Delay (s/veh)	*7.4*	*7.5*	*11.4*		*8.8*		*10.4*	
LOS	*A*	*A*	*B*		*A*		*B*	
Approach Delay (s/veh)	--	--	*11.0*			*10.4*		
Approach LOS	--	--	*B*			*B*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:34 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #3*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 8* North/South Street: *CR 5*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*11*	*4*	*0*	*50*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.40*	*0.38*	*0.92*	*0.51*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*27*	*10*	*0*	*98*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*7*	*7*	*0*	*1*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.62*	*0.62*	*0.92*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*11*	*11*	*0*	*4*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*0*		*15*			*11*	
C (m) (veh/h)	*1508*	*1587*		*879*			*963*	
v/c	*0.00*	*0.00*		*0.02*			*0.01*	
95% queue length	*0.00*	*0.00*		*0.05*			*0.03*	
Control Delay (s/veh)	*7.4*	*7.3*		*9.2*			*8.8*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.2*			*8.8*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #3*
Jurisdiction	*Brookings County*
Analysis Year	*2012*

Project Description

East/West Street: *CR 8* North/South Street: *CR 5*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*55*	*1*	*0*	*17*	*0*
Peak-Hour Factor, PHF	*0.50*	*0.89*	*0.25*	*0.92*	*0.75*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*12*	*61*	*4*	*0*	*22*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*6*	*1*	*0*	*1*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.50*	*0.25*	*0.92*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*12*	*4*	*0*	*4*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*100*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*12*	*0*		*8*			*12*	
C (m) (veh/h)	*1607*	*1550*		*817*			*1061*	
v/c	*0.01*	*0.00*		*0.01*			*0.01*	
95% queue length	*0.02*	*0.00*		*0.03*			*0.03*	
Control Delay (s/veh)	*7.3*	*7.3*		*9.4*			*8.4*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.4*			*8.4*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:36 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #4*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 26* North/South Street: *CR 77*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*318*	*81*	*9*	*98*	*18*
Peak-Hour Factor, PHF	*0.25*	*0.85*	*0.75*	*0.75*	*0.66*	*0.81*
Hourly Flow Rate, HFR (veh/h)	*4*	*374*	*108*	*12*	*148*	*22*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*128*	*64*	*3*	*17*	*7*	*17*
Peak-Hour Factor, PHF	*0.64*	*0.56*	*0.25*	*0.50*	*0.42*	*0.75*
Hourly Flow Rate, HFR (veh/h)	*200*	*114*	*12*	*34*	*16*	*22*
Percent Heavy Vehicles	*0*	*2*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*4*	*12*		*72*			*326*	
C (m) (veh/h)	*1420*	*1091*		*360*			*373*	
v/c	*0.00*	*0.01*		*0.20*			*0.87*	
95% queue length	*0.01*	*0.03*		*0.73*			*8.50*	
Control Delay (s/veh)	*7.5*	*8.3*		*17.5*			*54.1*	
LOS	*A*	*A*		*C*			*F*	
Approach Delay (s/veh)	--	--	*17.5*			*54.1*		
Approach LOS	--	--	*C*			*F*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:37 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #4*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 26* North/South Street: *CR 77*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*9*	*160*	*31*	*14*	*301*	*106*
Peak-Hour Factor, PHF	*0.75*	*0.86*	*0.69*	*0.50*	*0.82*	*0.67*
Hourly Flow Rate, HFR (veh/h)	*12*	*186*	*44*	*28*	*367*	*158*
Percent Heavy Vehicles	*0*	--	--	*10*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*43*	*21*	*3*	*84*	*51*	*18*
Peak-Hour Factor, PHF	*0.75*	*0.75*	*0.50*	*0.78*	*0.75*	*0.65*
Hourly Flow Rate, HFR (veh/h)	*57*	*28*	*6*	*107*	*68*	*27*
Percent Heavy Vehicles	*3*	*0*	*50*	*0*	*0*	*8*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*12*	*28*		*202*			*91*	
C (m) (veh/h)	*1052*	*1292*		*324*			*271*	
v/c	*0.01*	*0.02*		*0.62*			*0.34*	
95% queue length	*0.03*	*0.07*		*3.95*			*1.43*	
Control Delay (s/veh)	*8.5*	*7.8*		*32.9*			*24.9*	
LOS	*A*	*A*		*D*			*C*	
Approach Delay (s/veh)	--	--	*32.9*			*24.9*		
Approach LOS	--	--	*D*			*C*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #5*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR26 (32nd St)/CR21 (34th Ave)* North/South Street: *CR 26 (32nd St)*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*24*	*10*			*28*	*0*
Peak-Hour Factor, PHF	*0.71*	*0.58*	*1.00*	*1.00*	*0.56*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*33*	*17*	*0*	*0*	*49*	*0*
Percent Heavy Vehicles	*6*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*0*		*18*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*1.00*	*0.81*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*22*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*31*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*33*						*22*	
C (m) (veh/h)	*1533*						*943*	
v/c	*0.02*						*0.02*	
95% queue length	*0.07*						*0.07*	
Control Delay (s/veh)	*7.4*						*8.9*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*8.9*		
Approach LOS	--	--				*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #5*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR26 (32nd St)/CR21 (34th Ave)* North/South Street: *CR 26 (32nd St)*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*26*	*35*			*13*	*0*
Peak-Hour Factor, PHF	*0.75*	*0.69*	*1.00*	*1.00*	*0.56*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*34*	*50*	*0*	*0*	*23*	*0*
Percent Heavy Vehicles	*22*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*0*		*38*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*1.00*	*0.48*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*79*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*4*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*34*						*79*	
C (m) (veh/h)	*1472*						*1048*	
v/c	*0.02*						*0.08*	
95% queue length	*0.07*						*0.24*	
Control Delay (s/veh)	*7.5*						*8.7*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--					*8.7*	
Approach LOS	--	--					*A*	

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*M. Stewart*	Intersection	*Location #6*
Agency/Co.	*HR Green*	Jurisdiction	*Brookings County*
Date Performed	*2/13/13*	Analysis Year	*2032*
Analysis Time Period	*AM Peak*		

Project Description

East/West Street: *CR 12 (44th St)*	North/South Street: *CR 5 (464th Ave)*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*1*	*21*	*6*	*14*	*7*	*6*
Peak-Hour Factor, PHF	*0.25*	*0.62*	*0.33*	*0.50*	*0.42*	*0.50*
Hourly Flow Rate, HFR (veh/h)	*4*	*33*	*18*	*28*	*16*	*12*
Percent Heavy Vehicles	*100*	--	--	*20*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*23*	*31*	*9*	*1*	*9*	*21*
Peak-Hour Factor, PHF	*0.67*	*0.55*	*0.38*	*0.25*	*0.75*	*0.47*
Hourly Flow Rate, HFR (veh/h)	*34*	*56*	*23*	*4*	*12*	*44*
Percent Heavy Vehicles	*13*	*0*	*50*	*0*	*17*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*4*	*28*		*60*			*113*	
C (m) (veh/h)	*1130*	*1443*		*918*			*766*	
v/c	*0.00*	*0.02*		*0.07*			*0.15*	
95% queue length	*0.01*	*0.06*		*0.21*			*0.52*	
Control Delay (s/veh)	*8.2*	*7.5*		*9.2*			*10.5*	
LOS	*A*	*A*		*A*			*B*	
Approach Delay (s/veh)	--	--	*9.2*			*10.5*		
Approach LOS	--	--	*A*			*B*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #6*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 12 (44th St)* North/South Street: *CR 5 (464th Ave)*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*7*	*38*	*10*	*16*	*13*	*1*
Peak-Hour Factor, PHF	*0.62*	*0.84*	*0.88*	*0.69*	*0.45*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*11*	*45*	*11*	*23*	*28*	*4*
Percent Heavy Vehicles	*0*	--	--	*27*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*1*	*6*	*4*	*10*	*17*	*26*
Peak-Hour Factor, PHF	*0.25*	*0.50*	*0.38*	*0.58*	*0.50*	*0.50*
Hourly Flow Rate, HFR (veh/h)	*4*	*12*	*10*	*17*	*34*	*52*
Percent Heavy Vehicles	*0*	*0*	*0*	*14*	*8*	*17*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*11*	*23*		*103*			*26*	
C (m) (veh/h)	*1593*	*1403*		*834*			*815*	
v/c	*0.01*	*0.02*		*0.12*			*0.03*	
95% queue length	*0.02*	*0.05*		*0.42*			*0.10*	
Control Delay (s/veh)	*7.3*	*7.6*		*9.9*			*9.6*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.9*			*9.6*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:43 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #7a*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR77 (Main Ave)/CR 77* North/South Street: *Main Avenue*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*57*	*45*	*0*	*102*	
Peak-Hour Factor, PHF	*1.00*	*0.71*	*0.67*	*0.92*	*0.69*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*80*	*67*	*0*	*147*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*215*		*0*			
Peak-Hour Factor, PHF	*0.84*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*255*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*1*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*0*		*255*				
C (m) (veh/h)		*1447*		*730*				
v/c		*0.00*		*0.35*				
95% queue length		*0.00*		*1.57*				
Control Delay (s/veh)		*7.5*		*12.6*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--		*12.6*				
Approach LOS	--	--		*B*				

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #7a*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR77 (Main Ave)/CR 77* North/South Street: *Main Avenue*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*119*	*167*	*0*	*94*	
Peak-Hour Factor, PHF	*1.00*	*0.66*	*0.87*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*180*	*191*	*0*	*102*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*71*		*0*			
Peak-Hour Factor, PHF	*0.66*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*107*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*0*		*107*				
C (m) (veh/h)		*1199*		*628*				
v/c		*0.00*		*0.17*				
95% queue length		*0.00*		*0.61*				
Control Delay (s/veh)		*8.0*		*11.9*				
LOS		*A*		*B*				
Approach Delay (s/veh)	--	--	*11.9*					
Approach LOS	--	--	*B*					

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #7b*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 12/44th St*

North/South Street: *Main Ave (Twin Oaks Ln)*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*21*	*0*	*0*	*16*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.54*	*0.92*	*0.92*	*0.69*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*38*	*0*	*0*	*23*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*10*	*0*	*0*	*4*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.88*	*0.92*	*0.92*	*0.38*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*11*	*0*	*0*	*10*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*0*		*11*			*10*	
C (m) (veh/h)	*1605*	*1585*		*834*			*834*	
v/c	*0.00*	*0.00*		*0.01*			*0.01*	
95% queue length	*0.00*	*0.00*		*0.04*			*0.04*	
Control Delay (s/veh)	*7.2*	*7.3*		*9.4*			*9.4*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.4*			*9.4*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #7b*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 12/44th St*

North/South Street: *Main Ave (Twin Oaks Ln)*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*24*	*0*	*3*	*31*	*1*
Peak-Hour Factor, PHF	*0.92*	*0.71*	*0.92*	*0.50*	*0.92*	*0.25*
Hourly Flow Rate, HFR (veh/h)	*0*	*33*	*0*	*6*	*33*	*4*
Percent Heavy Vehicles	*0*	--	--	*50*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*6*	*0*	*0*	*4*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.50*	*0.92*	*0.92*	*0.75*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*12*	*0*	*0*	*5*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*33*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*6*		*12*			*5*	
C (m) (veh/h)	*1587*	*1318*		*808*			*751*	
v/c	*0.00*	*0.00*		*0.01*			*0.01*	
95% queue length	*0.00*	*0.01*		*0.05*			*0.02*	
Control Delay (s/veh)	*7.3*	*7.7*		*9.5*			*9.8*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.5*			*9.8*		
Approach LOS	--	--	*A*			*A*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:45 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #8*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 12 (216A St)* North/South Street: *CR12(216A St)/CR11(458th Ave)*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*13*			*6*	*15*
Peak-Hour Factor, PHF	*0.75*	*0.58*	*1.00*	*1.00*	*0.75*	*0.67*
Hourly Flow Rate, HFR (veh/h)	*8*	*22*	*0*	*0*	*8*	*22*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*13*		*0*			
Peak-Hour Factor, PHF	*0.58*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*22*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*43*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*8*						*22*	
C (m) (veh/h)	*1596*						*853*	
v/c	*0.01*						*0.03*	
95% queue length	*0.02*						*0.08*	
Control Delay (s/veh)	*7.3*						*9.3*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*9.3*		
Approach LOS	--	--				*A*		

Copyright © 2010 University of Florida, All Rights Reserved *HCS+*™ Version 5.6 Generated: 4/24/2013 7:46 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #8*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 12 (216A St)*

North/South Street: *CR12(216A St)/CR11(458th Ave)*

Intersection Orientation: *North-South*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*15*	*11*			*26*	*0*
Peak-Hour Factor, PHF	*0.67*	*0.38*	*1.00*	*1.00*	*0.58*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*22*	*28*	*0*	*0*	*44*	*0*
Percent Heavy Vehicles	*13*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*		*9*			
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.62*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*14*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*60*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*22*						*14*	
C (m) (veh/h)	*1496*						*883*	
v/c	*0.01*						*0.02*	
95% queue length	*0.04*						*0.05*	
Control Delay (s/veh)	*7.4*						*9.1*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--				*9.1*		
Approach LOS	--	--				*A*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:48 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #9*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project ID

East/West Street: *CR 30 (E North Dr)* North/South Street: *CR 33 (Comell St)*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*18*	*33*	*7*	*9*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*35*	*64*	*6*	*10*	*0*	*0*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.59*		*0.33*		*0.65*		*0.37*	
Flow Rate (veh/h)	*86*		*48*		*160*		*27*	
% Heavy Vehicles	*19*		*36*		*11*		*14*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*		*0.4*		*0.3*		*1.0*	
Prop. Right-Turns	*0.6*		*0.0*		*0.1*		*0.0*	
Prop. Heavy Vehicle	*0.2*		*0.4*		*0.1*		*0.1*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.7*		*0.2*		*0.4*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.08*		*0.04*		*0.14*		*0.02*	
hd, final value (s)	*4.36*		*5.15*		*4.48*		*4.85*	
x, final value	*0.10*		*0.07*		*0.20*		*0.04*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.4*		*3.2*		*2.5*		*2.9*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*336*		*298*		*410*		*277*	
Delay (s/veh)	*7.86*		*8.53*		*8.59*		*8.03*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.86*		*8.53*		*8.59*		*8.03*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*8.34*							
Intersection LOS	*A*							

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6 Generated: 4/24/2013 7:48 AM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #9*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project ID

East/West Street: *CR 30 (E North Dr)* North/South Street: *CR 33 (Comell St)*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*17*	*0*	*0*	*31*	*27*	*4*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*13*	*44*	*6*	*14*	*3*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.57*		*0.59*		*0.45*		*0.40*	
Flow Rate (veh/h)	*29*		*103*		*125*		*55*	
% Heavy Vehicles	*4*		*5*		*3*		*19*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*		*0.5*		*0.0*		*0.3*	
Prop. Right-Turns	*0.0*		*0.1*		*0.8*		*0.1*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.2*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.3*		*0.2*		*-0.4*		*0.3*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.03*		*0.09*		*0.11*		*0.05*	
hd, final value (s)	*4.68*		*4.48*		*3.87*		*4.64*	
x, final value	*0.04*		*0.13*		*0.13*		*0.07*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.7*		*2.5*		*1.9*		*2.6*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*279*		*353*		*375*		*305*	
Delay (s/veh)	*7.86*		*8.13*		*7.46*		*7.99*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.86*		*8.13*		*7.46*		*7.99*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.82*							
Intersection LOS	*A*							

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6 Generated: 4/24/2013 7:49 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Location #10*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 10 (220th St)* North/South Street: *CR 13 (465th St)*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*4*	*4*	*6*	*6*	
Peak-Hour Factor, PHF	*1.00*	*0.38*	*0.38*	*0.50*	*0.50*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*10*	*10*	*12*	*12*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*1*		*0*			
Peak-Hour Factor, PHF	*0.25*	*1.00*	*0.67*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*6*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*12*		*4*				
C (m) (veh/h)		*1609*		*956*				
v/c		*0.01*		*0.00*				
95% queue length		*0.02*		*0.01*				
Control Delay (s/veh)		*7.3*		*8.8*				
LOS		*A*		*A*				
Approach Delay (s/veh)	--	--		*8.8*				
Approach LOS	--	--		*A*				

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:50 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*M. Stewart*
Agency/Co.	*HR Green*
Date Performed	*2/13/13*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Location #10*
Jurisdiction	*Brookings County*
Analysis Year	*2032*

Project Description

East/West Street: *CR 10 (220th St)* North/South Street: *CR 13 (465th St)*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*4*	*0*	*21*	*7*	
Peak-Hour Factor, PHF	*1.00*	*0.75*	*0.92*	*0.75*	*0.62*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*5*	*0*	*28*	*11*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*		*3*			
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.25*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*12*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (veh/h)		*28*		*12*				
C (m) (veh/h)		*1630*		*1084*				
v/c		*0.02*		*0.01*				
95% queue length		*0.05*		*0.03*				
Control Delay (s/veh)		*7.2*		*8.4*				
LOS		*A*		*A*				
Approach Delay (s/veh)	--	--		*8.4*				
Approach LOS	--	--		*A*				

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 4/24/2013 7:50 AM

Appendix C

Early Stakeholder Coordination Summary Memorandum

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Phase 1 - Stakeholder Engagement Summary Report

FOR

FHWA, SDDOT, Brookings County

HP5510 (15) 3616 P
Work Order PD-07-12

February 26, 2013

Prepared by: HR Green

HRGreen

TABLE OF CONTENTS

Introduction 1
Stakeholder Input Summary 1
Stakeholder Meeting Comments 9

LIST OF FIGURES

Figure 1 A: Issues and Opportunities (Northwest Quadrant) 5
Figure 1 B: Issues and Opportunities (Northeast Quadrant) 6
Figure 1 C: Issues and Opportunities (Southwest Quadrant) 7
Figure 1 D: Issues and Opportunities (Southeast Quadrant) 8

INTRODUCTION

A key emphasis in the development of the Brookings County Master Transportation Plan is to promote effective decision-making by fostering a cooperative spirit among state, regional and local partners, as well as the general public. To that end, a comprehensive stakeholder engagement program was developed. The first phase of the stakeholder engagement program concluded in January of 2013. This effort included a series of individual meetings or focus groups with key stakeholders, including the following:

- Brookings County Highway Department
- Brookings County Planning, Zoning, and Drainage Department
- Brookings County Emergency Services (ambulance)
- City of Brookings (community development and public works)
- City of Brookings Emergency Services (police and fire)
- City of Volga
- Richland Township
- Oak Lake Township
- SDSU – Local Transportation Assistance Program (LTAP)
- South Dakota State University (SDSU) – Innovation Campus Research Park
- Brookings Area Economic Development Corporation (EDC)
- East Brookings Business and Industry Association (EBBIA)
- Daktronics (major employer)

In addition, a series of three public open house meetings were held at separate locations throughout the county, including:

- City of Elkton
- City of Volga
- City of White

The purpose of these meetings was to directly engage the key stakeholder groups early in the planning process in order to solicit input on key community, regulatory, and technical issues and opportunities with regard to the Brookings County transportation system and other related topics.

STAKEHOLDER INPUT SUMMARY

The following is a summary of the general comments and input received. Figures 1A, 1B, 1C, and 1D show the major location specific issues and opportunities identified as part of the initial stakeholder engagement activities.

- Roadway Geometry Issues: A number of roadway and intersection geometric issues were identified throughout the county. This includes issues generally related to growth and development at the edges of the City of Brookings and issues within the rural or small urban areas of the county. The following is a summary of the key problem locations identified:
    - *City of Brookings Expansion Areas – Typical issues are related to network connectivity, roadway safety, or traffic operations (volume, speed, etc.).*

- CR 16 (20th Street) bridge – I-29 is a major barrier to east-west connectivity. Local plans have identified a bridge and/or interchange at CR 16 as a future project.
- 34th Street paving – 34th Street is a parallel route east of I-29 connecting existing interchanges at SD324/CR 24 (217th St) and US 14 (6th St). A two-mile segment is unpaved gravel, limiting connectivity for trucks and commuters.
- US 14 bypass – as a result of traffic increases, congestion and delay are becoming problematic (particularly during special events).
- CR 77 (Main Ave)/CR 12 (216th St) intersection – S-curve and intersection sightline problems.
- Western Avenue – high truck traffic and speeding issues.

o *Brookings County/Small Urban – typical issues include intersection geometrics (skew, curves, etc.), flooding, and maintenance of gravel roads.*

- 217th St/Cornell Ave intersection (Elkton) – skewed intersection on a curve.
- Hwy 13/US 14 intersection (north of Elkton) – skewed intersection, sightline issues.
- Hwy 30 (204th St)/CR 25 (475th Ave) intersection (White) – sightline and topography issues.
- Big Sioux River bridges (southwest quadrant of County) – many old/obsolete bridges in need of repair or removal.
- Hwy 13/Hwy 324 intersection (west of Elkton) – skewed intersection on a curve.
- 484th Ave (Richland Township) – needs maintenance to correct soft/low spots.
- 214th St (Richland Township) – needs maintenance to accommodate increased truck traffic (New Dale manufacturing operations).
- CR 27 (482nd Ave)(Richland Township) – through route connecting US 14 and Hwy 13. Gravel segment should be paved.
- 483rd Ave (Oak Lake Township) – roadway maintenance issues.
- CR 47 (481st Ave) from CR 44 (200th St) to Hwy 30 (203rd St) (Oak Lake Township) – high traffic gravel route. Should be paved.
- Caspian Ave/US 14 Intersection (Volga) – safety and operation (delay) issues.
- US 14 (Volga) – speeding issues.
- 213th St (south of Volga) – interest in paving to create an alternative connection to City of Brookings.
- CR 6/Hwy 30 (204th St)(west side of county) – high traffic highway.
- CR 12 (southwest side of county) – high traffic highway.
- CR 35 (east side of county) – wind farm access route.
- CR 26 (west side of county) – flooding issues.
- 215th St (Aurora) – pave to improve connection to City of Brookings.

- Railroad Crossings: There is an east-west railroad mainline crossing Brookings County. Safety issues were identified at the following at-grade railroad/roadway crossings:
    - US 14, west of Volga
    - US 14, east of Volga
    - 34th Street, east of Brookings

- Bicycle and Pedestrian System: Outside of the City of Brookings, there is a general lack of bicycle and pedestrian facilities within the county. There is interest in developing a well-connected and comprehensive non-motorized transportation system. The follow are specific improvements identified:
    - Recreational bicycle trail – City of Brookings to Volga.
    - Expanded bicycle facilities system (SDSU area).
    - Improved bicycle accommodations along US 14, crossing I-29.
    - Caspian Ave (Volga) – pedestrian/bicycle accommodations.
    - Sumara Ave (CR 5)(Volga) – pedestrian/bicycle accommodations.
    - US 14/Hasina Ave intersection (Volga) – improve pedestrian crossing.
    - Recreational trails – connecting to and around major lakes.

- Developing and Land Use: The following issues and constraints with regard to emerging development and land use were identified:
    - City of Brookings development is generally limited to the south for residential and east for industrial. Growth is bounded by floodplains to the west and protected agricultural/research land to the north.
    - Baby Bel brand has plans to open a large scale manufacturing facility west of I-29. This facility will add significant truck traffic to the roadway network.
    - Recent wind turbine development has added truck traffic to the county and city roadway system. The next phase of wind turbine expansion (Buffalo Ridge 2) is planned for 2015.
    - There is a planned transmission line project (CapX2020), which will cross the county in 2014.
    - There is a general perception that new wind turbine and dairy farm development is increasing the burden on township roads without a corresponding increase in funding.
    - Township roads were not built to accommodate the heavy truck traffic associated with wind turbine and dairy farm development, or large scale farming operations.
    - Many employees of the industry east of the City of Brookings travel across I-29 via US 14 and then south through town to their homes daily. There is a need to improve the roadway network south of the City of Brooking to increase safety and efficiency for these trips. This is a priority for local employers.
    - There is a need for a truck stop facility along I-29 in the Brookings area.
    - Lake Cambell (southeast portion of the county) and Oakwood Lake (northeast) are popular recreation areas.

- Mass Transit/Bus Service: The Brookings Area Transit Authority (BATA) provides dial-a-ride service throughout the county. BATA provides rides for children, elderly, and adults. There is currently no fixed route transit service in Brookings; however, there is interest (particularly in collaboration with SDSU).

- Roadway Design Standards: There are currently no roadway design standards in place for county or township roads. As a result, re-built roads may not properly accommodate their use (i.e., heavy vehicles, etc.). There is interest in development benchmarks, standards, and policies to support the county and township roadway system.

- Asset Inventory and Management: There is a need for a comprehensive county-wide asset management system in order to better understand the location and condition of assets such as roads, culverts, and bridges.

- Township Funding and Project Prioritization: A major concern for some townships is funding for repair and maintenance of township roads. Given the limited availability of funding, townships are often unable to meet maintenance needs.

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 1A

Study Area

Potential recreational trail

High traffic/truck traffic route (connectivity issue)

Potential recreational trail connection to Oakwood Lake

Lake Poinsett
Johnson Lake
Lake Tetonkaha
Lake Oakwood
Lake Mitchell
Bruce
Arlington

196 ST
197 ST
198 ST
199 ST
200 ST
201 ST
202 ST
203 ST
204 ST
205 ST
206 ST
207 ST
208 ST

455 AVE
456 AVE
457 AVE
458 AVE
459 AVE
460 AVE
461 AVE
462 AVE
463 AVE
464 AVE
465 AVE
465B AVE
466 AVE
467 AVE
468 AVE
469 AVE
470 AVE
471 AVE

S LAKE DR
OAKWOOD PARK DR

Legend

- Road Centerlines
- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- Parks
- City Limits
- Brookings County Limits

- Safety/Operational Issues
- Connectivity/Maintenance Issues
- Pedestrian/Bicycle Issues

N
W E
S

0 3,500 7,000 Feet

1 inch = 7,000 feet

HRGreen

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 1B

Study Area

Roadway maintenance

Potential recreational trail/ trail connection to Lincoln Co. MN.

Planned energy development corridor
- Wind turbine farms
- High voltage transmission lines

Unpaved (gravel) route (connectivity issue)

High truck traffic/ wind turbine access route (connectivity issue)

Intersection safety/ geometric issue

Oak Lake

Lake Hendricks

White

SD HWY 30

I-29

196 ST
197 ST
198 ST
199 ST
200 ST
201 ST
202 ST
203 ST
203A ST
204 ST
205 ST
206 ST
207 ST
208 ST

471 AVE
472 AVE
473 AVE
474 AVE
475 AVE
476 AVE
477 AVE
478 AVE
479 AVE
480 AVE
481 AVE
482 AVE
483 AVE
483B AVE
484 AVE
485 AVE
486 AVE
487 AVE
487B AVE

Legend

- Road Centerlines
- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- Parks
- City Limits
- Brookings County Limits
- Safety/Operational Issues
- Connectivity/Maintenance Issues
- Pedestrian/Bicycle Issues

N
W E
S

0 3,500 7,000 Feet

1 inch = 7,000 feet

HRGreen

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 1C

Study Area

Potential recreational trail connection to Oakwood Lake

Operational (delay)/ safety issues

Railroad crossing safety issue

Pedestrian/bike safety issue

Speeding issues

Railroad crossing safety issue

Flood prone area

Potential recreational trail

Potential recreational trail

Potential trail connection to Lake Sinai

Unpaved (gravel) route (connectivity issue)

High traffic/truck traffic route (connectivity issue)

Flood prone area/ obsolete bridges

Potential recreational trail

Arlington

Brush Lake

Lake Goldsmith

Volga

Brookings

Lake Sinai

Sinai

Lake Cambell

208 ST
209 ST
210 ST
211A ST
212 ST
213 ST
214 ST
215 ST
216 ST
216A ST
217 ST
218 ST
218A ST
219 ST
220 ST
6TH ST
3 ST

455 AVE
456 AVE
457 AVE
458 AVE
458B AVE
459 AVE
460 AVE
461 AVE
461B AVE
462 AVE
463 AVE
464 AVE
465 AVE
466 AVE
467 AVE
468 AVE
469 AVE
470 AVE
471 AVE
COUNTY 77/MAIN AVE(S)

1 5 7 46 14 10 11 18 16 12 13 17 19 20 81

Legend

- Road Centerlines
- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- Parks
- City Limits
- Brookings County Limits

- Safety/Operational Issues
- Connectivity/Maintenance Issues
- Pedestrian/Bicycle Issues

N
W E
S

0 3,500 7,000 Feet

1 inch = 7,000 feet

HRGreen

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Figure 1D

Study Area

High truck traffic/ speeding issues

Future Baby Bel facility

Congestion/delay

Bicycle crossing issues (safety)

Emerging industrial development area

Railroad crossing safety issue

Roadway maintenance

Unpaved (gravel) route (connectivity issue)

Emerging residential development area

Unpaved (gravel) roadway segment (connectivity issue)

Potential future bridge/interchange (connectivity issue)

Intersection safety/ geometric issue

Intersection safety/ geometric issue

Intersection safety/ geometric issue

Emerging residential development area

Brookings

Aurora

Bushnell

Elkton

Legend

- Road Centerlines
- Rail Roads
- Interstate
- State Highways
- County Highways (paved)
- County & Township Roads (gravel)
- Parks
- City Limits
- Brookings County Limits
- Safety/Operational Issues
- Connectivity/Maintenance Issues
- Pedestrian/Bicycle Issues

N W E S

0 3,500 7,000 Feet

1 inch = 7,000 feet

HRGreen

STAKEHOLDER MEETING COMMENTS

The following is a detailed summary of the comments and discussion from each of the public open house and individual stakeholder meetings.

A. Public Open House Meetings

City of Elkton Public Open House
Elkton Community Center, January 15, 2013. 5:30 pm

Attendees:

- Five attendees
- Four staff/agency representatives

Public Comments

- There are geometric/safety issues at the intersection of 217th St and Cornell Ave in Elkton. Hwy13 has a curving through creating skewed intersections with the local roadway system.
- There are sight line issues at the T-intersection of Hwy 13 and US 14, north of Elkton.
- Speeding on Hwy 13 is an issue.
- Twin City Fan in Elkton is a high truck traffic generator.

City of Volga Public Open House
Volga Community Center, January 16, 2013. 5:30 pm

Attendees:

- Five attendees
- Five staff/agency representatives

Public Comments

- There is some concern over the potential traffic and circulation impacts of the proposed roadway re-configuration for the planned airport expansion.
- There is support for a recreational bicycle trail between Volga and Brookings.
- There is interest in developing a fixed route transit system to provide service between Brookings and Volga.

City of White Public Open House
McKnight Community Center, January 16, 2013. 5:30 pm

Attendees:

- Two attendees
- Five staff/agency representatives

Public Comments

- There is a general concern over the allocation of funds to the townships. White Township needs more funding in order to keep up with roadway maintenance needs.

B. Stakeholder Outreach Meetings

City of Brookings (Community Development and Public Works)
Brookings City Hall, January 15, 2013

Attendees:

- Mike Stuck, City of Brookings
- Jackie Lanning, City of Brookings
- Ross Harris, HR Green
- Dan Edgerton, HR Green

Transportation System Comments

- The city is in favor of the planned bridge over I-29 at (CR 16) 20th Street to connect to CR 21 (34th Street).
    - The city is interested in potential development opportunities in this area and views the project as a catalyst.
    - One unresolved issue is whether or not to provide interchange access.
    - Aurora is within the Brookings County School District. The project would provide a more efficient connection for school buses.
    - The existing interchange at CR 24 (217th St) is too far south for traffic destined for the City of Brookings.
- 34th St is a parallel route east of I-29 which connects the existing interchanges at CR 24 (217th St) and US 14 (6th St). This route carries a high volume of truck traffic due to the adjacent industrial land uses. A two-mile segment of this route is unpaved gravel, which limits its usefulness for trucks and employees. This route should be paved.
- Main Street is a primary entrance point for the City of Brookings.
- There are few arterial connections to the west of the city due to the barrier formed by the Big Sioux River.
- There is interest in turn lanes on the US 14 bypass, north of the city. Special event traffic is problematic.
- There is an interested in expanded bicycle facilities system wide (near SDSU in particular).
- There is an s-curve in Main Ave (CR 77) south of the city which is a safety concern. This curve intersects with CR 12 (44th St) which is a high traffic route connecting to the western portion of the county.

Development Comments

- Development in and around the City of Brookings is limited to the south and east. There are floodplain issues to the west and protected lands (SDSU agricultural research) to the north. Residential development is likely to the south and industrial development to the east.
- Baby Bel brand has plans to open a large scale manufacturing facility east of I-29. This facility will add significant truck traffic.
- Recent wind farm development has added truck traffic to the county and city roadway system.

General Comments

- Funding is a key issue for Brookings County and the townships.
- Lake Cambell and Oakwood Lake are popular recreation areas.
- Much of the county is served by the City of Brookings School District with many children traveling into the city for school.

- An expansion of the Brookings Regional Airport is currently underway. As part of this project, 16th Ave to the west will be realigned and rerouted to 28th Ave.

Transit Comments

- The Brookings Area Transit (BATA) provides dial-a-ride service throughout the county. BATA provides rides for school children, elderly, and adults. Regular trips to Sioux Falls are also made. There is no fixed route transit system in Brookings.
- Public perception is a major obstacle to expansion of the transit system. When buses aren't run, they sit empty in public parking lots.
- There is interest in collaborating with SDSU to develop a fixed route transit system.

City of Brookings Emergency Services (police and fire)
Brookings City Hall, January 15, 2013

Attendees:

- Pete Bolzer, City of Brookings Fire Department
- Jeff Miller, City of Brookings Police Department
- Ross Harris, HR Green
- Dan Edgerton, HR Green

General Comments

- There are a number of bridges in the southwest quadrant of county crossing the Big Sioux River. Many of the bridges are obsolete and in need of repair. This area is also prone to flooding. As a result, there are a number of routes that are regularly avoided by fire trucks.
- There are a number of newer homes on the west side of Lake Cambell. These homes are served by private roads and can be difficult for emergency services to access.
- In some cases, emergency service vehicles need to park on the highway. Erosion and substandard ditches can be problematic.
- The unpaved segment of 34th Ave (between US 14 (6th St) and 20th Street) to the east of the City of Brookings is problematic from a safety perspective. There is also an unsafe railroad crossing in this area.
- Traffic congestion in the area of the I-29 and US 14 interchange can be a safety issue.
- Western Avenue on the west side of the City of Brookings Connects US 14 to the US 14 bypass. High truck traffic and speeding and this roadway are a concern.
- Geometric issues at the intersection of Hwy 13 and Hwy 324 lead to safety concerns.

Richland Township
SDDOT Brookings Maintenance Office, January 16, 2013

Attendees:

- Henning Hansen, Richland Township
- Joel Koch, Richland Township
- Dick Birck, Brookings County
- Ross Harris, HR Green
- Dan Edgerton, HR Green

General Comments

- A general concern of Richland Township is a lack of funding to maintain and improve township roads.

- Wind tower and dairy farm development have been prevalent in this part of the county. The township is discouraging future development because of the increased burden on township roads and a lack of corresponding funding increases.
- Township roads were not built to accommodate the heavy truck traffic associated with wind turbine and dairy farm development, or large farming operations.
- There is a need for a set of standards for township roads.
- There is a perception that revenue generated from economic development does not get back to the township.
- There are approximately 15 culverts within Richland Township which need to be replaced.
- 484th Ave is a primary road in Richland Township. This route needs maintenance as there are a number of soft spots and low spots.
- 214th Street is in need of maintenance. Light manufacturing (New Dale) on this roadway generates moderate traffic.
- There is a need for a comprehensive asset management system in order to better understand the location and condition of assets such as roads and culverts.
- CR 27 (482nd Ave) is an important through route, connecting US 14 and Hwy 13. There is a four-mile segment of this roadway which is not paved.
- There is interested in developing benchmarks, standards, and policies to support the township roadway system.
- Some farms are using the drainage ditches along township and county roads, which can overburden the roadway drainage system.
- There is interest in exploring traffic impact assessments for new development.

Brookings County Emergency Services (ambulance)
SDDOT Brookings Maintenance Office, January 16, 2013

Attendees:

- Gordan Dekkenda
- Dick Birck, Brookings County
- Ross Harris, HR Green
- Dan Edgerton, HR Green

General Comments

- The County Road naming conventions (numbered and named) can be problematic as there are multiple names for a given road or street. This is also an issue for private roads, such as those in the Lake Cambell area.
- Limited access to and crossings of I-29 are a challenge.
- Some private homes do not have house numbers.
- The condition of the roads is a factor in ambulance response time and can contribute to patient pain (i.e., bumpy rides). Flooding and snow removal can be problematic as they may limit ambulance response times.
- There is some interest in implementing a coordinated (across all emergency services) dispatch system with GPS technology.

Oak Lake Township
First Bank and Trust (White, SD), January 16, 2013

Attendees:

- Steven Smith, Oak Lake Township
- Norris Patrick, Oak Lake Township
- Dewayne Jurrens, Oak Lake Township
- Edward Halsehue, Oak Lake Township
- Steve Gramm, SDDOT
- Dick Birck, Brookings County
- Ross Harris, HR Green
- Dan Edgerton, HR Green

Funding and Development Comments

- A major concern in Oak Lake Township is funding for repair and maintenance of township roads. Given the limited funding, the township is unable to meet its maintenance needs.
- There is concern over township representation on the Brookings County Board of Commissioners. There is a perception that the primary focus of the County Board is urban areas. There is support for implementing a districting system for the County Board to ensure geographic representation.
- Some townships in the area have disbanded, due in part to funding issues.
- There is concern over the county property tax split. A high percentage of tax revenue is allocated to schools; however, there are very few school aged children in Oak Lake Township (approximately 15).
- Wind tower development has been prevalent in this part of the county. Although road repair after construction has been fair, the township would like a share of the tax revenue from this development to help off-set the higher on-going maintenance associated with providing access to these areas (i.e., snow removal, moving, etc.).
- In some cases, the wind tower developers have proposed specific haul routes for construction which are not always honored.
- Because of the increased maintenance liability, some township officials oppose new economic development such as wind turbines and dairying operations.
- There has been an increase in heavy truck hauling on township roads. In addition to increased wind and dairy farm activity, many local farmers also use semi-trucks.
- The next phase of wind tower expansion (Buffalo Ridge 2) is planned for 2015.
- There is a planned transmission line project (CapX2020), which will cross the county in 2014. There is concern over the proposed pole spacing of 1,000 feet.
- During the last phase of development, the wind tower developers were required to obtain over-sized vehicle permits to offset increased maintenance costs. The county collected these funds, but a proportionate share was not distributed the township.
- Oak Lake Township has historically received about $30,000 per year in funding from the county. This was increased to approximately $40,000 as a result of wind tower development.

Transportation Comments

- 483rd Ave in the northeaster portion of the county, just south of Astoria is problematic in terms of maintenance. The land on the east side of this route is owned by South Dakota State University and the land adjacent to the road is not maintained adequately.
- There are many culverts on township roads which need to be replaced.

- CR 27 (481st Ave) from CR 44 (200th St) to Hwy 30 (203rd St) is currently gravel. This road is used by school buses and should be paved.
- There is a need for an improved asset management system in order to understand/document roadway conditions, culvert locations, etc.
- There is a need for roadway standards for high traffic generators.
- There is interest in developing a standardized maintenance program for township roads.

Daktronics
SDDOT Brookings Maintenance Office, January 16, 2013

Attendees:

- Carla Gatzke, Daktronics
- Matt Kurtenbach, Daktronics
- Steve Gramm, SDDOT
- Ross Harris, HR Green
- Dan Edgerton, HR Green

General Comments

- Daktronics is one of the major employers in Brookings County, employing over 1,500 with plans to grow. Of these, approximately 800 employees live in the City of Brookings and many live in the surrounding communities (Volga, White, Aurora, etc.) or Sioux Falls to the south.
- Approximately 20 – 30 trucks enter or leave Daktronics daily, with most incoming trucks in the AM and outbound in the PM. Most trucks come from or are bound for the south (Sioux Falls or I-90), via I-29.
- Daktronics would like to continue to grow in Brookings, but is constrained by the supply of labor in the area. Providing a quality transportation system is critical to attracting and maintaining the labor force.
- The highest priority for Daktronics is to provide additional crossings of I-29 via the proposed bridge at 20th St. They would also like full freeway access at this location.
- There is strong support for paving 34th Ave south of US 14 (6th St) to create a continuous paved routed connecting US 14, the planned 20th Street bridge, and the SD324/CR 24 interchange to the south.
- Many Daktronics employees travel across I-29 via the US 14 and then south through town to their homes on a daily basis. There is a need to improve the roadway network south of the City of Brookings to increase safety and efficiency for these trips.
- There is a need for improved roadway connections between the City of Brookings (Daktronics) and the future residential growth areas in Aurora.
- There is a need for improved bicycle accommodations along US 14, crossing I-29.
- There is a need for a truck stop facility long I-29 in the Brookings area.

City of Volga Staff
Volga City Hall, January 16, 2013

Attendees:

- Mary Bjerke, Mayor – City of Volga
- Nicole Rawden, City of Volga
- Steve Meyer, City of Volga
- Kelly VanderWal, City of Volga
- Marty Stasburry, City of Volga

- Steve Gramm, SDDOT
- Ross Harris, HR Green
- Dan Edgerton, HR Green

Roadway Comments

- Caspian Ave is a primary north-south route connecting to US 14 in Volga. The Caspian Ave/US 14 intersection experiences safety and operational issues.
    - Safety of vehicles turning onto US 14 is a concern, especially at night. Improved lighting at this location is needed.
    - Northbound left turns from Caspian Ave to westbound US 14 can experience high delay, especially during harvest season. This location can experience delays of 10 minutes or more.
    - There is high truck traffic at this intersection (northbound Caspian to eastbound US 14), particularly during harvest season.
- Speeding on US 14 through Volga is a problem. The posted speed is 35 mph.
- There is interest in creating a new paved route connection to the City of Brookings (213th St) to provide an alternative to US 14.

Pedestrian/Bicycle Comments

- There is high pedestrian (children) traffic on Caspian Ave and no sidewalks. The city has unsuccessfully applied for federal funds to add pedestrian/bicycle trails.
- Sumara Ave (CR 5) is a high volume north-south roadway on the west side of Volga. This road is very narrow with drainage ditches on both sides. It experiences high pedestrian traffic as it connects to a city park and pool. Pedestrian safety is a concern as there are no sidewalks. There is interest in converting this road to an urban cross-section (fill ditches, add storm sewer), which would allow for sidewalks. Although it falls under the jurisdiction of the city, this road is maintained by the county (CR 5).
- There is a pedestrian crossing on US 14 at Hasina Ave. This crossing is marked and has flashing lights. Safety at this crossing is a concern as pedestrians must cross five lanes of traffic which is traveling at high speeds.
- There are currently sidewalks on the north side of US 14 in some areas. Winter maintenance (snow removal) is problematic. SDDOT does not clear snow from the sidewalks. Snow storage at the driveways along US 14 in Volga is also an issue (sightlines, physical obstructions, etc.).
- Many of the roads in Volga do not have sidewalks and there are no recreational trails within the city. There is interest in expanding sidewalk and trail facilities in order to improve livability and promote a healthy lifestyle.
- There is interest in developing a trail connection between the City of Volga and Brookings. Potential alignments to evaluate include:
    - A route generally following the rail corridor (currently a snowmobile trail on north side of tracks).
    - 212th St, 213th St/20th St (CR 10), or 214th St (CR 16).
    - US 14 alignment. This could be a designated on-street bike route in the near-term (safety concerns) and a separated trail facility in the long term. An on-street bike route would need to be maintained (sweeping).
- There is interest in a trail connection to Oakwood Lake and Lake Cambell.

Land Use Comments

- Future residential development is anticipated to occur on the east side of town.
- There is potential for future commercial development west of Volga along US 14.

Misc. Comments

- Inconsistencies in signage as roads transition from city to township or county routes can be an issues (i.e., CR 5/Sumara Ave/464th Ave – same road).
- The expansion of the US 14 bypass (two to four lanes) in Brookings has had a positive impact on travel between Volga and Bookings. At the intersection of the US 14 bypass and 22nd Ave in Brookings, turning movements from the bypass to 22nd Ave can be problematic (delay) as this intersection is uncontrolled (no gaps in traffic to turn).
- There are at-grade railroad crossings along US 14 both east and west of Volga. Safety is a concern as there have been multiples crashes. There are no traffic signals, stop signs, or vehicle gates at these crossings.
- Funding for township roads is an issue. Funding for city roads in new development areas is also a concern.

South Dakota State University (SDSU) – Innovation Campus Research Park
Innovation Campus Office, January 17, 2013

Attendees:

- Dwaine Chapel, SDSU Research Park
- Steve Gramm, SDDOT
- Ross Harris, HR Green
- Dan Edgerton, HR Green

General Comments

- While the research park is primarily concerned with businesses located inside its park, Dwaine Chapel, the Director is a long time resident of Brookings County and has valuable insights.
    - Increased traffic (dairy, semis, etc.) on township roads is problematic.
    - The township roadway system may be over built. Is one-mile spacing for township roads needed? Are there roads that can be eliminated? Could some be reverted to private roads?
    - In many places across the state, townships have been dissolved. This should be a long-term consideration in Brookings County.
    - There is a need for a county-wide inventory of roads.
    - The county should evaluate alternative funding mechanisms such as public/private partnerships and impact fees.

South Dakota State University (SDSU)–Local Transportation Assistance Program (LTAP)
SDDOT Brookings Maintenance Office, January 17, 2013

Attendees:

- Ted Eggebraaten
- Steve Gramm, SDDOT
- Ross Harris, HR Green
- Dan Edgerton, HR Green

General Comments

- The primary issues of concern with regards to the roadway system within the county are the growth areas at the edges of the City of Brookings

- As growth occurs south of the City of Brookings, traffic on CR 77 (Medary Ave) may become an issue. This route is a primary entrance to the city for the residential development in this area.
- On the west side of the county, CR 6/SD 30 (204th St) sees high traffic as a through route connecting I-29 to US 81. CR 9 connecting to CR 6 is also a busy route.
- CR 12 is the primary access to Sinai in the southwest portion of the county.
- CR 35 on the east side of the county serves as the primary route for wind farm areas. CR 25 is also used (to a lesser extent).
- There are drainage issues in certain areas throughout the county. Standards should include considerations for drainage. A particular area of concerns is CR 26.
- While not required, the county maintains Samara Ave in the City of Volga, as it is a segment of CR 5. The county does maintenance on the pavement, but not drainage. The county also maintains Cornell Ave (CR 33) in Elkton and 478th Ave (CR 25) in White.
- As a future phase of the planning process, the county should investigate asset management options.
- LTAP provides training on alternative pavement and gravel specifications.

Brookings Area Economic Development Corporation (EDC)
SDDOT Brookings Maintenance Office, January 17, 2013

Attendees:

- Al Heuton, Brookings Economic Development Corp. (EDC)
- Steve Gramm, SDDOT
- Ross Harris, HR Green
- Dan Edgerton, HR Green

General Comments

- Most of the development within the county is happening in and around the City of Brookings. An exception is wind turbine and diary development which is occurring throughout the county.
- Most commercial and industrial development is happening east of I-29 and most residential development is occurring south of the city.
- Congestion on 6th St and 22nd Ave is problematic
- There is concern over the traffic impacts of the planned 6th St reconstruction project
- The EDC supports the planned overpass/underpass at I-29 and 20th Street.
- The I-29/US 14 interchange is a gateway to the City of Brookings. There is concern over traffic operations and aesthetics in this area. The EDC supports minimizing the amount of pavement added (don't add lanes) as a quality of life issue.
- The frontage road system along I-29 needs improvement.
- There is a need for an agricultural industrial park in the county. Preliminary plans are to locate this facility in the east half of section 33 (east of the City of Brookings between 213th St and 214th St, west of 745th Ave).
- There is a need for a truck stop/gas station facility along I-29 in the Brookings area.
- The region is seeing a large expansion in dairy operations. Due to the nature of the business, dairies need to be spread out (i.e., need agricultural land nearby for feed).
- There are plans to expand the wind turbines and high voltage transmission line within the county.
- There is currently a bill before the South Dakota Legislature to capture sales/excise tax from wind and dairy development to fund township roads.

- Development receives conditional use permits from the townships. One issues is that townships meet infrequently (maybe twice per year).
- There is a need for standards for township roads. Townships roads are seeing an increasing diversity of use: dairy, wind, farmer owner semis, etc.
- There is some support for a fixed route transit system.
- People currently bike from Brookings to Lake Campell, Sinai, and Volga. There may be demand for recreational trails connecting these areas.

East Brookings Business and Industry Association (EBBIA)
SDDOT Brookings Maintenance Office, January 17, 2013

Attendees:

- Al Heuton, Brookings Economic Development Corp. (EDC)
- Don Deibert, Dunde Counterpart
- Carla Catzke, Daktronics
- Aelred Kurtenbach, Daktronics
- Steve Gramm, SDDOT
- Ross Harris, HR Green
- Dan Edgerton, HR Green

General Comments

- There is an industrial park planned for an area east of the City of Brookings between 213th St and 214th St, west of 745th Ave. HDR recently completed a traffic impact study for this project.
- A primary concern of the EBBIA is the barrier created by I-29, just east of the City of Brookings.
- Two solutions under pursuit are: 1) improved connections across I-29, and 2) new housing east of I-29 (northeast side of Aurora),
- 34th St is a parallel route east of I-29 which connects the existing interchanges at SD324/CR 24 (217th St) and US 14 (6th St).
    - There are many business located along this route, most of which have shipping traffic coming from/bound for points south (i.e., Sioux Falls).
    - A two-mile segment of this route is unpaved gravel, which limits its usefulness for trucks and employees.
    - Paving this route would encourage traffic bound for the industrial area east of I-29 to use the CR 24 interchange rather than the US 14 interchange as is common today. This could improve operations and reduce congestion around the US 14 interchange.
    - There is an uncontrolled railroad crossing along this segment which is a safety concern due to topography and sight line issues.
- The most direct route connecting the City of Brookings and Aurora is 215th St which is a gravel road. This road regularly floods. As Aurora is growing, there is a need to provide a paved route with adequate drainage.
- The EBBIA supports the planned overpass/underpass at I-29 and 20th Street.
- The planned Baby Bel factory will be a significant traffic generator in the East Brooking Industrial Area with as many as 100 trucks per day.
- There is interest in leveraging talent at the near by South Dakota State University (SDSU) Campus to build the local talent pool.

- There is a need for improved bicycle and pedestrian connections between SDSU and the east Brookings industrial area. I-29 is currently a major barrier which employers do not encourage employees to cross.
- There is some interest in a fixed route transit system to support employees.
- Daktronics operates regular daily bus service between Brookings and Sioux Falls for employees which sees approximately 60 riders per day.
- The EBBIA sees maintaining and improving the transportation system of the area as being critical to its ability to recruit and retail quality employees.
- The EBBIA's priority ranking of potential transportation projects is as follows:
    1. Pave 34th Street
    2. Pave the road to Aurora (20th St)
    3. Construct the 20th Street bridge

Bookings County Planning, Zoning, and Drainage
SDDOT Brookings Maintenance Office, January 17, 2013

Attendees:

- Bob Hill, Brookings Co
- Steve Gramm, SDDOT
- Ross Harris, HR Green
- Dan Edgerton, HR Green

Drainage and Flood Management

- There are several areas throughout the county prone to flooding. A particular area of concern is 20th Street, east of I-29 heading into Aurora.
- Water levels in the area of Lake Sinai are high. Some of the township roads in that area are underwater and on occasion the lake encroaches on US 81 (454th Ave).
- The culvert on CR 11 (458th Ave) were recently upgraded, relieving flooding issues on this route
- The County may be able to provide a map showing past roadway closures due to flooding.

Planning and Zoning

- Outside of the city of Brookings, a majority of the county is zoned for Agriculture.
- There is a study currently underway to understand existing/potential dairy sites within the county.
- Dairies are zoned for agriculture. The county does not make a distinction between larger corporate farms and smaller locally owned farms.
- A major focus of the County's Comprehensive Plan is developing an "energy corridor" in the northeastern part of the county (winds farms and transmission lines),
- There is an expansion of the Buffalo Ridge wind farm are planned for 2017.
- The CAPX 2020 high voltage transmission line project is planned to cross Brookings County in 2015.
- The County is aware of a closure plan for the mining operation just east of the City of Brookings (just east of I-29 and south of US 14).

Transportation System

- CR 6 (204th St) sees heavy truck traffic as a through route connecting I-29 to US 81.
- There may be a demand for recreational bicycle trails connecting to and around lake Hendricks.

Appendix D

Internet Survey

Executive Summary
Survey Report
Survey Instrument

Brookings County, along with the South Dakota Department of Transportation (SDDOT) and the Federal Highway Administration (FHWA), is sponsoring the Brookings Master Transportation Study. The study is examining current transportation issues and needs facing the Brookings County area, and will develop solutions to address them. The study area encompasses Brookings County and incorporates recommendations by reference of the City of Brookings.

As part of the study's first phase – to inventory and analyze existing and future transportation needs – the project team surveyed citizens about their travel patterns, Brookings County's' transportation needs, and suggestions for improvements. The survey was accessible via the project website and through a flyer sent via email or regular mail for approximately six weeks during mid-December 2012 and January 2013, during which time 450 surveys were submitted.

This document is an executive summary of the full survey report and includes data highlights. Please note that not all respondents answered the survey in its entirety, but most questions had about a 95% or greater response rate.

Respondent Profile

Most of the survey respondents reside in Brookings County (almost 86%), and more than 319 said that they live in the 57006 zip code. Ninety-one (91) percent indicated that they are employed; the remaining 8% include self-employed citizens, part-time employees, retirees, students, homemakers, caregivers, and unemployed/looking for work. The majority of respondents are aged 18 – 44 years old and half do not have children under the age of 18 living in their household. There were 240 male and 184 female respondents (26 did not answer the question).

Getting to Work

- 429 of the respondents work in the Brookings County study area
- About 97% get to work via personal vehicle
- For most (331), the commute to work is less than 10 miles (one-way)
- On a typical day, it takes less than 20 minutes for almost 80% of those respondents who work in the Brookings County area to get to work, and almost 70% to return home (without making any stops along the way); and 20 - 29 minutes for 11% to get to work and 20-29 for 20% to return home; on average about 12% of people indicated that their commute time is 30 minutes or more each way

Getting to School

- 51 people reported that they attend school in the Brookings County study area; 46 attend South Dakota State University, three attend Brookings Schools; five attend a school other than these two options

- About 70% of respondents indicated that they get to school via personal vehicle, the remaining indicated that they get to school via demand bus service, carpool/vanpool, bicycle, or walking
- About 80% of respondents commute six or less miles to school each way
- Travel time to and from school is less than 20 minutes for over 80% of respondents (one-way without stops)

Getting Around Brookings County (Residents)

- In general, most respondents (363) use a personal vehicle for travel; only three reported that they bike, one choose demand bus service, and one choose carpool/vanpool
- The top reasons for travel are: to get to and from work (or for work-related trips); for groceries/food; to shop; and for household errands
- Most people travel Monday – Friday, between 5:30 – 9:00 am in the morning and 3:30 and 6:00 pm in the afternoon/evening
- On a typical weekday, about half of the respondents make three to four trips in a day; about a third make one to two trips per day

Traveling To/From Brookings County (Non-residents)

- For those respondents who reside outside of the study area, the top four reasons they travel to Brookings County are: to get to and from work (or for work-related travel), for grocery/food shopping, to dine out/patronize restaurants, and to shop
- They travel to Brookings County mostly on weekdays between 5:30 and 9:00 am and 3:30 and 6:00 pm

Transportation Needs/Issues

Citizens were asked to identify what they thought were the most pressing transportation needs or issues for the study area. Almost 76% of the respondents answered the question and the top five issues identified were:

- Better access and more overpasses onto I-29 to alleviate traffic congestion and improve overall travel in the area. Respondents repeatedly requested additional overpasses for I-29, most often mentioned is a 20th Street overpass.
- Conditions and quality of existing roads – respondents remarked that roads are in need of regular repair and maintenance, and that some need to be replaced more often.
- Improved access and better road quality near the Daktronics development.
- Improvements to 22nd Avenue – respondents repeatedly identified issues with 22nd Avenue and called for traffic flow improvements and road widening along this high-traffic corridor.
- Better access to the East side of I-29

Transportation Improvements

Each respondent then had the opportunity to choose what they thought were the three most important areas of transportation improvements. Out of 418 responses, the following were most often selected:

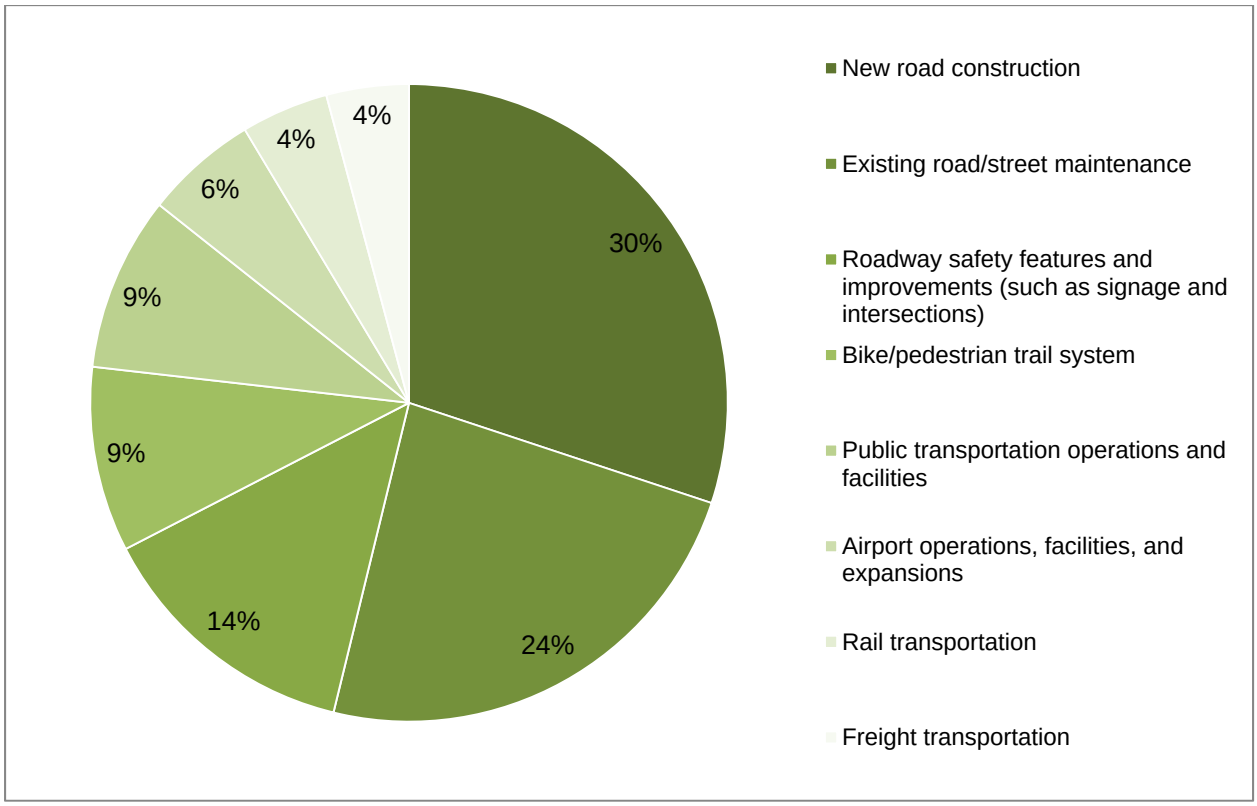
- Roadway traffic capacity improvements (260)
- City street maintenance (248)
- Roadway traffic safety improvements (125)
- State Highway or I-29 maintenance (119)

When asked which transportation improvements they thought would be beneficial to Brookings County in the next 20 – 30 years, about 68% of the respondents answered and the following topics were mentioned most often:

- More overpasses on I-29 to improve travel and congestion.
- Interstate overpass on 20th Street South.
- Expand bike paths and lanes and pedestrian accommodations.
- Road maintenance and repair – more frequent/regular resurfacing and/or reconstruction of roads.

Budgeting for Future Improvements

Survey participants were instructed to "spend" $100 on future transportation improvements; 393 respondents completed the task. The following pie chart shows how respondents would spend a $100 budget, based on the average amount allocated for each improvement.



Conclusion

Public input is a key component of Brookings County master transportation planning study. Data collected via the survey and from the open house will help the project team identify the area's transportation needs and develop strategies and potential solutions to address them.

Overview

Brookings County, along with the South Dakota Department of Transportation (SDDOT) and the Federal Highway Administration (FHWA), is sponsoring the Brookings County Master Transportation Study. The study will examine current transportation issues and needs facing the Brookings County area, and will develop solutions to address them. All transportation modes are being studied, including roadways, transit, railroads, freight, and pedestrian and bicycle facilities.

The study area encompasses Brookings County and incorporates recommendations by reference of the City of Brookings. The City of Brookings has a recently adopted transportation plan (2011) that has been coordinated with the Brookings County Transportation Plan.

The goals of the master planning process are to:

- Define current transportation deficiencies & identify future opportunities and needs;
- Plan for high quality facilities to deliver sustainably the best transportation services to local motorists, transit users, and bicyclists/pedestrians;
- Develop solutions & strategies to meet current and predicted future traffic conditions and promote a livable community that will enhance the economic and social well-being of Brookings residents; and
- Create a plan to provide guidance for implementation of recommended improvements.

The study consists of three main phases. The first phase includes an inventory and analysis of existing and future conditions and the identification of transportation needs. The second phase will develop strategies, alternatives and potential solutions that address the identified needs. Because of limited budgets for transportation infrastructure maintenance and construction, costs will be considered when developing alternatives. The third and final phase will select alternatives for further study and prioritize them based on other planned investments for the Brookings area.

The final plan is expected to be complete by the summer of 2013. It will outline recommended improvements and provide a guide for implementing them, along with other planned future developments in the study area.

Public Input

Public input is an important component of the study. In order to inform and involve citizens, the project team established a website: (www.sddot.com/transportation/highways/planning/specialstudies/BrookingsCo/), developed an online survey to collect public input, and hosted an open house meeting on December 4, 2012.

Survey

The online survey was developed to obtain information about citizens' travel patterns and destinations, transportation needs, and suggestions for transportation improvements. The survey collected data from both residents and non-residents of the Brookings County study area.

The internet survey was announced via the project web site and through a flyer sent via email or regular mail in mid-December, 2012, to local governments, libraries, and other public agencies in Brookings County as a means to advertise attendance and participation in public meetings. The survey was also distributed to several stakeholders (local and state agencies, schools, and businesses) who were contacted to discuss transportation system issues and concerns. The survey was available for completion online until January 31, 2013. Respondents were eligible to enter a drawing to win one of three gift cards to incentivize participation. A total of 450 surveys were completed online. The remainder of this document summarizes the survey data according to each survey question. A copy of the survey instrument is appended to this Summary.

Survey Results

Section 1: Where I live

Question 1: Do you currently reside in a city or township of Brookings County? (446 responses, 4 did not answer)

Yes: 382 (85.7%) No: 64 (13.3%)

Question 2: If yes, in which community (city or township) do you live (388 responses, 62 did not answer)

Arlington	1.5%	6
Aurora	3.1%	12
Brookings	74.7%	290
Bruce	1.5%	6
Elkton	2.1%	8
Medary	0.8%	3
Volga	3.4%	13
White	1.5%	6
Afton Twp	0.3%	1
Aurora Twp	0.5%	2
Bangor Twp	0.3%	1
Brookings Twp	4.4%	17
Elkton Twp	0.3%	1
Eureka Twp	0.8%	3
Lake Sinai Twp	0.3%	1
Medary Twp	1.5%	6

Oslo Twp	0.3%	1
Sherman Twp	1.0%	4
Sterling Twp	1.0%	4
Volga Twp	0.8%	3

Question 3: If no, where do you live? (please explain) 58 responses

Sioux Falls	17	Madison	4
Estelline	5	Dell Rapids	3
Flandreau	4	Lake Benton, MN	2
Colman	2		

Others (only one response for each):

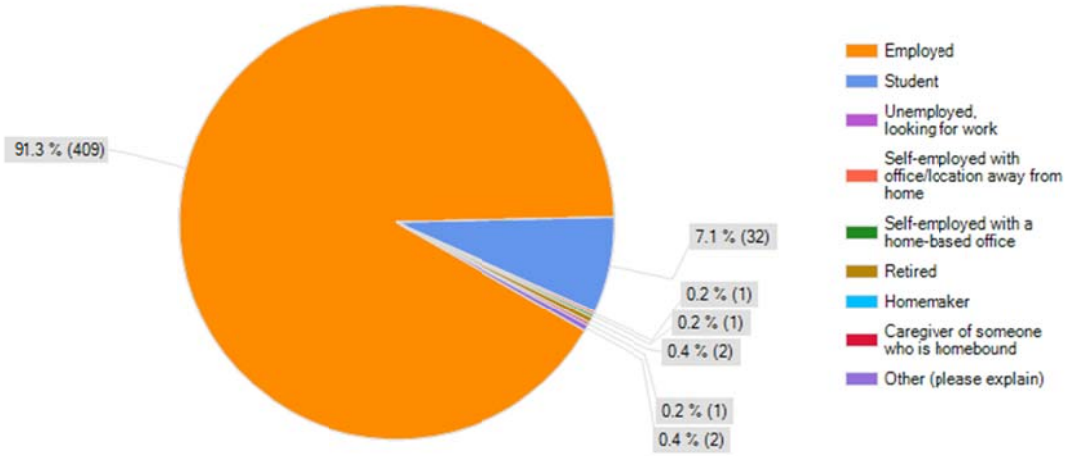
- Aberdeen
- Brandt
- Canistota
- Clear Lake
- Dempster
- Goodwin
- Harrisburg
- Hartford
- Hendricks, MN
- Lake Preston
- Montrose
- Nunda Twp
- Toronto

Comments:

Question 4: Please choose the zip code for where you live:

57002	2.9%	13
57006	72.0%	319
57026	2.3%	10
57071	4.7%	21
57212	1.6%	7
57220	2.3%	10
57234	1.4%	6
57268	0.2%	1
57276	2.3%	10
Other (please explain)	10.4%	46
Answered Question		**443**
Skipped Question		**7**

Question 5: Which of the following best describes you? Please check one.



The “other” category included one each of the following two stakeholder descriptions:

- Semi-retired, part time work and caregiver
- Retired, working part time

Section 2: Getting to Work

Question 6: Please answer the questions in this section if you are employed outside of your home and work in Brookings County (any city or township within Brookings County). If you have more than one job, please answer for your primary employment. Do you work in Brookings County (any city or township within Brookings County)? If not, please answer "No" and go to the next section of the survey. (440 responses 10 didn't respond)

Yes: 429 (97.5%) No: 11 (2.5%)

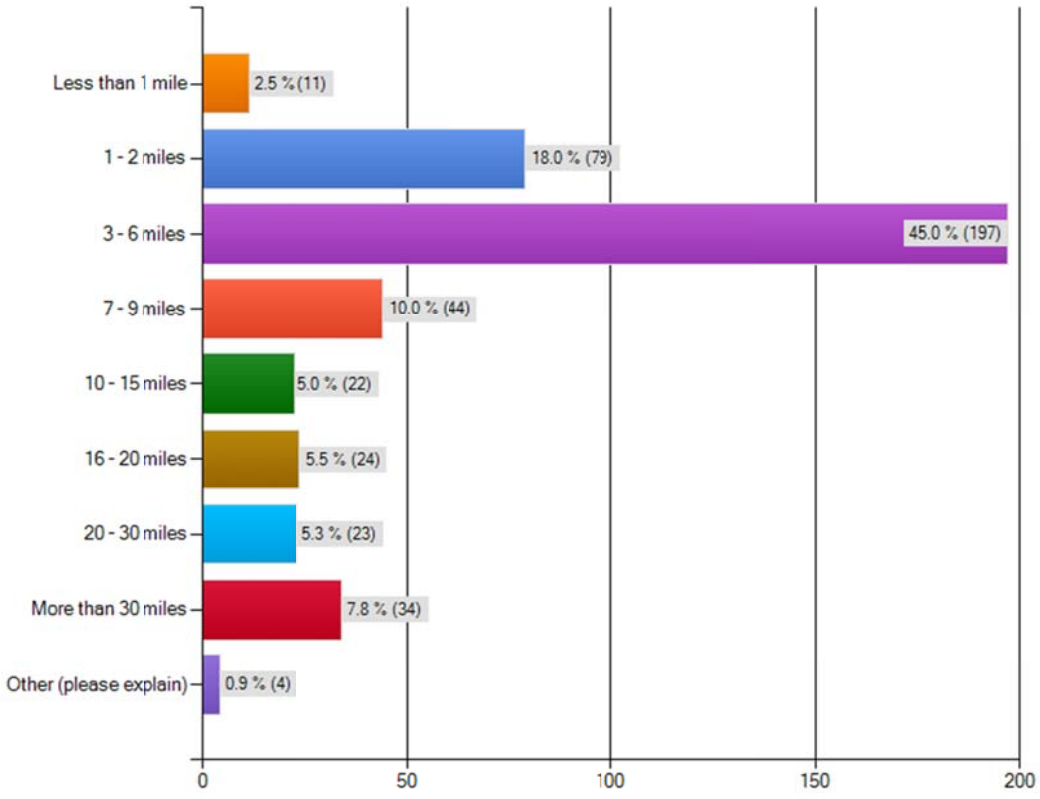
Question 7: In which quadrant of the County is your place of work located?

Arlington	0.2%	1
Aurora	0.5%	2
Brookings	95.6%	409
Bruce	0.5%	2
Volga	0.2%	1
White	0.2%	1
Aurora Twp	0.2%	1
Brookings Twp	2.1%	9
Lake Hendricks Twp	0.2%	1
Oakwood Twp	0.2%	1
Answered Question		**429**
Skipped Question		**11**

Question 8: What means of transportation do you most often use to get to work?

Personal vehicle	*96.6%*	*423*
Demand Bus Service	*0.7%*	*3*
Carpool / Vanpool	*1.1%*	*5*
Bicycle	*0.7%*	*3*
Walk	*0.5%*	*2*
Other (please explain)	*0.5%*	*2*
Answered Question		***438***
Skipped Question		***12***

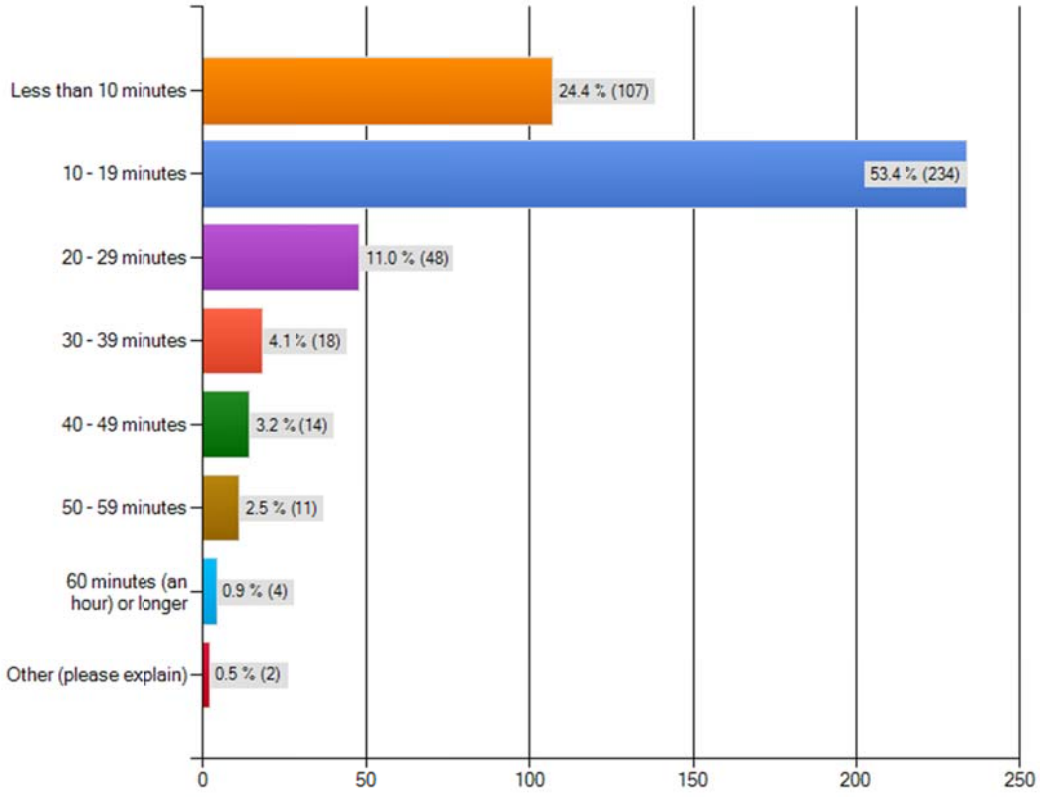
Question 9: Approximately how many miles is your commute to work (one-way)?



There were four comments in the “other” category:

- 55 miles
- 5-7 miles
- 20 miles
- 60 miles

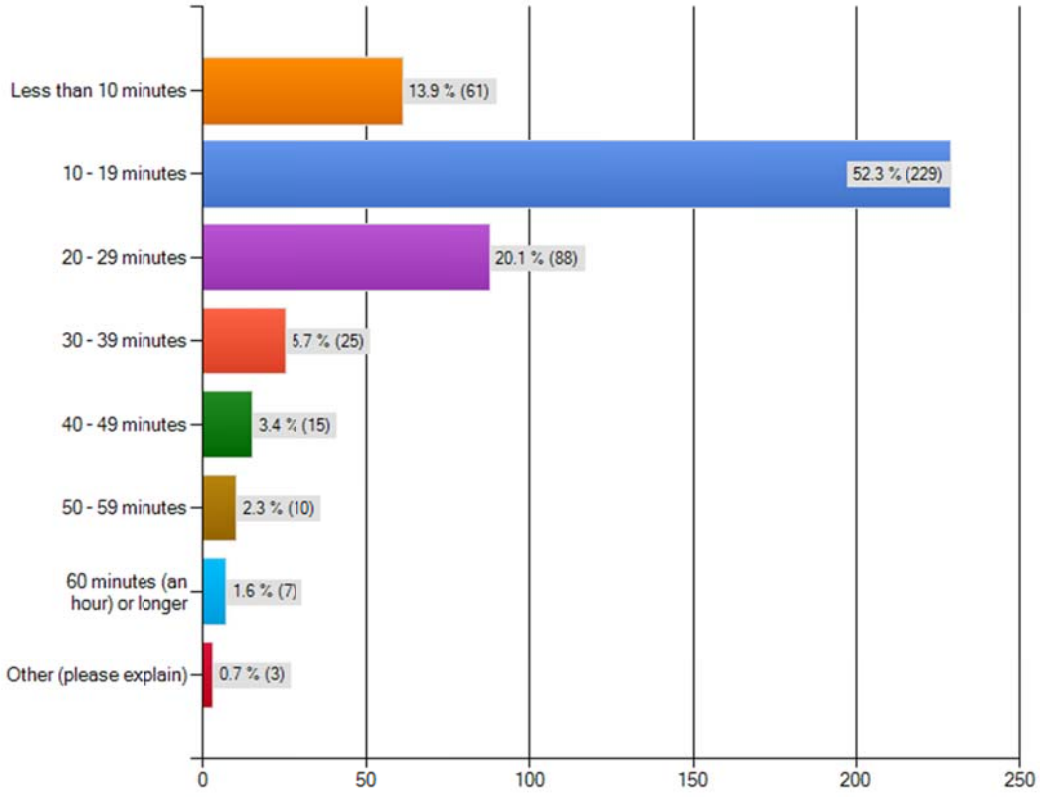
Question 10: On a typical day, how long does it take you to get to work from your home (without making any stops along the way)?



Two respondents provided the following remarks:

- 50 minutes
- Usually bringing kids to school; 15min

Question 11: On a typical day, how long does it take you to return home from work (without making any stops along the way)?



Three respondents provided the following remarks:

- 45 minutes
- If I got home to Aurora, it takes around 10-15 minutes. Otherwise, if I head into Brookings (which I usually do) it takes much longer due to there only being 2 exits from Daktronics and so many employees.
- Between 10-30 minutes, dependent on traffic and what time I get out of work

Section 3: Getting to School

Question 12: Please answer this section of the survey if you are at least 14 years of age and attend school in Brookings County (any Brookings County – city or township public or private school or college). Do you attend school in Brookings County (any Brookings County – city or township public or private school or college)? If not, please choose "No" and go to the next section of the survey.

Yes: 51 (12%) No: 373 (88%)

Question 13: Please indicate which school you attend:

Brookings Schools	5.6%	3
South Dakota State University	85.2%	46
Other (please explain)	9.3%	5
Answered Question		**54**
Skipped Question		**396**

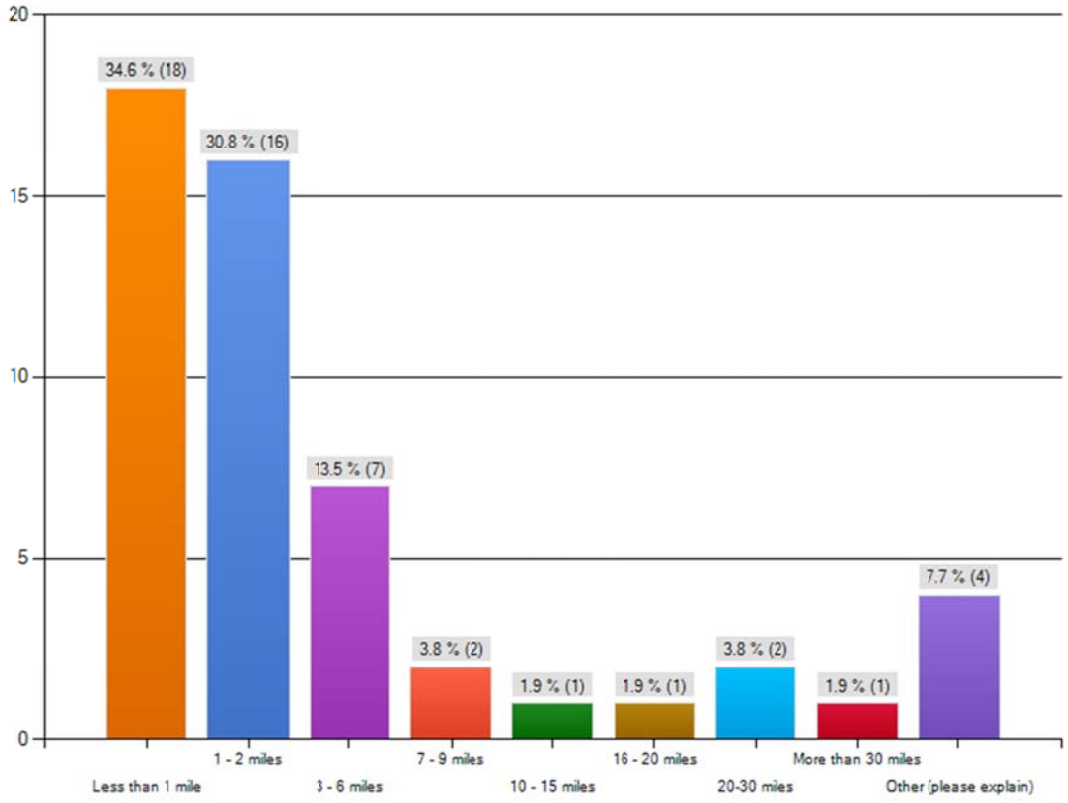
Question 14: Please indicate the type of school that you attend?

Middle or High school	7.1%	4
Technical or trade school	1.8%	1
College or University	85.7%	48
Other (please explain)	5.4%	3
Answered Question		**56**
Skipped Question		**394**

Question 15: What means of transportation do you most often use to get to school/class?

Personal vehicle	*69.2%*	*36*
Demand Bus Service	*1.9%*	*1*
Carpool/Vanpool	*1.9%*	*1*
Bicycle	*3.8%*	*2*
Walk	*17.3%*	*9*
Other (please explain)	*5.8%*	*3*
Answered Question		***52***
Skipped Question		***398***

Question 16: Approximately how many miles is your commute to school (one-way)?



Question 17: On a typical day, how long does it take you to get to school from your home (without making any stops on the way)?

Less than 10 minutes	57.7%	30
10 – 19 minutes	25.0%	13
20 – 29 minutes	5.8%	3
30 – 39 minutes	1.9%	1
50 – 59 minutes	1.9%	1
Other (please explain)	7.7%	4
Answered Question		**52**
Skipped Question		**398**

Four respondents provided the following remarks:

- 0
- n/a
- I live on campus
- N/A

Question 18: On a typical day, how long does it take you to return home from school (without making any stops on the way)?

Less than 10 minutes	**59.6%**	**31**
10 – 19 minutes	**21.2%**	**11**
20 – 29 minutes	**7.7%**	**4**
30 – 39 minutes	**1.9%**	**1**
50 – 59 minutes	**1.9%**	**1**
Other (please explain)	**7.7%**	**4**
Answered Question		**52**
Skipped Question		**398**

Four respondents provided the following remarks:

- 0
- n/a
- I live on campus
- N/A

Section 4: Getting Around Brookings County (Resident)

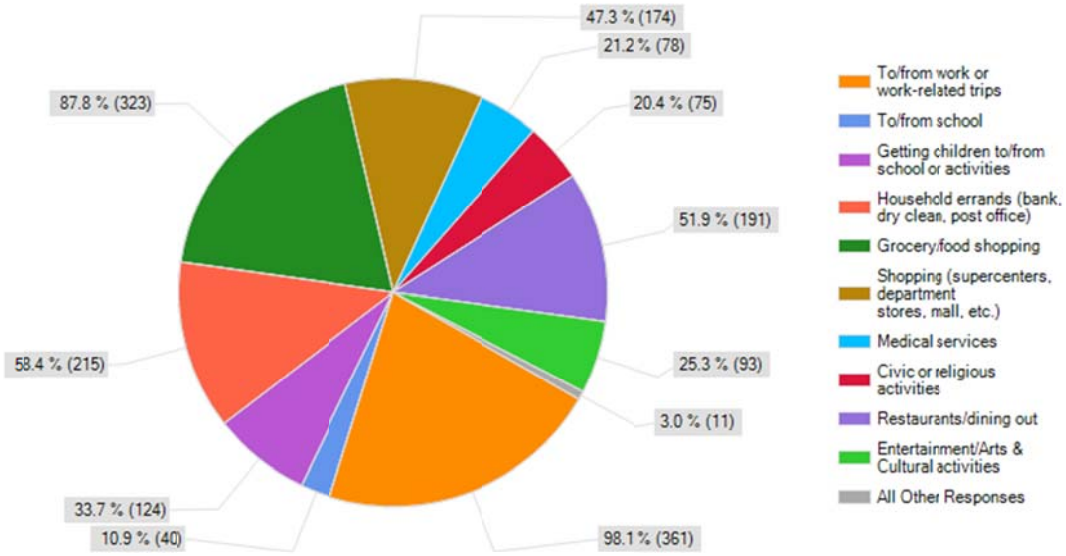
Question 19: Do you live in the Brookings County study area (any city or township in Brookings County)? (437 responses)

Yes: 361 (82.6%) No: 76 (17.4%)

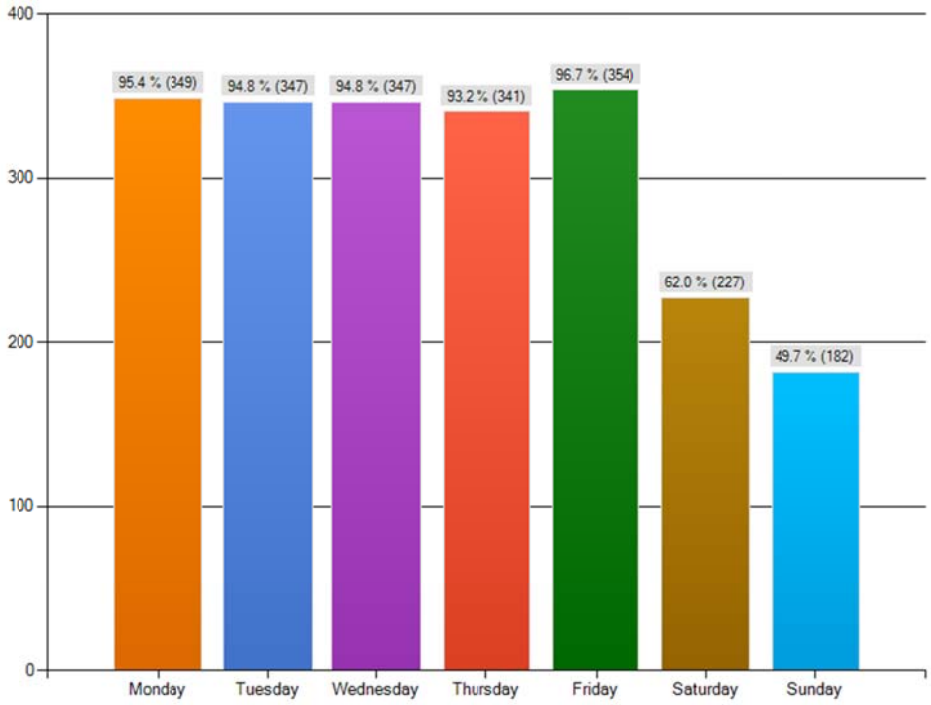
Question 20: In general, what mode of transportation do you most often use for local travel in Brookings County?

Personal vehicle	363
Demand Bus Service	1
Carpool/Vanpool	1
Bicycle	3

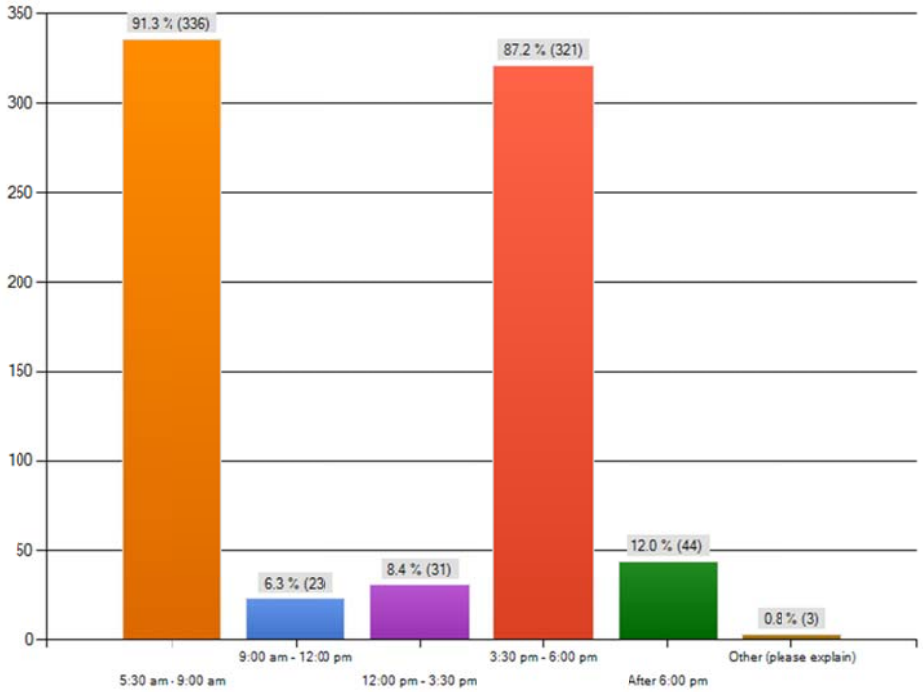
Question 21: As a resident of the Brookings County study area, on average, what are your primary reasons for local travel within Brookings County? You may select up to four responses. (233 responses)



Question 22: Which days of the week do you most often travel in and around Brookings County? Check all that apply. (232 responses)



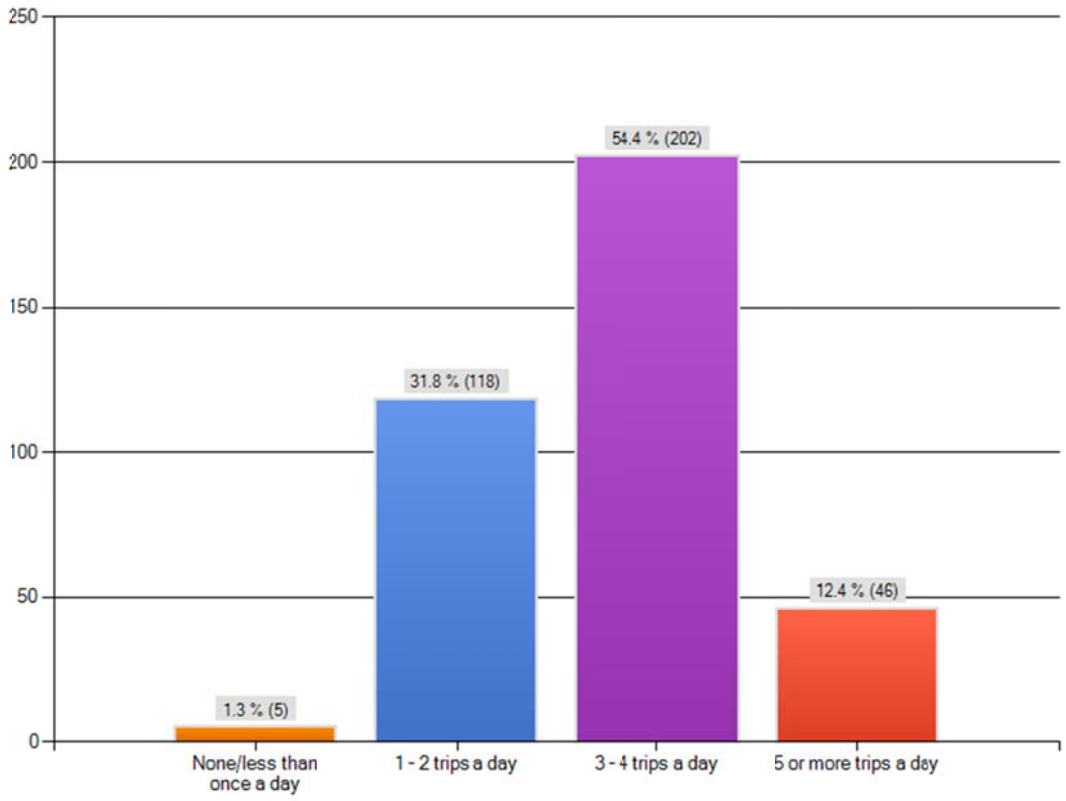
Question 23: What time(s) of day do you most often travel on a typical weekday (Monday – Friday)? You may select up to two responses. (230 responses)



Other responses:

- 2:30am to 3:30am (Nightshift)
- To work (before 8 AM), over lunch (around noon), & from work (5 PM)
- 12:00 - 1:00

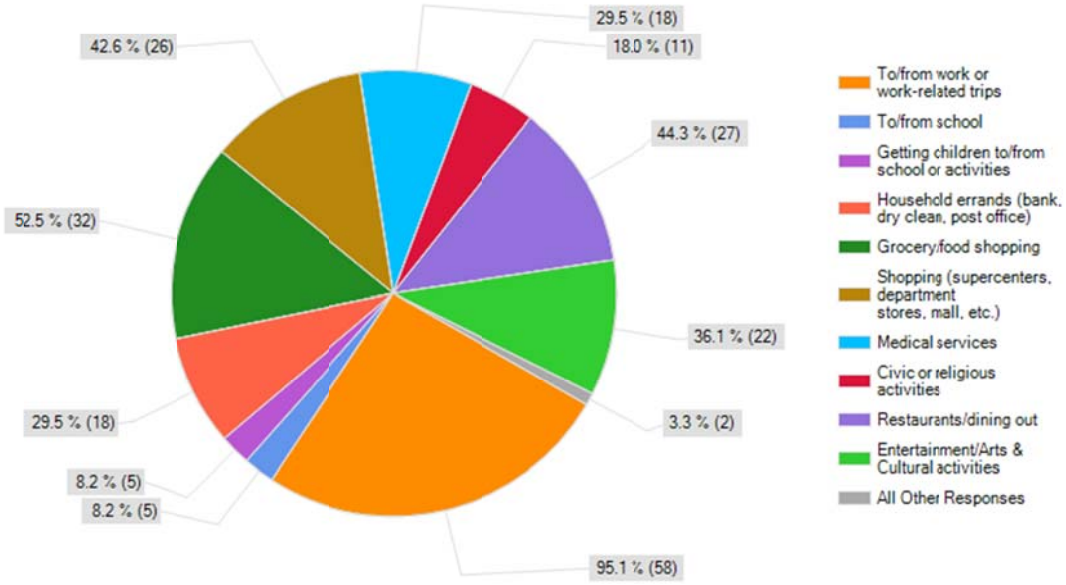
Question 24: How many local trips do you make in and around Brookings on a typical weekday (Monday – Friday)? (233 responses)*



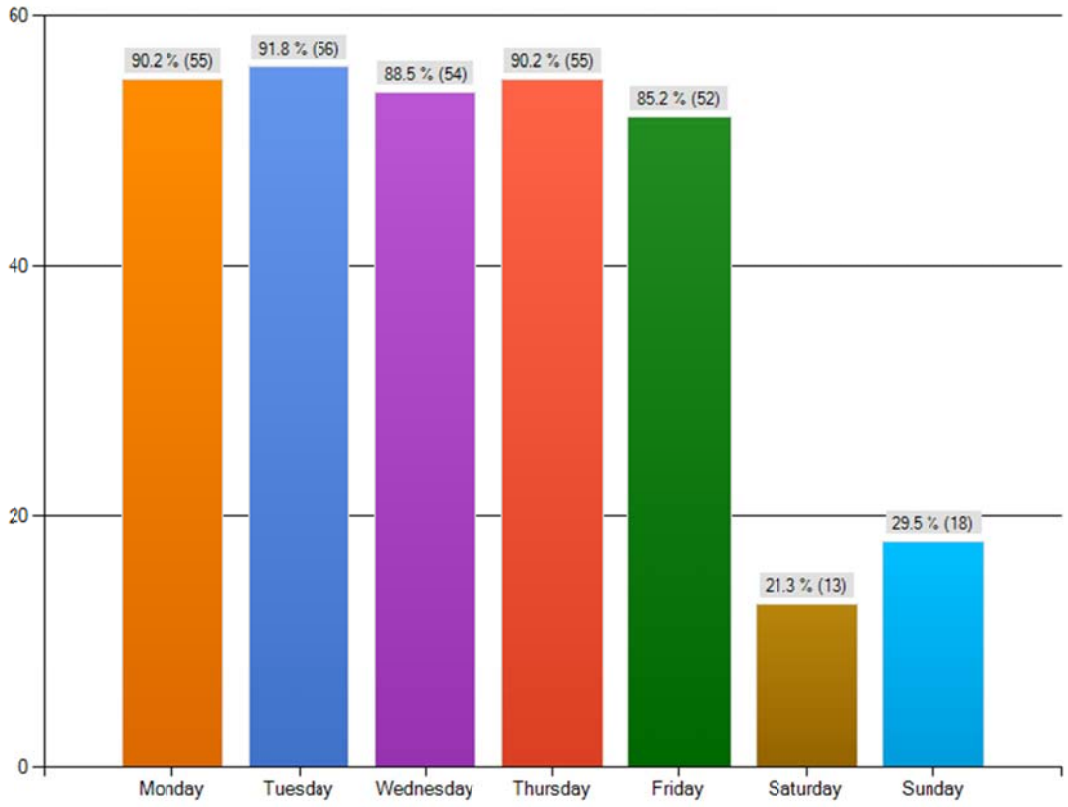
**A trip was defined as travel from one destination to another, including when the respondent first left their home for the day. It did not include leisure or recreational activities performed in the immediate vicinity of their home, such as jogging or walking a dog.*

Section 5: Traveling To/From Brookings County (Non-Residents)

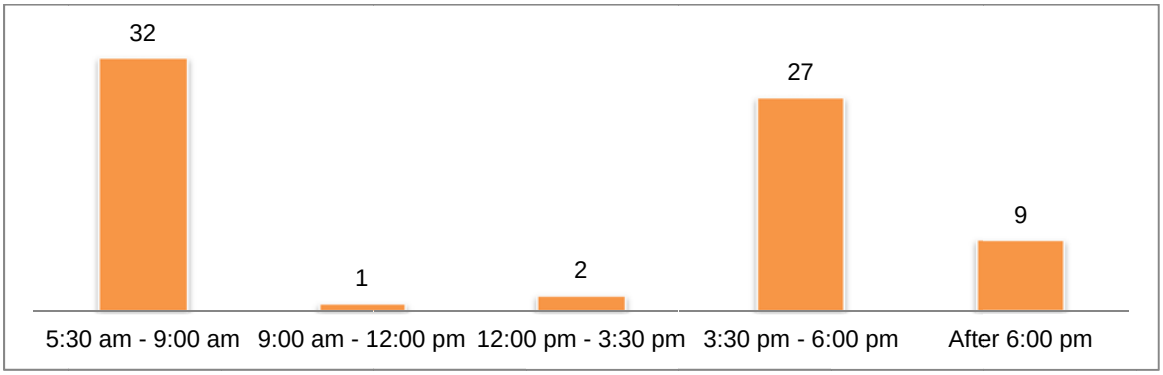
Question 25: Please complete this section if you reside outside Brookings County. If you live in Brookings County (in a city or township) and completed section 4, please go to the next section of the survey. If you live outside of Brookings County, in a typical month, what are your primary reasons for travel to a city or township within Brookings County? Check all that apply.
(61 responses)



Question 26: If you live outside of Brookings County, which day(s) of the week do you most often travel to destinations within Brookings County? Check all that apply. (61 responses)



Question 27: If you live outside of Brookings County, what time(s) of day during a typical weekday (Monday – Friday) do you most often travel to or from Brookings County? You may select up to two responses. (59 responses)



Other responses:

- 7:30-5:00

Section 6: Existing Conditions and Planning for the Future

Question 28: What do you think are the most pressing transportation needs or issues for Brookings County? (Please respond whether you are a resident or non-resident of a city or township in Brookings County). (342 responses)

Almost 76% of the respondents answered this open-ended question, providing more than 342 comments on key transportation needs and issues.

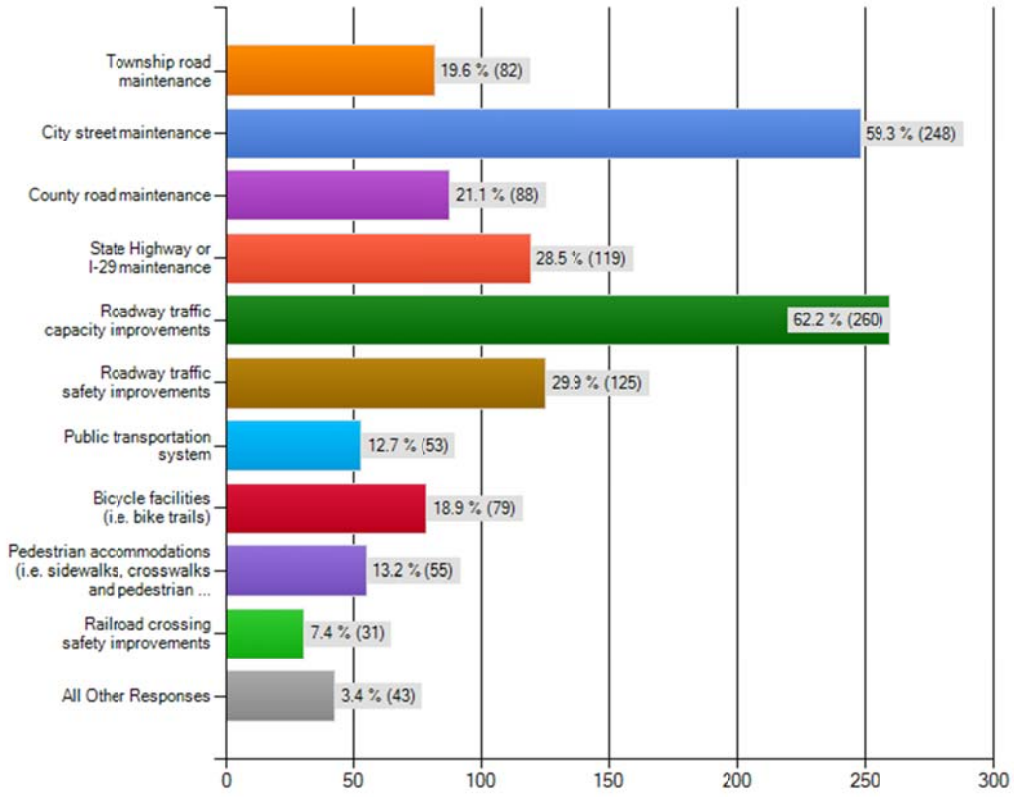
The top five issues identified were:

- Better access and more overpasses onto I-29 to alleviate traffic congestion and improve overall travel in the area. Respondents repeatedly requested additional overpasses for I-29, most often mentioned is a 20th Street overpass.
- Conditions and quality of existing roads – respondents remarked that roads are in need of regular repair and maintenance, and that some need to be replaced more often.
- Improved access and better road quality near the Daktronics development.
- Improvements to 22nd Avenue – respondents repeatedly identified issues with 22nd Avenue and called for traffic flow improvements and road widening along this high-traffic corridor.
- Better access to the East side of I-29

Other issues mentioned include the following (listed in order of frequency, from most-often mentioned to least-often mentioned):

- Better access to the Industrial Park to alleviate congestion.
- Interstate exit at 20th Street South to alleviate congestion at rush hour.
- Better snow removal in a timely manner to make the roads safer.
- Signal and stop sign management to improve traffic flow and safety- citizens mentioned the need for better signal synchronization and the addition of turn lanes and signals.
- Reducing the amount of traffic on Highway 14, improvement in safety by adding merge lane and turn lanes.
- Bicycle and pedestrian accommodations, safety measures for cyclists and pedestrians, additional trails.
- Public transportation options for medical and employment needs.
- Develop long term strategy for future development in the area.

Question 29: What areas of transportation improvements are most important to you? Please choose the three that you think should be given top priority in the transportation master plan. (418 responses)



In addition to choosing their top three choices from among the 10 topics provided, respondents could also supply their own answer, which resulted in the following 22 verbatim comments:

- 22nd Ave is too narrow
- Install I-29 overpass on 20th St. S.
- Overpass for 20th avenue
- Snow removal
- Parking improvements
- Snow removal
- Access to cross I 29 within Brookings city limits.
- Additional overpass on I-29
- Ramp on and off of I-29 at exit 131 or so.
- Township road safety
- Alleyway upkeep

- There needs to be another way to access Brookings on the east side of I-29 other than US Hwy 14 and the private drive next to the fire department on 22nd.
- Snow removal, I feel it has been better this year, but often the snow is not removed from streets which causes a slushy mess or dangerous icy conditions
- Emergency response vehicle movement
- I-29 access at 20th St. S.
- Over pass on 20th street south
- Widening & sidewalk on 20th St. South (west of main street)
- Please see comments above
- Timely snow removal
- Brookings Roads never get proper snow removal, it is very inconvenient and dangerous.
- Hard and natural surface trails
- Interstate exchange at 20th St S

Question 30: Are there any specific transportation improvements you think would be beneficial to Brookings County in the next 20 – 30 years? (238 responses)

About 68% of those who completed the survey responded to this question. The following four topics were mentioned most often:

- More overpasses on I-29 to improve travel and congestion.
- Interstate overpass on 20th Street South.
- Expand bike paths and lanes and pedestrian accommodations.
- Road maintenance and repair – more frequent/regular resurfacing and/or reconstruction of roads.

Other areas of improvement include:

- Additional bridge over I-29.
- More turn lanes, most often mentioned is 6th Street.
- More interstate exits to Brookings.
- Better access to Industrial Park on East side of I-29, add paved access from the south.
- Improve 6th Street with better signalization.
- Additional lanes/wider lanes.
- Improve and expand public transportation.
- Railroad overpass/underpass.
- Underground storm sewers.
- Additional exit out of industrial park and SDSU campus.

Question 31: If you had a budget of $100 to spend on future transportation improvements in the Brookings County, how much would you spend on the following areas? (393 responses)

The table below displays the response average for each improvement category. The average was determined by dividing the total amount of money allocated to a particular category by the number of respondents that allocated money to that category. The response total is the total amount of money allocated to each improvement.

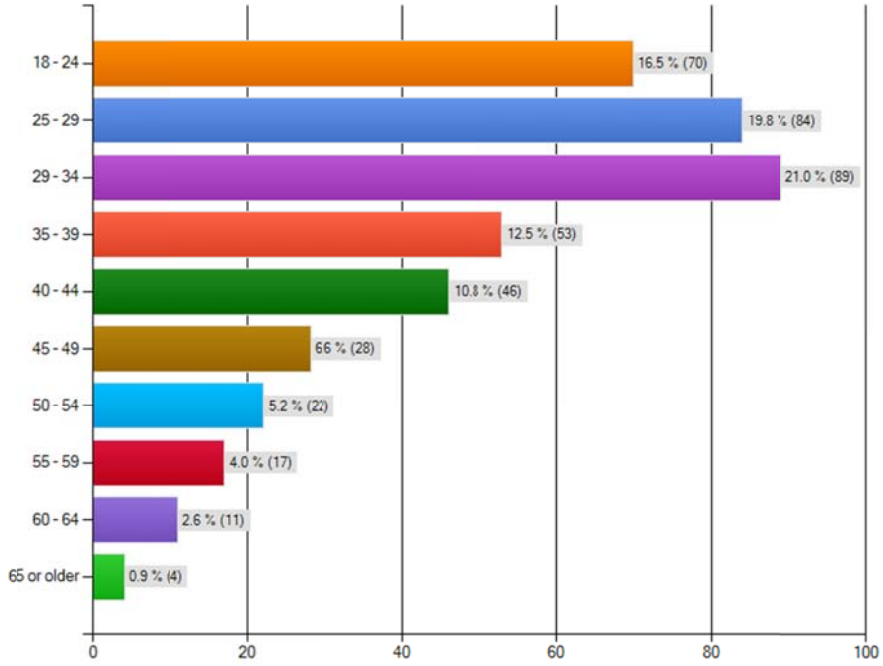
Improvement	Response Average	Response Total
New road construction	43.29	$15,020
Existing road/street maintenance	34.12	$11,498
Roadway safety features and improvements (such as signage and intersections)	19.59	$5,073
Bike/pedestrian trail system	13.51	$2,931
Public transportation operations and facilities	12.74	$2,306
Airport operations, facilities, and expansion	8.23	$1,021
Rail transportation	6.38	$766
Freight transportation	6.01	$685

Section 7: Demographics

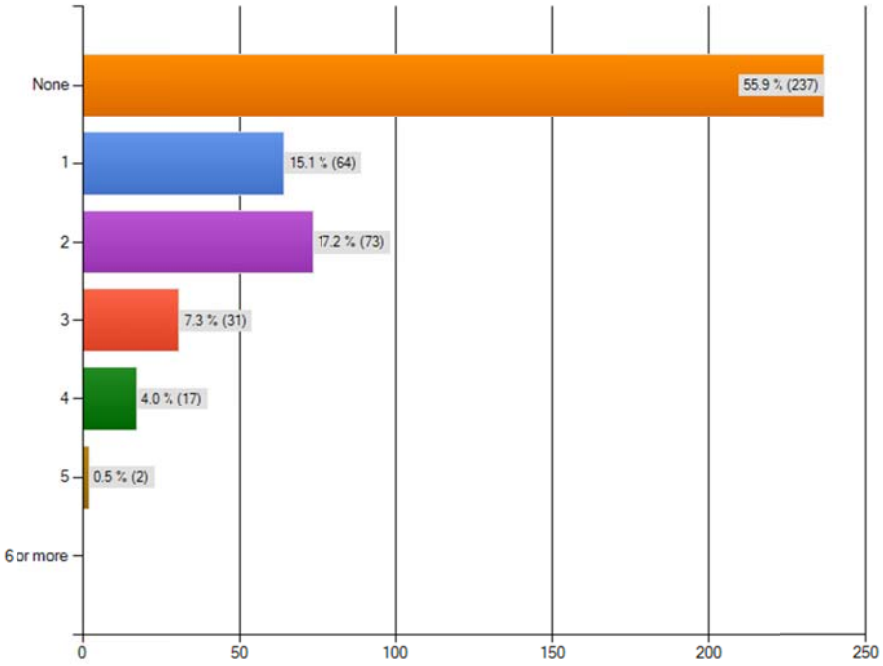
Question 32: What is your gender?

Male: 240 Female: 184

Question 33: What is your age?



Question 34: How many children age 17 or younger live in your household?



Conclusion

Public input is a key component of Brookings County master transportation planning study. Data collected via the survey and from the open house will help the project team identify the area's transportation needs and develop strategies and potential solutions to address them.

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Thank you for choosing to complete the Brookings County Master Transportation Plan survey. Brookings County, in cooperation with the South Dakota Department of Transportation (SDDOT) and Federal Highway Administration (FHWA) is collecting this information for planning purposes only. All data collected will be held in the strictest of confidence and no personal information will be shared or sold.

You must be at least 14 years of age to complete the survey. The survey should take approximately 10 minutes to complete. If a question does not pertain to you, you may skip it.

Section 1: Where I live

1. Do you currently reside in a city or township of Brookings County?
   ☐ Yes ☐ No

   If **yes**, in which community (city or township) do you live?

   ☐ Arlington
   ☐ Aurora
   ☐ Brookings
   ☐ Bruce
   ☐ Bushnell
   ☐ Elkton
   ☐ Medary
   ☐ Sinai
   ☐ Volga
   ☐ White
   ☐ Afton Twp
   ☐ Alton Twp
   ☐ Argo Twp
   ☐ Aurora Twp
   ☐ Bangor Twp
   ☐ Brookings Twp
   ☐ Elkton Twp
   ☐ Eureka Twp
   ☐ Lake Hendricks Twp
   ☐ Lake Sinai Twp
   ☐ Laketon Twp
   ☐ Medary Twp
   ☐ Oaklake Twp
   ☐ Oakwood Twp
   ☐ Oslo Twp
   ☐ Parnell Twp
   ☐ Preston Twp
   ☐ Richland Twp
   ☐ Sherman Twp
   ☐ Sterling Twp
   ☐ Trenton Twp
   ☐ Volga Twp
   ☐ Winsor Twp

   If **no**, where do you live? (please explain): _____

2. Please choose the zip code for where you live:

- ☐ 57002
- ☐ 57006
- ☐ 57026
- ☐ 57071
- ☐ 57136
- ☐ 57212
- ☐ 57213
- ☐ 57220
- ☐ 57234
- ☐ 57268
- ☐ 57276
- ☐ Other – Please explain:

_____

3. Which of the following best describes you? Please check one.

- ❑ Employed
- ❑ Student
- ❑ Unemployed, looking for work
- ❑ Self-employed with office/location away from home
- ❑ Self-employed with a home-based office
- ❑ Retired
- ❑ Homemaker
- ❑ Caregiver of someone who is homebound
- ❑ Other – Please explain:

_____

Section 2: Getting to Work

Please answer the questions in this section if you are employed outside of your home and work in Brookings County (any city or township within Brookings County). If you have more than one job, please answer for your primary employment.

4. Do you work in Brookings County (any city or township within Brookings County)? If not, please answer "No" and go to the next section of the survey.
   ☐ Yes ☐ No

5. If you work in Brookings County, in which city or township is your place of work located?

- ☐ Arlington
- ☐ Aurora
- ☐ Brookings
- ☐ Bruce
- ☐ Bushnell
- ☐ Elkton
- ☐ Medary
- ☐ Sinai
- ☐ Volga
- ☐ White
- ☐ Afton Twp
- ☐ Alton Twp
- ☐ Argo Twp
- ☐ Aurora Twp
- ☐ Bangor Twp
- ☐ Brookings Twp
- ☐ Elkton Twp
- ☐ Eureka Twp
- ☐ Lake Hendricks Twp
- ☐ Lake Sinai Twp
- ☐ Laketon Twp
- ☐ Medary Twp
- ☐ Oaklake Twp
- ☐ Oakwood Twp
- ☐ Oslo Twp
- ☐ Parnell Twp
- ☐ Preston Twp
- ☐ Richland Twp

- ☐ Sherman Twp
- ☐ Sterling Twp
- ☐ Winsor Twp
- ☐ Trenton Twp
- ☐ Volga Twp

6. What means of transportation do you most often use to get to work?
   - ☐ Personal vehicle
   - ☐ Public transportation
   - ☐ Demand Bus Service
   - ☐ Paratransit Service (for persons with disabilities)
   - ☐ Carpool / Vanpool
   - ☐ Taxi
   - ☐ Bicycle
   - ☐ Walk
   - ☐ Other – Please explain:

     _____
     _____
     _____

7. Approximately how many miles is your commute to work (one-way)?
   - ☐ Less than 1 mile
   - ☐ 1 – 2 miles
   - ☐ 3 – 6 miles
   - ☐ 7 – 9 miles
   - ☐ 10 – 15 miles
   - ☐ 16 – 20 miles
   - ☐ 20 – 30 miles
   - ☐ More than 30 miles
   - ☐ Other – Please explain:

     _____

8. On a typical day, how long does it take you to get to work from your home *(without making any stops along the way)?*
   - ❑ Less than 10 minutes
   - ❑ 10 – 19 minutes
   - ❑ 20 – 29 minutes
   - ❑ 30 – 39 minutes
   - ❑ 40 – 49 minutes
   - ❑ 50 – 59 minutes
   - ❑ 60 minutes (an hour) or longer
   - ❑ Other – Please explain:

     _____

9. On a typical day, how long does it take you to return home from work *(without making any stops along the way)*?
   - ❑ Less than 10 minutes
   - ❑ 10 – 19 minutes
   - ❑ 20 – 29 minutes
   - ❑ 30 – 39 minutes
   - ❑ 40 – 49 minutes
   - ❑ 50 – 59 minutes
   - ❑ 60 minutes (an hour) or longer
   - ❑ Other – Please explain:

     _____

Section 3: Getting to School

Please answer this section of the survey if you are at least 14 years of age and attend school in Brookings County (any Brookings County – city or township public or private school or college). If you do not attend school or college, please choose "No" and go to the next section of the survey.

10. Do you attend school in Brookings County (any Brookings County – city or township public or private school or college)? If not, please choose "No" and go to the next section of the survey.
    - ☐ Yes
    - ☐ No

11. Please indicate which school you attend:
    - ☐ Arlington Schools
    - ☐ Brookings Schools
    - ☐ Deubrook Area Schools
    - ☐ Elkton Schools
    - ☐ Sioux Valley Schools
    - ☐ Volga Christian
    - ☐ South Dakota State University
    - ☐ Other – Please explain: _____

12. Please indicate the type of school that you attend:
    - ☐ Middle or High school
    - ☐ Technical or trade school
    - ☐ College or University
    - ☐ Other – Please explain: _____

13. If you are a student, what means of transportation do you most often use to get to school/class?
    - ☐ Personal vehicle
    - ☐ School bus
    - ☐ Public transportation
    - ☐ Demand Bus Service
    - ☐ Paratransit Service (for persons with disabilities)
    - ☐ Carpool/Vanpool
    - ☐ Taxi
    - ☐ Bicycle
    - ☐ Walk
    - ☐ Other – Please explain: _____ _____ _____

14. Approximately how many miles is your commute to school (one-way)?
    - ☐ Less than 1 mile
    - ☐ 1 – 2 miles
    - ☐ 3 – 6 miles
    - ☐ 7 – 9 miles
    - ☐ 10 – 15 miles
    - ☐ 16 – 20 miles
    - ☐ 20-30 miles
    - ☐ More than 30 miles
    - ☐ Other – Please explain: _____

15. On a typical day, how long does it take you to get to school from your home *(without making any stops on the way)?*
    - ❑ Less than 10 minutes
    - ❑ 10 – 19 minutes
    - ❑ 20 – 29 minutes
    - ❑ 30 – 39 minutes
    - ❑ 40 – 49 minutes
    - ❑ 50 – 59 minutes
    - ❑ 60 minutes (an hour) or longer
    - ❑ Other – Please explain: _____

16. On a typical day, how long does it take you to return home from school *(without making any stops on the way)*?
    - ❑ Less than 10 minutes
    - ❑ 10 – 19 minutes
    - ❑ 20 – 29 minutes
    - ❑ 30 – 39 minutes
    - ❑ 40 – 49 minutes
    - ❑ 50 – 59 minutes
    - ❑ 60 minutes (an hour) or longer
    - ❑ Other – Please explain: _____

Section 4: Getting around Brookings County (Resident)

17. Do you live in the Brookings County study area (any city or township in Brookings County)? If you do not, please choose "No" and go to the next section of the survey.
    - ☐ Yes
    - ☐ No

18. In general, what mode of transportation do you most often use for local travel in Brookings County?
    - ❑ Personal vehicle
    - ❑ Public transportation
    - ❑ Demand Bus Service
    - ❑ Paratransit Service (for persons with disabilities)
    - ❑ Carpool/Vanpool
    - ❑ Taxi
    - ❑ Bicycle
    - ❑ Walk
    - ❑ Other – Please explain: _____ _____ _____

19. As a resident of the Brookings County study area, on average, what are your primary reasons for local travel within Brookings County? *You may select up to four responses.*
    - ❑ To/from work or work-related trips
    - ❑ To/from school
    - ❑ Getting children to/from school or activities
    - ❑ Household errands (bank, dry clean, post office)
    - ❑ Grocery/food shopping
    - ❑ Shopping (supercenters, department stores, mall, etc.)
    - ❑ Medical services
    - ❑ Civic or religious activities
    - ❑ Restaurants/dining out
    - ❑ Entertainment/Arts & Cultural activities
    - ❑ Other – Please explain:

      _____

      _____

      _____

20. Which days of the week do you most often travel in and around Brookings County? *Check all that apply.*
    - ❑ Monday
    - ❑ Tuesday
    - ❑ Wednesday
    - ❑ Thursday
    - ❑ Friday
    - ❑ Saturday
    - ❑ Sunday

21. What time(s) of day do you most often travel on a typical weekday (Monday – Friday)? *You may select up to two responses.*
    - ❑ 5:30 am – 9:00 am
    - ❑ 9:00 am – 12:00 pm
    - ❑ 12:00 pm – 3:30 pm
    - ❑ 3:30 pm – 6:00 pm
    - ❑ After 6:00 pm
    - ❑ Other – Please explain:

      _____

22. How many local trips do you make in and around Brookings County on a typical weekday (Monday – Friday)? *(A trip occurs anytime that you travel from one destination to another, including when you first leave home for the day. It does not include leisure or recreational activities performed in the immediate vicinity of your home, such as jogging or walking a dog)*
    - ❑ None/less than once a day
    - ❑ 1 – 2 trips a day
    - ❑ 3 – 4 trips a day
    - ❑ 5 or more trips a day

Section 5: Traveling to/from Brookings County (non-resident)

Please complete this section if you reside **outside** Brookings County. If you live in Brookings County (in a city or township) and completed section 4, please go to the next section of the survey.

23. If you live outside of Brookings County, in a typical month, what are your primary reasons for travel to a city or township within Brookings County? *Check all that apply.*
    - ❑ To/from work or work-related trips
    - ❑ To/from school
    - ❑ Getting children to/from school or activities
    - ❑ Household errands (bank, dry clean, post office)
    - ❑ Grocery/food shopping
    - ❑ Shopping (supercenters, department stores, mall, etc.)
    - ❑ Medical services
    - ❑ Civic or religious activities
    - ❑ Restaurants/dining out
    - ❑ Entertainment/Arts & Cultural activities
    - ❑ Other – Please explain:

      _____

      _____

      _____

24. If you live outside of Brookings County, which day(s) of the week do you most often travel to destinations within Brookings County? *Check all that apply.*
    - ❑ Monday
    - ❑ Tuesday
    - ❑ Wednesday
    - ❑ Thursday
    - ❑ Friday
    - ❑ Saturday
    - ❑ Sunday

25. If you live outside of Brookings County, what time(s) of day during a typical weekday (Monday – Friday) do you most often travel to or from Brookings County? *You may select up to two responses.*
    - ❑ 5:30 am – 9:00 am
    - ❑ 9:00 am – 12:00 pm
    - ❑ 12:00 pm – 3:30 pm
    - ❑ 3:30 pm – 6:00 pm
    - ❑ After 6:00 pm
    - ❑ Other – Please explain:

      _____

Section 6: Existing Conditions and Planning for the Future

26. What do you think are the most pressing transportation needs or issues for Brookings County? *(Please respond whether you are a resident or non-resident of a city or township in Brookings County.)*

_____

_____

_____

_____

_____

27. What areas of transportation improvements are most important to you? *Please choose the **three** that you think should be given top priority in the transportation master plan*.

- ❑ Township road maintenance
- ❑ City street maintenance
- ❑ County road maintenance
- ❑ State Highway or I-29 maintenance
- ❑ Roadway traffic capacity improvements
- ❑ Roadway traffic safety improvements
- ❑ Public transportation system
- ❑ Bicycle facilities (i.e. bike trails)
- ❑ Pedestrian accommodations (i.e. sidewalks, crosswalks and pedestrian paths/trails)
- ❑ Railroad crossing safety improvements
- ❑ Brookings County airports
- ❑ Freight transportation
- ❑ Other – Please explain:

  _____

  _____

  _____

28. Are there any specific transportation improvements you think would be beneficial to Brookings County in the next 20 – 30 years?

_____

_____

_____

_____

29. If you had a budget of $100 to spend on future transportation improvements in Brookings County, how much would you spend on the following areas? *(Please indicate the amount of money you would spend for each category. You do not have to fund each category, but please spend the entire $100 and make sure that your total does not exceed $100. Please enter only whole numbers – no decimals).*

$	New road construction
$	Existing road/street maintenance
$	Roadway safety features and improvements (such as signage and intersections)
$	Bike/pedestrian trail system
$	Public transportation operations and facilities
$	Rail transportation
$	Freight transportation
$	Airport operations, facilities, and expansion
$100	**TOTAL**

Section 7: Demographics

30. What is your gender?
    - ☐ Female
    - ☐ Male

31. What is your age?
    - ☐ 18 – 24
    - ☐ 25 – 29
    - ☐ 29 – 34
    - ☐ 35 – 39
    - ☐ 40 – 44
    - ☐ 45 – 49
    - ☐ 50 – 54
    - ☐ 55 – 59
    - ☐ 60 – 64
    - ☐ 65 or older

32. How many children age 17 or younger live in your household?
    - ☐ None
    - ☐ 1
    - ☐ 2
    - ☐ 3
    - ☐ 4
    - ☐ 5
    - ☐ 6 or more

Thank you for your participation. Your input is valuable to the planning team.

If you would like to be entered into the drawing to win a VISA gift card* please provide your name, phone number, and email address.

Name: _____

Phone number: _____

Alternative number: _____

Email Address: _____

Mailing Address

Prizes include three VISA gift cards; one valued at $50.00 and the other two valued at $25.00 each. Three winners will be identified on **Friday, January 25, 2013** by random selection and will be contacted by a project representative via phone and email. Attempts to contact winners will be made four times. If we are unable to reach you or you do not claim your prize by February 1, 2013, you will forfeit the gift card and another winner will be selected from the pool of eligible participants.

** Please note that employees and their family members of the following are not eligible to win: Federal Highway Administration, South Dakota Department of Transportation, Brookings County and any of the consulting firms working on or affiliated with the Brookings County Master Transportation Plan.*

Appendix E

Implementation Plan - Project Profiles

Project Profile

PROJECT

A.1. - US 14/ Caspian Avenue Intersection (Volga)
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

US 14 is classified as a state highway and Caspian Avenue is classified as a local rural road.

NEED

The intersection of US 14 and Caspian Avenue has been documented as a high crash location and needs safety improvements. Operational issues have been noted especially during fall harvest.

PROPOSED IMPROVEMENT

The proposed improvements to the intersection of US 14 and Caspian Avenue include providing intersection lighting and providing a northbound left turn lane on Caspian Avenue to help alleviate delays during fall harvest. New turn lane requires additional railroad crossing work

TOTAL COST

Lighting, railroad crossing improvements, new turn lane = $450,000

PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

A.2. – SD Highway 30/ County Road 25 Intersection (White)
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

SD 30 is classified as a state highway and CR 25 is classified as a major arterial.

NEED

The existing intersection of SD Highway 30 and County Road 25 has been identified as having geometric deficiencies.

PROPOSED IMPROVEMENT

The proposed improvement is to conduct an intersection study to identify geometric improvements for the intersection.

TOTAL COST

Intersection study = $25,000

PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

A.3. – US 81/ US 14 Intersection
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

US 14 and US 81 are classified as state highways.

NEED

The intersection of US 14 and US 81 has been documented as a high crash location and needs safety improvements. Sun glare off Brush Lake impacts sight lines reducing safety.

PROPOSED IMPROVEMENT

The proposed improvement is to provide intersection lighting to improve safety and conduct an intersection study to identify geometric improvements for the intersection.

TOTAL COST

Intersection study and intersection lighting = $75,000

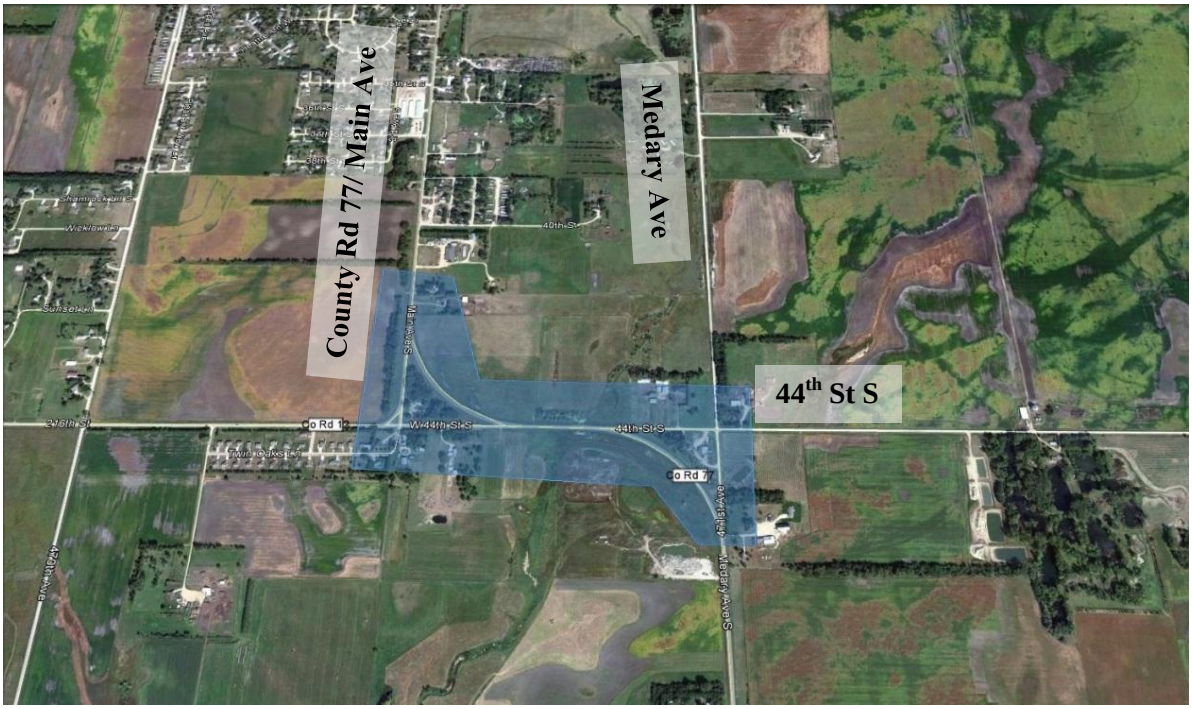
PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

A.4. - County Road 77/ Main Avenue/ Medary Avenue Intersection (South of Brookings)
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

County Road 77 (Main Avenue) is classified as a major arterial and County Road 12 (44th/216th Street) is classified as a major arterial.

NEED

The s-curve segment along County Road 77 and intersecting roadways need improved geometry to correct safety issues.

PROPOSED IMPROVEMENT

The s-curve segment along County Road 77 will be removed and a revised roadway alignment will be provided to improve sight lines. This safety improvement will require reconfiguration of the roadway intersections.

TOTAL COST

Reconstruction of County Road 77 intersections = $3,000,000.

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

A.5. – SD Highway 13/ Cornell Avenue Intersection (Elkton)
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

SD 13 is classified as a state highway and Cornell Avenue (486th Avenue) is classified as a major collector.

NEED

The intersection of SD 13 and Cornell Avenue (County Road 35) has geometric deficiencies due to poor sight lines.

PROPOSED IMPROVEMENT

The proposed improvement is to reconstruct the SD 13/Cornell Avenue (County Road 35) intersection to correct geometric deficiencies and improve sight lines.

TOTAL COST

Intersection reconstruction $1,500,000

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

A.6. – County Road 26 (32nd Street)/ County Road 77 (Main Avenue) Intersection (Brookings)
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

County Road 26 (32nd Street) is classified as a minor arterial and County Road 77 (Main Avenue) is classified as a major arterial.

NEED

The County Road 26(32nd Street)/ County Road 77(Main Avenue) intersection future operations indicate poor level of service and delay at the intersection.

PROPOSED IMPROVEMENT

The proposed improvement is to revise the intersection traffic control to reduce delays and improve intersection operations.

TOTAL COST

Revised intersection traffic control = $2,000.

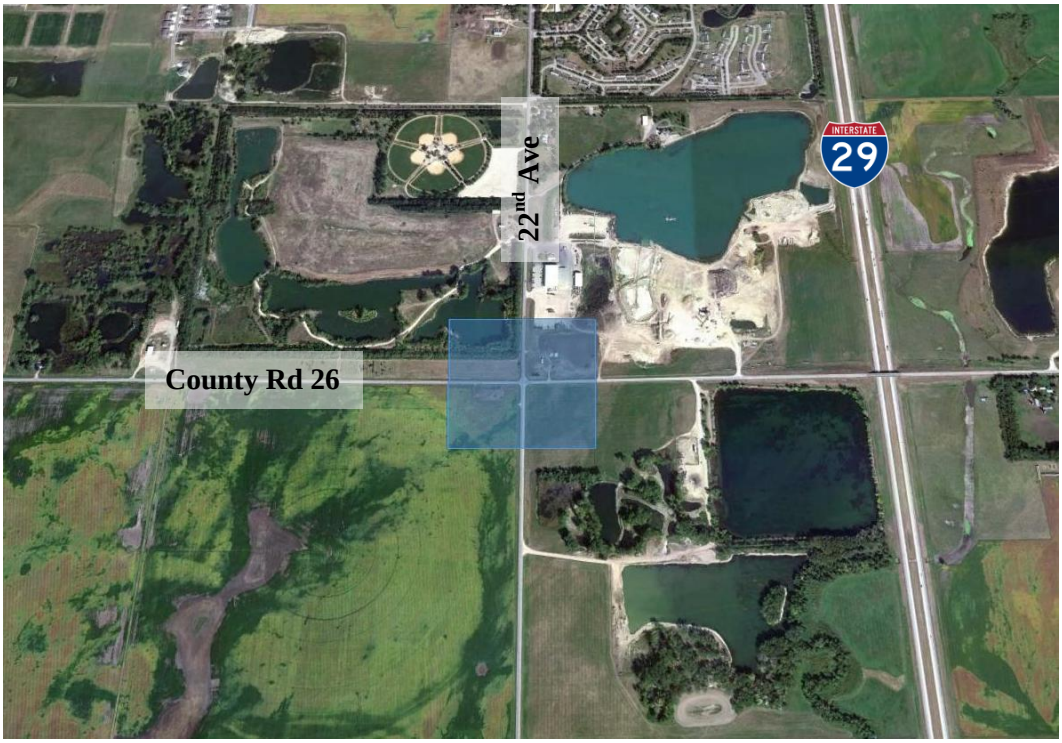
PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

A.7. – 22nd Avenue/ County Road 26 Intersection
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

22nd Avenue (472nd Avenue) is classified as a major arterial and County Road 26 (32nd/215th Street) is classified as a minor arterial.

NEED

The intersection of 22nd Avenue (472nd Avenue) and County Road 26 (32nd/215th Street) has been documented as a high crash location and needs safety improvements.

PROPOSED IMPROVEMENT

The proposed improvement is to revise the intersection traffic control and provide additional lighting at the intersection.

TOTAL COST

Revised traffic control and intersection lighting = $52,000

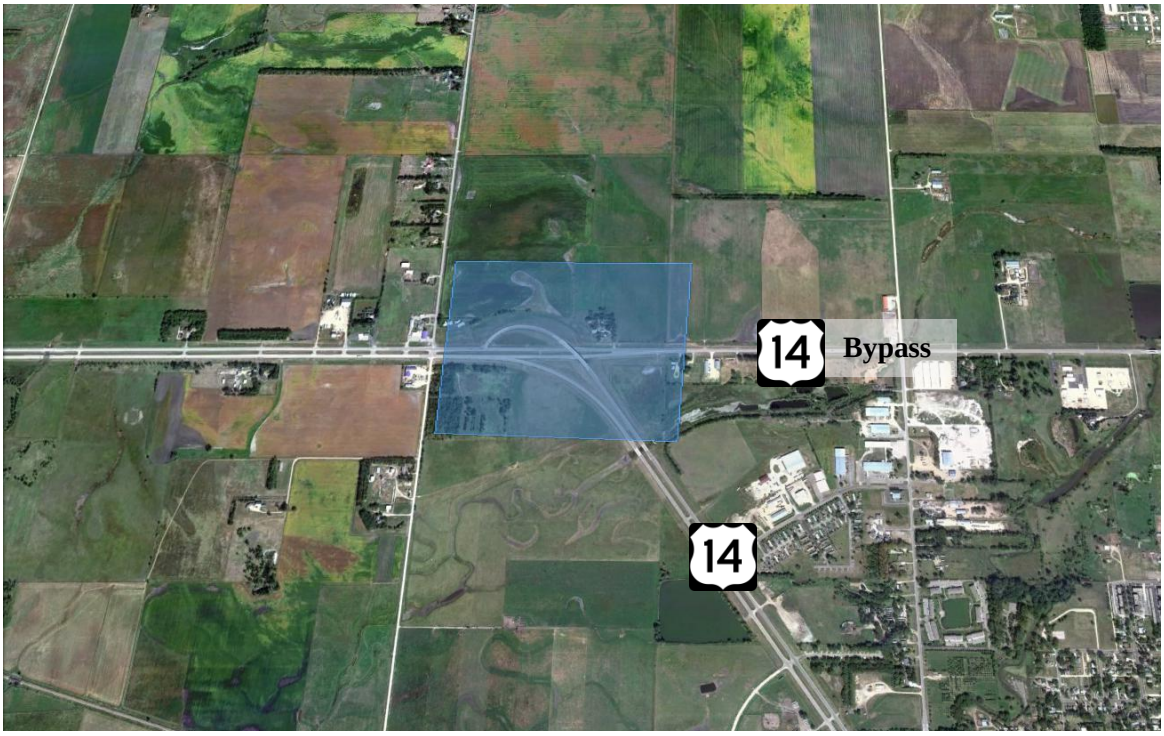
PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

A.8. – US 14 Bypass/ US 14 North T-Intersection
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

US 14 Bypass and US 14 are classified as state highways.

NEED

The intersection of US 14 and US 14 Bypass has geometric deficiencies due to poor sight lines and is a high crash location.

PROPOSED IMPROVEMENT

The proposed improvement is to reconstruction the intersection of US 14 and US 14 Bypass, provide intersection lighting and provide a signalized intersection (if warranted).

TOTAL COST

Intersection reconstruction = $1,750,000.

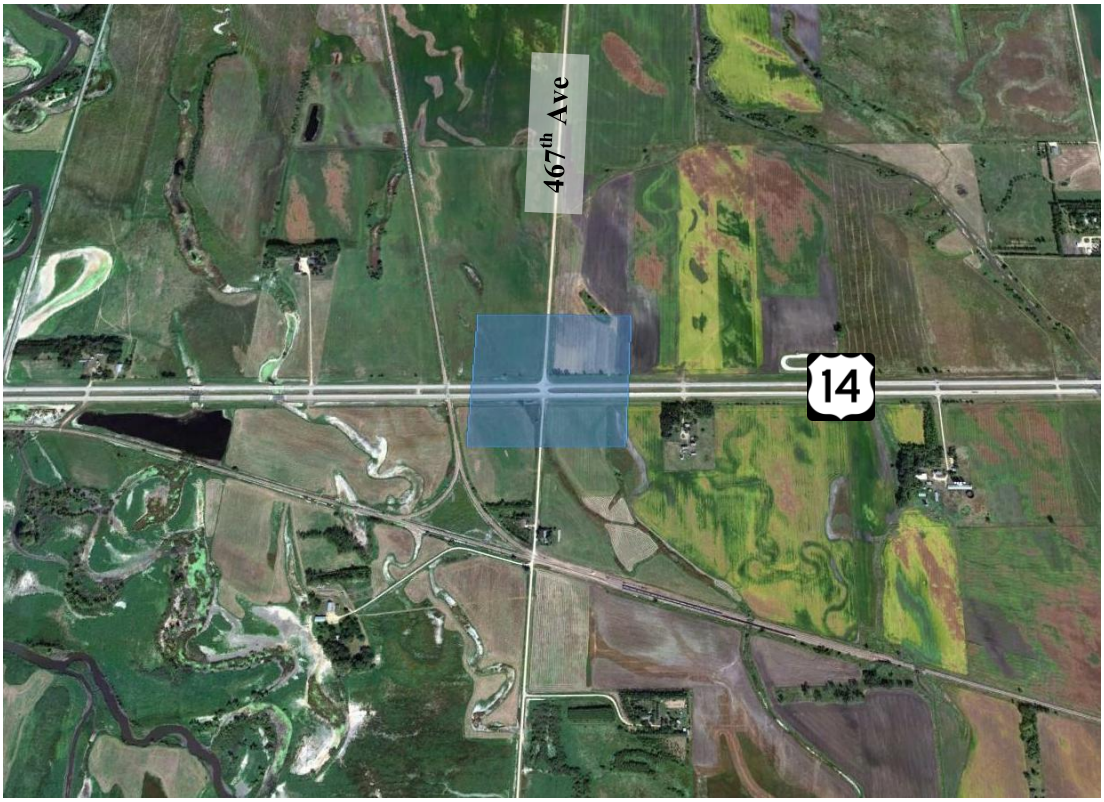
PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

A.9. – US 14/ 467th Avenue Intersection
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

US 14 is classified as a state highway and 467th Avenue is classified as a local road.

NEED

The intersection of US 14 and 467th Avenue is a high crash location.

PROPOSED IMPROVEMENT

The proposed improvement is to conduct an intersection study to identify geometric and safety improvements for the intersection.

TOTAL COST

Intersection study = $25,000.

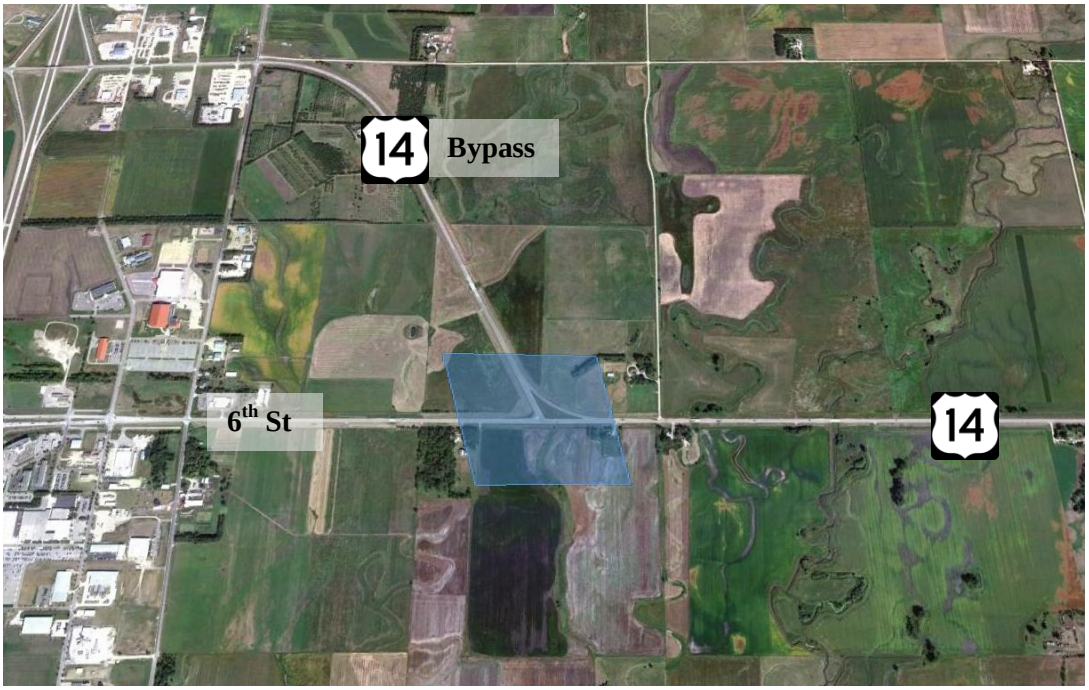
PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

A.10. – US 14 Bypass/ US 14 (6th Street) T-Intersection
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

US 14 Bypass and US 14 are classified as state highways.

NEED

The intersection of US 14 and US 14 Bypass has geometric deficiencies due to poor sight lines and is a high crash location.

PROPOSED IMPROVEMENT

The proposed improvement is to reconstruction the intersection of US 14 and US 14 Bypass, provide intersection lighting, and provide a signalized intersection (if warranted).

TOTAL COST

Reconstruction of intersection, signal, lighting = $1,750,000

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

A.11. – County Road 23/ US 14 Intersection
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

US 14 is classified as a state highway and County Road 23 (476th Avenue) is classified as a minor arterial.

NEED

The intersection of US 14 and County Road 23 (476th Avenue) is a high crash location.

PROPOSED IMPROVEMENT

The proposed improvement is to provide intersection lighting and to remove existing trees/shrubs from intersection sight lines.

TOTAL COST

Intersection lighting and clearing of sight lines = $75,000.

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

A.12. – SD Highway 324/ SD Highway 13 Intersection (West of Elkton)
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

SD 324 and SD 13 are classified as state highways.

NEED

The existing intersection has been identified as having geometric deficiencies.

PROPOSED IMPROVEMENT

The proposed improvement is to conduct an intersection study to identify proposed geometric improvements.

TOTAL COST

Intersection study = $25,000.

PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

A.13. – SD Highway 13/ US 14 Intersection (North of Elkton)
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

US 14 and SD 13 are classified as state highways.

NEED

The existing intersection has been identified as having geometric deficiencies.

PROPOSED IMPROVEMENT

The proposed improvement is to conduct an intersection study to identify proposed geometric improvements.

TOTAL COST

Intersection study = $25,000.

PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

A.14. – US 14/ Hansina Avenue Intersection (Volga)
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

US 14 is classified as a state highway and Hansina Avenue is classified as a local road.

NEED

The existing intersection is identified as a high crash location in Brookings County and is used as a pedestrian crossing in the City of Volga.

PROPOSED IMPROVEMENT

The proposed improvement is to conduct an intersection study to identify pedestrian crossing enhancements and safety improvements for all users.

TOTAL COST

Intersection study = $25,000.

PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

A.15. – County Road 29/ SD Highway 30 Intersection
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

SD Highway 30 is classified as a state highway and County Road 29 (485th Avenue) is classified as a minor collector.

NEED

The existing intersection has been identified as having geometric deficiencies.

PROPOSED IMPROVEMENT

The proposed improvement is to conduct an intersection study to determine geometric improvements.

TOTAL COST

Intersection study = $25,000.

PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

A.16. – County Road 77/ County Road 24 T-Intersection
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

County Road 77 (471st Avenue) is classified as a major arterial and County Road 24 (217th Street) is classified as a major arterial.

NEED

The existing intersection is identified as a high crash location in Brookings County.

PROPOSED IMPROVEMENT

The proposed improvement is to conduct an intersection study to identify necessary geometric improvements.

TOTAL COST

Intersection study = $25,000.

PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

A.17. – Western Avenue S/ 32nd Street Intersection
Segment Length: N/A



MAJOR ROAD PLAN CLASSIFICATION

Western Avenue (470th Avenue) is classified as a minor arterial and 32nd Street (215th Street) is classified as a major collector.

NEED

The existing intersection has been identified has having geometric deficiencies and needs a traffic control change.

PROPOSED IMPROVEMENT

The proposed improvement is to conduct an intersection study to identify necessary geometric improvements.

TOTAL COST

Intersection study = $25,000.

PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

B.1. – US 14 From 22nd Avenue to 34th Avenue (Brookings)
Segment Length: 1.0 mile



MAJOR ROAD PLAN CLASSIFICATION

US 14 is classified as a state highway.

NEED

The existing segment of US 14 is over capacity and reduces mobility.

PROPOSED IMPROVEMENT

SDDOT has proposed project from 22nd Avenue to 34th Avenue to revise access, provide turn lanes, and provide trails along US 14.

TOTAL COST

US 14 reconstruction = $7,163,000.

PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

B.2. - County Road 21 (34th Avenue) between 32nd Street and Prince Drive (Brookings)
Segment Length: 2.3 miles



MAJOR ROAD PLAN CLASSIFICATION

County Road 21 (34th Avenue) is classified as a minor arterial.

NEED

The paving of County Road 21 will provide a new paved connection along the east side of Brookings east of I-29. This will provide a continuous paved route from the I-29 interchange with SD 324 to the I-29 interchange with US 14.

PROPOSED IMPROVEMENT

The proposed improvement is to pave County Road 21 from 32nd Street to Prince Drive. (Recommended in the Brookings Area Master Transportation Plan)

TOTAL COST

From Brookings Area Master Transportation Plan - Paved roadway = $2,300,000.

PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

B.3. - County Road 16 (20th Street South) between 22nd Avenue and 34th Avenue
Segment Length: 1.0 mile



MAJOR ROAD PLAN CLASSIFICATION

County Road 16 (20th Street) is classified as a minor arterial.

NEED

The extension of County Road 16 between 22nd Avenue and 34th Avenue will provide a new crossing of I-29 to connect the residential area of Brookings to an employment center in Brookings. This connection could potentially reduce traffic demand along US 14 at I-29.

PROPOSED IMPROVEMENT

The proposed improvement is to provide a new grade separated crossing of I-29 between the I-29/US 14 interchange and the I-29/SD 324 interchange. The new grade separated crossing should be located such that in the future the grade separated crossing can be revised to provide access to I-29. (Recommended in the Brookings Area Master Transportation Plan)

TOTAL COST

(From Brookings Area Master Transportation Plan) = $7,000,000 to $15,000,000.

PROPOSED PRIORITY

Medium Range for the grade separation

Long Range for the interchange access to I-29.

Project Profile

PROJECT

B.4. – US 14 Bypass Between I-29 and 16th Avenue (Brookings)
Segment Length: 1.0 mile



MAJOR ROAD PLAN CLASSIFICATION

US 14 Bypass is classified as a state highway.

NEED

The existing roadway is forecast to have capacity issues in the future.

PROPOSED IMPROVEMENT

The proposed improvement is to provide an additional lane in each direction and reconstruction of the roadway.

TOTAL COST

Roadway reconstruction = $5,000,000.

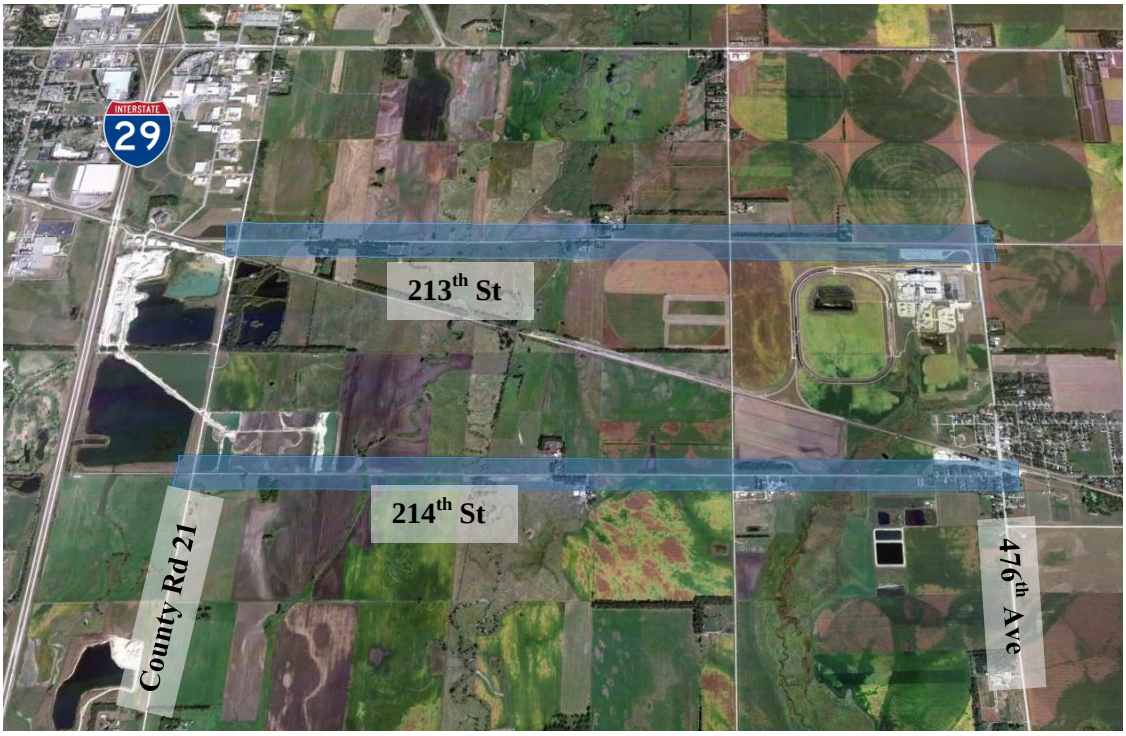
PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

B.5. – 213th Street/ 214th Street between County Road 21 and 476th Avenue (Aurora)
Segment Length: 6.0 miles



MAJOR ROAD PLAN CLASSIFICATION

213th Street is classified as a minor collector and 214th Street is classified as a minor arterial.

NEED

The extension of 213th Street and 214th Street will provide a paved roadway to connect Aurora to the employment center in Brookings.

PROPOSED IMPROVEMENT

The proposed improvement is to provide paved roadways to improve the regional connectivity.

TOTAL COST

Paved rural roadways = $8,400,000.

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

B.6. – Western Avenue S (470th Avenue) between Trail Ridge Road and 216th Street
Segment Length: 2.4 miles



MAJOR ROAD PLAN CLASSIFICATION

Western Avenue (470th Avenue) is classified as a minor arterial.

NEED

The existing Western Avenue is a gravel roadway with residential development occurring along the route.

PROPOSED IMPROVEMENT

Pave roadway (recommendation from Brookings Area Master Transportation Plan)

TOTAL COST

From Brookings Area Master Transportation Plan = $12,404,994.

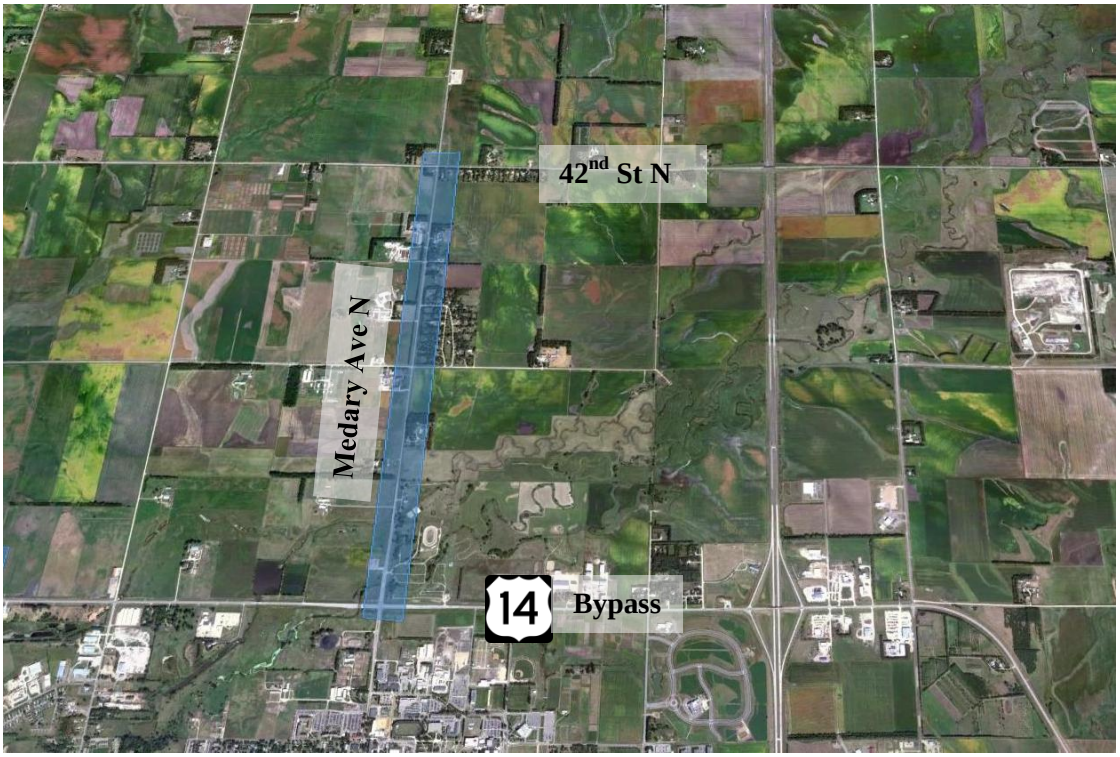
PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

B.7. – Medary Avenue N between US 14 Bypass and 42nd Street N
Segment Length: 2.0 miles



MAJOR ROAD PLAN CLASSIFICATION

County Road 77 (Medary Avenue) is classified as a minor arterial.

NEED

The existing roadway has poor pavement and is in need of being reconstructed.

PROPOSED IMPROVEMENT

The proposed project is to reconstruct the existing roadway to provide a safer and smoother ride.

TOTAL COST

Rural roadway reconstruction = $2,800,000.

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

B.8. – County Road 27 from 209th Street to SD Highway 30 (East of Brookings County)
Segment Length: 6.0 miles



MAJOR ROAD PLAN CLASSIFICATION

County Road 27 is classified as a minor collector.

NEED

The existing roadway requires reconstruction to meet needs of users and to provide an additional north/south roadway in eastern Brookings County.

PROPOSED IMPROVEMENT

Pave roadway to improve this regional connectivity.

TOTAL COST

Reconstruct rural roadway $8,400,000.

PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

B.9. – County Road 27 from SD Highway 30 to 200th Street (East of White)
Segment Length: 3.0 miles



MAJOR ROAD PLAN CLASSIFICATION

County Road 27 is classified as a minor collector.

NEED

The existing roadway requires reconstruction to meet needs of users and to provide an additional north/south roadway in eastern Brookings County.

PROPOSED IMPROVEMENT

Pave roadway to improve this regional connectivity.

TOTAL COST

Reconstruct rural roadway $4,200,000.

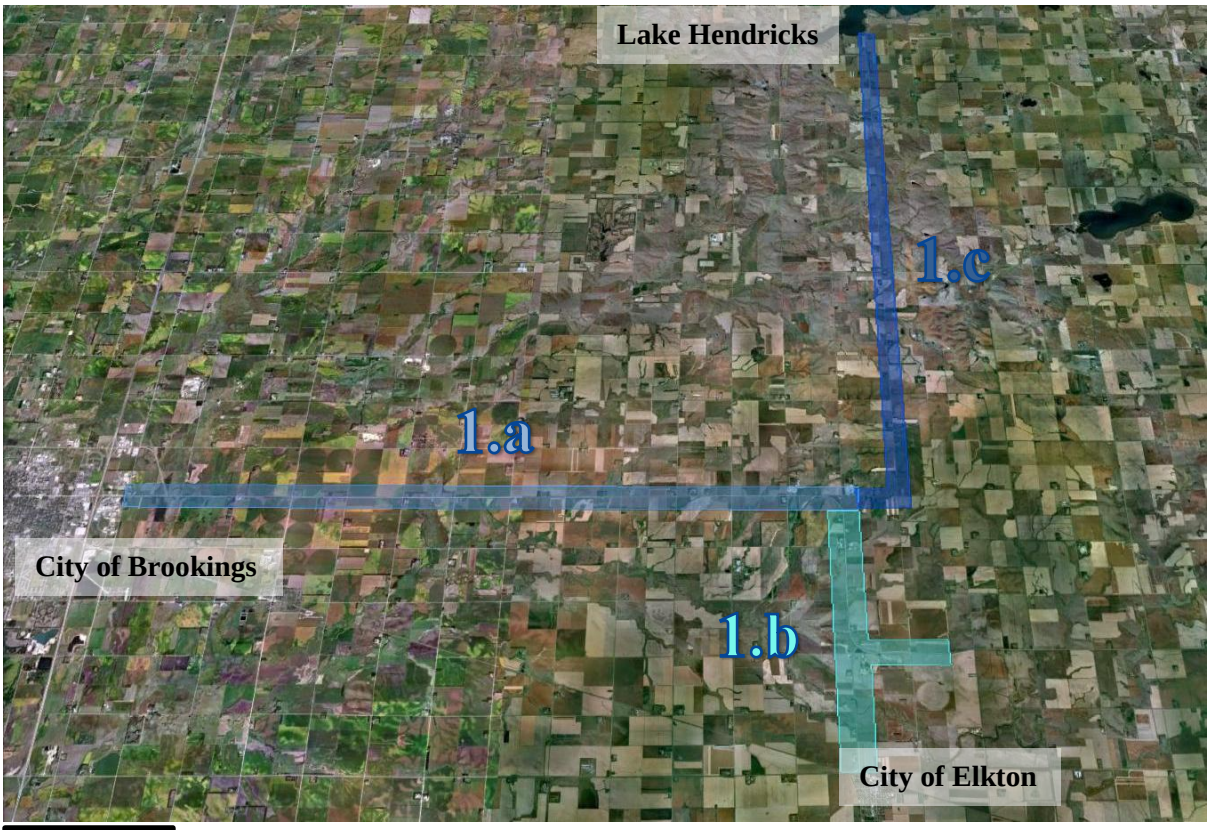
PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

C.1. – Pedestrian and Bicycle Facility Needs Analysis
Lake Hendricks Trail: Connection between City of Brookings and Lake Hendricks area, Elkton, and Lake Benton.



NEED

A need has been identified to study the feasibility of providing recreational trail connections between the City of Brookings and Lake Hendricks, Lake Benton (Lincoln County, MN) and Elkton.

PROPOSED IMPROVEMENT

The proposed improvement is to identify if recreational trails are needed to provide users alternative transportation modes to/from the City of Brookings from/to the following locations:
1.a.- Lake Benton (Lincoln, MN) Connection
1.b.- Elkton Connection
1.c.- Lake Hendricks Connection

TOTAL COST

Planning study for 3 trail routes = $150,000.

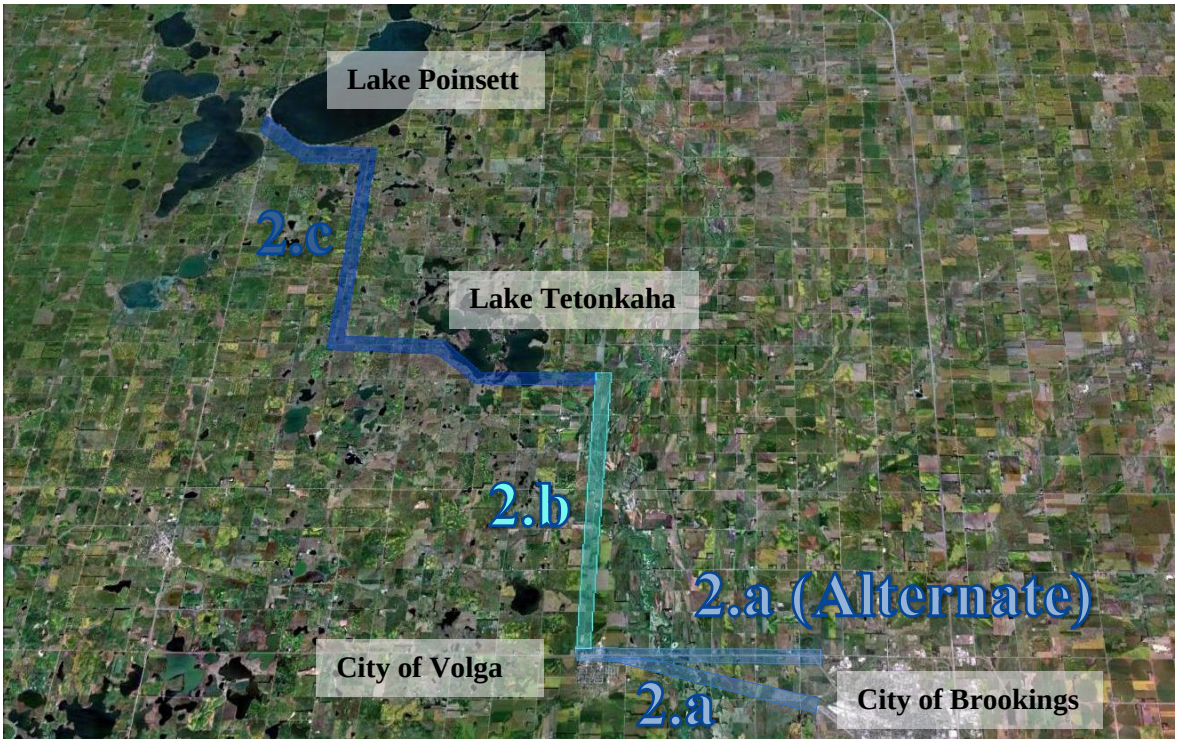
PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

C.2. – Pedestrian and Bicycle Facility Needs Analysis
Volga/ Lake Poinsett Trail: Connection between City of Brookings and Lake Poinsett



NEED

A need has been identified to study the feasibility of providing recreational trail connections between the City of Brookings and Volga, Lake Tetonkaha, and Lake Poinsett.

PROPOSED IMPROVEMENT

The proposed improvement is to identify if recreational trails are needed to provide users alternative transportation modes to/from the City of Brookings from/to the following locations:
2.a.- Volga Connection
2.b.- Lake Tetonkaha Connection
2.c.- Lake Poinsett Connection

TOTAL COST

Planning study for 3 trail routes = $150,000.

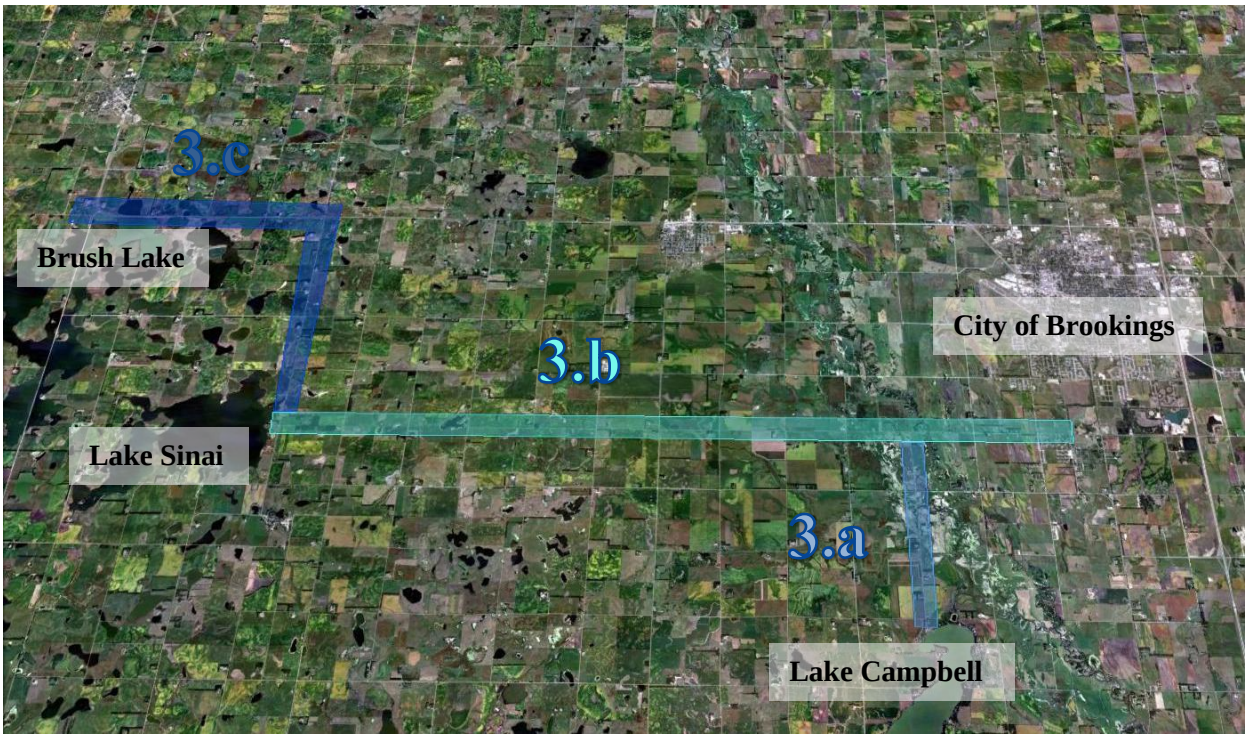
PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

C.3. – Pedestrian and Bicycle Facility Needs Analysis
Lake Campbell/ Sinai Kingsbury County Trail: Connection between City of Brookings and Areas West



NEED

A need has been identified to study the feasibility of providing recreational trail connections between the City of Brookings and Lake Campbell, Lake Sinai, and Brush Lake.

PROPOSED IMPROVEMENT

The proposed improvement is to identify if recreational trails are needed to provide users alternative transportation modes to/from the City of Brookings from/to the following locations:
3.a.- Lake Campbell Connection
3.b.- Lake Sinai Connection
3.c.- Brush Lake/ Kingsbury County Connection

TOTAL COST

Planning study for 3 trail routes = $150,000.

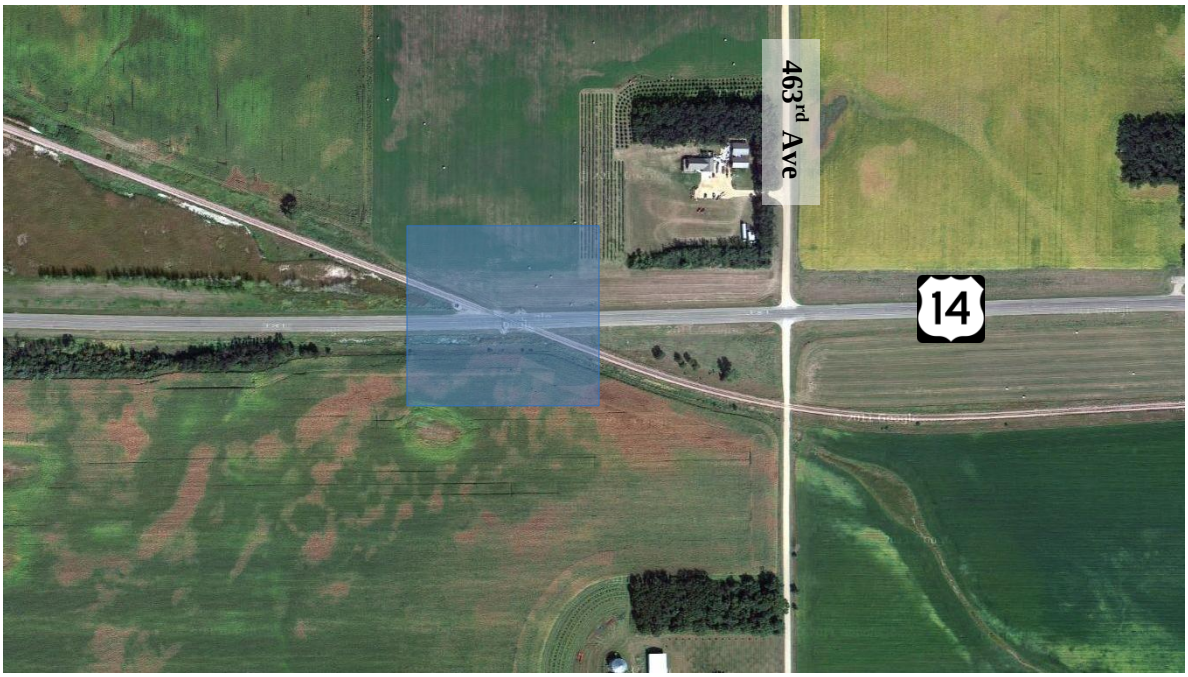
PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

C.4. – Railroad Crossing Safety Improvement
US 14 West of Volga (Mainline Crossing)



NEED

A need has been identified to improve the safety of the railroad crossing of US 14 near 463rd Avenue.

PROPOSED IMPROVEMENT

The proposed improvement is to upgrade the railroad crossing to improve safety with the addition of gate arms.

TOTAL COST

Upgrade railroad crossing = $250,000.

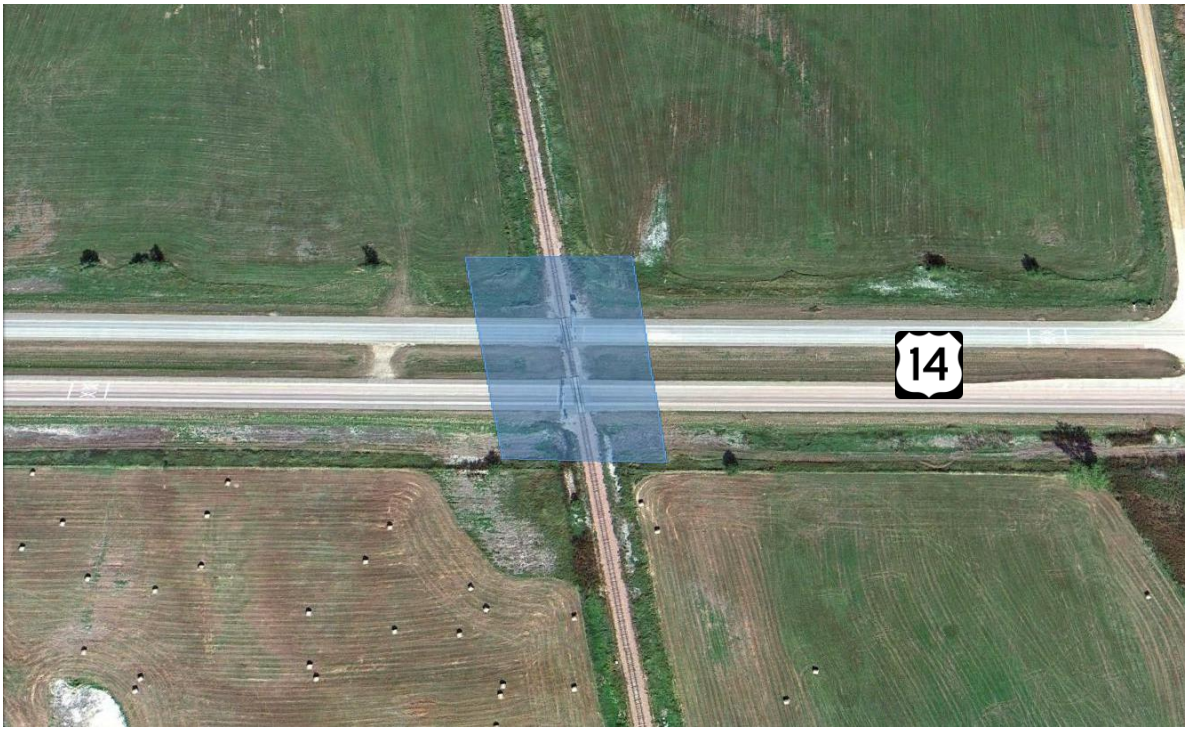
PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

C.5. – Railroad Crossing Safety Improvement
US 14 East of Volga (Spur Crossing)



NEED

I need has been identified to improve safety at the railroad crossing (spur line) of US 14. This location is in the top 5 crash locations of Brookings County.

PROPOSED IMPROVEMENT

The proposed improvement is to upgrade the crossing to provide a safer railroad crossing with gate arms.

TOTAL COST

Upgrade railroad crossing = $250,000.

PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

C.6. – Railroad Crossing Safety Improvement
County Road 21 (34th Avenue) East of Brookings



NEED

A need has been identified to upgrade the railroad crossing to improve safety.

PROPOSED IMPROVEMENT

The proposed improvement is to study the crossing and determine if grade separation is required or enhance the existing crossing with gate arms and a signalized crossing. A grade separated crossing is the recommended improvement from the Brookings Area Master Transportation Plan.

TOTAL COST

Upgrade the at grade crossing with gate arms and signals = $255,000

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

C.7. – Coordinate Bicycle and Pedestrian Facility Planning with Other Jurisdictions

NEED

A need has been identified to coordinate the development of bicycle and pedestrian facilities with other jurisdictions such that these facilities can be connected together to form a network of trails and non-motorized paths.

PROPOSED IMPROVEMENT

The proposed improvement is to work with neighboring jurisdictions to develop and connect a cohesive network of trails and non-motorized paths.

TOTAL COST

Coordination of bicycle and pedestrian planning = $25,000.

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

C.8. – BATA Program and Facility Coordination

NEED

A need has been identified to monitoring future transit service needs within Brookings County.

PROPOSED IMPROVEMENT

Coordinate with BATA on proposed County-wide needs and programs for BATA customers. Monitor frequently traveled BATA routes for mobility and safety needs.

TOTAL COST

Study for future transit needs = $50,000.

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

C.9. – Conduct a Study of the At-Grade Railroad Crossing in Brookings County

NEED

A need has been identified to study all at-grade railroad crossing in Brookings County and determine which crossings require improvements.

PROPOSED IMPROVEMENT

The proposed improvement is to complete an assessment of the existing at-grade crossings using inventory data from SDDOT and FRA. Identify and prioritize potential railroad crossing safety improvements and then implement those improvements.

TOTAL COST

Study at grade railroad crossing locations = $100,000.

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

C.10. – Grade-Separated Crossing of Railroad East of I-29

NEED

A need has been identified to determine if a grade separated crossing of the railroad east of I-29 is required with the continued land development and job growth in the area.

PROPOSED IMPROVEMENT

The proposed improvement is to identify if a grade separated crossing is required east of I-29 and if required where the grade separated crossing should be located and when the grade separated crossing should be constructed. County Road 21 (34th Avenue) has been identified as a potential location in the Brookings Area Master Transportation Plan for a grade separated crossing.

TOTAL COST

Study grade crossing locations = $50,000

PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

C.11. – Transit Needs/ Feasibility Study

NEED

A need has been identified to study the future transit needs for Brookings County.

PROPOSED IMPROVEMENT

The proposed improvement is to further study the options for expanded transit service.

TOTAL COST

Transit study = $50,000.

PROPOSED PRIORITY

Long Range

Project Profile

PROJECT

D.1. – Prepare Traffic Impact Ordinance

NEED

A need has been identified to have a traffic impact ordinance established. Funding and maintenance

PROPOSED IMPROVEMENT

The proposed improvement is to have the traffic impact ordinance established for new residential, commercial, and industrial developments in Brookings County.

TOTAL COST

To be developed.

PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

D.2. – Asset Management Strategy/ GIS Coordination

NEED

Develop a management database which is an inventory of assets within the County

PROPOSED IMPROVEMENT

Integrates GIS into all data collection and management systems, integrate asset management strategies of roadway engineering/ public works decision-making.

TOTAL COST

To be developed.

PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

D.3. – Design Standardization and Review Procedures

NEED

A need has been identified to develop procedures on which typical section design should be used for each roadway classification in Brookings County.

PROPOSED IMPROVEMENT

Create typical sections for each roadway classification in Brookings County. Provide pavement design sections for different soil types encountered in Brookings County for each typical section.

TOTAL COST

To be developed.

PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

D.4. – Follow SDDOT Road Design Manual for Left/Right Turn Lane Criteria

NEED

Develop a set of criteria on when to install left or right turn lanes.

PROPOSED IMPROVEMENT

Follow the SDDOT Road Design Manual to determine warrants on when to provide left and right turn lanes.

TOTAL COST

To be developed.

PROPOSED PRIORITY

Short Range

Project Profile

PROJECT

D.5. – County Road Inventory and Assessment

NEED

Provide a system inventory, prioritization, and standards of all County Roads within Brookings County

PROPOSED IMPROVEMENT

Conduct systematic inventory and condition assessment of all County Roads. Develop a project list beginning with neediest areas in terms of safety issues and roadway quality.

TOTAL COST

To be developed.

PROPOSED PRIORITY

Medium Range

Project Profile

PROJECT

D.6. – Township Road Inventory and Assessment

NEED

Provide a system inventory, prioritization, and standards for the Township Roads in Brookings County

PROPOSED IMPROVEMENT

Conduct systematic inventory and condition assessment of all Township Roads. Begin with neediest areas identified by constituents, followed by township-by-township facility.

TOTAL COST

To be developed.

PROPOSED PRIORITY

Medium Range

Appendix F

Stakeholder and Public Meeting Summaries Draft Brookings County Master Transportation Plan

Summary of Stakeholder Feedback and Public Meetings
June 25 - 27, 2013

As a follow-up activity to stakeholder and public meetings held in January, 2013, a series of stakeholder and public meetings were held on June 25, 26, and 27 to review the draft Brookings County Master Transportation Plan. A stakeholder meeting invitation was sent to cities, business and industry, townships, and first responders/schools who were solicited for participation in December 2012 and January 2013 as noted in the illustration below.

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

To: Agency Officials, Businesses and Interested Persons

You are invited to send a representative to attend an informal session to discuss the draft Brookings County Master Transportation Plan. The sessions will be held at the South Dakota Department of Transportation (SDDOT) office in Brookings, located at 2131 34th Avenue. SDDOT and Consultant staff will be available to discuss the highlights of the draft plan.

Time slot	Wed 6/26/13	Thurs 6/27/13
10:00 a.m. – 12:00 p.m.	**Cities** Officials – policymakers and staff	**Business and Industry** East Brookings Industrial Association Brookings Economic Development Association
1:30 p.m. – 3:30 p.m.	**Townships** Officials – policymakers and staff	**First Responders/Schools** SDSU Public Schools

If you are not able to attend a scheduled session above and are interested in learning more about the draft plan, please free to attend one of the following open houses for more information:

Tuesday, June 25, 2013 – Elkton Community Center, Elkton
Wednesday, June 26, 2013 – Volga Community Center, Volga
Thursday, June 27, 2013 – McKnight Community Center, White

Each open house is identical and will be held from 5:30 – 7:00 p.m., with a short presentation beginning at 6:00 p.m.

For more information, please visit the project web site:
http://sddot.com/transportation/highways/planning/specialstudies/BrookingsCo/default.aspx.

A composite summary of the Stakeholder meeting discussions is as follows:

1. A trail component should also be added from Aurora to Brookings. Railroad right of way should be depicted, with an alternative using US 14 (similar to the rail right of way trail corridor to Volga with an alternative using US 14).
2. Right of way estimates should also be provided in the typical section illustrations for the various roadway and trail classifications.
3. The application of a road use agreement should be referenced in the "standards" section and a model agreement should be included in an appendix of the document.
4. The components of trail costs should be better defined.
5. The components of the roadway costs should be refined if needed. For instance, Roadway Segment Project No. 6 seems a bit high?
6. A future 20th Street bridge crossing over I-29 is very important to the East Brookings Business and Industrial Association members.

Public Meetings

Identical public meetings were held in Elkton (June 25), Volga (June 26), and White (June 27). The purpose of the meetings was to gather public feedback and reactions to the draft Brookings County Master Transportation Plan. The meetings were advertised twice during the month of June 2013 in the following publications.

- Brookings Register
- Brookings Town and Country Shopper
- Elkton Record
- Volga Tribune
- White Tri-City Star

An example of the aforementioned newspaper meeting announcement is attached to this Appendix F. The meetings were also advertised on the SDDOT project web page and Brookings County website during the month of June 2013.

The meeting attendance lists are attached to this Appendix F.

Draft Plan Comments Received from Stakeholders and Members of the Public

There were no oral comments received at the public meetings. A summary of the written comments received on the plan and follow-up actions in response to the comments are following.

Written Comments Received and Responses:

From: Carla Gatzke [mailto:Carla.Gatzke@daktronics.com]
Sent: Wednesday, July 10, 2013 5:41 AM
To: Harris, Ross
Cc: Jim Morgan; Al Kurtenbach
Subject: feedback from EBBIA about Brookings County Master Transportation Plan Study

Ross,

Thank you for scheduling a time on June 27 for the East Brookings Business and Industry Association (EBBIA) to provide feedback about the draft Brookings County Master Transportation Plan Study.

Matt Kurtenbach and Lyle Bowes and I attended. We appreciated getting a chance to learn about your planned recommendations, and the good conversation with you and Steve Gramm from DOT.

Since that meeting, I shared the handouts with Jim Morgan, Daktronics CEO, and with Al Kurtenbach, EBBIA chair. The following are additional suggestions from my meeting with them, which we hope you can still take into consideration in your final plan:

1. Our greatest overall concern is for improved traffic flow to the east industrial park, and we appreciate that several of the road segment projects address this concern.
2. Our most urgent priority is Project B2 CR-21 34th Ave from Prince Dr to 32nd St S. We strongly encourage that this project be completed before the start of Project B1 (US 14 from 22nd Ave to 34th Ave). We believe it will be essential to provide an alternate detour south from the industrial park into the residential area of Brookings and an alternate south truck route from the interstate into the Industrial park.
3. Our highest long-term priority is a bridge across the interstate on 20th St S. And so we strongly support Project B3 to develop a written study which we believe would help accelerate that project.
4. We request that the Master Plan show the 214th St and 213th St projects as separate projects, rather than as alternates within Project B5:
    a. The 213th St project has merit for agricultural industrial development.
    b. The 214th St project is essential to improve connectivity to the 34th Ave and 20th St S intersection, which is necessary for the future 20th St S interstate bridge and will facilitate improved traffic flow between Aurora and the East Industrial park.
5. We support the enhancement of bike trails in Brookings County. We suggest two projects that are not in the draft plan:
    a. A bike bridge over the interstate from SDSU to the East Industrial Park, approximately half-way between US 14 and US 14 Bypass. We believe that a separate bridge for bikes will be safer and more likely used than bike lanes on the US 14 and US 14 Bypass bridges.
    b. An Aurora connection to the bike trail system, similar to the planned Volga connection.

6. We encourage a safety improvement to the intersection of 34th Ave and US 14 Bypass, perhaps even a traffic light and turn lanes. Currently, traffic on US 14 Bypass east of 34th Ave is 65 mph, on a curve with limited visibility. We believe that the increased traffic from further industrial advancement along 34th Ave will create a safety need.

Thank you again for the opportunity for EBBIA to comment on the preliminary Master Plan. We appreciate the open dialogue of the meeting and our overall communications. Please contact any of us if you have any questions.

Carla

Responses:

1. Comment noted.
2. Comment noted. Project B1 is in the current (2014-2017) STIP.
3. Comment noted; has been previously documented in City of Brookings Transportation Plan (2011).
4. a & b: Brookings County will work with the City of Brookings to determine the appropriate design standards and improvement timing depending on planned annexations by the City of Brookings. These projects can then be implemented separately as noted in the comment or as determined by agreement between Brookings County and the City of Brookings.
5. a: The bike bridge noted in the comment has been addressed by the City of Brookings in its Master Transportation Plan (2011).
b: A proposed Aurora to Brookings trail connection has been added to the list of implementation projects, including two variations to make the proposed connect.
6. Left and right turn lanes are planned to be added to the referenced intersection. This intersection, however, does not meet signal justification warrants.

From: Rames, Steven [mailto:steven.rames@sdstate.edu]
Sent: Thursday, July 11, 2013 5:07 PM
To: Gramm, Steve
Cc: Harris, Ross; dbirk@brookingscountysd.gov; Kattelmann, Dean; Weiss, James; Olive, Leslie; Finn, Lynne
Subject: Brookings County Master Transportation Plan

Steve,

SDSU has reviewed the information available regarding the Brookings Master Transportation Plan and we have the following comments.

Roadway Segment Projects:

> #4 US 14-Bypass – SDSU has a significant interest in this project. SDSU would like input on design of turn movements into campus at Jack Rabbit Road (old Stadium Road) and at 16th Avenue. SDSU is also working with the SDDDOT design team to provide borrow for this project from an adjacent SDSU site.
>
> #7 CR-77 – This segment is draining well or at least it is not creating any drainage concerns for SDSU facilities/properties adjacent to Highway 77. If there are any proposed changes in drainage, SDSU would like to be informed of those changes.

SDSU has no other comments at this time.

Thank you for including SDSU in your study.

Steven Rames

Responses:

1. This comment is oriented to a project currently being designed and programmed for construction by SDDOT. Comment was forwarded to appropriate SDDOT staff for feedback.
2. This comment is oriented to a recently constructed project. Comment forwarded to appropriate Brookings County staff for feedback.

INTERESTED PARTICIPANTS – Public Agencies, Schools, and Businesses in Brookings County

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Name	Address	Email
Bob Hill	520 3rd ST ste 200	rhill@brookingscountysd.gov
Meghan Thoreau	"	Mthoreau@brookingscountysd.gov.
Tim Reed	" ste 230	tsreed@brookings.net
Jackie Lanning	520 3rd St Ste 140	jlanning@cityofbrookings.org

INTERESTED PARTICIPANTS – Public Agencies, Schools, and Businesses in Brookings County

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Name	Address	Email
Lyle Bowes	2621 22nd Ave S Brkgs.	l_bowes@bowesconstruction.com
Carla Gatzke	Daktronics	carla.gatzke@daktronics.com
Matt Kortenbach	Daktronics Inc.	Matt.Kortenbach@daktronics.com

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION
BROOKINGS COUNTY
NOTICE OF PUBLIC INFORMATION MEETINGS / OPEN HOUSES
FOR THE
BROOKINGS COUNTY MASTER TRANSPORTION PLAN

To Be Held From 5:30 p.m. to 7:00 p.m. on the following dates and locations:

Date	Location
Tuesday, June 25, 2013	Elkton Community Center, 109 Elk Street, Elkton, SD
Wednesday, June 26, 2013	Volga Community Center, 109 Samara Avenue, Volga, SD
Thursday, June 27, 2013	McKnight Community Center, 228 West Main Street, White, SD

The South Dakota Department of Transportation (SDDOT) in conjunction with Brookings County will hold identical open house style public meetings to discuss and receive public input on the preliminary recommendations of a Master Transportation Plan being developed for Brookings County. The open house will be informal, with one on one discussion available with SDDOT, County & Consultant staff.

Between 5:30 p.m. and 7:00 p.m., SDDOT, County, & Consultant staff will be available with displays to discuss the proposed options and answer your questions. During this time, you will also have the opportunity to present written comments. A short presentation will be given at approximately 6:00 p.m.

Notice is further given to individuals with disabilities that these open houses/public meetings are being held in a physically accessible place. Any individuals with disabilities who will require a reasonable accommodation in order to participate in the open houses/public meetings 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 in order to ensure accommodations are available. For further information regarding the study, contact Steve Gramm at (605) 773-6641 or by email at steve.gramm@state.sd.us.

Notice published twice at the total approximate cost of $408.00

PUBLIC OPEN HOUSE

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Name	Address	Email
Steve Gramm	700 E. Broadway Ave. Pierre SD 57501	Steve.gramme@state.sd.us
Bill Moran	Sioux Falls, SD	WMoran@hrgreen.com
Ross Harris	HR Green, Des Moines	rharris@hrgreen.com

Elkton Community Center, June 25, 2013

PUBLIC OPEN HOUSE

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Name	Address	Email
Steve Gramm	700 E. Broadway Ave. Pierre SD 57501	Steve.gramm@state.sd.us
Stephne Miller	3428 Oak Ln Bkgs	gsmiller@itctel.com
Mary Bjorke Mayor	Volga	mbjerke5@msn.com
Bob Hill County EM	520 3rd ST Brookings	rhill@brookingscountysd.gov
Chris Prussman	517 Shamrock Lane Bkgs	chris@11cracing.com
Dick Birk	422 Western Ave	dbirk@brookingscountysd.gov
Lyle Johnson	46726 212TH ST	ldyohn@itctel.com
BILL MORAN	HR GREEN, SIOUX FALLS	wmoran@hrgreen.com
ROSS HARRIS	HR GREEN, DES MOINES	rharris@hrgreen.com

Volga Community Center, July 26, 2013

PUBLIC OPEN HOUSE

BROOKINGS COUNTY MASTER TRANSPORTATION PLAN

Name	Address	Email
Steve Gramm	700 E. Broadway Ave. Pierre SD 57501	Steve.gramm@State.sd.us
Dennis Falken	1632 Overlook Rd Brookings	d falken @ brookings.net
Dick Bush	DW	d
BILL MORAN	HR GREEN, SIOUX FALLS	wmoran@hrgreen.com
ROSS HARRIS	HR GREEN, DES MOINES	rharris@hrgreen.com

McKnight Community Center, June 27, 2013

Appendix G

Model Road Use Agreement

MODEL ROAD USE AGREEMENT

_____, hereinafter referred to as "User" and Brookings County, hereinafter referred to as the "Roadway Authority" (including municipalities and townships with roadways under Brookings County jurisdiction), recognize it is in their mutual best interest to enter into the following agreement, and:

WHEREAS, User desires to use public roadways owned and maintained by the Roadway Authority to access User's business operations; and,

WHEREAS, the parties recognize that Brookings County roads may not be designed for and will not withstand the heavy truck traffic and overweight vehicles of User's operations; and,

WHEREAS, the public roadways to be used are described on {"Exhibit A"} and are described herein as "roadways"; and,

WHEREAS, as a condition to the use of the roadways by the User, the Roadway Authority is requiring the User to execute this agreement to obligate the User to maintain Brookings County roads which it makes use of, in the same or better condition the roadways had prior to the commencement of User's operations, and to maintain the roadways in a good state of repair during the User's operations; and,

WHEREAS, in order to secure the User's obligation to maintain Brookings County roadways, the User is required to execute this agreement to set forth the User's promise, covenant and agreement to maintain the roadways.

NOW, THEREFORE, in consideration of the mutual promises and covenants herein contained and other good and valuable consideration, the receipt of which is hereby acknowledged, and intending to be legally bound hereby, the parties do hereby agree as follows:

1. Before initiating business operations, the User will designate a route, to and from the User's end location.

2. Upon route designation, the User will provide a pre-use construction design, maintenance and post-use repair criteria to be followed by the User. The ultimate goal of the design shall be:

   A. Maintaining the roadway during use so as not to interfere with ordinary vehicle traffic.

   B. Safety of all users and to provide continuous access for emergency vehicles.

   C. Insuring that post-use, the condition of the road will be as good as or better than pre-use.

D. Maintaining the roadway in a manner that drainage features (structures) remain functional and effective at all times, including surface road drainage.

3. The design shall take into account, at a minimum, the following:

A). Current load bearing capacity of the road including the sub-base.

B). Current load bearing capacity of any bridges or culverts.

C). Weather conditions, time of year of use, and subsurface hydrology.

D). Duration of the proposed use.

E). Interval of inspections.

F). Interval of repairs.

G). Pre-use improvements.

H). Stormwater and runoff including improvements resulting from flow increases due to additional impervious surface.

I). Dust control.

J). Possibility of using or constructing new non-public roads.

K). Snow and ice removal.

L). Detailed maintenance plan based on the classification of the road and any specific/unique factors affecting the road.

M). All permits and responsibility for compliance with all other government agencies.

N). Number and weight of vehicles.

O). Adequate video or photographic record of the pre-use condition of the roadway.

4. Upon receipt of the design, the Roadway Authority shall have 10 days in which to either accept the plan and execute the road use agreement or submit proposed changes or revisions to the proposed plan initiated by Brookings County itself or its designated officials.

5. If the User proposes pre-use improvements designed for the proposed use, the User, upon completion of those pre-use improvements, shall not be required to post a financial bond but shall be required to comply with all terms of the maintenance agreement.

6. If the User proposes to use the existing roads with a maintenance plan without installing pre-use improvements, the User shall be required to post a maintenance bond at the rates prescribed by the Roadway Authority. It is understood the Roadway Authority shall be enabled to enforce the maintenance agreement during the term of this agreement by calling in the maintenance bonds and requiring the posting of additional bonds should the cost of repairs at any time exceed the amount of the bond.

7. Upon the completion of the User's operations, the User, at its own cost and expense, shall within 60 days restore the roadways to the same or better condition as existed prior to the commencement of User's operations. Any associated costs or fees incurred by the Roadway Authority for the administration or supervision of User's operations shall be borne by User.

8. Upon execution of this agreement, the User further agrees to immediately suspend or limit its use of roadways (either completely suspend or agrees to abide by imposed weight limits) upon written notice from the Roadway Authority's Highway Supervisor or designated staff, if in the discretion and opinion of the Roadway Authority's Highway Supervisor or designated staff, the continued use of the roadway may cause unnecessary damages, or interference with access resulting from changes in weather conditions and/or the User's operations. Upon receipt of the notice, the User agrees to suspend its use of roadways immediately until, in the sole and absolute discretion of the Roadway Authority's Highway Supervisor or designated staff, the conditions causing the suspension of the use of the roadways no longer exist.

9. The provisions of this agreement shall apply not only to the User's trucks, tractors and trailers, but also to any and all other equipment or vehicles used by the User, its agents, employees or assigns, during User's operations.

10. Should the User fail to maintain, repair, restore or resurface the roadways to the condition existing prior to the execution of this agreement within 60 days from the date of completion of User's operations, said User hereby agrees to reimburse and indemnify the Roadway Authority for all costs and expenses incurred by the Roadway Authority to repair, restore or resurface the roadways to the same condition which existed prior to the User's operations. In addition, emergency repairs resulting from the user's operations and determined to be necessary by the Roadway Authority's Highway Supervisor or designated staff, may be made by the Roadway Authority with the User to reimburse the Roadway Authority for all costs incurred by the Roadway Authority in making such emergency repairs.

11. This agreement shall remain in effect until the User has complied with all the terms and conditions of this agreement.

12. This agreement shall be binding upon the parties hereto, their heirs, executors, administrators, successors and assigns. Provided, however, that the User shall not assign its interest, or any portion thereof, in this agreement to a third party without the prior written consent of the Roadway Authority.

13. This agreement shall be construed under the laws of the State of South Dakota and constitutes the entire understanding between the parties hereto. No modification or amendment to this agreement shall be permitted or effective unless in writing and executed by both parties.

14. The User hereby agrees to hold harmless and indemnify the Roadway Authority for any and all costs, expenses (including legal fees), suits, claims demands are other causes of action which may accrue because of the User's operations.

IN WITNESS WHEREOF, the parties hereto, intending to be legally bound, have executed this Agreement this ____ day of _____, 20___.

Roadway Authority	User
_____	_____
Brookings County Board of Commissioners	(Name of Business)
_____	_____
Attest	Authorized Representative
_____	_____
Date	Date