RESEARCH

2008-44

Safety Effects of Centerline Rumble Strips in Minnesota

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Technical Report Documentation Page

1. Report No.	2.	3. Recipients Accession No.	
MN/RC – 2008-44			
4. Title and Subtitle Safety Effects of Centerline Rumble Strips in Minnesota		5. Report Date December 2006	
		6.	
7. Author(s) Marc Briese		8. Performing Organization Report No.	
9. Performing Organization Name and Address City of Woodbury 8301 Valley Creek Road Woodbury, MN 55125		10. Project/Task/Work Unit No.	
		11. Contract (C) or Grant (G) No.	
12. Sponsoring Organization Name and Address Minnesota Department of Transportation Research Services Section 395 John Ireland Boulevard Mail Stop 330 St. Paul, Minnesota 55155		13. Type of Report and Period Covered Final Report	
		14. Sponsoring Agency Code	
15. Supplementary Notes http://www.lrrb.org/PDF/200844.pdf			

16. Abstract (Limit: 200 words)

Rural two-lane roads generally have only a 12 inch area separating opposing traffic. This area is represented by the double yellow line. Because opposing traffic is not separated by more than the double yellow line, a major crash problem on these roads involves (1) vehicles crossing the centerline and striking an opposing vehicle head on, (2) vehicles crossing the centerline and sideswiping an opposing vehicle, or (3) vehicles crossing the centerline and running off the road to the left.

On Minnesota Trunk Highways (TH) for the period 2000-2002, head-on, sideswipe opposing, and run off the road left crashes account for 25% of all crashes on rural 2-lane roads, while accounting for only 11% of all TH crashes statewide. Additionally, head-on, sideswipe opposing, and run off the road left crashes have the three highest average cost per crash, valued at $289,000, $111,000 and $69,000, respectively. These crashes are significantly overrepresented AND they are the most severe types of crashes.

Given the extremely severe nature of the target crashes, and their overrepresentation on rural 2-lane roads, targeting these crashes for reduction by using CLRS presents an excellent opportunity to help move Minnesota Towards Zero Deaths (TZD). This report examines the relationship between CLRS and traffic safety.

17. Document Analysis/Descriptors		18.Availability Statement	
Traffic Safety Rumble strips Centerline	Crashes	No restrictions. Document available from: National Technical Information Services, Springfield, Virginia 22161	
19. Security Class (this report)	20. Security Class (this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	115	

SAFETY EFFECTS OF CENTERLINE RUMBLE STRIPS IN MINNESOTA

BY: MARC BRIESE

CAPSTONE PROJECT FOR INFRASTRUCTURE SYSTEMS ENGINEERING PROGRAM

DECEMBER, 2006

DISCLAIMER

This paper was written by Marc Briese for the Infrastructure Systems Engineering (ISE) master's program at the University of Minnesota, fall 2006 semester, as a Capstone project.

The views expressed in this paper are solely the opinions of the author, and should not be interpreted as official or unofficial Mn/DOT positions.

ACKNOWLEDGEMENTS

I would to thank those who helped me with this project. Some include:

- Osama Masoud, Department of Computer Science and Engineering, University of Minnesota, for performing video data analysis

- Gary Dirlam, Mn/DOT D3, for providing field data collection help

- Nathan Drews, Mn/DOT OTSO, for providing data

- Loren Hill, Mn/DOT, for providing general direction and input

- Howard Preston, CH2M Hill, for providing general direction and input

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1.0 INTRODUCTION

Rural two-lane roads generally have only a 12 inch area separating opposing traffic. This area is represented by the double yellow line. Because opposing traffic is not separated by more than the double yellow line, a major crash problem on these roads involves (1) vehicles crossing the centerline and striking an opposing vehicle head on, (2) vehicles crossing the centerline and sideswiping an opposing vehicle, or (3) vehicles crossing the centerline and running off the road to the left.

On Minnesota Trunk Highways (TH) for the period 2000 – 2002, head-on, sideswipe opposing, and run off the road left crashes accounted for 25% of all crashes on rural 2-lane roads, while accounting for only 11% of all TH crashes statewide. Additionally, head-on, sideswipe opposing, and run off the road left crashes have the three highest average cost per crash, valued at $289,000, $111,000, and $69,000, respectively. These crashes are significantly overrepresented AND they are the most severe types of crashes.

These types of crashes, referred to as ‘target crashes’ from here on, can be reduced by employing a number of different strategies – some more practical than others, some more effective than others. For example, one such strategy would be to physically separate opposing traffic lanes with a barrier, such as concrete or cable. While this would certainly greatly reduce the target crashes, the cost to implement barrier would be prohibitive. Conversely, funds could be spent on roadway signing or education efforts intended to affect drivers’ decision making on the road. While signing and education are important components of a comprehensive traffic safety program, the effectiveness of reducing target crashes would probably be questionable, at best. Somewhere in the middle lie centerline rumble strips.

Centerline rumble strips (CLRS) are simply a new take on an old idea. Shoulder or edgeline rumble strips have been used for years to reduce the number of run off the road right lane departure crashes. Rumble strips are grooves in the pavement that, when driven over, produce an audible ‘rumble’, and vehicle vibration as the tires pass over the grooves. Rumble strips are generally ground into bituminous pavement. Centerline rumble strips are placed in the center of two-lane roads. Designs vary, but they are typically 0.5 inches deep, 12 – 16 inches wide (laterally), and 6 – 8 inches long (longitudinally). The sole purpose of CLRS is to alert drivers that they have begun to crossover into oncoming lanes of traffic, and corrective maneuvering is necessary. The idea is simple. The intended outcome, a reduction in these extremely severe target crashes, can be profound.

Given the extremely severe nature of the target crashes, and their overrepresentation on rural 2-lane roads, targeting these crashes for reduction by using CLRS presents an excellent opportunity to help move Minnesota Towards Zero Deaths (TZD). This report examines the relationship between CLRS and traffic safety.

2.0 CENTERLINE RUMBLE STRIP OVERVIEW

Centerline rumble strips are intended to provide an auditory and vibratory warning to motorists if their vehicles come too close to the centerline. CLRS is a safety treatment that is gaining momentum nationally and internationally as an effective, low cost treatment that can reduce cross centerline crashes.

2.1 OPPORTUNITY FOR SAVING LIVES

One of the most important objectives for government transportation agencies such as the Minnesota Department of Transportation (Mn/DOT), is to provide a safe and reliable trip for the traveling public. It is the duty of such agencies to continually look for ways to improve safety and continue to drive down the number of annual fatalities on roadways. The following is a fictional case study, but illustrates one of the types of crash that CLRS targets.

> *It's 6:30 a.m. on a Tuesday. Susan is on her way to drop off her infant child, Rebecca, at day care. Then she is on her way to work. Then to the gym. Then groceries. Plus the parent teacher meeting tonight for her 11 year old, Michael. Today will be a busy day. As she drives along the 2-lane rural county road that connects to the interstate, Rebecca starts crying from her child seat, which is properly fastened into the backseat shoulder harness. Susan turns her head and rotates her shoulders to see what's wrong. Susan sees that Rebecca is crying because her pacifier had fallen out of her mouth. Susan smiles, and turns her attention back to the road. When her head turns and her eyes fix on the road, she sees the truck approaching and realizes that she drifted into the oncoming traffic when she turned around to check on Rebecca. It's too late to get out of the way…*

This example used a mother who was distracted by her infant child in the back seat, but it just as easily could have been a person reaching to the floor to pickup a dropped CD or cigarette, or a drowsy driver who doses off and slowly crosses the centerline. These are the types of crashes that CLRS are intended to prevent.

2.2 CENTERLINE RUMBLE STRIP USE IN MINNESOTA

As of the fall of 2003, Mn/DOT had installed approximately 270 miles of CLRS in the state, all of which on state trunk highways. There are no CLRS installed on county highways to the knowledge of the author. The majority of these are located in Mn/DOT's District 3, including the St. Cloud and Brainerd areas. District 3 accounts for approximately three quarters of the CLRS in the state. Table 2-1 shows the locations of CLRS in Minnesota and the data installed. Figure 2-1 displays these locations. Note that since fall of 2003, approximately 28 miles of TH 23 (roughly reference points 147 – 163 and 168 – 180) included in the table were reconstructed to a 4-lane divided section with no CLRS. Also, from the table roughly one mile of TH 71 (reference point 129 – 130) had the CLRS removed as part of an overlay project.

Currently, Mn/DOT does not have a policy on the installation of CLRS; however, CLRS rumble strips are included in Mn/DOT's Comprehensive Highway Safety Plan (CHSP, 2005). In 2003, Mn/DOT developed draft guidelines for the installation of CLRS, but these have not been adopted as state policy. Districts continue to retain authority on when CLRS should and should not be installed.

Table 2-1
Locations of CLRS in Minnesota

District	Hgwy	Approximate Location CL Rumblestrips	Date Installed	Start TM	End TM	Miles
3	55	Buffalo to Rockford	6/19/2000	156.845	164.430	7.6
3	23	Paynesville to Richmond	8/11/2000	168.354	180.617	12.3
3	169	Wigwam Bay, Mille Lacs Lake	9/28/2000	224.472	225.594	1.1
3	169	St Albans Bay, Mille Lacs Lake	9/28/2000	228.059	229.919	1.9
3	15	Kimball to I-94	9/1/2003	132.290	141.370	9.1
3			9/1/2003	142.250	144.158	1.9
3	23	St Cloud to Milaca	9/1/2003	209.084	216.833	7.7
			9/1/2003	218.435	219.844	1.4
			9/1/2003	220.008	222.195	2.2
			9/1/2003	222.625	227.836	5.2
			9/1/2003	228.507	230.288	1.8
3	25	TH 95 to Brainerd	9/1/2003	93.435	97.247	3.8
			9/1/2003	98.774	103.835	5.1
			9/1/2003	104.293	116.689	12.4
			9/1/2003	117.196	120.862	3.7
			9/1/2003	122.041	125.787	3.7
			9/1/2003	129.029	154.413	25.4
3	55	Annandale to TH 25	9/1/2003	142.222	143.986	1.8
			9/1/2003	144.507	146.695	2.2
			9/1/2003	147.215	147.319	0.1
			9/1/2003	148.769	155.025	6.3
3	65	TH 107 to TH 23	9/1/2003	53.647	64.929	11.3
3	95	2 mi E of TH 25 to Mille Lac/Isanti	9/1/2003	9.164	21.902	12.7
			9/1/2003	23.900	26.854	3.0
3	18	Brainerd to Garrison	9/1/2003	3.163	19.570	16.4
3	169	TH 27 to Mille Lac/Crow Wing Line	9/1/2003	214.105	221.303	7.2
			9/1/2003	223.352	224.472	1.1
			9/1/2003	225.594	227.519	1.9
3	210	TH 169 to McGregor	9/1/2003	160.668	174.373	13.7
3	371	Nisswa to 0.5 mi south Pine River	9/1/2003	41.338	49.603	8.3
			9/1/2003	51.013	55.036	4.0
3	95	W Isanti County Line to Cambridge	2004	29.000	40.000	11.0
6	63	Racine to 2 miles S of Stewartville	11/29/1999	23.420	27.490	4.1
7	14	E Jct TH 15 New Ulm) to TH 99 (Nicollet)	2004	104.300	117.800	13.5
8	23	N Jct TH 71 to Paynesville	8/11/2000	147.087	168.354	21.3
8	71	N Jct 23 to Co Rd 27	8/11/2000	129.204	130.164	1.0
Metro	8	Wash/Chisago Cnty line to CR 80	11/1/1995	1.722	8.382	6.7
Metro	8	Center City to MNTH95	11/1/1995	13.338	18.747	5.4
Metro	3	CSAH 11 to CSAH 30	9/20/1993	33.995	38.487	4.5
Metro	212	Eden Prairie	1998/2000	151.888	155.065	3.2

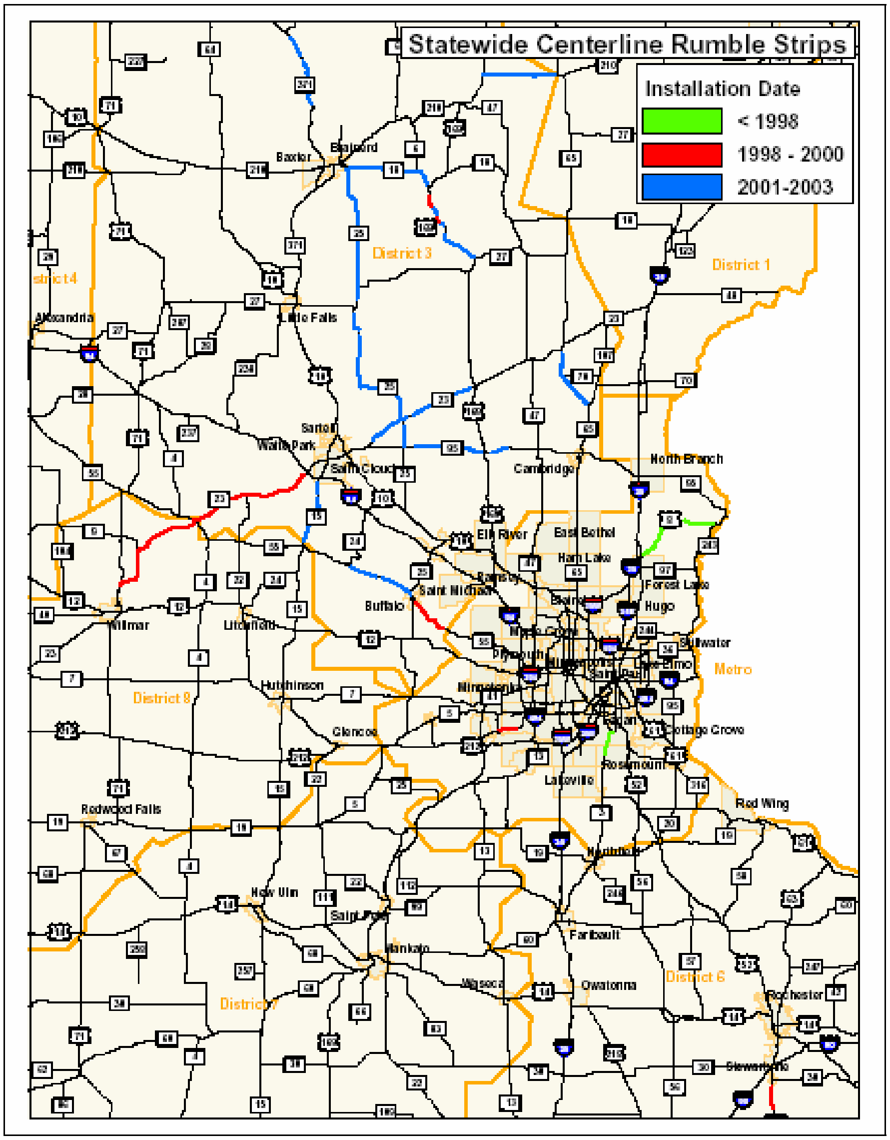

Figure 2-1
Centerline Rumble Strips in Minnesota

2.3 INSTALLATION PROCESS

Mn/DOT's District 3 (D3) installed approximately 170 miles of centerline rumble strips during the summer and fall of 2003 at a cost of approximately $1,000 per mile. Figure 2-2 shows the design that was used for the D3 installations. Initially, D3 intended to use six inch groves on either side of the centerline stripe, rather than the eight inch grooves that eventually were used;

however testing at the St Cloud Safety Center showed that the six inch grooves did not provide adequate noise and vibration for larger vehicles.

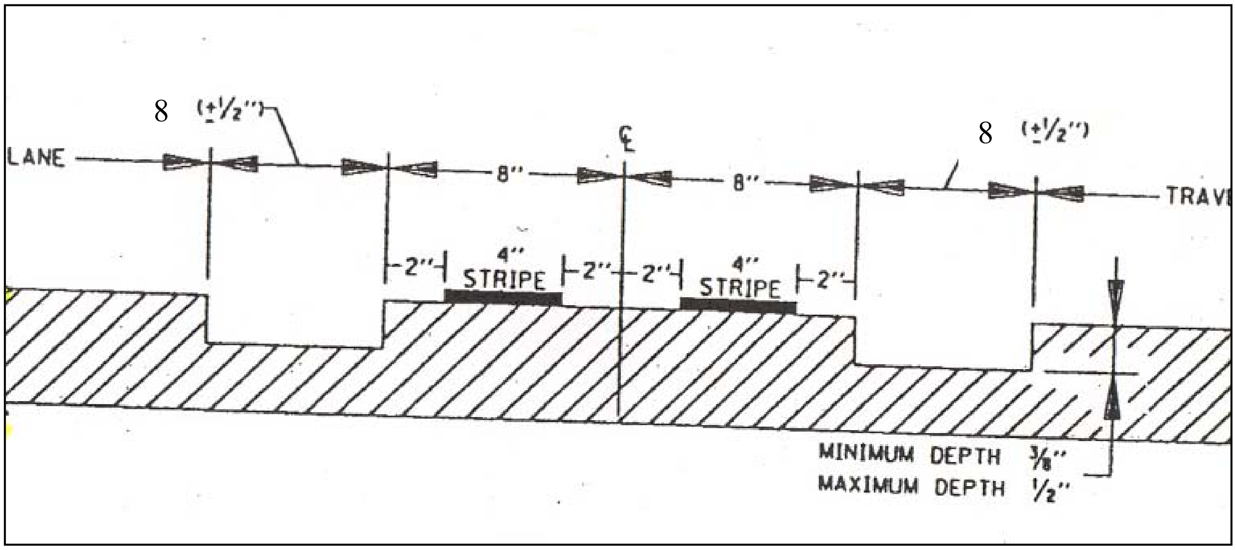

Figure 2-2
Centerline Rumble Stripe Design

A grinding machine is used to mill the rumble strips. See Figure 2-3 for a picture of this procedure. The grinder typically should have a water tank mounted to the back in order to minimize the amount of dust that is created as a result of this process. For the design used in D3, and special set of cutting teeth had to the developed and manufactured. They were created so that a single pass of the grinding machine would create both sides of the rumble strips.

Figure 2-3
Grinding Operation

After grinding is complete, a street sweeper comes through and sweeps all of the debris off of the road. See Figure 2-4 for a picture. The sweepings can be recycled and used in future mill and overlay jobs. Figure 2-5 shows the completed product. Sometimes rumble strips are fog sealed with an asphalt emulsion or painted with an epoxy stripe. The purpose of fog sealing is keeping moisture out of the pavement to prevent premature pavement deterioration. The purpose of painting an epoxy pavement marking stripe (double yellow, for example) is to get some increased wet reflective properties from the marking. Increased wet reflective performance can be achieved by painting in the rumble strip itself because some of the glass beads that provide retro-reflectivity, become embedded on the nearly vertical face of the rumble strip. Neither of these treatments were done in the D3 installations.

Figure 2-4
Sweeping Operation

Figure 2-5
CLRS Finished Product

2.4 EXISTING QUESTIONS IN MINNESOTA

Many potential issues have been identified with the use of CLRS. The following list of questions and potential issues was compiled in April, 2004 by surveying Mn/DOT districts. The remainder of this study beyond this chapter deals with specific safety effects associated with CLRS, and does not further examine any of the following potential issues :

- Effects of CLRS on vehicles tires/steering (law enforcement trying to push cars off the highway which they train for at this facility)
- Physiological affects of CLRS on drivers of various ages including the elderly. Ongoing research by St. Cloud State University is addressing this issue.
- Impact of CLRS on motorcyclists
- Impact of CLRS on drivers in no-passing and passing areas
- Impact of CLRS on snow plowing
- Winter driving conditions often lead to vehicles "setting" the lane location under snow conditions not based on where the striping is but on where they feel the safe condition is
    - How will CLRS play into this situation
    - Will this force drivers to maintain adjacent 12' lanes under snow condition or drive on CLRS as lanes meander around? Will CLRS prevent the meandering from starting.
- Impact on vehicles pulling light trailers or boats
- Impact of pavement life.
- Impact on semi-trucks
- Impact on centerline pavement markings
- Can the rumble strips be constructed so as to drain

- Increased noise
- On a two lane highway, a motorist's first action when trying to pass is to move slightly left and peek around the vehicle ahead to see it there are any cars approaching. Typically, that means the left tires are on the centerline. With rumble strips on center, will it influence motorists to move even further left (partially into the oncoming lane) to see if there are approaching cars?
- Will CLRS influence the departure angle from the driving lane when passing?
- Will center rumble strips create a "shy" distance from centerline that is greater than what motorists now have? Will they choose a travel path that puts them closer to the edge of the roadway? This question is addressed in Chapter 3.

A survey of District 3 snow and ice maintenance personnel revealed the following:

- No noticeable accelerated wear of snow plow blade
- More vibration for snow plow trucks when driving on CLRS. This can act as a guide for plowing when centerline is covered with snow.
- No noticeable problem with cross slope icing.

2.5 NATIONAL TRENDS

CLRS have gained a considerable amount of momentum in the past five to ten years. In a survey from the year 2000, conducted by Kansas State University, it was found that 20 states had CLRS on some roadways in the state, totally 100 – 200 miles. The five states with the most comprised 100 miles total. In 2003, the survey was repeated. Just three years after the in initial survey, it was found that 22 states had CLRS, totally approximately 1,100 miles. The top five states had 850 miles. Since the 2003 survey, at least two states (Pennsylvania and Missouri) have implemented policies that systematically deploy CLRS statewide on 2-lane rural roads.

The Insurance Institute for Highway Safety (IIHS) conducted the most comprehensive before-after safety study for CLRS. It included data from seven states: California, Colorado, Delaware, Maryland, Minnesota, Oregon, and Washington. In total, 98 treatment sites along approximately 210 miles of road were studied (Persaud, 2004). Its findings were that CLRS could be expected to reduce the incident of head on and side swipe opposing crashes by 25%.

The following sections include summaries of what just a few states are doing in the area of CLRS.

2.5.1 Pennsylvania

PennDOT has implemented a policy that installs CLRS on roads as overlays and reconstruction occur. PennDOT conducted research that examined the effect on vehicle's lateral placement and travel speed. The following is a short summary of their findings (Mahoney, 2003).

Data analysis and statistical testing indicate the centerline rumble strips had a significant effect on lateral vehicle placement at two treatment sites. The observed change in lateral vehicle placement was away from the centerline rumble strips at both treatment sites. Data collected at the corresponding comparison sites during the before and after periods indicate the change in lateral vehicle placement was not significant. In comparing before and after data, a significant reduction in the variance of lateral vehicle placement was found at both treatment sites; no significant change was found in the before-after variances of lateral vehicle placement for either comparison site. The study found that lateral vehicle placement in travel lanes may not be normally distributed as was previously assumed. Analysis of speed data did not reveal a consistent effect of centerline rumble strips on the mean or variance of the speed distribution.

2.5.2 Missouri

Missouri has implemented a policy that will install both CLRS and shoulder rumble strips on all major 2-lane roads(Practical Design, 2006). The policy also states that CLRS may be installed on minor roads that have a significant accident history. Rumble strips are only installed on roadway with posted speed limits of 50 mph and higher.

Missouri conducted a before after study on a pilot project that implemented CLRS in 2003 (Centerline Rumble Strips, 2006). In the two year after period, there was a 60% reduction in all crossover centerline crashes and an 84% reduction in severe crossover centerline crashes. Fatal and injury crashes (disabling and minor injury) were reduced to one. The results of this study support MoDOT's decision to implement CLRS into the daily practice of the practical design guide. It should be noted that the project included a new surface and new centerline stripes.

2.5.3 Kansas

Kansas State University conducted a study that examined the validity of reducing crossover crashes by using CLRS (Russell, 2004 and Russell, 2005). Some of it's main conclusions include:

- CLRS are an effective safety countermeasure for reducing overall and injury cross-over crashes on two-lane, two-way roadways.
- No conclusive evidence of negative effect of CLRS were found; however several concerns or potential negative effects have yet to be proven or disproven, particularly the safety effect on bicyclists, and need additional study.
- Warrants - in the context of MUTCD type warrants for highway signing – are not appropriate for CLRS; guidelines are preferred.

This study also found that the most effective design for CLRS were continuous, 12" wide, installed 12" on center. This design provided the loudest measured audible response when a vehicle is driven over the rumble strip (average of 89 decibels). This study did not consider what level of audible response is necessary for the CLRS to be effective.

2.5.4 Virginia

The Virginia DOT conducted a study in 2005 (Chen, 2005). The study included development of guidelines that outline the application of CLRS, design dimensions, installation and maintenance, and other issues. The authors recommended that the Virginia Department of Transportation's Traffic Engineering Division implement the guidelines as a division memorandum. A sample estimated benefit-cost ratio was at least 7.6 per mile.

3.0 DISTRICT 3 BEFORE & AFTER SPEED AND VIDEO ANALYSIS

The Minnesota Department of Transportation's District 3 is in central Minnesota, and includes the St. Cloud and Brainerd Lakes areas. In the summer and fall of 2003, District 3 installed approximately 170 miles of CLRS on rural two-lane state trunk highways. Prior to and after these installations, the Office of Traffic, Security, and Operations (OTSO) within Mn/DOT, with help from District 3 staff, collected three pieces of data: travel speed on horizontal curves and tangent sections, video data for lateral placement of vehicles on tangent sections, and video data for centerline encroachment on horizontal curves.

Vehicle travel speed is an often collected Measure of Effectiveness (MOE) in traffic safety improvement projects. The intention of examining travel speed is to determine whether or not a particular safety improvement had an effect on how quickly people drive. Generally, the slower the vehicle speed, the less severe an average crash on a corridor would be. A decrease in average severity would be considered an improvement in traffic safety.

Video data for lateral placement of vehicles was collected at one location. Research in Pennsylvania indicated a relationship between the variance of lateral vehicle placement and crash frequency (Mahoney, 2003). Vehicle lateral placement was measured to determine whether or not CLRS cause vehicles to drive farther away from the centerline. It has been hypothesized that CLRS could act as a perceived obstruction and cause motorists to drive closer to the edgeline. If this is the case, it would be considered a positive, but only to a point. The farther vehicles drive from the centerline, the less chance there is of impacting a vehicle traveling the opposite direction – this is the positive. However, as the distance from the centerline continues to increase, the vehicle gets closer and closer to the outside edgelines (and potentially shoulder rumble strips).

This is not an issue for small passenger vehicles such as a Ford Festiva or Toyota Prius, but could be a problem for wider vehicles such as semi tractor trailers, recreational vehicles, or pick up trucks pulling boats. So a small increase in lateral placement from the centerline would considered a positive effect, while a very large increase in lateral placement would be considered a negative effect.

Video data collection for centerline encroachments of vehicles on horizontal curves was collected in the before and after periods. Video data for centerline encroachments was collected at two locations. In both periods, video was taken of vehicles traveling along both the inside and outside of horizontal curves. The idea is to observe how often vehicles drive onto or even cross over the centerline while navigating a horizontal curve. If the percentage of vehicles encroaching onto the centerline decrease in the after period, this would be considered a positive effect.

Below are descriptions of the procedures for data collection, various roles and responsibilities of involved parties, more detailed information on the locations themselves, and results.

3.1 TANGENT SITES

Video and vehicle speed data were collected. The video data was collected to examine the relationship between CLRS and lateral placement of vehicles. Speed data was collected to determine whether or not CLRS have an effect on how quickly motorists drive on tangent sections of roadway.

3.1.1 Lateral Placement

As discussed in the Highway Capacity Manual (HCM), traffic barriers can be real or perceived. Both types of barrier can affect how and where motorists operate their vehicles on the road. For example, the presence of a physical concrete barrier in close proximity to a travel lane has a negative effect on level of service. This is an example of a real barrier. A steep slope in the clear zone does not have a physical constraining affect on traffic operations; however, because running off the road and traversing the steep slope can be imposing on motorists, this also can have a negative affect on traffic operations. This is an example of a perceived barrier. CLRS may have the effect of acting as a perceived barrier, thus causing some motorists to orient their vehicles farther away from the centerline. For this reason, lateral placement of vehicles was measured as part of this study.

3.1.1.1 Methodology

Video data was collected by District 3 personnel on Trunk Highway (TH) 23 at reference point 215. Video data was also to be collected at a location on TH 25 at reference point 108, but a problem with the video camera precluded that collection. See Figure 3-1 for the data collection site on TH 23 and the location on TH 25 where data could not be collected. The locations are indicated by a red solid arrow (TH 23) and a dotted red arrow (TH 25). At the TH 23 site, the camera was mounted on the inside post of an “Adopt a Highway” sign directly across the road from an RWIS site. It was installed in sidefire mode, pointing perpendicular to the travel lane, looking at traffic traveling northeast. See Figure 3-2. This location was videotaped in the late morning of a sunny, clear day. The reason for this is to have the sun as high in the sky as possible so that the shadows cast by vehicles are as nearly coincident with the vehicles' wheel path as possible. This aided in more accurate data reduction when calculating lateral placement.

Figure 3-1
Tangent Section Data Collection Sites

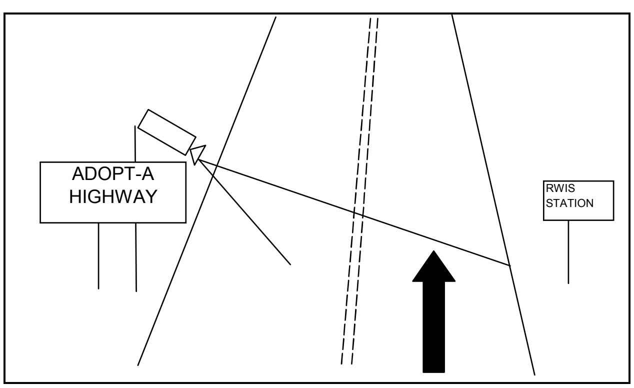

Figure 3-2
TH 23 Camera Setup

A digital video camera recorded 2 hours of video. Dr. Osama Masoud, from the Department of Computer Science and Engineering at the University of Minnesota, agreed to help on this project in the area of data analysis. He applied a computer algorithm that had been developed for a different project, and measured the lateral distance (perpendicular to centerline) at which each vehicle was located as it passed the point of study. The methodology of determining lateral placement of vehicles can be summarized as follows:

- After the camera was mounted and recording began, a District 3 employee walked onto the roadway and put down a one foot board touching the inside of the double yellow pavement marking, laying perpendicular to traffic. This was done as a calibration so distances from centerline could be calculated later in the office.
- The video tape was delivered to Dr. Masoud for processing.
- Dr. Masoud digitized the video and uploaded it into a computer.
- Dr. Masoud used the calibration to accurately calculate the real distance in the field that corresponded to a single pixel on the video.
- A computer program, developed by Dr. Masoud's group, was used to calculate the lateral distance of each vehicle as it passed through the study area. The distance measured was from the centerline stripe to the shadow cast by the vehicle. It was important that data was collected at a time when the sun was located most directly overtop the vehicles, at its highest point in the sky. This was so the shadow cast was as closely coincident with the inside wheels of each vehicle. See Figure 3-3 for a snapshot from the computer analysis. Lateral placement was calcuated as the distance from the yellow line to the blue triangle.
- A summary spreadsheet was created and delivered to Mn/DOT for analysis. Appendix Tables 1 and 2 represent a sample of the spreadsheets that were delivered to Mn/DOT.

Figure 3-3
Snapshot from Computer Analysis

3.1.1.2 Results

Table 3-1 includes a summary of the lateral placement analysis. The second and third columns show total number of vehicles in the 'before' and 'after' cases that were measured in various bins of distances away from the centerline as they passed through the study area. For example, in the 'after' period, 91 vehicles were measured to be located between 20 and 30 inches away from the centerline. The next set of 'before'/'after' columns represent the raw percentage of vehicles that fell into each bin. Finally, the third set of columns show the cumulative percentage of vehicles that fell into each bin (and the previous bins). For example, in the 'before' period, 41% of the vehicles that drove through the study area and were measured, were not greater than 40 inches away from the centerline.

Table 3-1
Summary of Lateral Placement Analysis

	# of vehicles		**% Vehicles**		**Cumulative %**	
Bin	Before	After	Before	After	Before	After
(inches)	*Frequency*	*Frequency*				
0-5	2	0	1%	0%	1%	0%
5-10	0	8	0%	2%	1%	2%
10-15	5	14	1%	3%	2%	4%
15-20	4	11	1%	2%	3%	6%
20-30	44	91	13%	18%	16%	24%
30-40	87	96	25%	19%	41%	43%
40-50	98	124	28%	24%	69%	68%
50-75	91	124	26%	24%	96%	92%
75+	15	41	4%	8%	100%	100%
	346	509				

Figure 3-4 displays the last set of data from Table 3-1 – cumulative percentage of vehicles that fell into each bin (and the previous bins). This is the most important measure in determining the effect of CLRS on lateral placement of vehicles. The data shows that there was virtually no difference in lateral placement in the 'before' and 'after' periods. This is interesting because one may expect that CLRS could act as a barrier that may make some motorists uncomfortable, resulting in those motorists driving a little farther away from the centerline. In fact, we saw that vehicles traveled slightly closer to the centerline in the 'after' condition. The data suggests that CLRS have minimal impact on lateral placement of vehicles.

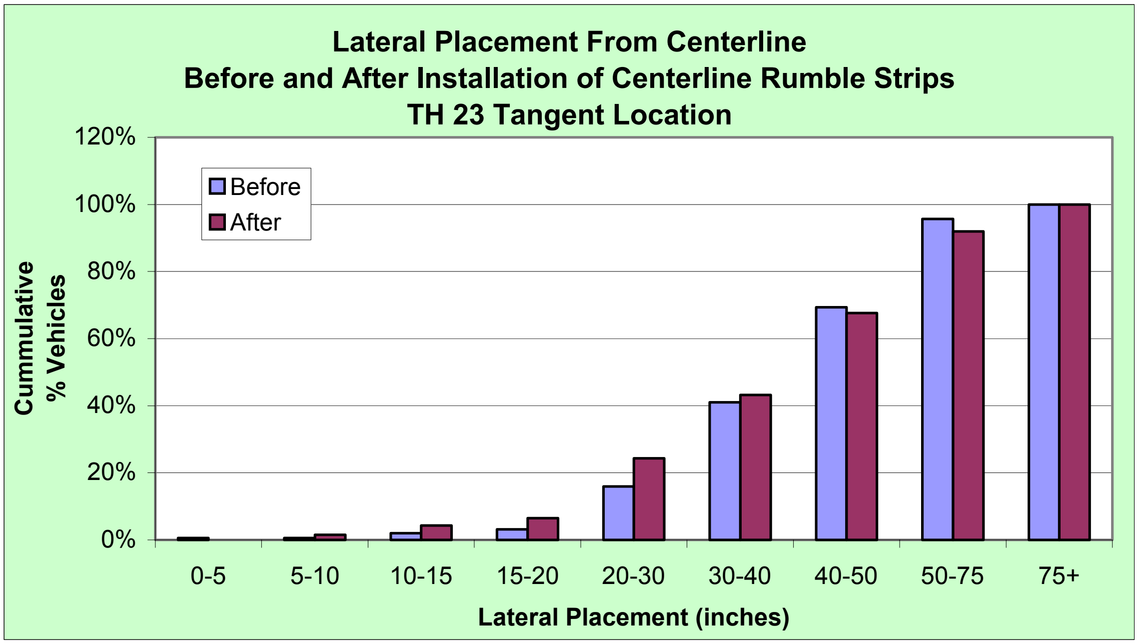

Figure 3-4
Lateral Placement Comparison

3.1.2 Speed Data

Speed data was collected and used as a MOE. In general, if any safety treatment results in reduced speeds, this is considered a positive effect.

3.1.2.1 Methodology

Speed data was collected on TH 23 at reference point 215, the same location where video data was collected. Speed data was also collected on TH 25 at reference point 108 – the location where video data was also to be collected but could not because of a problem with the camera. See Figure 3-1. In conducting a speed study, the following methodology is used, according to the Minnesota Department of Transportation:

- The person collecting speed data is located in position that is not immediately apparent to vehicles as they pass through the study area. This is done so that their travel speed is not influenced by the presence of someone holding a speed gun, often assumed to be a police officer.
- A laser speed gun was used.
- Speeds are measured for vehicles that passes through the data collection site. Vehicles are excluded from the study if they are part of a platoon, because these vehicles travel patterns are affected by the other vehicles in the platoon.
- It is desirable to collect at least 100 vehicles' speeds for the study. This is needed so that the study is statistically reliable, and any changes in the 'before' and 'after' periods are significant.

3.1.2.2 Results

Figures 3-5 and 3-6 display summaries of the speed studies on TH 23 and TH 25, respectively. Raw data from these studies is displayed as Appendix Tables 3 through 6. The 85th percentile speed and 10 mile per hour (mph) pace are commonly used measures when comparing 'before' and 'after' speed distributions. The 85th percentile speed is that speed at which 85% of the vehicles were traveling at or below. This is commonly used to set speed limits. The 10 mph pace is the 10 mph range that contains the most vehicles.

On TH 23, the 'before' and 'after' 85th percentile speeds were both 63 mph. The 10 mph pace was 54 – 63 mph in the 'before' condition, while the 10 mph pace was 55 – 64 mph in the 'after' condition. The data suggests that CLRS had little affect on travel speed at the TH 23 site.

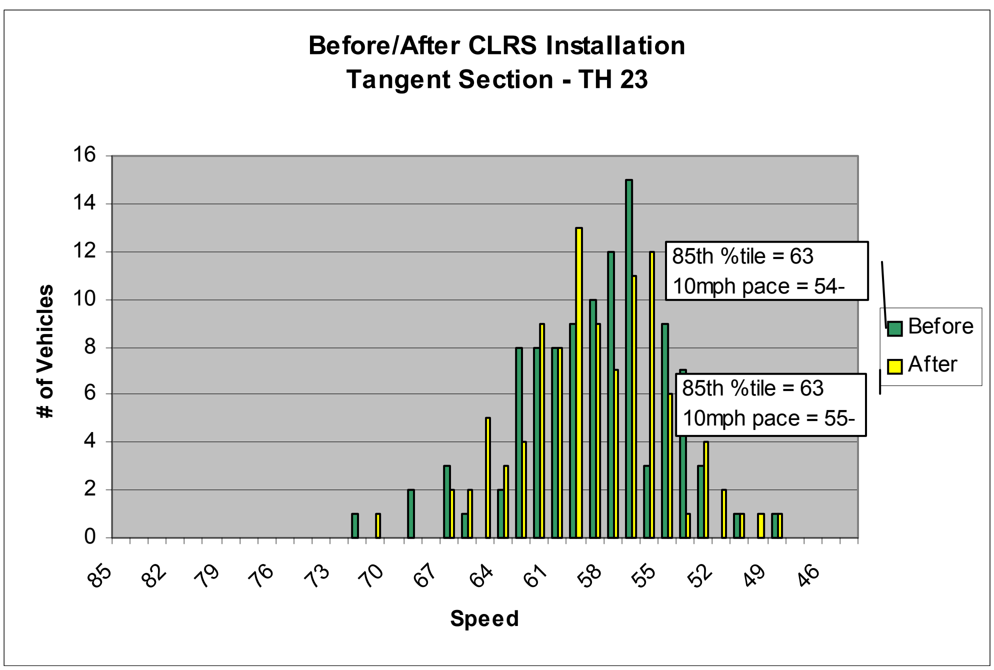

Figure 3-5
Speed Distribution – TH 23 Tangent Section

At the TH 25 site, the 'before' and 'after' 85th percentile speeds were 69 and 67 mph, respectively. The 10 mph pace in both the 'before' and 'after' conditions were 57 – 66 mph. The data suggests that CLRS had very little affect on travel speed at the TH 25 site.

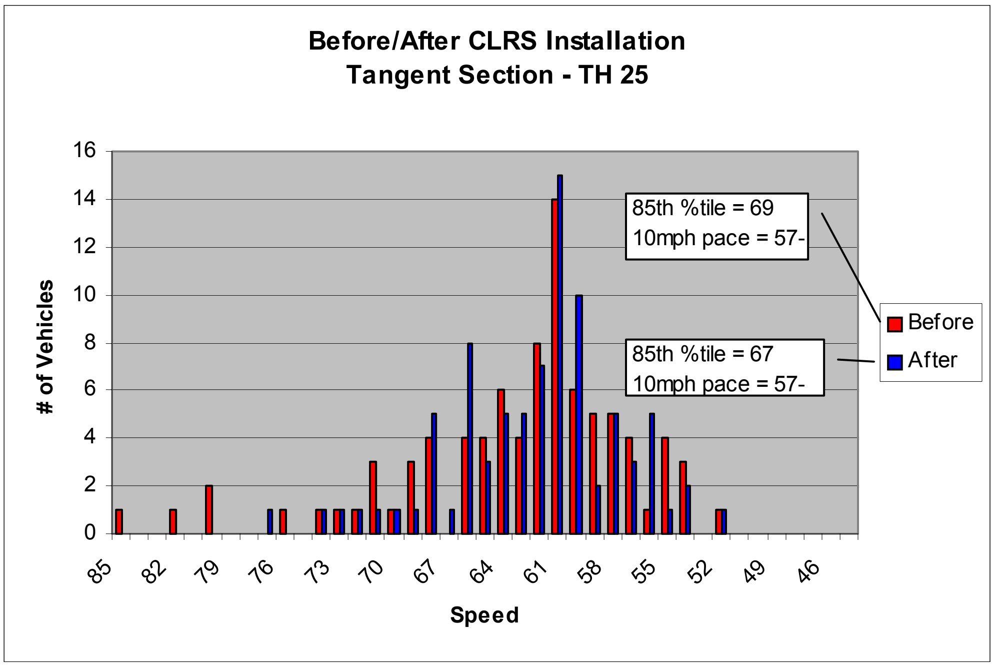

Figure 3-6
Speed Distribution – TH 25 Tangent Section

3.2 HORIZONTAL CURVE SITES

Video and vehicle speed data were collected. The video data was collected to examine the relationship between CLRS and how often vehicles encroach or cross the centerline. Speed data was collected to determine whether or not CLRS have an effect on how quickly motorists drive on horizontal curves.

3.2.1 Centerline Encroachment

It is obvious that in order for a cross centerline crash to occur, it is first necessary for at least one vehicle to partially or fully cross the centerline. For this reason, an evaluation of centerline encroachments was included in this study. Figure 3-7 is a diagram of an example of a vehicle encroaching on the centerline after it has entered the inside of a curve.

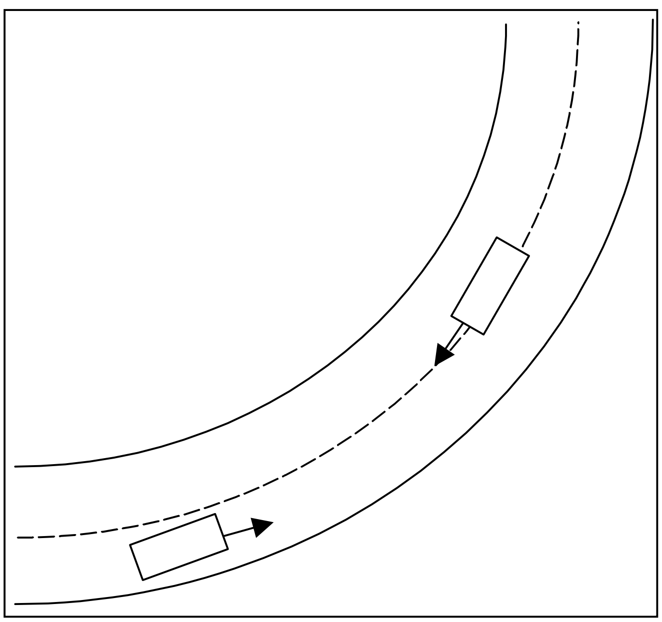

Figure 3-7
Example of Centerline Encroachment

3.2.1.1 Methodology

Video data was studied at two horizontal curve locations on TH 23 and TH 25. These locations are shown in Figure 3-8, and are represented by red solid triangles. TH 23 site was located just

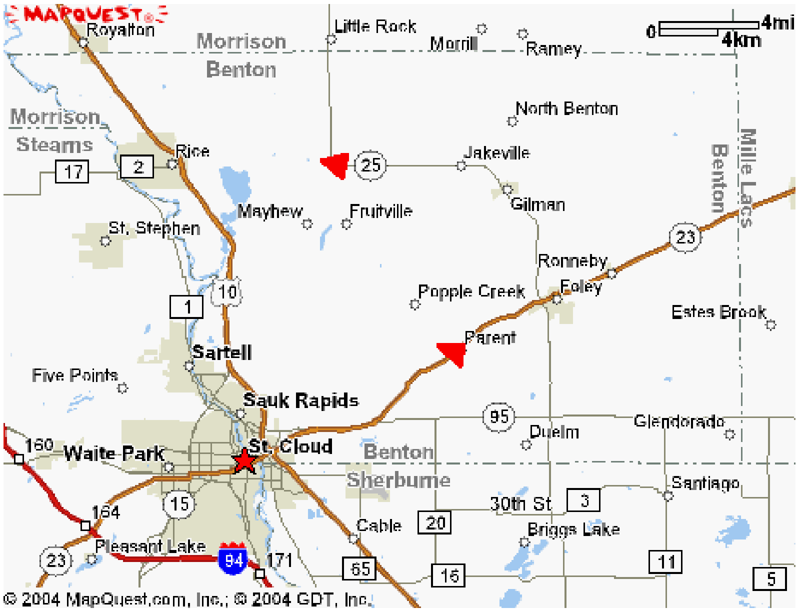

Figure 3-8
Horizontal Curve Data Collection Sites

northeast of reference point 217 (near Parent, MN). This horizontal curve has a relatively large radius, resulting in a gradual curve that can be driven at relatively high speeds. The camera was mounted on a tripod and located on the shoulder approximately 50 feet northeast of Benton County Road 83 (85th Ave) pointing in the direction of the horizontal curve to the northeast. The TH 25site was located just west/northwest of reference point 112. This horizontal curve has a relatively small radius of curvature, resulting in a fairly steep curve that cannot be comfortably driven at high speeds. The camera was mounted on a tripod and located on the shoulder just south of Benton County State Aid Highway 2 near the “MNTH 25” sign, pointing in the direction of the horizontal curve to the east.

Mn/DOT OTSO reduced the video data in the office by watching the video and manually documenting the number of times a vehicle encroached onto the centerline or crossed into the lane for oncoming traffic. A vehicle was considered to have encroached if at least one of its wheels crossed onto the yellow line, while crossing was considered to have occurred if at least one wheel completely crossed the inside yellow solid or broken stripe for the opposite direction.

3.2.1.2 Results

Encroachments on the centerline are a relatively rare occurrence. On the inside of curves, encroachments should generally be considered accidental. As a vehicle transitions from a tangent section to a horizontal curve, if the motorist is on the inside of the curve, not immediately recognizing that a transition needs to be made would result in the vehicle crossing the centerline. For vehicles approaching the outside of a horizontal curve, not immediately recognizing that a transition needs to be made would result in the vehicle crossing the outside edgeline. During data reduction, it was noted that many vehicles on the outside of curves 'cheated' the curve by intentionally encroaching on the centerline to shorten the distance traveled on the horizontal curve.

Table 3-2 includes a summary of the horizontal curve vehicle encroachment analysis. The results are profound. Appendix Tables 7 through 10 include the raw data from this analysis. At the TH 23 site, 0.6% of the vehicles on the inside of the curve encroached or crossed the centerline in the 'before' period. 7.5% of the vehicles on the outside of the curve encroached or crossed the centerline in the 'before' period. Both inside and outside curve traffic experienced significant reductions in the percentage of vehicles that encroached on the centerline in the 'after' condition – a 50% reduction for inside curve traffic, and a 76% reduction for outside curve traffic. The inside curve reduction, while slightly less that outside curve reductions, is more important. This is because, as mentioned above, inside curve encroachments are generally accidental. Logic dictates that accidental encroachments cause more centerline crossing crashes that do intentional crossings.

Table 3-2
Horizontal Curve Encroachment Summary

		Period	# Vehicles	% Encroaching or crossing Centerline	Reduction In Encroachments/ Crossings
TH 23	WB (inside curve)	Before	964	0.6%	50%
		After	643	0.3%	
	EB (outside curve)	Before	1121	7.5%	76%
		After	664	1.8%	
TH 25	WB (inside curve)	Before	175	7.4%	40%
		After	112	4.5%	

Note: Green Shading indicates statistically significant reduction

At the TH 25 site, data could only be collected for vehicles traversing the inside of the curve, because of the close proximity of a three-legged 'T' intersection on the horizontal curve. From viewing the video, it was impossible to determine whether traffic on the outside of the curve had come from mainline TH 25 or had entered TH 25 from the cross street. In the 'before' period, 7.4% of the vehicles encroached on or entirely crossed the centerline. This is a significantly larger percentage than on the TH 23 curve. This is because of the TH 25 curve is much sharper than the TH 23 curve. As will be discussed in more detail below, vehicles enter both curves at approximately the same speed (85^{th} percentile speed of roughly 65 mph). Because the TH 25 curve is steeper and cannot be driven at high speeds, the result is that more vehicles encroach on the centerline and do realize it until they have crossed the centerline. In the 'after' period, 4.5% of the vehicles encroached on or crossed the centerline on the TH 25 curve. This represents a significant reduction of 40%.

3.2.2 Speed Data

Speed data was collected and used as a MOE. In general, if any safety treatment results in reduced speeds, this is considered a positive effect.

3.2.2.1 Methodology

Speed data was collected on TH 23 at reference point 217 and on TH 25 at reference point 112, the same locations where video data was collected. Speeds were collected as vehicles approached the horizontal curve.

The methodology for collecting and analyzing speed data on horizontal curves is the same as was used for tangent sections. See section 2.1.2.1.

3.2.2.2 Results

Figures 3-9 and 3-10 display summaries of the speed studies on TH 23 and TH 25, respectively. Raw data from these studies is displayed as Appendix Tables 11 through 14.

On TH 23, the 'before' and 'after' 85^{th} percentile speeds were both 64 mph. The 10 mph pace was 55 – 64 mph in the 'before' condition, while the 10 mph pace was 56 – 65 mph in the 'after' condition. These data elements suggest that CLRS had very little affect on travel speed at the TH 23 site.

At the TH 25 site, the 'before' and 'after' 85^{th} percentile speeds were 65 and 64 mph, respectively. The 10 mph pace was 56 – 65 mph in the 'before' period and was 53 – 62 mph in the 'after' condition. These data elements suggest that CLRS had very little affect on travel speed at the TH 25 site.

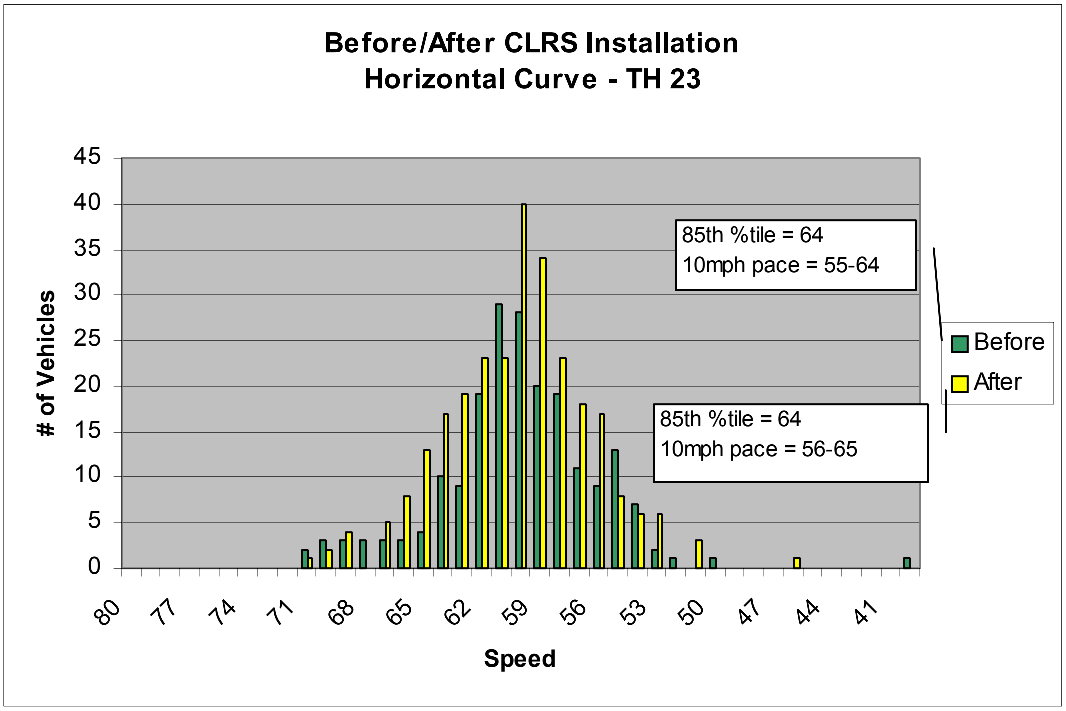

Figure 3-9
Speed Distribution – TH 23 Horizontal Curve

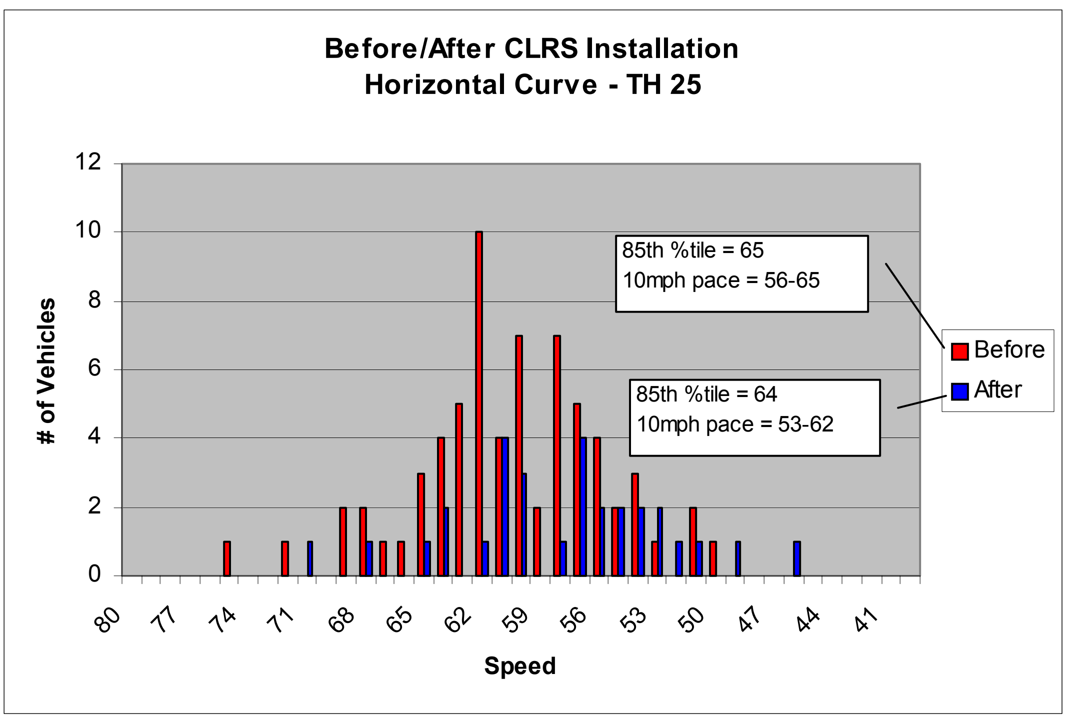

Figure 3-10
Speed Distribution – TH 25 Horizontal Curve

3.3 SUMMARY

The 'before' and 'after' tangent section analysis can be summarized by the following:

- CLRS had no impact on lateral placement of vehicles. This is in contrast to previous research in Pennsylvania that showed CLRS to have a significant effect on lateral vehicle placement away from the centerline (Mahoney, 2003).
- CLRS had very little affect on travel speed. 85^{th} percentile speeds and the 10 mph pace showed no appreciable differences.

The 'before' and 'after' horizontal curve analysis can be summarized by the following:

- CLRS had a profound and large affect on centerline encroachments and crossings. Reductions in encroachments ranged from 40% to 76%.
- CLRS had very little affect on travel speed. 85^{th} percentile speeds and the 10 mph pace showed no appreciable differences.

4.0 BEFORE – AFTER CRASH ANALYSIS

The most commonly used method of measuring a safety treatment's effectiveness in improving safety is the simple before-after analysis. This method simply counts the total number of crashes in the pre-defined "before" period, and comparing to the total number of crashes in the "after" period. It is desirable for the "before" and "after" periods to include at least three years before a safety treatment was implemented and the three years after a safety treatment was implemented, although this is not requirement. If more than three years of crash data are available for either period, it should be included in the analysis as long as there was not a drastic change to traffic operations, geometry, or demographics in the area. In some cases, it may not be possible to use a full three years of "after" data because of the installation date. In cases where the before and after periods are not equal, the analysis must be conducted on an average per year basis.

More and more in national scientific research, the simple before-after study's validity is being discounted because it fails to account for a phenomenon known as regression to the mean (Hauer, 2002). This refers to the fact that, by definition, most safety treatments are applied to sections of road or specific spot intersections that have recently exhibited higher than average crash characteristics. Crash patterns dictate that when locations show relatively high crash rates or numbers of crashes in a particular year, it is expected that these numbers will go down in subsequent years regardless of whether a safety treatment is applied or not. Thus, crash numbers tend to regress to the mean. The simple before-after crash analysis uses the count of "before" period crashes to predict what would have been the expected count of "after" period crashes. For this reason, the simple before-after analysis is fundamentally flawed.

Because the simple before-after analysis is still a popular method of evaluating a safety treatment in state departments of transportation, it is easily understood by the public, and despite of its shortcomings, it is included in this report.

4.1 METHODOLOGY

Table 4-1 is a selected sample of sections of trunk highways that contain CLRS, and represents the sample of roadways that are used for the before-after analysis. Included are 203 miles of roadway in Mn/DOT districts 3, 6, 7, and 8. Sections of roadway that do have CLRS but were not included in this analysis were excluded either because they were listed as being urban, or the installation date was in the early to mid 1990's (adequate crash data was not collected for the 'before' period analysis for these sections).

The sections of roadway from District 3 with installation dates in September, 2003 had no other safety treatments implemented at the time CLRS were installed. It is unknown whether or not the other sections of roadway in this analysis had other safety treatments implemented at the time CLRS were installed. The District 3 sections with September, 2003 installation dates make up 56% of the miles used in this before-after traffic safety analysis.

For each section of roadway, crash statistics dating back to 1996 were obtained from Mn/DOT's Office of Traffic, Security, and Operations. For each section of road, "before" and "after" periods were defined. The "before" periods were defined to include five years of data if the installation date allowed. For example, for the sections that had September, 2003 CLRS installation dates, the "before" period was defined as the five year period 1998 – 2002. For other sections, as many years available were used. For example, for a section of roadway with an installation date of August, 2000, the "before" period was defined as the four year period 1996 – 1999.

Table 4-1
CLRS Sections Statewide

Route Sys	Route Num	Start Ref	End Ref	Location Description	Install Date	Before Period	Afer Period	Length	Dist	SL
USTH	14	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	98-02	05	5.796	7	55
USTH	14	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	98-02	05	0.397	7	45
USTH	14	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLLT	Jun-04	98-02	05	6.686	7	55
MNTH	15	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	98-02	04-05	8.568	3	55
MNTH	15	143+00.616	145+00.492	BGN SB RTL	Sep-03	98-02	04-05	1.875	3	55
MNTH	18	*3.159*	019+00.593	BGN EB RTL	Sep-03	98-02	04-05	16.434	3	55
MNTH	23	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	96-99	01-02	3.491	8	65
MNTH	23	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	96-99	01-02	1.288	8	45
MNTH	23	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESVIL	Aug-00	96-99	01-02	2.246	8	55
MNTH	23	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROAD	Aug-00	96-99	01-02	3.506	8	65
MNTH	23	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESVIL	Aug-00	96-99	01-02,04-05	5.448	8	55
MNTH	23	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY	Sep-03	98-02	04-05	7.867	3	55
MNTH	23	222+00.811	223+00.833	BGN EB RTL	Sep-03	98-02	04-05	1.033	3	55
MNTH	23	224+00.041	226+00.187	BGN WB RTL	Sep-03	98-02	04-05	2.146	3	55
MNTH	23	226+00.630	229+00.641	BGN WB RTL	Sep-03	98-02	04-05	3.003	3	55
MNTH	23	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	98-02	04-05	2.195	3	55
MNTH	23	232+00.495	234+00.281	BGN WB RTL	Sep-03	98-02	04-05	1.778	3	55
MNTH	25	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY	Sep-03	98-02	04-05	3.815	3	55
MNTH	25	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKMA	Sep-03	98-02	04-05	5.281	3	55
MNTH	25	*105+00.140*	*117+00.527*		Sep-03	98-02	04-05	12.387	3	
MNTH	25	*118+00.034*	*121+00.658*		Sep-03	98-02	04-05	3.624	3	
MNTH	25	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH 27	Sep-03	98-02	04-05	3.777	3	55
MNTH	25	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINERD	Sep-03	98-02	04-05	25.672	3	55
MNTH	55	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	98-02	04-05	1.915	3	45
MNTH	55	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE L	Sep-03	98-02	04-05	2.189	3	55
MNTH	55	*147+00.221*	*147+00.325*		Sep-03	98-02	04-05	0.104	3	
MNTH	55	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUFF	Sep-03	98-02	04-05	6.23	3	55
USTH	63	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWARTV	Nov-99	96-98	00-02,04-05	3.914	6	55
MNTH	65	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MOR	Sep-03	98-02	04-05	11.461	3	55
USTH	71	128+00.964	129+00.204	CR-93 RT	Aug-00	96-99	01-02	0.267	8	65
USTH	71	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Aug-00	96-99	01-02	0.471	8	60
MNTH	95	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169	Sep-03	98-02	04-05	12.801	3	55
MNTH	95	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMBRI	Sep-03	98-02	04-05	3.503	3	55
USTH	169	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	98-02	04-05	7.061	3	55
USTH	169	225+00.787	226+00.896	BGN NB RTL	Sep-03	98-02	04-05	1.104	3	55
USTH	169	228+00.326	229+00.894	BGN NB RTL	Sep-03	98-02	04-05	1.582	3	55
USTH	169	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	98-02	04-05	1.107	3	55
MNTH	210	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	98-02	04-05	13.666	3	55
MNTH	371	046+00.796	051+00.530	BGN NB RTL	Sep-03	98-02	04-05	4.722	3	55
MNTH	371	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JENKI	Sep-03	98-02	04-05	2.381	3	55

The same methodology was used in defining the “after” period. However, at some point several sections of roadway that had CLRS were converted to 4-lane divided sections. An example of this is TH 23, from reference point 152+00.705 to reference point 168+00.559. This section of roadway began reconstructed to a 4-lane divided section in 2003. Therefore, the “after” period for this section was defined as 2001 – 2002. Also note that crash data from 2003 was excluded from this analysis because of questions of data integrity caused by a change in data collection and storage experienced in 2003 at the Minnesota Department of Public Safety.

4.2 RESULTS

Two types of analysis were conducted: all crashes and only the target crashes for CLRS. Target crashes for CLRS are those that CLRS are intended to reduce – cross centerline crashes. These include head-one, sideswipe opposing, and run off the road left crashes.

4.2.1 Definition of Terms

The following are definitions of terms that are used in the following sections:

- Crash Severity
  - F: worst injury is a fatality
  - 'A' Severity: worst injury is an incapacitating injury
  - 'B' Severity: worst injury is a non-incapacitating injury
  - 'C' Severity: worst injury is 'C', usually a complaint of pain by one of the persons involved in the crash
  - PD: property damage only
- Crash Rate: number of crashes per million vehicle miles traveled
- Severity Rate: weighted crash rate, giving a weighting of 5 to fatals, 4 to 'A' severity, 3 to 'C' severity, 2 to 'B' severity, and 1 to property damage only
- Average Daily Traffic (ADT): the average number of vehicles that pass a given point, both direction, in one day
- Crash Density: number of crashes per mile per year

4.2.2 All Crashes

Table 4-2 contains before and after crash statistics, using all crash types, for the sections identified above. Appendix Tables 15 – 24 contain raw data for each section for 1996 through 2005. Table 4-3 represents percent change in several key crash statistics.

Table 4-2
Before-After Section Analysis: 2-Lane Rural Roads with CLRS
All Crash Types

					BEFORE PERIOD (per year)						AFTER PERIOD (per year)					
Route	Route				Avg	All Crashes					Avg	All Crashes				
Sys	Num	Start Ref	End Ref	Length	ADT	F&A	Total	CR	SR	Density	ADT	F&A	Total	CR	SR	Density
USTH	14	*104.376*	110+00.172	5.796	6,494	0.4	14	1.0	1.6	2.4	6,871	0.0	13	0.9	1.0	2.2
USTH	14	110+00.172	110+00.569	0.397	6,231	0.0	1.2	1.3	2.4	3.0	7,389	0.0	2	1.9	1.9	5.0
USTH	14	111+00.165	117+00.900	6.686	5,513	0.2	7.6	0.6	0.8	1.1	6,130	0.0	6	0.4	0.7	0.9
MNTH	15	134+00.155	142+00.705	8.568	6,287	1.0	13.2	0.7	1.2	1.5	6,922	1.0	10	0.5	0.7	1.2
MNTH	15	143+00.616	145+00.492	1.875	8,314	0.0	7	1.2	2.1	3.7	8,922	0.0	9.5	1.6	2.7	5.1
MNTH	18	*3.159*	019+00.593	16.434	6,443	1.0	28	0.7	1.2	1.7	6,601	0.5	27	0.7	1.1	1.6
MNTH	23	152+00.705	156+00.081	3.491	6,794	1.3	9	1.0	2.3	2.6	7,792	0.5	9.5	1.0	1.9	2.7
MNTH	23	156+00.081	157+00.362	1.288	8,789	0.0	9	2.2	3.6	7.0	10,447	0.0	11	2.2	2.7	8.5
MNTH	23	157+00.362	159+00.616	2.246	7,871	0.5	8.25	1.3	2.3	3.7	8,869	0.5	10	1.4	2.5	4.5
MNTH	23	159+00.616	163+00.123	3.506	5,725	0.0	6	0.8	1.3	1.7	6,124	0.0	9	1.1	1.7	2.6
MNTH	23	163+00.123	168+00.559	5.448	4,731	0.0	5.25	0.6	1.0	1.0	5,205	0.0	6.75	0.7	1.3	1.2
MNTH	23	*212.950*	220+00.817	7.867	7,237	1.2	12.4	0.6	1.0	1.6	8,020	1.0	15	0.7	1.1	1.9
MNTH	23	222+00.811	223+00.833	1.033	6,054	0.2	1.2	0.5	1.1	1.2	6,641	0.0	1.5	0.6	1.4	1.5
MNTH	23	224+00.041	226+00.187	2.146	5,027	0.0	3.8	1.0	1.4	1.8	5,614	0.0	1	0.2	0.5	0.5
MNTH	23	226+00.630	229+00.641	3.003	5,027	0.2	2.8	0.5	0.8	0.9	5,614	0.0	1.5	0.2	0.3	0.5
MNTH	23	229+00.641	231+00.816	2.195	5,027	0.0	1.8	0.4	0.7	0.8	5,614	0.0	1.5	0.3	0.9	0.7
MNTH	23	232+00.495	234+00.281	1.778	6,892	0.0	3	0.7	1.0	1.7	8,020	0.0	5.5	1.1	1.8	3.1
MNTH	25	*93.919*	*97.734*	3.815	2,784	0.0	2.4	0.6	0.8	0.6	3,353	0.0	0.5	0.1	0.2	0.1
MNTH	25	099+00.400	*104.681*	5.281	1,648	0.0	2.8	0.9	1.6	0.5	2,001	0.0	3	0.8	1.3	0.6
MNTH	25	*105+00.140*	*117+00.527*	12.387	1,648	0.4	6.4	0.9	1.5	0.5	2,001	0.0	1.5	0.2	0.2	0.1
MNTH	25	*118+00.034*	*121+00.658*	3.624	1,648	0.6	3.2	1.5	3.1	0.9	2,001	0.0	0.5	0.2	0.2	0.1
MNTH	25	*122.816*	*126.593*	3.777	2,596	0.0	4.2	1.2	2.1	1.1	2,271	1.0	3	1.0	2.6	0.8
MNTH	25	129+00.605	*155.277*	25.672	2,107	1.6	21	1.1	2.0	0.8	2,120	0.5	20	1.0	1.6	0.8
MNTH	55	142+00.070	*143.985*	1.915	8,666	0.0	3.6	0.6	0.7	1.9	10,518	0.0	0.5	0.1	0.1	0.3
MNTH	55	*144.517*	*146.706*	2.189	8,361	0.2	3.4	0.5	1.1	1.6	9,515	0.0	1.5	0.2	0.2	0.7
MNTH	55	*147+00.221*	*147+00.325*	0.104	8,361	0.0	0	0.0	0.0	0.0	9,515	0.0	1	2.8	2.8	9.6
MNTH	55	148+00.777	155+00.013	6.23	10,643	0.4	17.6	0.7	1.2	2.8	11,546	0.5	16	0.6	1.1	2.6
USTH	63	023+00.552	027+00.456	3.914	6,898	1.3	5.667	0.6	1.2	1.4	7,307	0.2	5.4	0.5	0.7	1.4
MNTH	65	*51.539*	063+00.000	11.461	7,149	0.8	23.8	0.8	1.3	2.1	7,872	1.5	28	0.9	1.5	2.4
USTH	71	128+00.964	129+00.204	0.267	12,827	0.0	1.5	1.2	1.4	5.6	13,814	0.0	2.5	1.9	3.0	9.4
USTH	71	129+00.204	129+00.675	0.471	12,593	0.0	1	0.5	0.7	2.1	13,534	0.0	0	0.0	0.0	0.0
MNTH	95	*9.204*	022+00.005	12.801	4,244	0.8	14.6	0.7	1.2	1.1	4,654	1.0	14	0.6	1.1	1.1
MNTH	95	024+00.495	028+00.000	3.503	6,377	0.4	6.6	0.8	1.6	1.9	6,653	0.0	5.5	0.6	0.9	1.6
USTH	169	216+00.650	223+00.687	7.061	10,120	0.8	18.2	0.7	1.1	2.6	11,902	1.0	19	0.6	1.1	2.7
USTH	169	225+00.787	226+00.896	1.104	10,586	0.2	1	0.2	0.5	0.9	11,028	0.0	2.5	0.6	0.9	2.3
USTH	169	228+00.326	229+00.894	1.582	9,238	0.2	4.6	0.9	1.5	2.9	9,524	0.0	2	0.4	0.4	1.3
USTH	169	234+00.246	235+00.357	1.107	4,833	0.2	2.2	1.1	1.8	2.0	4,261	0.0	2	1.2	1.7	1.8
MNTH	210	160+00.459	174+00.122	13.666	2,830	0.2	13.8	1.0	1.4	1.0	3,315	1.5	11.5	0.7	1.3	0.8
MNTH	371	046+00.796	051+00.530	4.722	10,096	0.4	15.6	0.9	1.3	3.3	10,927	0.5	14.5	0.8	1.4	3.1
MNTH	371	052+00.220	054+00.595	2.381	9,284	1.2	7.4	0.9	1.8	3.1	9,026	0.5	10	1.3	2.3	4.2
TOTAL				***203***	***5,333***	***16***	***314***	***0.80***	***1.34***	***1.55***	***5,831***	***12***	***304***	***0.70***	***1.18***	***1.50***

Table 4-3
Before-After Section Analysis: 2-Lane Rural Roads with CLRS
Percent Change, All Crash Types

Route Sys	Route Num	Start Ref	End Ref	Dist	Before-After Analysis Percent Change				
					F&A	Total	CR	SR	Density
USTH	14	*104.376*	110+00.172	7	-100%	-6%	-11%	-34%	-6%
USTH	14	110+00.172	110+00.569	7	-	67%	41%	-23%	67%
USTH	14	111+00.165	117+00.900	7	-100%	-21%	-29%	-5%	-21%
MNTH	15	134+00.155	142+00.705	3	0%	-24%	-31%	-41%	-24%
MNTH	15	143+00.616	145+00.492	3	-	36%	26%	26%	36%
MNTH	18	*3.159*	019+00.593	3	-50%	-4%	-6%	-7%	-4%
MNTH	23	152+00.705	156+00.081	8	-60%	6%	-8%	-19%	6%
MNTH	23	156+00.081	157+00.362	8	-	22%	3%	-23%	22%
MNTH	23	157+00.362	159+00.616	8	0%	21%	8%	11%	21%
MNTH	23	159+00.616	163+00.123	8	-	50%	40%	25%	50%
MNTH	23	163+00.123	168+00.559	8	-	29%	17%	31%	29%
MNTH	23	*212.950*	220+00.817	3	-17%	21%	9%	12%	21%
MNTH	23	222+00.811	223+00.833	3	-100%	25%	14%	23%	25%
MNTH	23	224+00.041	226+00.187	3	-	-74%	-76%	-67%	-74%
MNTH	23	226+00.630	229+00.641	3	-100%	-46%	-52%	-61%	-46%
MNTH	23	229+00.641	231+00.816	3	-	-17%	-25%	19%	-17%
MNTH	23	232+00.495	234+00.281	3	-	83%	58%	86%	83%
MNTH	25	*93.919*	*97.734*	3	-	-79%	-83%	-72%	-79%
MNTH	25	099+00.400	*104.681*	3	-	7%	-12%	-18%	7%
MNTH	25	*105+00.140*	*117+00.527*	3	-100%	-77%	-81%	-89%	-77%
MNTH	25	*118+00.034*	*121+00.658*	3	-100%	-84%	-87%	-94%	-84%
MNTH	25	*122.816*	*126.593*	3	-	-29%	-18%	20%	-29%
MNTH	25	129+00.605	*155.277*	3	-69%	-5%	-5%	-20%	-5%
MNTH	55	142+00.070	*143.985*	3	-	-86%	-89%	-91%	-86%
MNTH	55	*144.517*	*146.706*	3	-100%	-56%	-61%	-82%	-56%
MNTH	55	*147+00.221*	*147+00.325*	3	-	-	-	-	-
MNTH	55	148+00.777	155+00.013	3	25%	-9%	-16%	-9%	-9%
USTH	63	023+00.552	027+00.456	6	-85%	-5%	-10%	-37%	-5%
MNTH	65	*51.539*	063+00.000	3	88%	18%	7%	16%	18%
USTH	71	128+00.964	129+00.204	8	-	67%	55%	112%	67%
USTH	71	129+00.204	129+00.675	8	-	-100%	-100%	-100%	-100%
MNTH	95	*9.204*	022+00.005	3	25%	-4%	-13%	-4%	-4%
MNTH	95	024+00.495	028+00.000	3	-100%	-17%	-20%	-44%	-17%
USTH	169	216+00.650	223+00.687	3	25%	4%	-11%	-2%	4%
USTH	169	225+00.787	226+00.896	3	-100%	150%	140%	92%	150%
USTH	169	228+00.326	229+00.894	3	-100%	-57%	-58%	-76%	-57%
USTH	169	234+00.246	235+00.357	3	-100%	-9%	3%	-5%	-9%
MNTH	210	160+00.459	174+00.122	3	650%	-17%	-29%	-7%	-17%
MNTH	371	046+00.796	051+00.530	3	25%	-7%	-14%	4%	-7%
MNTH	371	052+00.220	054+00.595	3	-58%	35%	39%	29%	35%
TOTAL					***-25%***	***-3%***	***-11%***	***-12%***	***-3%***

Note: Blue indicates statistical significant change

For the combined 203 miles of roadway with CLRS that is included in this analysis, the following trends were found, and are displayed in Figure 4-1:

- 25% reduction in fatal and 'A' severity crashes per year in the after period (four [4] fewer per year)
- 3% reduction in total crashes per year (10 fewer total crashes per year)
- 11% reduction in crash rate in the after period
- 12% reduction in severity rate in the after period
- 3% reduction in crash density in the after period
- 9% increase in ADT

Assuming the crash data is distributed as Poisson, and that the before and after data sets are independent, all measures of safety identified below are statistically significant.

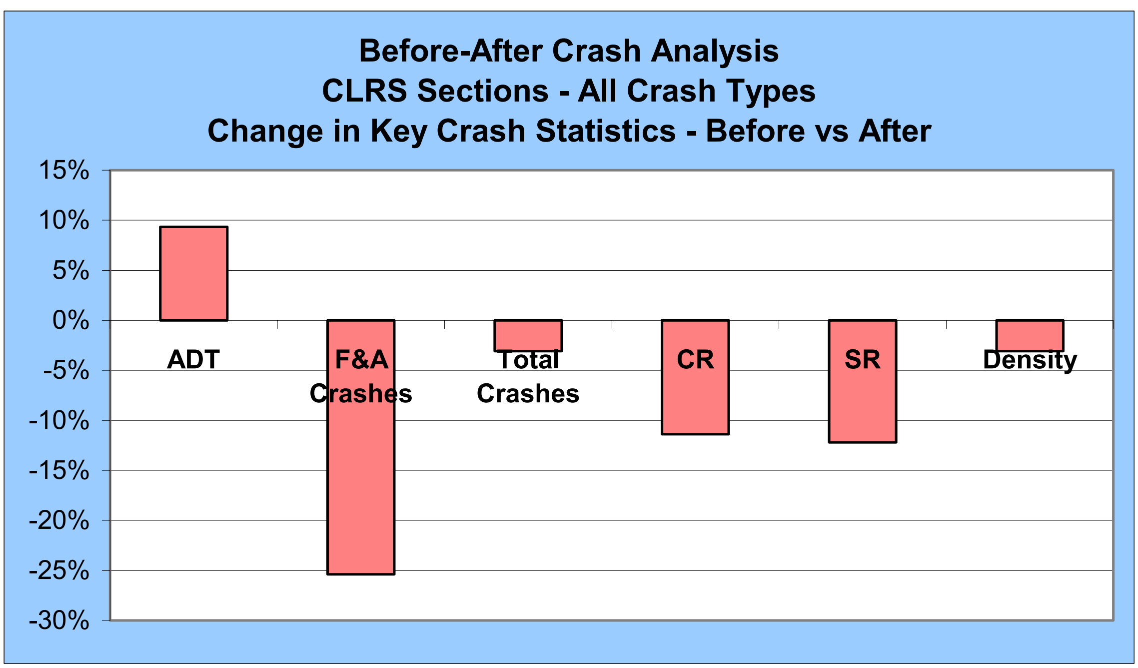

Figure 4-1
Before –After Crash Analysis: All Crashes

These results are significant. Every key crash statistic decreased, even those that are positively related to exposure. Total Fatal and 'A' Severity crashes decreased by 25%, crash rate and severity rate both decrease by more than 10%, even while ADT increased by nearly 10%. This suggests that CLRS have a postive impact on safety performance of a roadway. In order to make a better determination on the positive effect CLRS have on safety performance, it is necessary to isolate only the target crashes that CLRS are intended to reduce. The next section includes this analysis.

4.2.3 Target Crashes Only

Table 4-4 contains before and after crash statistics, using only target crashes, for the sections identified above. Appendix Tables 25 – 34 contain raw data for each section for 1996 through 2005, target crashes only. Again, target crashes are defined as being head-on, sideswipe opposing, and run off the road left. Table 4-5 represents percent change in several key crash statistics.

Table 4-4
Before-After Section Analysis: 2-Lane Rural Roads with CLRS
Target Crashes Only (ROR left, head on, sd swipe opp crashes only)

					BEFORE PERIOD (per year)						AFTER PERIOD (per year)					
Route	Route				Avg	Target Crashes Only					Avg	Target Crashes Only				
Sys	Num	Start Ref	End Ref	Length	ADT	F&A	Total	CR	SR	Density	ADT	F&A	Total	CR	SR	Density
USTH	14	*104.376*	110+00.172	5.796	6,494	0.2	1.4	0.1	0.2	0.2	6,871	0.0	4	0.3	0.3	0.7
USTH	14	110+00.172	110+00.569	0.397	6,231	0.0	0.4	0.4	0.9	1.0	7,389	0.0	0	0.0	0.0	0.0
USTH	14	111+00.165	117+00.900	6.686	5,513	0.2	1.8	0.1	0.2	0.3	6,130	0.0	3	0.2	0.2	0.4
MNTH	15	134+00.155	142+00.705	8.568	6,287	1.0	4	0.2	0.5	0.5	6,922	1.0	2	0.1	0.3	0.2
MNTH	15	143+00.616	145+00.492	1.875	8,314	0.0	2	0.4	0.6	1.1	8,922	0.0	1.5	0.2	0.5	0.8
MNTH	18	*3.159*	019+00.593	16.434	6,443	0.6	6	0.2	0.3	0.4	6,601	0.5	6.5	0.2	0.3	0.4
MNTH	23	152+00.705	156+00.081	3.491	6,794	0.0	0.25	0.0	0.0	0.1	7,792	0.0	0.5	0.1	0.1	0.1
MNTH	23	156+00.081	157+00.362	1.288	8,789	0.0	0	0.0	0.0	0.0	10,447	0.0	1.5	0.3	0.3	1.2
MNTH	23	157+00.362	159+00.616	2.246	7,871	0.5	2	0.3	0.7	0.9	8,869	0.5	1	0.1	0.4	0.4
MNTH	23	159+00.616	163+00.123	3.506	5,725	0.0	0.5	0.1	0.1	0.1	6,124	0.0	1	0.1	0.2	0.3
MNTH	23	163+00.123	168+00.559	5.448	4,731	0.0	0.5	0.1	0.1	0.1	5,205	0.0	1.25	0.1	0.2	0.2
MNTH	23	*212.950*	220+00.817	7.867	7,237	0.8	2	0.1	0.3	0.3	8,020	0.5	4	0.2	0.4	0.5
MNTH	23	222+00.811	223+00.833	1.033	6,054	0.2	0.6	0.3	0.6	0.6	6,641	0.0	0.5	0.2	0.4	0.5
MNTH	23	224+00.041	226+00.187	2.146	5,027	0.0	0.8	0.2	0.3	0.4	5,614	0.0	0	0.0	0.0	0.0
MNTH	23	226+00.630	229+00.641	3.003	5,027	0.2	0.6	0.1	0.3	0.2	5,614	0.0	0	0.0	0.0	0.0
MNTH	23	229+00.641	231+00.816	2.195	5,027	0.0	0	0.0	0.0	0.0	5,614	0.0	0.5	0.1	0.2	0.2
MNTH	23	232+00.495	234+00.281	1.778	6,892	0.0	0.4	0.1	0.1	0.2	8,020	0.0	1.5	0.3	0.4	0.8
MNTH	25	*93.919*	*97.734*	3.815	2,784	0.0	0.2	0.1	0.1	0.1	3,353	0.0	0.5	0.1	0.1	0.1
MNTH	25	099+00.400	*104.681*	5.281	1,648	0.0	0.6	0.2	0.4	0.1	2,001	0.0	0	0.0	0.0	0.0
MNTH	25	*105+00.140*	*117+00.527*	12.387	1,648	0.0	0.6	0.1	0.1	0.0	2,001	0.0	0	0.0	0.0	0.0
MNTH	25	*118+00.034*	*121+00.658*	3.624	1,648	0.0	0.8	0.4	0.6	0.2	2,001	0.0	0	0.0	0.0	0.0
MNTH	25	*122.816*	*126.593*	3.777	2,596	0.0	0.6	0.2	0.2	0.2	2,271	0.5	0.5	0.2	0.8	0.1
MNTH	25	129+00.605	*155.277*	25.672	2,107	0.6	3.6	0.2	0.4	0.1	2,120	0.0	4	0.2	0.2	0.2
MNTH	55	142+00.070	*143.985*	1.915	8,666	0.0	0.8	0.1	0.1	0.4	10,518	0.0	0	0.0	0.0	0.0
MNTH	55	*144.517*	*146.706*	2.189	8,361	0.2	1.6	0.2	0.5	0.7	9,515	0.0	1	0.1	0.1	0.5
MNTH	55	*147+00.221*	*147+00.325*	0.104	8,361	0.0	0	0.0	0.0	0.0	9,515	0.0	0.5	1.4	1.4	4.8
MNTH	55	148+00.777	155+00.013	6.23	10,643	0.0	1.8	0.1	0.1	0.3	11,546	0.5	1	0.0	0.1	0.2
USTH	63	023+00.552	027+00.456	3.914	6,898	1.3	2	0.2	0.7	0.5	7,307	0.2	0.4	0.0	0.1	0.1
MNTH	65	*51.539*	063+00.000	11.461	7,149	0.4	4.4	0.1	0.3	0.4	7,872	0.0	3	0.1	0.2	0.3
USTH	71	128+00.964	129+00.204	0.267	12,827	0.0	1.25	1.0	1.2	4.7	13,814	0.0	0.5	0.4	0.7	1.9
USTH	71	129+00.204	129+00.675	0.471	12,593	0.0	0.25	0.1	0.1	0.5	13,534	0.0	0	0.0	0.0	0.0
MNTH	95	*9.204*	022+00.005	12.801	4,244	0.0	0.8	0.0	0.0	0.1	4,654	1.0	5	0.2	0.5	0.4
MNTH	95	024+00.495	028+00.000	3.503	6,377	0.2	1.4	0.2	0.4	0.4	6,653	0.0	0	0.0	0.0	0.0
USTH	169	216+00.650	223+00.687	7.061	10,120	0.4	2.8	0.1	0.2	0.4	11,902	1.0	5	0.2	0.3	0.7
USTH	169	225+00.787	226+00.896	1.104	10,586	0.0	0	0.0	0.0	0.0	11,028	0.0	0	0.0	0.0	0.0
USTH	169	228+00.326	229+00.894	1.582	9,238	0.2	0.8	0.1	0.4	0.5	9,524	0.0	0.5	0.1	0.1	0.3
USTH	169	234+00.246	235+00.357	1.107	4,833	0.0	0	0.0	0.0	0.0	4,261	0.0	1.5	0.9	1.5	1.4
MNTH	210	160+00.459	174+00.122	13.666	2,830	0.2	4.2	0.3	0.5	0.3	3,315	1.0	4	0.2	0.5	0.3
MNTH	371	046+00.796	051+00.530	4.722	10,096	0.2	1.8	0.1	0.2	0.4	10,927	0.5	4	0.2	0.4	0.8
MNTH	371	052+00.220	054+00.595	2.381	9,284	0.6	1.8	0.2	0.6	0.8	9,026	0.5	2	0.3	0.5	0.8
TOTAL				***203***	***5,333***	***8***	***55***	***0.14***	***0.30***	***0.27***	***5,831***	***8***	***62***	***0.14***	***0.26***	***0.31***

Table 4-5
Section Analysis: 2-Lane Rural Roads with CLRS
Target Crashes Only (ROR left, head on, sd swipe opp crashes only)

Route Sys	Route Num	Start Ref	End Ref	Dist	Before-After Analysis Percent Change				
					F&A	Total	CR	SR	Density
USTH	14	*104.376*	110+00.172	7	-100%	186%	170%	11%	186%
USTH	14	110+00.172	110+00.569	7	-	-100%	-100%	-100%	-100%
USTH	14	111+00.165	117+00.900	7	-100%	67%	50%	4%	67%
MNTH	15	134+00.155	142+00.705	3	0%	-50%	-55%	-38%	-50%
MNTH	15	143+00.616	145+00.492	3	-	-25%	-30%	-13%	-25%
MNTH	18	*3.159*	019+00.593	3	-17%	8%	6%	-14%	8%
MNTH	23	152+00.705	156+00.081	8	-	100%	74%	249%	100%
MNTH	23	156+00.081	157+00.362	8	-	-	-	-	-
MNTH	23	157+00.362	159+00.616	8	0%	-50%	-56%	-41%	-50%
MNTH	23	159+00.616	163+00.123	8	-	100%	87%	40%	100%
MNTH	23	163+00.123	168+00.559	8	-	150%	127%	105%	150%
MNTH	23	*212.950*	220+00.817	3	-38%	100%	80%	35%	100%
MNTH	23	222+00.811	223+00.833	3	-100%	-17%	-24%	-35%	-17%
MNTH	23	224+00.041	226+00.187	3	-	-100%	-100%	-100%	-100%
MNTH	23	226+00.630	229+00.641	3	-100%	-100%	-100%	-100%	-100%
MNTH	23	229+00.641	231+00.816	3	-	-	-	-	-
MNTH	23	232+00.495	234+00.281	3	-	275%	222%	186%	275%
MNTH	25	*93.919*	*97.734*	3	-	150%	108%	108%	150%
MNTH	25	099+00.400	*104.681*	3	-	-100%	-100%	-100%	-100%
MNTH	25	*105+00.140*	*117+00.527*	3	-	-100%	-100%	-100%	-100%
MNTH	25	*118+00.034*	*121+00.658*	3	-	-100%	-100%	-100%	-100%
MNTH	25	*122.816*	*126.593*	3	-	-17%	-5%	376%	-17%
MNTH	25	129+00.605	*155.277*	3	-100%	11%	10%	-49%	11%
MNTH	55	142+00.070	*143.985*	3	-	-100%	-100%	-100%	-100%
MNTH	55	*144.517*	*146.706*	3	-100%	-38%	-45%	-74%	-38%
MNTH	55	*147+00.221*	*147+00.325*	3	-	-	-	-	-
MNTH	55	148+00.777	155+00.013	3	-	-44%	-49%	-19%	-44%
USTH	63	023+00.552	027+00.456	6	-85%	-80%	-81%	-85%	-80%
MNTH	65	*51.539*	063+00.000	3	-100%	-32%	-38%	-47%	-32%
USTH	71	128+00.964	129+00.204	8	-	-60%	-63%	-38%	-60%
USTH	71	129+00.204	129+00.675	8	-	-100%	-100%	-100%	-100%
MNTH	95	*9.204*	022+00.005	3	-	525%	470%	1040%	525%
MNTH	95	024+00.495	028+00.000	3	-100%	-100%	-100%	-100%	-100%
USTH	169	216+00.650	223+00.687	3	150%	79%	52%	33%	79%
USTH	169	225+00.787	226+00.896	3	-	-	-	-	-
USTH	169	228+00.326	229+00.894	3	-100%	-38%	-39%	-80%	-38%
USTH	169	234+00.246	235+00.357	3	-	-	-	-	-
MNTH	210	160+00.459	174+00.122	3	400%	-5%	-19%	-2%	-5%
MNTH	371	046+00.796	051+00.530	3	150%	122%	105%	131%	122%
MNTH	371	052+00.220	054+00.595	3	-17%	11%	14%	-18%	11%
TOTAL					***-4%***	***12%***	***3%***	***-11%***	***12%***

Note: None of the TOTAL changes were statistically significant

For the combined 203 miles of roadway with CLRS that is included in this analysis, the following trends were found, and are displayed in Figure 4-2:

- 4% reduction in fatal and ‘A’ severity crashes per year in the after period (0.3 fewer per year)
- 12% increase in total crashes per year (7 more total crashes per year)
- 3% increase in crash rate in the after period
- 11% reduction in severity rate in the after period
- 12% increase in crash density in the after period
- 9% increase in ADT

Assuming the crash data is distributed as Poisson, and that the before and after data sets are independent, none of the measures of safety identified below are statistically significant.

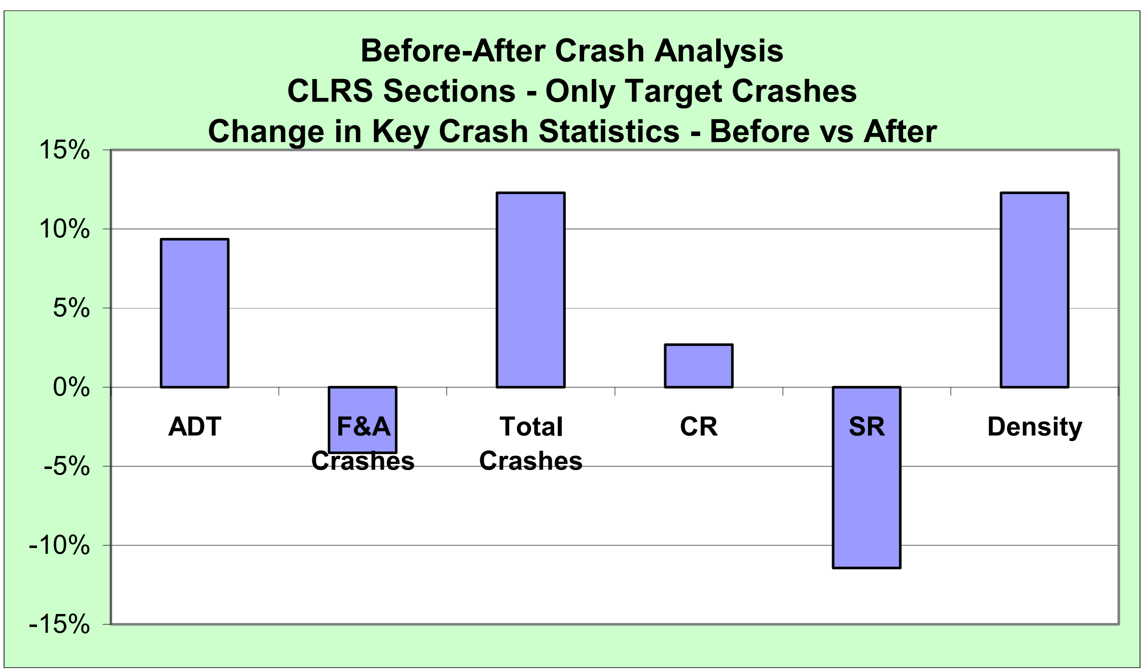

Figure 4-2
Before-After Crash Analysis: Target Crashes Only

These results are much less conclusive than are the results for all crashes; however, it is important to remember that by only considering target crashes (which tend to be fairly rare crashes), the pool of crashes is drastically reduced. This is why the results are not statistically significant. The increases in total crashes per year and crash density are consistent with the increase in ADT. This is not unexpected, because total number of crashes and crash density are positively related to the exposure, or number of vehicles that drive past a given point. As ADT increase, total crashes and therefore crash density increase. Crash rate increased slightly, at 3%, while fatal and 'A' crashes and severity rate decreased by 4% and 11%, respectively.

5.0 CROSS SECTIONAL STUDY

As discussed in the previous chapter, the simple before-after study does not account for regression to the mean. For this reason, it is beginning to lose some validity in national research circles. A cross sectional study compares like sections of road over the same time period, one group with a particular safety treatment, one without, thus eliminating many potential sources of error associated with time such as weather, deer population, regional demographics, others.

A cross sectional study compares safety performance of similar roadways during the same years. One group, called the treatment group, contains roadways that have had a particular safety treatment deployed. The other group, called the control group, does not have the safety treatment being researched. The control group is used as a prediction of what the safety performance of the treatment group would have been had the safety treatment not been deployed. When selecting the control group, it is extremely important to only select those roadways or locations that truly are as similar to the treatment group as possible. In this case, that means that the treatment and control groups should have similar speed limits, geometry, rural vs urban characteristics, and geographic location.

5.1 METHODOLOGY

Table 5-1 displays the treatment group. These are locations in Mn/DOT's District 3 that had CLRS installed in the fall of 2003. All of these sections are 2-lane rural roadways with speed limits of 45 mph or greater and ADT's greater than 4,500 and less than or equal to 10,000. There are 109 miles of roadway in the treatment group. Table 5-2 displays the roadways that were chosen as the control group. All of these sections are also 2-lane rural roadways from District 3, with speed limits greater than or equal to 45 mph, and ADT's greater than 4,500 and less than or equal to 10,000. There are 215 miles of roadway in the control group.

Table 5-1
Treatment Group – Selected D3 Locations with CLRS

Route Sys	Route Num	Start Ref	End Ref	Location Description	Length	SL
MNTH	15	133+00.260	142+00.740	BEG SL 55 N SIDE KIMBALL TO SL 35 S SIDE LUXEMBERG	9.492	55
MNTH	15	143+00.540	145+00.650	BEG SL 55 N SIDE LXMBRG TO SL 65 4 LN .7 MI S I-94	2.109	55
MNTH	18	002+00.930	020+00.200	BEG SL 55 E SIDE BRAINERD TO SL 35 W SIDE GARRISON	17.26	55
MNTH	23	213+00.915	221+00.000	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY	7.121	55
MNTH	23	*222.435*	*223.833*	*BEG SL 55 E SIDE FOLEY TO SL 50 W SIDE FORESTON*	1.398	55
MNTH	23	*223.997*	*226.187*		2.19	55
MNTH	23	*226.617*	*231.816*		5.199	55
MNTH	23	232+00.035	232+00.438	BEG SL 50 W SIDE TO BEG SL 55 E SIDE FORESTON	0.403	50
MNTH	23	232+00.438	234+00.801	BG SL 55 E SIDE FORESTON TO BEG SL 30 W SIDE MILACA	2.355	55
MNTH	55	*142.218*	*143.985*	*BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE LAKE*	1.767	45
MNTH	55	*144.517*	*146.706*		2.189	55
MNTH	55	*147.221*	*147.325*		0.104	55
MNTH	55	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUFFALO	6.23	55
MNTH	65	*51.539*	*62.827*		11.288	55
MNTH	95	*9.204*	*21.917*		12.713	55
MNTH	95	*24.519*	*27.488*	*BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMBRIDGE*	2.969	55
USTH	169	*216.513*	*223.687*		7.174	55
USTH	169	*225.748*	*226.896*	*BEG SL 55 .6 MI S CSAH 35 TO SL 35 .3 MI S TH 18*	1.148	55
USTH	169	*227.979*	*229.894*		1.915	55
MNTH	371	046+00.050	051+00.530	BEG SL 55 N SIDE NISSWA TO SL 35 S SIDE PEQUOT LKS	5.468	55
MNTH	371	052+00.220	055+00.032	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JENKINS	2.812	55
MNTH	371	055+00.411	060+00.835	BEG SL 55 N SIDE JENKINS TO SL 30 S SIDE PINE RIVER	5.425	55

The cross sectional study included collecting crash data and traffic data for each section in the treatment group and the control group, for the years 2004 and 2005. These two years were selected for analysis because all of the treatment group sections had CLRS installed in 2003. Several key crash statistics were calculated and comparisons were made across the two groups. Because the total number of miles of roadway in the treatment group was roughly half the mileage in the control group, comparisons of total raw numbers of crashes could be made. Only comparisons that were length and/or traffic adjusted could be made.

Table 5-2
Control Group
D3 Locations without CLRS

Route Sys	Route Num	Start Ref	End Ref	Location Description	Length	SL
USTH	10	090+00.393	090+00.820	BEG SL 50 END 3 LN .3 MI E TH 71 TO BG SL 55/WADENA	0.427	50
USTH	10	090+00.820	092+00.620	BEG SL 55 .9 MI E TH 71 TO BEG DIV .5 MI E CR 108	1.787	55
USTH	10	105+00.874	106+00.815	BEG 2 LN TO BEG SL 40/W SIDE STAPLES	0.938	55
USTH	12	114+00.641	117+00.340	BEG D3 MEEKER-WRIGHT CN TO BEG SL 35/W COKATO	2.687	55
USTH	12	118+00.890	119+00.931	BEG SL 55 .5 MI E COKATO TO 4 LN PASS/E COKATO	1.03	55
USTH	12	121+00.551	123+00.700	END 4 LN PASS/E COKATO TO SL 30 W SIDE HOWARD LAKE	2.143	55
USTH	12	125+00.003	128+00.800	BG SL 55 .2 MI E CSAH 7 TO BEG SL 45 .3 MI W CSAH 8	3.788	55
USTH	12	132+00.260	134+00.217	BEG SL 55 .2 MI E TH 25 TO BEG 4LN PASS/E JCT TH 25	1.964	55
MNTH	18	002+00.327	002+00.380	BEG SL 45 .6 MI E CSAH 45 TO SL 50 E SIDE BRAINERD	0.053	45
MNTH	23	174+00.922	185+00.832	BEG SL 55 E SIDE PAYNSVLLE TO SL 50 W SIDE RICHMOND	10.895	55
MNTH	23	186+00.503	190+00.161	BG SL 55 E SIDE RCHMOND TO SL 30 W SIDE COLD SPRING	3.684	55
MNTH	23	*223.833*	*223.997*		0.164	55
MNTH	23	*226.187*	*226.617*		0.43	55
MNTH	23	235+00.882	236+00.772	BG SL 45 E SIDE MILACA TO SL 55 E SIDE MILACA	0.899	45
MNTH	23	236+00.772	247+00.410	BG SL 55 E SIDE MILACA TO SL 40 W JCT TH 47 OGILVIE	10.633	55
MNTH	23	247+00.780	248+00.700	BG SL 50 .4 MI E W JCT TH 47 TO SL 55 E SIDE OGLVIE	0.924	50
MNTH	23	248+00.700	254+00.577	BEG SL 55 E SIDE OGILVIE TO S JCT TH 65 SW OF MORA	5.859	55
MNTH	23	256+00.850	262+00.070	BEG SL 55 W SIDE MORA TO BEG SL 50 W SIDE QUAMBA	5.207	55
MNTH	24	031+00.737	035+00.312	BEG SL 45 .7 MI N CSAH 50 TO SL 55 N SIDE ANNANDALE	3.567	45
MNTH	24	035+00.312	043+00.820	BEG SL 55 N SIDE ANNANDALE TO SL 40 S SIDE CLRWATER	8.449	55
MNTH	25	050+00.481	057+00.223	E JCT TH 12 TO BEG SL 30 S SIDE BUFFALO	6.721	55
MNTH	25	155+00.940	157+00.069	BG SL 50 S OF BRNRD TO TH 210 (RP 157.059)	1.128	50
MNTH	55	108+00.965	110+00.330	BEG SL 50 TO SL 55 E OF PAYNESVILLE	1.383	50
MNTH	55	132+00.610	136+00.305	BEG SL 55 E KIMBALL TO SL 30 W SOUTH HAVEN	3.711	55
MNTH	55	136+00.848	141+00.334	BEG SL 55 E SOUTH HAVEN TO SL 30 W SIDE ANNANDALE	4.47	55
MNTH	55	*143.985*	*144.517*		0.532	55
MNTH	55	*146.706*	*147.221*		0.515	55
MNTH	55	147+00.341	148+00.777	BEG SL 45 W SIDE TO SL 55 E SIDE MAPLE LAKE	1.442	45
MNTH	65	044+00.830	046+00.000	BG SL 55 N END CAMBRD BYPSS TO SL 50 S SIDE GRANDY	1.212	55
MNTH	65	046+00.000	046+00.482	BEG SL 50 S SIDE TO BEG SL 55 N SIDE GRANDY	0.482	50
MNTH	65	*46.482*	*51.539*	*BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MORA*	5.057	55
MNTH	65	*62.827*	*64.01*		1.183	55
MNTH	65	065+00.310	081+00.783	BEG SL 55 N SIDE MORA TO TH 27/END D3	16.474	55
USTH	71	169+00.054	169+00.455	BEG SL 45 S MAIN ST TO SL 55 .3 MI N TH 302/SAUK CN	0.401	45
USTH	71	185+00.320	185+00.815	BEG SL 45 S LNG PRAIRIE TO BEG SL 30 .4 MI S TH 287	0.495	45
USTH	71	186+00.695	187+00.041	BEG SL 45 .2 MI N TH 27 TO SL 60 .6 MI N TH 27/LON	0.35	45
USTH	71	187+00.041	193+00.621	BEG SL 60 .6 MI N TH 27 TO SL 30 S SIDE BROWERVILLE	6.568	60
USTH	71	225+00.560	226+00.277	BEG SL 45 .6 MI N TH 10 TO SL 60 N SIDE WADENA	0.728	45
USTH	71	246+00.658	247+00.084	BEG SL 45 1 MI S TH 87 TO SL 30 .6 MI S TH 87/MENAG	0.429	45
USTH	71	247+00.846	251+00.366	BEG SL 55 .4 MI N TH 87 TO END D3 WADENA/HUBBARD CL	3.519	55
MNTH	95	*0.05*	*9.204*	*TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169*	9.154	55
MNTH	95	022+00.005	023+00.501	BEG SL 50 W SIDE JCT 169 TO SL 45 W SIDE PRINCETON	0.915	50
MNTH	95	023+00.501	024+00.495	BEG SL 45 W SIDE PRINCETON TO SL 55 E OF PRINCETON	0.961	45
MNTH	95	*27.488*	*41.079*		13.591	55
MNTH	95	042+00.840	052+00.045	BEG SL 55 E SIDE CAMBRIDGE TO ISANTI CO LN/END D3	9.001	55
MNTH	107	000+00.000	000+00.900	TH 65 TO BEG SL 50 S SIDE BRAHAM	0.9	55
MNTH	107	000+00.900	001+00.505	BEG SL 50 S SIDE BRAHAM TO SL 30 BRAHAM	0.64	50
USTH	169	*215.541*	*216.513*	*BG SL 55 .2 MI S N JCT TH 27 TO SL 45 S N SCENIC DR*	0.97	55
USTH	169	223+00.992	225+00.245	BEG SL 45 S N SCENIC DR TO BG SL 55 .6 MI S CSAH 35	1.241	45
USTH	169	*226.896*	*227.979*		1.083	55
USTH	169	251+00.560	251+00.980	BEG SL 45 S SIDE AITKIN TO SL 30 .2 MI S TH 47	0.42	45
MNTH	210	101+00.327	117+00.960	BEG SL 55 E SIDE MOTLEY TO BEG 4LN DIV 3 MI W TH371	16.634	55
MNTH	210	125+00.479	136+00.283	BEG SL 55 E OF BRAINERD TO SL 30 W SIDE IRONTON	10.815	55
MNTH	210	138+00.645	141+00.550	BEG SL 55 E OF CROSBY TO SL 45 W OF DEERWOOD	2.898	55
MNTH	210	142+00.390	151+00.449	BEG SL 55 E SIDE DEERWOOD TO SL 45 W SIDE AITKIN	9.058	55
MNTH	210	151+00.449	151+00.747	BEG SL 45 TO SL 30 W SIDE AITKIN	0.298	45
MNTH	210	152+00.741	153+00.530	BEG SL 45 TO SL 55 E SIDE AITKIN	0.794	45
MNTH	371	045+00.510	046+00.050	BEG SL 45 END 4 LN TO SL 55 N SIDE NISSWA	0.55	45
MNTH	371	055+00.032	055+00.411	BEG SL 45 S SIDE TO SL 55 N SIDE JENKINS	0.379	45
MNTH	371	077+00.445	077+00.735	BEG SL 45 .03 MI S TO SL 30 .3 MI N CR 40/HACKNSACK	0.29	45
MNTH	371	078+00.360	078+00.650	BEG SL 45 .2 MI S CR 5 TO SL 55 N SIDE HACKENSACK	0.29	45
MNTH	371	078+00.650	090+00.410	BEG SL 55 N SIDE HACKENSACK TO SL 45 S SIDE WALKER	11.8	55
MNTH	371	090+00.410	090+00.790	BEG SL 45 S SIDE WALKER TO SL 30 1.08 MI S TH 34	0.38	45

5.2 RESULTS

Two types of analysis were conducted: all crashes and only the target crashes for CLRS. Target crashes for CLRS are those that CLRS are intended to reduce – cross centerline crashes. These include head-one, sideswipe opposing, and run off the road left crashes.

5.2.1 Definition of Terms

The following are definitions of terms that are used in the following sections:

- Crash Severity
  - F: worst injury is a fatality
  - 'A' Severity: worst injury is an incapacitating injury
  - 'B' Severity: worst injury is a non-incapacitating injury
  - 'C' Severity: worst injury is 'C', usually a complaint of pain by one of the persons involved in the crash
  - PD: property damage only
- Crash Rate: number of crashes per million vehicle miles traveled
- Severity Rate: weighted crash rate, giving a weighting of 5 to fatals, 4 to 'A' severity, 3 to 'C' severity, 2 to 'B' severity, and 1 to property damage only
- F and 'A' rate: number of fatal and 'A' severity crashes per ten million vehicle miles traveled
- Average Daily Traffic (ADT): the average number of vehicles that pass a given point, both direction, in one day
- Crash Density: number of crashes per mile per year

5.2.2 All Crashes

Table 5-3 contains crash statistics from 2004 and 2005, using all crash types, for the treatment group sections identified above. Appendix Tables 35 and 36 contain raw data for each section for 2004 and 2005. Table 5-4 contains crash data from the same time period for the control group sections.

Table 5-3
Cross Section Analysis – Treatment Group
All Crashes

Route Sys	Route Num	Start Ref	End Ref	Length	Average ADT	All Crashes (over two years)				
						F&A	Total	CR	SR	Density
MNTH	15	133+00.260	142+00.740	9.492	6,919	2	23	0.5	0.7	1.2
MNTH	15	143+00.540	145+00.650	2.109	8,922	0	20	1.5	2.6	4.7
MNTH	18	002+00.930	020+00.200	17.26	6,675	1	58	0.7	1.1	1.7
MNTH	23	213+00.915	221+00.000	7.121	8,042	2	34	0.8	1.3	2.4
MNTH	23	*222.435*	*223.833*	1.398	5,861	0	4	0.7	1.3	1.4
MNTH	23	*223.997*	*226.187*	2.19	5,861	0	2	0.2	0.4	0.5
MNTH	23	*226.617*	*231.816*	5.199	5,861	0	6	0.3	0.5	0.6
MNTH	23	232+00.035	232+00.438	0.403	6,994	1	8	3.9	7.8	9.9
MNTH	23	232+00.438	234+00.801	2.355	8,049	0	17	1.2	2.0	3.6
MNTH	55	*142.218*	*143.985*	1.767	9,808	0	1	0.1	0.1	0.3
MNTH	55	*144.517*	*146.706*	2.189	9,515	0	3	0.2	0.2	0.7
MNTH	55	*147.221*	*147.325*	0.104	9,515	0	2	2.8	2.8	10
MNTH	55	148+00.777	155+00.013	6.23	11,546	1	32	0.6	1.1	2.6
MNTH	65	*51.539*	*62.827*	11.288	7,991	3	55	0.8	1.5	2.4
MNTH	95	*9.204*	*21.917*	12.713	4,654	2	28	0.6	1.1	1.1
MNTH	95	*24.519*	*27.488*	2.969	6,408	0	10	0.7	0.9	1.7
USTH	169	*216.513*	*223.687*	7.174	11,915	2	38	0.6	1.1	2.6
USTH	169	*225.748*	*226.896*	1.148	9,749	0	5	0.6	1.0	2.2
USTH	169	*227.979*	*229.894*	1.915	9,749	0	7	0.5	0.6	1.8
MNTH	371	046+00.050	051+00.530	5.468	10,927	1	30	0.7	1.2	2.7
MNTH	371	052+00.220	055+00.032	2.812	8,825	1	21	1.2	2.0	3.7
MNTH	371	055+00.411	060+00.835	5.425	7,191	0	11	0.4	0.5	1.0
TOTAL				***109***	***7,805***	***16***	***415***	***0.67***	***1.13***	***1.91***

Table 5-4
Cross Section Analysis – Control Group
All Crashes

Route Sys	Route Num	Start Ref	End Ref	Length	Average ADT	All Crashes over two years)				
						F&A	Total	CR	SR	Density
USTH	10	090+00.393	090+00.820	0.427	9,624	0	2	0.7	1.0	2.3
USTH	10	090+00.820	092+00.620	1.787	7,591	1	8	0.8	1.5	2.2
USTH	10	105+00.874	106+00.815	0.938	8,321	0	3	0.5	0.5	1.6
USTH	12	114+00.641	117+00.340	2.687	7,920	0	15	1.0	1.4	2.8
USTH	12	118+00.890	119+00.931	1.03	8,120	0	3	0.5	0.8	1.5
USTH	12	121+00.551	123+00.700	2.143	8,315	1	6	0.5	0.9	1.4
USTH	12	125+00.003	128+00.800	3.788	9,303	0	6	0.2	0.3	0.8
USTH	12	132+00.260	134+00.217	1.964	11,853	4	13	0.8	1.9	3.3
MNTH	18	002+00.327	002+00.380	0.053	7,920	1	1	3.3	13.1	9.4
MNTH	23	174+00.922	185+00.832	10.895	6,342	2	37	0.7	1.2	1.7
MNTH	23	186+00.503	190+00.161	3.684	11,172	2	57	1.9	3.6	7.7
MNTH	23	*223.833*	*223.997*	0.164	5,861	1	6	8.6	18.5	18.3
MNTH	23	*226.187*	*226.617*	0.43	5,861	0	2	1.1	1.6	2
MNTH	23	235+00.882	236+00.772	0.899	6,263	0	13	3.2	4.4	7.2
MNTH	23	236+00.772	247+00.410	10.633	5,457	1	36	0.8	1.4	1.7
MNTH	23	247+00.780	248+00.700	0.924	5,949	0	5	1.2	1.7	2.7
MNTH	23	248+00.700	254+00.577	5.859	5,099	2	12	0.6	1.4	1.0
MNTH	23	256+00.850	262+00.070	5.207	4,905	3	19	1.0	2.1	1.8
MNTH	24	031+00.737	035+00.312	3.567	6,767	2	24	1.4	2.6	3.4
MNTH	24	035+00.312	043+00.820	8.449	5,655	1	33	0.9	1.5	2.0
MNTH	25	050+00.481	057+00.223	6.721	5,826	0	10	0.3	0.6	0.7
MNTH	25	155+00.940	157+00.069	1.128	7,200	1	19	3.2	4.4	8.4
MNTH	55	108+00.965	110+00.330	1.383	5,416	0	8	1.5	2.2	2.9
MNTH	55	132+00.610	136+00.305	3.711	5,013	0	6	0.4	0.7	0.8
MNTH	55	136+00.848	141+00.334	4.47	6,882	0	11	0.5	0.8	1.2
MNTH	55	*143.985*	*144.517*	0.532	9,515	1	2	0.5	1.4	1.9
MNTH	55	*146.706*	*147.221*	0.515	9,515	0	3	0.8	1.4	2.9
MNTH	55	147+00.341	148+00.777	1.442	9,306	0	21	2.1	3.5	7.3
MNTH	65	044+00.830	046+00.000	1.212	11,629	0	5	0.5	0.7	2.1
MNTH	65	046+00.000	046+00.482	0.482	10,618	0	10	2.7	3.2	10.4
MNTH	65	*46.482*	*51.539*	5.057	7,991	5	41	1.4	2.7	4.1
MNTH	65	*62.827*	*64.01*	1.183	7,991	3	16	2.3	4.5	6.8
MNTH	65	065+00.310	081+00.783	16.474	4,817	1	39	0.7	0.9	1.2
USTH	71	169+00.054	169+00.455	0.401	6,004	0	2	1.1	1.1	2.5
USTH	71	185+00.320	185+00.815	0.495	10,827	0	7	1.8	2.0	7.1
USTH	71	186+00.695	187+00.041	0.35	4,562	0	0	0.0	0.0	0
USTH	71	187+00.041	193+00.621	6.568	4,562	1	10	0.5	0.7	0.8
USTH	71	225+00.560	226+00.277	0.728	5,565	0	4	1.4	2.0	2.7
USTH	71	246+00.658	247+00.084	0.429	5,113	0	0	0.0	0.0	0
USTH	71	247+00.846	251+00.366	3.519	6,172	0	13	0.8	1.3	1.8
MNTH	95	*0.05*	*9.204*	9.154	4,654	2	16	0.5	1.0	0.9
MNTH	95	022+00.005	023+00.501	0.915	6,682	0	18	4.0	5.6	9.8
MNTH	95	023+00.501	024+00.495	0.961	7,763	1	31	5.7	7.7	16.1
MNTH	95	*27.488*	*41.079*	13.591	6,408	0	66	1.0	1.6	2.4
MNTH	95	042+00.840	052+00.045	9.001	9,079	2	57	1.0	1.5	3.2
MNTH	107	000+00.000	000+00.900	0.9	4,712	0	1	0.3	0.3	0.6
MNTH	107	000+00.900	001+00.505	0.64	4,921	0	3	1.3	1.3	2.3
USTH	169	*215.541*	*216.513*	0.97	11,915	0	14	1.7	2.1	7.2
USTH	169	223+00.992	225+00.245	1.241	11,028	0	9	0.9	1.2	3.6
USTH	169	*226.896*	*227.979*	1.083	9,749	0	10	1.3	1.9	4.6
USTH	169	251+00.560	251+00.980	0.42	7,519	0	2	0.9	0.9	2
MNTH	210	101+00.327	117+00.960	16.634	6,815	3	89	1.1	1.6	2.7
MNTH	210	125+00.479	136+00.283	10.815	8,261	3	42	0.6	1.2	1.9
MNTH	210	138+00.645	141+00.550	2.898	5,144	1	9	0.8	1.6	1.6
MNTH	210	142+00.390	151+00.449	9.058	4,922	1	19	0.6	0.8	1.0
MNTH	210	151+00.449	151+00.747	0.298	7,820	0	3	1.8	1.8	5.0
MNTH	210	152+00.741	153+00.530	0.794	7,962	0	4	0.9	0.9	2.5
MNTH	371	045+00.510	046+00.050	0.55	10,588	0	8	1.9	2.1	7.3
MNTH	371	055+00.032	055+00.411	0.379	7,719	0	6	2.8	5.6	7.9
MNTH	371	077+00.445	077+00.735	0.29	5,375	0	1	0.9	0.9	2
MNTH	371	078+00.360	078+00.650	0.29	5,414	0	1	0.9	0.9	1.7
MNTH	371	078+00.650	090+00.410	11.8	5,856	0	40	0.8	1.3	1.7
MNTH	371	090+00.410	090+00.790	0.38	8,443	0	2	0.9	0.9	2.6
TOTAL				***215***	***6,554***	***46***	***979***	***0.95***	***1.54***	***2.27***

The following were found when comparing the treatment group with all crash types to the control group. Figure 5-1 is a graphical representation of these results. Because the number of miles in each group is not the same, it is only appropriate to compare rates or density. Raw numbers cannot be compared.

- 73% lower fatal and ‘A’ severity crash rate on sections with CLRS (0.26 vs. 0.45)
- 42% lower crash rate on sections with CLRS (0.67 vs. 0.95)
- 37% lower severity rate on sections with CLRS (1.13 vs. 1.54)
- 19% lower crash density on sections with CLRS (1.91 vs. 2.27)
- 16% higher ADT on sections with CLRS

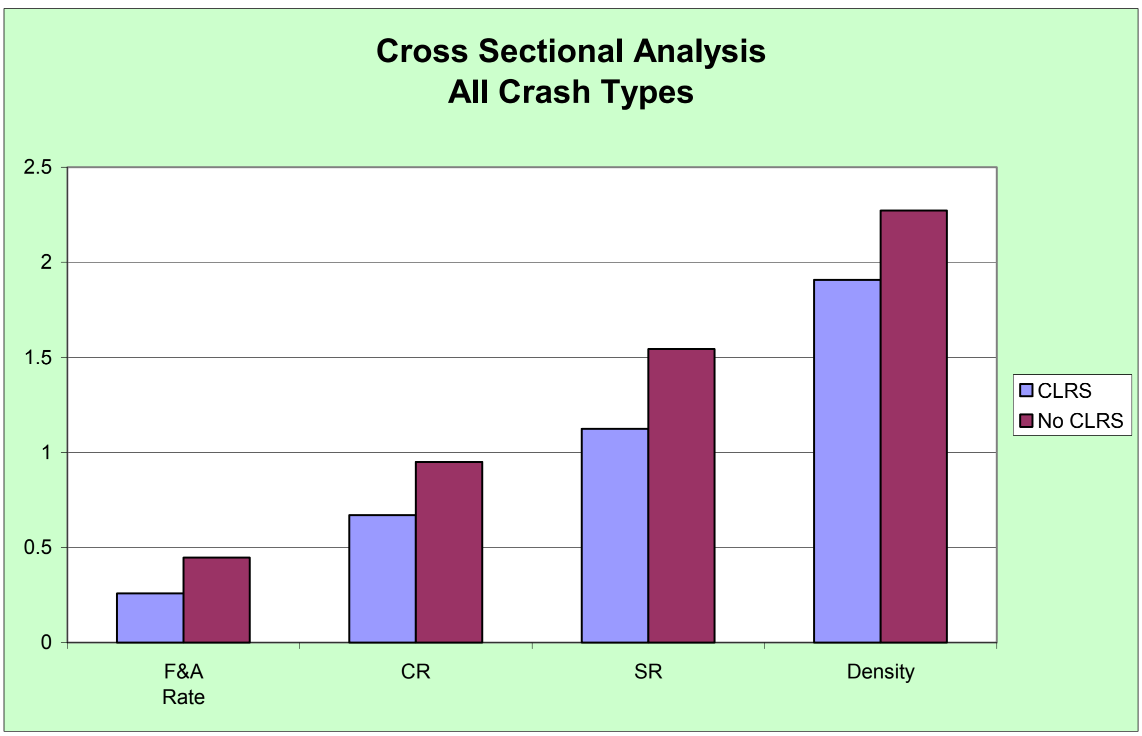

Figure 5-1
Cross Sectional Analysis Summary – All Crashes

These results are significant. Every crash statistic was much lower for the group that had CLRS. Even crash density was lower on roads with CLRS, even though the average ADT on CLRS sections of road is 16% higher than those sections without CLRS. Normally, as ADT goes up, crash density also goes up. This is because crash frequency usually is positively proportional to the amount of traffic on a roadway. The fact that crash density decreased should be considered further evidence that CLRS are an effective safety treatment (no change or even a small increase in crash density would not necessarily be a indication that CLRS are not effective).

5.2.3 Target Crashes Only

Table 5-5 contains crash statistics from 2004 and 2005, using only the target crash types, for the treatment group sections identified above. Appendix Tables 37 and 38 contain raw data for each section for 2004 and 2005.Table 5-6 contains crash data from the same time period for the control group sections.

Table 5-5
Cross Section Analysis – Treatment Group
Target Crashes Only

Route Sys	Route Num	Start Ref	End Ref	Length	Average ADT	Target Crashes (over 2 years)				
						F&A	Total	CR	SR	Density
MNTH	15	133+00.260	142+00.740	9.492	6,919	2	5	0.1	0.3	0.3
MNTH	15	143+00.540	145+00.650	2.109	8,922	0	3	0.2	0.4	0.7
MNTH	18	002+00.930	020+00.200	17.26	6,675	1	14	0.2	0.3	0.4
MNTH	23	213+00.915	221+00.000	7.121	8,042	1	7	0.2	0.4	0.5
MNTH	23	*222.435*	*223.833*	1.398	5,861	0	1	0.2	0.3	0.4
MNTH	23	*223.997*	*226.187*	2.19	5,861	0	0	0.0	0.0	0.0
MNTH	23	*226.617*	*231.816*	5.199	5,861	0	1	0.0	0.1	0.1
MNTH	23	232+00.035	232+00.438	0.403	6,994	0	0	0.0	0.0	0.0
MNTH	23	232+00.438	234+00.801	2.355	8,049	0	3	0.2	0.3	0.6
MNTH	55	*142.218*	*143.985*	1.767	9,808	0	0	0.0	0.0	0.0
MNTH	55	*144.517*	*146.706*	2.189	9,515	0	2	0.1	0.1	0.5
MNTH	55	*147.221*	*147.325*	0.104	9,515	0	1	1.4	1.4	5
MNTH	55	148+00.777	155+00.013	6.23	11,546	1	2	0.0	0.1	0.2
MNTH	65	*51.539*	*62.827*	11.288	7,991	0	6	0.1	0.2	0.3
MNTH	95	*9.204*	*21.917*	12.713	4,654	2	10	0.2	0.5	0.4
MNTH	95	*24.519*	*27.488*	2.969	6,408	0	0	0.0	0.0	0.0
USTH	169	*216.513*	*223.687*	7.174	11,915	2	10	0.2	0.3	0.7
USTH	169	*225.748*	*226.896*	1.148	9,749	0	0	0.0	0.0	0.0
USTH	169	*227.979*	*229.894*	1.915	9,749	0	3	0.2	0.2	0.8
MNTH	371	046+00.050	051+00.530	5.468	10,927	1	8	0.2	0.4	0.7
MNTH	371	052+00.220	055+00.032	2.812	8,825	1	5	0.3	0.5	0.9
MNTH	371	055+00.411	060+00.835	5.425	7,191	0	2	0.1	0.1	0.2
TOTAL				***109***	***7,805***	***11***	***83***	***0.13***	***0.25***	***0.38***

Table 5-6
Cross Section Analysis – Control Group
Target Crashes Only

Route Sys	Route Num	Start Ref	End Ref	Length	Average ADT	Target Crashes (over 2 years)				
						F&A	Total	CR	SR	Density
USTH	10	090+00.393	090+00.820	0.427	9,624	0	0	0.0	0.0	0.0
USTH	10	090+00.820	092+00.620	1.787	7,591	1	2	0.2	0.5	0.6
USTH	10	105+00.874	106+00.815	0.938	8,321	0	1	0.2	0.2	0.5
USTH	12	114+00.641	117+00.340	2.687	7,920	0	2	0.1	0.4	0.4
USTH	12	118+00.890	119+00.931	1.03	8,120	0	1	0.2	0.2	0.5
USTH	12	121+00.551	123+00.700	2.143	8,315	0	2	0.2	0.3	0.5
USTH	12	125+00.003	128+00.800	3.788	9,303	0	0	0.0	0.0	0.0
USTH	12	132+00.260	134+00.217	1.964	11,853	1	2	0.1	0.5	0.5
MNTH	18	002+00.327	002+00.380	0.053	7,920	0	0	0.0	0.0	0.0
MNTH	23	174+00.922	185+00.832	10.895	6,342	0	8	0.2	0.3	0.4
MNTH	23	186+00.503	190+00.161	3.684	11,172	0	7	0.2	0.3	1.0
MNTH	23	*223.833*	*223.997*	0.164	5,861	0	0	0.0	0.0	0.0
MNTH	23	*226.187*	*226.617*	0.43	5,861	0	0	0.0	0.0	0
MNTH	23	235+00.882	236+00.772	0.899	6,263	0	1	0.2	0.7	0.6
MNTH	23	236+00.772	247+00.410	10.633	5,457	0	10	0.2	0.4	0.5
MNTH	23	247+00.780	248+00.700	0.924	5,949	0	2	0.5	1.0	1.1
MNTH	23	248+00.700	254+00.577	5.859	5,099	1	2	0.1	0.3	0.2
MNTH	23	256+00.850	262+00.070	5.207	4,905	1	4	0.2	0.6	0.4
MNTH	24	031+00.737	035+00.312	3.567	6,767	1	6	0.3	0.6	0.8
MNTH	24	035+00.312	043+00.820	8.449	5,655	0	10	0.3	0.3	0.6
MNTH	25	050+00.481	057+00.223	6.721	5,826	0	1	0.0	0.0	0.1
MNTH	25	155+00.940	157+00.069	1.128	7,200	0	1	0.2	0.5	0.4
MNTH	55	108+00.965	110+00.330	1.383	5,416	0	0	0.0	0.0	0.0
MNTH	55	132+00.610	136+00.305	3.711	5,013	0	2	0.1	0.1	0.3
MNTH	55	136+00.848	141+00.334	4.47	6,882	0	2	0.1	0.2	0.2
MNTH	55	*143.985*	*144.517*	0.532	9,515	0	0	0.0	0.0	0.0
MNTH	55	*146.706*	*147.221*	0.515	9,515	0	0	0.0	0.0	0.0
MNTH	55	147+00.341	148+00.777	1.442	9,306	0	1	0.1	0.3	0.3
MNTH	65	044+00.830	046+00.000	1.212	11,629	0	2	0.2	0.3	0.8
MNTH	65	046+00.000	046+00.482	0.482	10,618	0	1	0.3	0.5	1.0
MNTH	65	*46.482*	*51.539*	5.057	7,991	1	6	0.2	0.5	0.6
MNTH	65	*62.827*	*64.010*	1.183	7,991	0	1	0.1	0.1	0.4
MNTH	65	065+00.310	081+00.783	16.474	4,817	1	12	0.2	0.3	0.4
USTH	71	169+00.054	169+00.455	0.401	6,004	0	0	0.0	0.0	0.0
USTH	71	185+00.320	185+00.815	0.495	10,827	0	0	0.0	0.0	0.0
USTH	71	186+00.695	187+00.041	0.35	4,562	0	0	0.0	0.0	0
USTH	71	187+00.041	193+00.621	6.568	4,562	1	3	0.1	0.3	0.2
USTH	71	225+00.560	226+00.277	0.728	5,565	0	0	0.0	0.0	0.0
USTH	71	246+00.658	247+00.084	0.429	5,113	0	0	0.0	0.0	0
USTH	71	247+00.846	251+00.366	3.519	6,172	0	7	0.4	0.6	1.0
MNTH	95	*0.050*	*9.204*	9.154	4,654	2	8	0.3	0.6	0.4
MNTH	95	022+00.005	023+00.501	0.915	6,682	0	3	0.7	0.7	1.6
MNTH	95	023+00.501	024+00.495	0.961	7,763	0	4	0.7	1.1	2.1
MNTH	95	*27.488*	*41.079*	13.591	6,408	0	16	0.3	0.4	0.6
MNTH	95	042+00.840	052+00.045	9.001	9,079	1	22	0.4	0.6	1.2
MNTH	107	000+00.000	000+00.900	0.9	4,712	0	0	0.0	0.0	0.0
MNTH	107	000+00.900	001+00.505	0.64	4,921	0	0	0.0	0.0	0.0
USTH	169	*215.541*	*216.513*	0.97	11,915	0	3	0.4	0.6	1.5
USTH	169	223+00.992	225+00.245	1.241	11,028	0	1	0.1	0.2	0.4
USTH	169	*226.896*	*227.979*	1.083	9,749	0	1	0.1	0.1	0.5
USTH	169	251+00.560	251+00.980	0.42	7,519	0	1	0.4	0.4	1
MNTH	210	101+00.327	117+00.960	16.634	6,815	2	14	0.2	0.4	0.4
MNTH	210	125+00.479	136+00.283	10.815	8,261	2	16	0.2	0.4	0.7
MNTH	210	138+00.645	141+00.550	2.898	5,144	0	1	0.1	0.1	0.2
MNTH	210	142+00.390	151+00.449	9.058	4,922	1	2	0.1	0.2	0.1
MNTH	210	151+00.449	151+00.747	0.298	7,820	0	0	0.0	0.0	0.0
MNTH	210	152+00.741	153+00.530	0.794	7,962	0	0	0.0	0.0	0.0
MNTH	371	045+00.510	046+00.050	0.55	10,588	0	0	0.0	0.0	0.0
MNTH	371	055+00.032	055+00.411	0.379	7,719	0	1	0.5	0.5	1.3
MNTH	371	077+00.445	077+00.735	0.29	5,375	0	0	0.0	0.0	0
MNTH	371	078+00.360	078+00.650	0.29	5,414	0	0	0.0	0.0	0.0
MNTH	371	078+00.650	090+00.410	11.8	5,856	0	5	0.1	0.2	0.2
MNTH	371	090+00.410	090+00.790	0.38	8,443	0	1	0.4	0.4	1.3
TOTAL				***215***	***6,554***	***16***	***198***	***0.19***	***0.35***	***0.46***

The following were found when comparing the treatment group with only target crashes to the control group. Figure 5-2 is a graphical representation of these results. Because the number of miles in each group is not the same, it is only appropriate to compare rates or density. Raw numbers cannot be compared.

- 13% higher fatal and 'A' severity crash rate on sections with CLRS (0.18 vs. 0.16)
- 43% lower crash rate on sections with CLRS (0.13 vs. 0.19)
- 37% lower severity rate on sections with CLRS (0.25 vs. 0.35)
- 20% lower crash density on sections with CLRS (0.38 vs. 0.46)
- 16% higher ADT on sections with CLRS

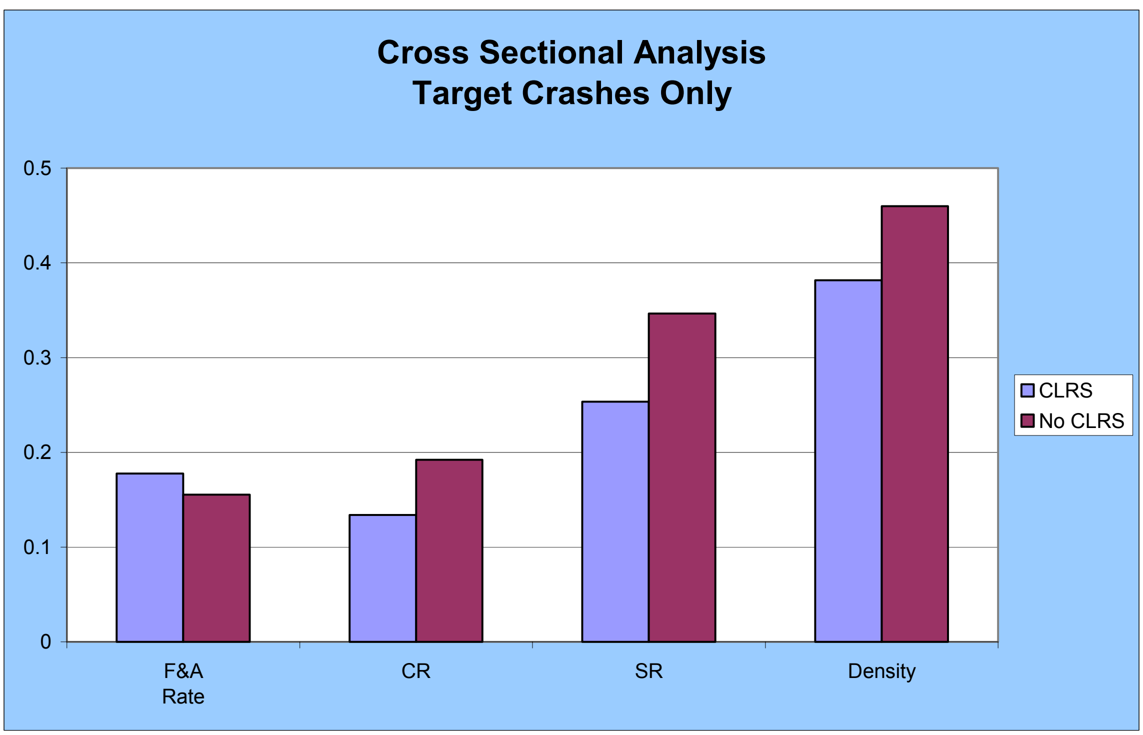

Figure 5-2
Cross Sectional Analysis Summary –Target Crashes Only

These results are also noteworthy, and are strikingly similar to the analysis for all crash types. The group with CLRS showed lower crash rate, severity rate, and crash density of 43%, 37%, and 20%. These reductions are almost identical to those found for the all crash analysis (42%, 37%, 19%). The only measure that was not consistent with the all crash analysis, and in fact showed an increase, was the F and 'A' rate. For the target crash analysis, sections of road with CLRS had a F and 'A' rate 13% higher than the control group.

This is not surprising, nor should it be considered evidence that CLRS are not effective. By considering only target crashes, and only considering fatal and 'A' severity crashes, and having only two years of data, the number of crashes was so low that very little confidence can be placed in this comparison (8 total F&A crashes in treatment group, 16 F&A crashes in control).

6.0 CONCLUSIONS AND RECOMMENDATIONS

This report dealt with CLRS and quantified the safety benefits associated with their use in Minnesota. This study examined the effect of CLRS on the vehicle speed, lateral placement of vehicles on tangent sections, centerline encroachment on horizontal curves, before-after safety analysis, and a comparison group study. This study is by no means a comprehensive study of CLRS – it does not consider any of the potential issues identified in Chapter 2. The following sections detail conclusions and recommendations.

6.1 CONCLUSIONS

The majority of data studied in this report shows that CLRS are beneficial. The following is a summary of the conclusion from data analysis discussed in Chapters 3 through 5:

- CLRS appear to have little effect on lateral placement of vehicles on tangent sections. This suggests that 2-lane roads could be implemented with both shoulder rumble strips and centerline rumble strips, with little effect on the majority of the traveling public.

- CLRS do not affect the travel speed of vehicles, either on tangent sections or sections on horizontal curves.

- CLRS dramatically decrease the occurrence of centerline encroachments of vehicles on horizontal curves, for both vehicles entering on the inside and outside of a curve. Reductions in centerline encroachments for vehicles on the inside of the curve ranged from 40% to 50%, with one of two locations reductions being statistically significant. For vehicles entering on the outside of a curve, the reduction in centerline encroachments was measured to be 76% and was statistically significant. However, these types of encroachments are generally considered to be voluntary, and therefore less hazardous.

- Before-After analysis when considering all crash types yielded across the board reductions in all safety related measures of effectiveness (MOEs) that were considered, even while average daily traffic increase. All reductions were statistically significant.

- The Before-After analysis for only target crashes was less conclusive. When considering only head-on, sideswipe opposing, and run off the road left crashes, Fatal and 'A' severity crashes and severity rate decreased, while total crashes, crash rate, and crash density increased. However, nearly 50% of the mileage considered had only one year or two years of 'after' data, which after only looking at target crashes further reduced the sample size of the 'after' analysis. As a result, none of the results were found to be statistically significant.

- The cross sectional study using all crash types showed lower crash statistics for roads with CLRS across all traffic safety MOEs considered.

- The cross sectional study using only target crashes showed lower crash statistics for roads with CLRS across all traffic safety MOEs considered, with the exception of Fatal and 'A' severity crashes (fatal and 'A' crash rate of 0.18 per ten million vehicle miles for CLRS vs. 0.16 for non-CLRS).

The vast majority of MOEs considered, and all MOEs that were statistically significant, show that roads with CLRS exhibit better safety characteristics than roads that do not have CLRS. With the low cost of CLRS, at $1,000 per mile, this is a cost effective way to increase safety on rural 2-lane roads, both state and county.

Previous Mn/DOT in-house (unpublished) research has estimated Benefit Cost ratios for systematic installation of CLRS on Trunk Highways with ADT>3000 between 45:1 and 90:1. For CSAHs with ADT>3000, estimated Benefit Cost ratios would range between 43:1 and 86:1. These estimates are based on 2000 – 2002 crash data, assumed crash reduction factors of 10% and 20%, and effective CLRS life of 8 years.

6.2 RECOMMENDATIONS

The Insurance Institute for Highway Safety's national research concluded that CLRS are an effective safety treatment for 2-lane rural roads (Persaud, 2004), reducing target crashes by 20%. The only participating state in that study that showed inconclusive results was Minnesota. This study showed that, while not all MOEs were positive, the majority of MOEs associated with traffic safety for the use of CLRS in Minnesota were positive. Three separate studies, presented as Chapters 3 – 5, point towards CLRS being effective, albeit to varying degrees of conclusiveness. Having three independent studies all pointing to the same conclusion, makes that conclusion even stronger – that CLRS are an effective safety treatment for 2-lane rural roads in Minnesota.

Mn/DOT's Safety unit within the Office of Traffic, Security, and Operations is currently working on research that could potentially set Mn/DOT policy for the use of CLRS in Minnesota. This research is expected to be conducted in 2007, which would expand the sample size of 'after' crash data used in this study and provide three full years for a follow up cross sectional study.

The ultimate solution to eliminating crashes on 2-lane rural roads is to eliminate the crashes completely by reconstructing to 4-lane divided roadways. Obviously, this is not a practical solution for all two-lane rural roads, but it should not be dismissed for the highest priority safety corridors. If there are stretches of 2-lane roads that have alarmingly high rates of cross centerline type crashes, conversion to 4-lane divided should be considered as a safety alternative. This is particularly true of roadways that are quickly approaching thresholds that would warrant upgrades to 4-lane divided roads for capacity reasons in the near future.

The majority of potential issues identified in Chapter 2 have not been quantifiably dismissed. Nonetheless, based on the results of this research, existing national research, and national trends, the following preliminary recommendations are made for the future use of CLRS in Minnesota:

- Mn/DOT should consider implementing a policy for the installation of CLRS on a statewide basis. Currently, Mn/DOT has a draft guideline, but nothing official (CLRS, 2002). This policy should include guidance on design and placement of the rumble strip: strips on either side of the centerline stripe as was used in the 2003 District 3 installations, or applied directly on the centerline stripe to produce a "rumble stripe". The rumble stripe increases wet, nighttime visibility of markings by creating a semi-vertical face to which reflective beads can adhere. These beads would not be covered by water in rainy conditions.

- If the rumble stripe option is selected, consideration should be given to possible treatments to CLRS to increase the longevity of the pavement at centerline, assuming milling operation occurs atop an existing joint between bituminous passes. This could include fog sealing the rumble strip or spraying with a black epoxy. Both would act as a sealant, and the epoxy would create a better bond for centerline striping if epoxy striping is used.

- If a policy is established, Mn/DOT should determine priorities for a phased implementation strategy. This could be based on existing crash characteristics where the highest crash rate 2-lane roads would receive initial treatment. Or it could be based on average daily traffic and future construction plans. Or it could be targeted for horizontal curves, where this study showed dramatic reductions in centerline encroachments when CLRS were installed.

- If a policy is established, Mn/DOT should promote CLRS as an effective safety treatment to counties. The vast majority of county roads are 2-lane rural roads that could benefit from the installation of CLRS. There are approximately 700 miles of 2-lane, rural, high speed county state aid roads, with approximately 23 fatal and Type A injury crashes per year. These roads provide the best opportunity to implement CLSR on county roads.

- If a policy is established, it should specify that locations that receive CLRS will have them installed continuously – not just in no passing zones. Cross centerline crashes are just as likely to occur in passing sections as they are in no passing sections. In order to realize the full benefits of CLRS, they must be installed continuously.

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APPENDIX

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TABLE A-1

August, 2003
Results for Tangent Section on TH 23

				1.58	min error		
				1.8	av error	0.11	std dev of error
	Calibration Parameters			2.34	max error		
	c	14843.34					
	e	-54.79773		3.1	min offset		
	start	283		44.4	av offset	16.57246	std dev of offset
				118.5	max offset		

Vehicle #	Frame #	Time	Y Coord	Inches from inside of yellow line to vehicle side	error
1	147	0:00:05	260	38.5	1.80
2	284	0:00:09	268	24.5	1.71
3	664	0:00:22	250	57.1	1.92
4	1817	0:01:01	260	38.5	1.80
5	2080	0:01:09	261	36.7	1.79
6	2153	0:01:12	273	16.1	1.66
7	2217	0:01:14	266	27.9	1.73
8	2351	0:01:18	258	42.1	1.82
9	2453	0:01:22	261	36.7	1.79
10	2544	0:01:25	265	29.7	1.74
11	2573	0:01:26	260	38.5	1.80
12	3670	0:02:02	243	70.8	2.01
13	4559	0:02:32	269	22.8	1.70
14	5169	0:02:52	258	42.1	1.82
15	5580	0:03:06	238	81.0	2.08
16	5833	0:03:14	222	116.2	2.32
17	6908	0:03:50	262	35.0	1.77
18	7041	0:03:55	254	49.5	1.87
19	7162	0:03:59	221	118.5	2.34
20	7626	0:04:14	234	89.5	2.14
21	7702	0:04:17	258	42.1	1.82
22	8451	0:04:42	233	91.6	2.15
23	8630	0:04:48	233	91.6	2.15
24	8861	0:04:55	257	44.0	1.83
25	8915	0:04:57	263	33.2	1.76
26	8987	0:05:00	252	53.3	1.89
27	9317	0:05:11	257	44.0	1.83
28	9907	0:05:30	253	51.4	1.88
29	9927	0:05:31	254	49.5	1.87
30	9975	0:05:33	248	60.9	1.94
31	11019	0:06:07	254	49.5	1.87
32	11226	0:06:14	245	66.8	1.98
33	11320	0:06:17	250	57.1	1.92
34	11407	0:06:20	252	53.3	1.89
35	11561	0:06:25	261	36.7	1.79
36	11607	0:06:27	275	12.8	1.64
37	13578	0:07:33	258	42.1	1.82
38	13635	0:07:34	256	45.8	1.84
39	13723	0:07:37	255	47.7	1.86

TABLE A-2

September, 2005
Results for Tangent Section on TH 23 - Post Install

		1.66	min error		
		1.9	av error	0.16	std dev of error
Calibration Parameters		2.48	max error		
c	10785.86				
e	-24.25773	8.2	min offest		
start	260	45.0	av offest	20.72072	std dev of offset
		111.7	max offset		

Vehicle #	Frame #	Time	Y Coord	Inches from inside of yellow line to vehicle side	error
1	5863	0:03:15	245	25.4	1.79
2	5929	0:03:18	246	23.6	1.77
3	5990	0:03:20	246	23.6	1.77
4	7070	0:03:56	253	11.5	1.68
5	7776	0:04:19	244	27.2	1.80
6	7831	0:04:21	241	32.6	1.84
7	8854	0:04:55	233	47.8	1.96
8	8925	0:04:58	226	61.9	2.07
9	8977	0:04:59	228	57.8	2.03
10	9832	0:05:28	249	18.3	1.73
11	9859	0:05:29	242	30.8	1.83
12	11351	0:06:18	236	42.0	1.91
13	11486	0:06:23	236	42.0	1.91
14	11552	0:06:25	235	43.9	1.93
15	11614	0:06:27	219	76.7	2.19
16	11934	0:06:38	240	34.5	1.85
17	11970	0:06:39	234	45.8	1.94
18	13904	0:07:43	230	53.7	2.00
19	13989	0:07:46	244	27.2	1.80
20	14076	0:07:49	229	55.7	2.02
21	14111	0:07:50	217	81.2	2.22
22	14170	0:07:52	238	38.2	1.88
23	14282	0:07:56	231	51.7	1.99
24	15379	0:08:33	245	25.4	1.79
25	15588	0:08:40	251	14.9	1.71
26	15616	0:08:41	245	25.4	1.79
27	16070	0:08:56	231	51.7	1.99
28	16099	0:08:57	236	42.0	1.91
29	17408	0:09:40	239	36.3	1.87
30	19084	0:10:36	214	87.9	2.28
31	19238	0:10:41	220	74.6	2.17
32	19409	0:10:47	243	29.0	1.81
33	19499	0:10:50	249	18.3	1.73
34	20091	0:11:10	246	23.6	1.77
35	20889	0:11:36	248	20.1	1.75
36	22352	0:12:25	250	16.6	1.72
37	22421	0:12:27	243	29.0	1.81
38	22473	0:12:29	235	43.9	1.93
39	23726	0:13:11	253	11.5	1.68

TABLE A-3

FIELD SPEED SURVEY SUMMARY

Road #	TH 23	Zone	55 MPH	Location	at RWIS station
Ref. Pt.	215	Time	12:00-1:30 AM-PM		
County	Benton	Weather	Sunny, 85F	Road Type	bit, 6' paved shoudlers
Date	8/14/2003	Machine	Laser	NB: 85th %ile	63 MPH, Pace 54 to 63
Day	Thursday	Observer(s)	Marc B	SB: 85th %ile	N/A MPH, Pace N/A to N/A

PASSENGER VEHICLES

SPEED (mph)	NORTH BOUND				SPEED (mph)	SOUTH BOUND			
	INDIVIDUAL VEHICLES		ACCUMULATED VEH.			INDIVIDUAL VEHICLES		ACCUMULATED VEH.	
	# of vehicles	% vehicles	# of vehicles	% vehicles		# of vehicles	% vehicles	# of vehicles	% vehicles
85		0.0%	103	100%	85				
84		0.0%	103	100%	84				
83		0.0%	103	100%	83				
82		0.0%	103	100%	82				
81		0.0%	103	100%	81				
80		0.0%	103	100%	80				
79		0.0%	103	100%	79				
78		0.0%	103	100%	78				
77		0.0%	103	100%	77				
76		0.0%	103	100%	76				
75		0.0%	103	100%	75				
74		0.0%	103	100%	74				
73		0.0%	103	100%	73				
72	1	1.0%	103	100%	72				
71		0.0%	102	99%	71				
70		0.0%	102	99%	70				
69	2	1.9%	102	99%	69				
68		0.0%	100	97%	68				
67	3	2.9%	100	97%	67				
66	1	1.0%	97	94%	66				
65		0.0%	96	93%	65				
64	2	1.9%	96	93%	64				
63	8	7.8%	94	91%	63				
62	8	7.8%	86	83%	62				
61	8	7.8%	78	76%	61				
60	9	8.7%	70	68%	60				
59	10	9.7%	61	59%	59				
58	12	11.7%	51	50%	58				
57	15	14.6%	39	38%	57				
56	3	2.9%	24	23%	56				
55	9	8.7%	21	20%	55				
54	7	6.8%	12	12%	54				
53	3	2.9%	5	5%	53				
52		0.0%	2	2%	52				
51	1	1.0%	2	2%	51				
50		0.0%	1	1%	50				
49	1	1.0%	1	1%	49				
48		0.0%	0	0%	48				
47		0.0%	0	0%	47				
46		0.0%	0	0%	46				
45		0.0%	0	0%	45				

TABLE A-4

FIELD SPEED SURVEY SUMMARY

Road #	TH 23	Zone	55 MPH	Location	at RWIS station
Ref. Pt.	215	Time	12:00-1:00 AM-PM		
County	Benton	Weather	party sunny, 65F	Road Type	bit, 6' paved shoudlers
Date	9/30/2004	Machine	Laser	NB: 85th %ile	63 MPH Pace 55 to 64
Day	Thursday	Observer(s)	Marc B and Ben J	SB: 85th %ile	N/A MPH Pace N/A to N/A

PASSENGER VEHICLES

SPEED (mph)	NORTH BOUND				SPEED (mph)	SOUTH BOUND			
	INDIVIDUAL VEHICLES		ACCUMULATED VEH.			INDIVIDUAL VEHICLES		ACCUMULATED VEH.	
	# of vehicles	% vehicles	# of vehicles	% vehicles		# of vehicles	% vehicles	# of vehicles	% vehicles
85		0.0%	102	100%	85				
84		0.0%	102	100%	84				
83		0.0%	102	100%	83				
82		0.0%	102	100%	82				
81		0.0%	102	100%	81				
80		0.0%	102	100%	80				
79		0.0%	102	100%	79				
78		0.0%	102	100%	78				
77		0.0%	102	100%	77				
76		0.0%	102	100%	76				
75		0.0%	102	100%	75				
74		0.0%	102	100%	74				
73		0.0%	102	100%	73				
72		0.0%	102	100%	72				
71	1	1.0%	102	100%	71				
70		0.0%	101	99%	70				
69		0.0%	101	99%	69				
68		0.0%	101	99%	68				
67	2	2.0%	101	99%	67				
66	2	2.0%	99	97%	66				
65	5	4.9%	97	95%	65				
64	3	2.9%	92	90%	64				
63	4	3.9%	89	87%	63				
62	9	8.8%	85	83%	62				
61	8	7.8%	76	75%	61				
60	13	12.7%	68	67%	60				
59	9	8.8%	55	54%	59				
58	7	6.9%	46	45%	58				
57	11	10.8%	39	38%	57				
56	12	11.8%	28	27%	56				
55	6	5.9%	16	16%	55				
54	1	1.0%	10	10%	54				
53	4	3.9%	9	9%	53				
52	2	2.0%	5	5%	52				
51	1	1.0%	3	3%	51				
50	1	1.0%	2	2%	50				
49	1	1.0%	1	1%	49				
48		0.0%	0	0%	48				
47		0.0%	0	0%	47				
46		0.0%	0	0%	46				
45		0.0%	0	0%	45				

TABLE A-5

FIELD SPEED SURVEY SUMMARY

Road #	TH 25	Zone	55 MPH	Location	At no passing sign for EB traffic				
Ref. Pt.	107.6	Time	11:30-3:00pm AM-PM						
County	Benton	Weather	Sunny, 85F	Road Type	bit, 2' paved shoudlers				
Date	8/7/2003	Machine	Laser	EB: 85th %ile	69 MPH	Pace	57	to	66
Day	Thursday	Observer(s)	Wendy K and Marc B	WB: 85th %ile	N/A MPH	Pace	N/A	to	N/A

PASSENGER VEHICLES

SPEED (mph)	EAST BOUND INDIVIDUAL VEHICLES # of vehicles	EAST BOUND INDIVIDUAL VEHICLES % vehicles	EAST BOUND ACCUMULATED VEH. # of vehicles	EAST BOUND ACCUMULATED VEH. % vehicles	SPEED (mph)	WEST BOUND INDIVIDUAL VEHICLES # of vehicles	WEST BOUND INDIVIDUAL VEHICLES % vehicles	WEST BOUND ACCUMULATED VEH. # of vehicles	WEST BOUND ACCUMULATED VEH. % vehicles
85	1	1.1%	88	100%	85				
84		0.0%	87	99%	84				
83		0.0%	87	99%	83				
82	1	1.1%	87	99%	82				
81		0.0%	86	98%	81				
80	2	2.3%	86	98%	80				
79		0.0%	84	95%	79				
78		0.0%	84	95%	78				
77		0.0%	84	95%	77				
76	1	1.1%	84	95%	76				
75		0.0%	83	94%	75				
74	1	1.1%	83	94%	74				
73	1	1.1%	82	93%	73				
72	1	1.1%	81	92%	72				
71	3	3.4%	80	91%	71				
70	1	1.1%	77	88%	70				
69	3	3.4%	76	86%	69				
68	4	4.5%	73	83%	68				
67		0.0%	69	78%	67				
66	4	4.5%	69	78%	66				
65	4	4.5%	65	74%	65				
64	6	6.8%	61	69%	64				
63	4	4.5%	55	63%	63				
62	8	9.1%	51	58%	62				
61	14	15.9%	43	49%	61				
60	6	6.8%	29	33%	60				
59	5	5.7%	23	26%	59				
58	5	5.7%	18	20%	58				
57	4	4.5%	13	15%	57				
56	1	1.1%	9	10%	56				
55	4	4.5%	8	9%	55				
54	3	3.4%	4	5%	54				
53		0.0%	1	1%	53				
52	1	1.1%	1	1%	52				
51		0.0%	0	0%	51				
50		0.0%	0	0%	50				
49		0.0%	0	0%	49				
48		0.0%	0	0%	48				
47		0.0%	0	0%	47				
46		0.0%	0	0%	46				
45		0.0%	0	0%	45				

TABLE A-6

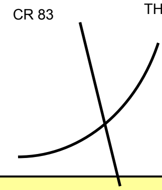
FIELD SPEED SURVEY SUMMARY

Road #	TH 25	Zone	55 MPH	Location	At no passing sign for EB traffic				
Ref. Pt.	107.6	Time	10:30-1:30pm AM-PM						
County	Benton	Weather	partly sunny, 75F	Road Type	bit, 2' paved shoudlers				
Date	9/23/2004	Machine	Laser	EB: 85th %ile	67 MPH	Pace	57	to	66
Day	Thursday	Observer(s)	Marc B	WB: 85th %ile	N/A MPH	Pace	N/A	to	N/A

PASSENGER VEHICLES									
SPEED (mph)	EAST BOUND				SPEED (mph)	WEST BOUND			
	INDIVIDUAL VEHICLES		ACCUMULATED VEH.			INDIVIDUAL VEHICLES		ACCUMULATED VEH.	
	# of vehicles	% vehicles	# of vehicles	% vehicles		# of vehicles	% vehicles	# of vehicles	% vehicles
85		0.0%	85	100%	85				
84		0.0%	85	100%	84				
83		0.0%	85	100%	83				
82		0.0%	85	100%	82				
81		0.0%	85	100%	81				
80		0.0%	85	100%	80				
79		0.0%	85	100%	79				
78		0.0%	85	100%	78				
77	1	1.2%	85	100%	77				
76		0.0%	84	99%	76				
75		0.0%	84	99%	75				
74	1	1.2%	84	99%	74				
73	1	1.2%	83	98%	73				
72	1	1.2%	82	96%	72				
71	1	1.2%	81	95%	71				
70	1	1.2%	80	94%	70				
69	1	1.2%	79	93%	69				
68	5	5.9%	78	92%	68				
67	1	1.2%	73	86%	67				
66	8	9.4%	72	85%	66				
65	3	3.5%	64	75%	65				
64	5	5.9%	61	72%	64				
63	5	5.9%	56	66%	63				
62	7	8.2%	51	60%	62				
61	15	17.6%	44	52%	61				
60	10	11.8%	29	34%	60				
59	2	2.4%	19	22%	59				
58	5	5.9%	17	20%	58				
57	3	3.5%	12	14%	57				
56	5	5.9%	9	11%	56				
55	1	1.2%	4	5%	55				
54	2	2.4%	3	4%	54				
53		0.0%	1	1%	53				
52	1	1.2%	1	1%	52				
51		0.0%	0	0%	51				
50		0.0%	0	0%	50				
49		0.0%	0	0%	49				
48		0.0%	0	0%	48				
47		0.0%	0	0%	47				
46		0.0%	0	0%	46				
45		0.0%	0	0%	45				

TABLE A-7

Centerline Rumble Strip Horizontal Curve Data Reduction



TH 23 **(camera pointed towards northeast, located at intersection)**

Date Collected: 7/29/2003

Time period: start at 12:00pm

	WESTBOUND VEHICLES (inside curve)												EASTBOUND VEHICLES (outside curve)											
	Passenger Vehicles			Vehicles towing boat or other trailer (w/ trailer at least as wide as veh)			Heavy trucks (including RVs and buses)			Motorcycles			Passenger Vehicles			Vehicles towing boat or other trailer (w/ trailer at least as wide as veh)			Heavy trucks (including RVs & buses)			Motorcycles		
	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL
11:30 - 12:30	235	0	0	5	0	0	15	1	0	6	0	0	211	15	0	11	1	0	20	4	0	1	0	0
12:30 - 1:30	195	1	0	6	0	0	19	1	0	5	0	0	189	14	3	9	2	0	18	4	1	1	0	0
1:30 - 2:30	202	0	0	7	0	0	22	1	0	0	0	0	257	7	0	5	0	0	12	3	1	1	0	0
2:30 - 3:30	213	1	0	3	1	0	23	0	0	2	0	0	283	22	2	4	1	0	15	4	0	0	0	0
TOTAL	845	2	0	21	1	0	79	3	0	13	0	0	940	58	5	29	4	0	65	15	2	3	0	0

NOTES / OBSERVATIONS:

1. Passing allowed through entire curve
2. very difficult to tell difference bewteen encroaching vehicles and crossing centerline
3. DID CAMERA AND/OR WORKER CAUSE MOTORISTS TO CHANGE BEHAVIOR?
4. Observed much platoon traffic which could lead to bad passing decisions.

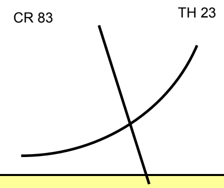
TABLE A-8

Centerline Rumble Strip Horizontal Curve Data Reduction

TH 23 (camera pointed towards northeast, located at intersection)

Date Collected:__October 6, 2004__

Time period:__~11:00-2:00pm__



WESTBOUND VEHICLES (inside curve)									EASTBOUND VEHICLES (outside curve)								
Passenger Vehicles			Vehicles towing boat or other trailer (w/ trailer at least as wide as veh)			Heavy trucks (including RVs)			Passenger Vehicles			Vehicles towing boat or other trailer (w/ trailer at least as wide as veh)			Heavy trucks (including RVs)		
Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL	Stay in Lane	Encroach CL	x-ing CL
566	1	0	16	0	0	59	1	0	592	10	0	13	1	0	47	1	0

NOTES / OBSERVATIONS:

1. Encroaching in 'after' condition is defined as tires contacting rumble strips
2. several WB vehicles cut the corner on the shoulder
3. left front wheels of heavy vehicles WB most often were very close to CLRS
4. No nearby traffic signals --> no platooning.
5. When both EB and WB go around curve together, lateral placement from CL increases.
6. Did not count police or other emergecy vehicles.

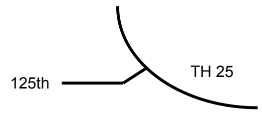
TABLE A-9

Centerline Rumble Strip Horizontal Curve Data Reduction

TH 25 **(camera pointed southeast, located at intersection)**

Date Collected:__7/30/2003_

Time period:__start at 1:00pm__



Note: no data collected for SB/EB traffic because view of camera precludes ability to distinguish which vehicles had just entered TH 25 from 125th St (which intersects with TH 25 just out of view but on the horizontal curve)

	WESTBOUND/NORTHBOUND VEHICLES (inside curve)											
	Passenger Vehicles				**Vehicles towing boat or other trailer**				**Heavy trucks (including RVs)**			
	Stay in Lane	Left turning	Encroach CL	x-ing CL	Stay in Lane	Left turning	Encroach CL	x-ing CL	Stay in Lane	Left turning	Encroach CL	x-ing CL
12:50-1:40	35	10	2	0	5	2	0	0	2	2	2	0
1:40 - 2:40	40	6	3	0	5	0	0	0	6	3	0	0
2:40 - 2:55	8	1	0	0	0	0	0	0	3	3	2	0
2:55 - 3:40	50	12	3	0	3	1	0	0	5	1	1	0
TOTAL	133	29	8	0	13	3	0	0	16	9	5	0

NOTES / OBSERVATIONS:

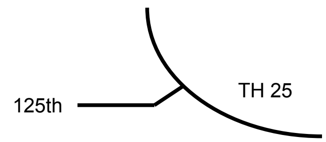
TABLE A-10

Centerline Rumble Strip Horizontal Curve Data Reduction

TH 25 **(camera pointed southeast, located at intersection)**

Date Collected:_October 6, 2004___

Time period:___~12:00-4:00pm___



Note: no data collected for SB/EB traffic because view of camera precludes ability to distinguish which vehicles had just entered TH 25 from 125th St (which intersects with TH 25 just out of view but on the horizontal curve)

WESTBOUND/NORTHBOUND VEHICLES (inside curve)											
Passenger Vehicles				**Vehicles towing boat or other trailer (w/ trailer at least as wide as veh)**				**Heavy trucks (including RVs)**			
Total Veh	Left turning	Encroach CL	x-ing CL	Total Veh	Left turning	Encroach CL	x-ing CL	Total Veh	Left turning	Encroach CL	x-ing CL
90	40	1	0	6	2	1	0	11	13	2	1

NOTES / OBSERVATIONS:

1. No nearby traffic signals --> no platooning.
2. Observed one EB vehicle noticably cross CL and react back into their lane after hitting CLRS.
3. One WB bicycle caused a SUV to veer into oncoming lane

TABLE A-11

FIELD SPEED SURVEY SUMMARY

Road #	TH 23	Zone	55 MPH	Location	at 85th St
Ref. Pt.	~217	Time	11:50am AM-PM		
County	Benton	Weather	??	Road Type	bit
Date	7/29/2003	Machine	??	SWB: 85th %ile	64 MPH Pace 55 to 64
Day	Tuesday	Observer(s)	D3B traffic engineering		N/A MPH Pace N/A to N/A

PASSENGER VEHICLES									
SPEED (mph)	SOUTHWEST BOUND				SPEED (mph)				
	INDIVIDUAL VEHICLES		ACCUMULATED VEH.			INDIVIDUAL VEHICLES		ACCUMULATED VEH.	
	# of vehicles	% vehicles	# of vehicles	% vehicles		# of vehicles	% vehicles	# of vehicles	% vehicles
80		0.0%	200	100%	80				
79		0.0%	200	100%	79				
78		0.0%	200	100%	78				
77		0.0%	200	100%	77				
76		0.0%	200	100%	76				
75		0.0%	200	100%	75				
74		0.0%	200	100%	74				
73		0.0%	200	100%	73				
72		0.0%	200	100%	72				
71	2	1.0%	200	100%	71				
70	3	1.5%	198	99%	70				
69	3	1.5%	195	98%	69				
68	3	1.5%	192	96%	68				
67	3	1.5%	189	95%	67				
66	3	1.5%	186	93%	66				
65	4	2.0%	183	92%	65				
64	10	5.0%	179	90%	64				
63	9	4.5%	169	85%	63				
62	19	9.5%	160	80%	62				
61	29	14.5%	141	71%	61				
60	28	14.0%	112	56%	60				
59	20	10.0%	84	42%	59				
58	19	9.5%	64	32%	58				
57	11	5.5%	45	23%	57				
56	9	4.5%	34	17%	56				
55	13	6.5%	25	13%	55				
54	7	3.5%	12	6%	54				
53	2	1.0%	5	3%	53				
52	1	0.5%	3	2%	52				
51		0.0%	2	1%	51				
50	1	0.5%	2	1%	50				
49		0.0%	1	1%	49				
48		0.0%	1	1%	48				
47		0.0%	1	1%	47				
46		0.0%	1	1%	46				
45		0.0%	1	1%	45				
44		0.0%	1	1%	44				
43		0.0%	1	1%	43				
42		0.0%	1	1%	42				
41		0.0%	1	1%	41				
40	1	0.5%	1	1%	40				

TABLE A-12

FIELD SPEED SURVEY SUMMARY

Road #	TH 23	Zone	55 MPH	Location	at 85th St
Ref. Pt.	~217	Time	11:15-2:15 AM-PM		
County	Benton	Weather	??	Road Type	bit
Date	10/5/2004	Machine	??	SWB: 85th %ile	64 MPH Pace 56 to 65
Day	Tuesday	Observer(s)	D3B traffic engineering		64 MPH Pace 56 to 65

PASSENGER VEHICLES									
SPEED (mph)	SOUTHWEST BOUND				SPEED (mph)	NORTHEAST			
	INDIVIDUAL VEHICLES		ACCUMULATED VEH.			INDIVIDUAL VEHICLES		ACCUMULATED VEH.	
	# of vehicles	% vehicles	# of vehicles	% vehicles		# of vehicles	% vehicles	# of vehicles	% vehicles
80		0.0%	271	100%	80		0.0%	259	100%
79		0.0%	271	100%	79		0.0%	259	100%
78		0.0%	271	100%	78		0.0%	259	100%
77		0.0%	271	100%	77		0.0%	259	100%
76	0	0.0%	271	100%	76	1	0.4%	259	100%
75	0	0.0%	271	100%	75	0	0.0%	258	100%
74	0	0.0%	271	100%	74	0	0.0%	258	100%
73	0	0.0%	271	100%	73	2	0.8%	258	100%
72	0	0.0%	271	100%	72	1	0.4%	256	99%
71	1	0.4%	271	100%	71	0	0.0%	255	98%
70	2	0.7%	270	100%	70	5	1.9%	255	98%
69	4	1.5%	268	99%	69	1	0.4%	250	97%
68	0	0.0%	264	97%	68	5	1.9%	249	96%
67	5	1.8%	264	97%	67	6	2.3%	244	94%
66	8	3.0%	259	96%	66	5	1.9%	238	92%
65	13	4.8%	251	93%	65	10	3.9%	233	90%
64	17	6.3%	238	88%	64	19	7.3%	223	86%
63	19	7.0%	221	82%	63	23	8.9%	204	79%
62	23	8.5%	202	75%	62	33	12.7%	181	70%
61	23	8.5%	179	66%	61	29	11.2%	148	57%
60	40	14.8%	156	58%	60	31	12.0%	119	46%
59	34	12.5%	116	43%	59	24	9.3%	88	34%
58	23	8.5%	82	30%	58	27	10.4%	64	25%
57	18	6.6%	59	22%	57	12	4.6%	37	14%
56	17	6.3%	41	15%	56	9	3.5%	25	10%
55	8	3.0%	24	9%	55	6	2.3%	16	6%
54	6	2.2%	16	6%	54	4	1.5%	10	4%
53	6	2.2%	10	4%	53	2	0.8%	6	2%
52	0	0.0%	4	1%	52	1	0.4%	4	2%
51	3	1.1%	4	1%	51	0	0.0%	3	1%
50	0	0.0%	1	0%	50	1	0.4%	3	1%
49	0	0.0%	1	0%	49	1	0.4%	2	1%
48	0	0.0%	1	0%	48	1	0.4%	1	0%
47	0	0.0%	1	0%	47	0	0.0%	0	0%
46	1	0.4%	1	0%	46	0	0.0%	0	0%
45		0.0%	0	0%	45		0.0%	0	0%
44		0.0%	0	0%	44		0.0%	0	0%
43		0.0%	0	0%	43		0.0%	0	0%
42		0.0%	0	0%	42		0.0%	0	0%
41		0.0%	0	0%	41		0.0%	0	0%
40		0.0%	0	0%	40		0.0%	0	0%

TABLE A-13

FIELD SPEED SURVEY SUMMARY

Road # TH 25 | Zone 55 MPH | Location just south of Benton CSAH 2
Ref. Pt. 112 | Time 12:58pm AM-PM
County Benton | Weather ?? | Road Type bit
Date 7/30/2003 | Machine ?? | EB: 85th %ile N/A MPH | Pace N/A to N/A
Day Wednesday | Observer(s) D3B traffic engineering | WB: 85th %ile 65 MPH | Pace 56 to 65

PASSENGER VEHICLES									
SPEED (mph)	EAST BOUND				SPEED (mph)	WEST BOUND			
	INDIVIDUAL VEHICLES		ACCUMULATED VEH.			INDIVIDUAL VEHICLES		ACCUMULATED VEH.	
	# of vehicles	% vehicles	# of vehicles	% vehicles		# of vehicles	% vehicles	# of vehicles	% vehicles
80					80		0.0%	68	100%
79					79		0.0%	68	100%
78					78		0.0%	68	100%
77					77		0.0%	68	100%
76					76		0.0%	68	100%
75					75	1	1.5%	68	100%
74					74		0.0%	67	99%
73					73		0.0%	67	99%
72					72	1	1.5%	67	99%
71					71		0.0%	66	97%
70					70		0.0%	66	97%
69					69	2	2.9%	66	97%
68					68	2	2.9%	64	94%
67					67	1	1.5%	62	91%
66					66	1	1.5%	61	90%
65					65	3	4.4%	60	88%
64					64	4	5.9%	57	84%
63					63	5	7.4%	53	78%
62					62	10	14.7%	48	71%
61					61	4	5.9%	38	56%
60					60	7	10.3%	34	50%
59					59	2	2.9%	27	40%
58					58	7	10.3%	25	37%
57					57	5	7.4%	18	26%
56					56	4	5.9%	13	19%
55					55	2	2.9%	9	13%
54					54	3	4.4%	7	10%
53					53	1	1.5%	4	6%
52					52		0.0%	3	4%
51					51	2	2.9%	3	4%
50					50	1	1.5%	1	1%
49					49		0.0%	0	0%
48					48		0.0%	0	0%
47					47		0.0%	0	0%
46					46		0.0%	0	0%
45					45		0.0%	0	0%
44					44		0.0%	0	0%
43					43		0.0%	0	0%
42					42		0.0%	0	0%
41					41		0.0%	0	0%
40					40		0.0%	0	0%

TABLE A-14

FIELD SPEED SURVEY SUMMARY

Road # TH 25 | Zone 55 MPH | Location just southeast of Benton CSAH 2
Ref. Pt. 112 | Time 11:00am AM-PM
County Benton | Weather Clear/dry | Road Type bit
Date 10/6/2004 | Machine k55 | EB: 85th %ile 62 MPH | Pace 54 to 63
Day Wednesday | Observer(s) D Totzke | WB: 85th %ile 64 MPH | Pace 53 to 62

PASSENGER VEHICLES									
SPEED (mph)	EAST BOUND				SPEED (mph)	WEST BOUND			
	INDIVIDUAL VEHICLES		ACCUMULATED VEH.			INDIVIDUAL VEHICLES		ACCUMULATED VEH.	
	# of vehicles	% vehicles	# of vehicles	% vehicles		# of vehicles	% vehicles	# of vehicles	% vehicles
80		0.0%	33	100%	80		0.0%	30	100%
79		0.0%	33	100%	79		0.0%	30	100%
78		0.0%	33	100%	78		0.0%	30	100%
77		0.0%	33	100%	77		0.0%	30	100%
76		0.0%	33	100%	76		0.0%	30	100%
75		0.0%	33	100%	75		0.0%	30	100%
74		0.0%	33	100%	74		0.0%	30	100%
73		0.0%	33	100%	73		0.0%	30	100%
72		0.0%	33	100%	72		0.0%	30	100%
71		0.0%	33	100%	71	1	3.3%	30	100%
70		0.0%	33	100%	70		0.0%	29	97%
69		0.0%	33	100%	69		0.0%	29	97%
68		0.0%	33	100%	68	1	3.3%	29	97%
67	1	3.0%	33	100%	67		0.0%	28	93%
66		0.0%	32	97%	66		0.0%	28	93%
65	1	3.0%	32	97%	65	1	3.3%	28	93%
64		0.0%	31	94%	64	2	6.7%	27	90%
63	2	6.1%	31	94%	63		0.0%	25	83%
62	3	9.1%	29	88%	62	1	3.3%	25	83%
61	4	12.1%	26	79%	61	4	13.3%	24	80%
60	4	12.1%	22	67%	60	3	10.0%	20	67%
59	2	6.1%	18	55%	59		0.0%	17	57%
58	2	6.1%	16	48%	58	1	3.3%	17	57%
57	4	12.1%	14	42%	57	4	13.3%	16	53%
56	5	15.2%	10	30%	56	2	6.7%	12	40%
55	1	3.0%	5	15%	55	2	6.7%	10	33%
54	1	3.0%	4	12%	54	2	6.7%	8	27%
53	2	6.1%	3	9%	53	2	6.7%	6	20%
52		0.0%	1	3%	52	1	3.3%	4	13%
51		0.0%	1	3%	51	1	3.3%	3	10%
50	1	3.0%	1	3%	50		0.0%	2	7%
49		0.0%	0	0%	49	1	3.3%	2	7%
48		0.0%	0	0%	48		0.0%	1	3%
47		0.0%	0	0%	47		0.0%	1	3%
46		0.0%	0	0%	46	1	3.3%	1	3%
45		0.0%	0	0%	45		0.0%	0	0%
44		0.0%	0	0%	44		0.0%	0	0%
43		0.0%	0	0%	43		0.0%	0	0%
42		0.0%	0	0%	42		0.0%	0	0%
41		0.0%	0	0%	41		0.0%	0	0%
40		0.0%	0	0%	40		0.0%	0	0%

TABLE A-15

Section Analysis: 2-Lane Rural Roads with CLRS
1996

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W C	Jun-04	12.49	5.796	5,906	7	52	0	0	2	4	11	17	1.4	2.0	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH	Jun-04	0.89	0.397	6,124	7	52	0	0	0	1	1	2	2.2	3.4	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/	Jun-04	12.97	6.686	5,300	7	52	0	1	1	0	5	7	0.5	0.9	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	15.95	8.568	5,085	3	73	1	1	3	3	3	11	0.7	1.7	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	4.60	1.875	6,700	3	73	0	0	0	1	3	4	0.9	1.1	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	32.37	16.434	5,381	3	18	0	1	2	2	9	14	0.4	0.7	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	8.4	3.491	6,600	8	34	0	1	2	0	5	8	0.9	1.8	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	3.7	1.288	7,942	8	34	0	0	2	1	4	7	1.9	3.2	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PA	Aug-00	6.1	2.246	7,385	8	34	0	0	3	1	1	5	0.8	2.0	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDE	Aug-00	6.8	3.506	5,308	8	34	0	0	1	1	5	7	1.0	1.5	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PA	Sep-03	8.6	5.448	4,300	8	34	0	0	0	5	2	7	0.8	1.4	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE F	Sep-03	21.59	7.867	7,500	3	5	0	1	2	7	10	20	0.9	1.6	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	1.69	1.033	4,457	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.61	2.146	4,600	3	5	1	0	0	2	2	5	1.4	3.0	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.06	3.003	4,600	3	5	0	0	0	1	2	3	0.6	0.8	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X	Sep-03	3.70	2.195	4,600	3	48	0	0	0	0	2	2	0.5	0.5	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.10	1.778	6,300	3	48	0	0	1	0	5	6	1.5	2.0	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (or	Sep-03	3.90	3.815	2,794	3	71	0	0	1	0	3	4	1.0	1.5	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF	Sep-03	3.02	5.281	1,565	3	5	0	0	0	0	5	5	1.7	1.7	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	7.10	12.387	1,565	3	5	1	0	1	0	4	6	0.8	1.7		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.08	3.624	1,565	3	5	0	0	0	0	1	1	0.5	0.5		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S J	Sep-03	3.02	3.777	2,187	3	49	0	0	0	0	1	1	0.3	0.3	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE E	Sep-03	17.64	25.672	1,877	3	49	0	0	5	4	16	25	1.4	2.2	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNAI	Sep-03	5.69	1.915	8,122	3	86	0	0	0	0	1	1	0.2	0.2	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE	Sep-03	6.30	2.189	7,865	3	86	0	0	1	0	0	1	0.2	0.5	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.30	0.104	7,865	3	86	0	0	1	0	0	1	3.3	10.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SI	Sep-03	22.48	6.23	9,860	3	86	0	0	5	8	6	19	0.8	1.6	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE ST	Nov-99	9.88	3.914	6,900	6	50	3	0	0	0	4	7	0.7	1.9	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S S	Sep-03	23.94	11.461	5,723	3	30	0	0	2	5	14	21	0.9	1.3	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.21	0.267	12,400	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELG	Sep-03	2.10	0.471	12,179	8	34	0	0	0	0	1	1	0.5	0.5	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 1	Sep-03	17.42	12.801	3,719	3	5	0	0	1	2	10	13	0.7	1.0	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE	Sep-03	6.43	3.503	5,018	3	48	0	0	0	1	4	5	0.8	0.9	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	25.68	7.061	9,938	3	48	1	0	1	6	15	23	0.9	1.4	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.26	1.104	10,548	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.10	1.582	8,800	3	48	0	0	1	1	3	5	1.0	1.6	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITK	Sep-03	1.80	1.107	4,450	3	18	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	14.69	13.666	2,937	3	1	0	0	0	7	5	12	0.8	1.3	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	13.13	4.722	7,600	3	18	0	0	1	4	10	15	1.1	1.6	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SI	Sep-03	6.34	2.381	7,271	3	18	1	0	1	2	3	7	1.1	2.4	55	RC2N1

TABLE A-16

Section Analysis: 2-Lane Rural Roads with CLRS
1997

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W C	Jun-04	12.85	5.796	6,072	7	52	0	0	1	3	10	14	1.1	1.5	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 2	Jun-04	0.91	0.397	6,296	7	52	0	0	0	1	0	1	1.1	2.2	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/	Jun-04	13.30	6.686	5,448	7	52	0	0	0	4	2	6	0.5	0.8	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	16.35	8.568	5,227	3	73	0	0	4	3	9	16	1.0	1.7	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	4.71	1.875	6,888	3	73	0	0	0	1	6	7	1.5	1.7	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	33.18	16.434	5,531	3	18	2	0	4	6	19	31	0.9	1.6	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	8.6	3.491	6,785	8	34	1	1	3	3	2	10	1.2	3.0	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	3.8	1.288	8,164	8	34	0	0	1	5	4	10	2.6	4.4	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PA	Aug-00	6.2	2.246	7,592	8	34	0	0	1	4	9	14	2.2	3.2	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDE	Aug-00	7.0	3.506	5,456	8	34	0	0	1	1	5	7	1.0	1.4	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PA	Sep-03	8.8	5.448	4,420	8	34	0	0	0	1	3	4	0.5	0.6	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE F	Sep-03	22.14	7.867	7,710	3	5	2	0	3	4	8	17	0.8	1.6	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	1.73	1.033	4,582	3	5	0	0	0	1	2	3	1.7	2.3	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.70	2.146	4,729	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.18	3.003	4,729	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X	Sep-03	3.79	2.195	4,729	3	48	0	0	0	1	1	2	0.5	0.8	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.20	1.778	6,476	3	48	0	0	0	2	1	3	0.7	1.2	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (ori	Sep-03	4.00	3.815	2,872	3	71	0	0	1	0	0	1	0.3	0.8	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF	Sep-03	3.10	5.281	1,609	3	5	0	1	0	1	3	5	1.6	2.9	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	7.27	12.387	1,609	3	5	0	0	0	1	2	3	0.4	0.5		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.13	3.624	1,609	3	5	0	0	0	0	1	1	0.5	0.5		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S J	Sep-03	3.10	3.777	2,248	3	49	0	2	0	1	3	6	1.9	4.2	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE B	Sep-03	18.08	25.672	1,930	3	49	0	1	2	7	6	16	0.9	1.7	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNAN	Sep-03	5.84	1.915	8,350	3	86	0	0	0	0	2	2	0.3	0.3	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE	Sep-03	6.46	2.189	8,085	3	86	0	0	1	1	0	2	0.3	0.8	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.31	0.104	8,085	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SI	Sep-03	23.05	6.23	10,136	3	86	0	0	1	2	10	13	0.6	0.7	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE ST	Nov-99	10.13	3.914	7,093	6	50	1	0	0	1	6	8	0.8	1.3	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SI	Sep-03	24.61	11.461	5,883	3	30	0	1	3	2	17	23	0.9	1.4	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.24	0.267	12,747	8	34	0	0	0	1	1	2	1.6	2.4	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELG	Sep-03	2.15	0.471	12,520	8	34	0	0	0	0	2	2	0.9	0.9	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 1	Sep-03	17.86	12.801	3,823	3	5	0	0	2	3	11	16	0.9	1.3	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE	Sep-03	6.60	3.503	5,159	3	48	0	0	1	3	6	10	1.5	2.3	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	26.33	7.061	10,216	3	48	0	0	2	2	9	13	0.5	0.7	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.37	1.104	10,844	3	48	1	0	0	0	0	1	0.2	1.1	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.22	1.582	9,046	3	48	0	0	0	1	1	2	0.4	0.6	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKI	Sep-03	3.66	1.107	9,046	3	18	0	0	1	2	0	3	0.8	1.9	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	15.06	13.666	3,020	3	1	0	0	4	2	10	16	1.1	1.7	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	13.47	4.722	7,813	3	18	0	0	4	2	17	23	1.7	2.5	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SI	Sep-03	6.50	2.381	7,475	3	18	0	1	3	0	2	6	0.9	2.3	55	RC2N1

TABLE A-17

Section Analysis: 2-Lane Rural Roads with CLRS
1998

Route	Route	sect				Install						All Crashes									
Sys	Num	x-ref	Start Ref	End Ref	Location Description	Date	MVM	Length	ADT	Dist	Cnty	F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	104.376	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	13.56	5.796	6,409	7	52	0	0	1	2	5	8	0.6	0.9	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.79	0.397	5,459	7	52	0	0	0	1	0	1	1.3	2.5	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	13.18	6.686	5,400	7	52	0	0	1	1	5	7	0.5	0.8	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	18.49	8.568	5,914	3	73	2	0	2	0	4	8	0.4	1.1	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.54	1.875	8,100	3	73	0	0	1	3	1	5	0.9	1.8	55	RC2N1
MNTH	18	7	3.159	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	39.05	16.434	6,510	3	18	0	1	3	6	12	22	0.6	0.9	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	8.7	3.491	6,800	8	34	0	0	3	3	3	9	1.0	2.1	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	4.4	1.288	9,394	8	34	0	0	2	3	8	13	2.9	4.5	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Aug-00	6.7	2.246	8,140	8	34	0	2	1	2	3	8	1.2	2.7	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Aug-00	7.7	3.506	5,984	8	34	0	0	2	1	3	6	0.8	1.4	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	10.0	5.448	5,031	8	34	0	0	1	2	1	4	0.4	0.8	55	RC2N1
MNTH	23	10	212.950	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	20.67	7.867	7,200	3	5	2	2	0	1	5	10	0.5	1.2	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.19	1.033	5,819	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.84	2.146	4,900	3	5	0	0	1	0	4	5	1.3	1.8	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.37	3.003	4,900	3	5	0	0	1	1	1	3	0.6	1.1	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	3.93	2.195	4,900	3	48	0	0	1	0	0	1	0.3	0.8	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.02	1.778	6,200	3	48	0	0	0	1	2	3	0.7	1.0	55	RC2N1
MNTH	25	16	93.919	97.734	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	3.72	3.815	2,668	3	71	0	0	0	1	3	4	1.1	1.3	55	RC2N1
MNTH	25	17	099+00.400	104.681	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKM	Sep-03	2.63	5.281	1,363	3	5	0	0	0	2	2	4	1.5	2.3	55	RC2N1
MNTH	25	18,19	105+00.140	117+00.527		Sep-03	6.16	12.387	1,363	3	5	0	0	1	0	4	5	0.8	1.1		
MNTH	25	20	118+00.034	121+00.658		Sep-03	1.80	3.624	1,363	3	5	0	0	0	1	0	1	0.6	1.1		
MNTH	25	21	122.816	126.593	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.38	3.777	2,453	3	49	0	0	2	0	1	3	0.9	2.1	55	RC2N1
MNTH	25	22	129+00.605	155.277	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINEI	Sep-03	18.26	25.672	1,949	3	49	3	0	2	1	6	12	0.7	1.6	55	RC2N1
MNTH	55	23	142+00.070	143.985	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	5.77	1.915	8,248	3	86	0	0	1	0	2	3	0.5	0.9	45	RC2N1
MNTH	55	24	144.517	146.706	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	6.20	2.189	7,761	3	86	0	0	3	1	0	4	0.6	1.8	55	RC2N1
MNTH	55	25	147+00.221	147+00.325		Sep-03	0.29	0.104	7,761	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	23.76	6.23	10,448	3	86	1	0	3	2	10	16	0.7	1.2	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWART	Nov-99	9.57	3.914	6,700	6	50	0	0	0	1	1	2	0.2	0.3	55	RC2N1
MNTH	65	28	51.539	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	26.70	11.461	6,383	3	30	1	0	4	8	15	28	1.0	1.8	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.26	0.267	12,900	8	34	0	0	0	0	3	3	2.4	2.4	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.18	0.471	12,659	8	34	0	0	1	0	0	1	0.5	1.4	60	RC2N1
MNTH	95	30	9.204	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	18.82	12.801	4,029	3	5	0	0	0	6	11	17	0.9	1.2	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMBI	Sep-03	6.56	3.503	5,127	3	48	0	0	0	0	2	2	0.3	0.3	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	24.36	7.061	9,451	3	48	1	0	6	4	11	22	0.9	1.7	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.09	1.104	10,157	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.77	1.582	10,000	3	48	0	0	1	1	3	5	0.9	1.4	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	2.18	1.107	5,400	3	18	0	0	0	0	2	2	0.9	0.9	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	12.34	13.666	2,473	3	1	0	1	4	3	8	16	1.3	2.4	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	16.89	4.722	9,800	3	18	0	0	0	0	7	7	0.4	0.4	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	8.12	2.381	9,343	3	18	2	0	2	4	4	12	1.5	3.4	55	RC2N1

TABLE A-18

Section Analysis: 2-Lane Rural Roads with CLRS
1999

Route	Route	sect				Install						All Crashes									
Sys	Num	x-ref	Start Ref	End Ref	Location Description	Date	MVM	Length	ADT	Dist	Cnty	F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	13.94	5.796	6,589	7	52	0	0	2	3	9	14	1.0	1.5	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.81	0.397	5,612	7	52	0	0	1	0	1	2	2.5	4.9	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	13.55	6.686	5,551	7	52	0	0	2	0	10	12	0.9	1.2	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	19.01	8.568	6,080	3	73	1	0	3	6	6	16	0.8	1.7	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.70	1.875	8,327	3	73	0	0	2	1	2	5	0.9	1.8	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	40.14	16.434	6,692	3	18	0	0	5	4	9	18	0.4	0.8	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	8.9	3.491	6,990	8	34	0	2	2	2	3	9	1.0	2.4	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	4.5	1.288	9,657	8	34	0	0	0	4	2	6	1.3	2.2	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESVI	Aug-00	6.9	2.246	8,368	8	34	0	0	0	3	3	6	0.9	1.3	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROAI	Aug-00	7.9	3.506	6,152	8	34	0	0	1	2	1	4	0.5	1.0	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESVI	Sep-03	10.3	5.448	5,172	8	34	0	0	2	1	3	6	0.6	1.1	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (c	Sep-03	21.25	7.867	7,402	3	5	0	1	2	1	7	11	0.5	0.9	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.26	1.033	5,982	3	5	0	0	0	1	1	2	0.9	1.3	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.95	2.146	5,037	3	5	0	0	0	0	2	2	0.5	0.5	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.52	3.003	5,037	3	5	0	0	0	0	3	3	0.5	0.5	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.04	2.195	5,037	3	48	0	0	0	0	2	2	0.5	0.5	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.14	1.778	6,374	3	48	0	0	1	0	1	2	0.5	1.0	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	3.82	3.815	2,742	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKM	Sep-03	2.70	5.281	1,401	3	5	0	0	0	1	0	1	0.4	0.7	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	6.33	12.387	1,401	3	5	0	0	0	3	3	6	0.9	1.4		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	1.85	3.624	1,401	3	5	0	1	1	1	0	3	1.6	4.9		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH 2	Sep-03	3.48	3.777	2,522	3	49	0	0	0	0	4	4	1.2	1.2	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINER	Sep-03	18.77	25.672	2,003	3	49	0	1	8	7	12	28	1.5	2.9	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE (	Sep-03	5.93	1.915	8,478	3	86	0	0	0	0	3	3	0.5	0.5	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	6.37	2.189	7,978	3	86	0	1	2	0	0	3	0.5	1.6	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.30	0.104	7,978	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	24.42	6.23	10,741	3	86	0	0	5	4	9	18	0.7	1.3	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWART	Nov-99	9.84	3.914	6,888	6	50	0	0	0	1	0	1	0.1	0.2	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MOF	Sep-03	27.45	11.461	6,561	3	30	0	0	4	3	13	20	0.7	1.1	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.29	0.267	13,261	8	34	0	0	0	0	1	1	0.8	0.8	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.24	0.471	13,013	8	34	0	0	0	0	0	0	0.0	0.0	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig (	Sep-03	19.35	12.801	4,142	3	5	0	1	1	0	8	10	0.5	0.8	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMBF	Sep-03	6.74	3.503	5,271	3	48	0	0	0	2	4	6	0.9	1.2	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	25.04	7.061	9,715	3	48	0	1	2	3	13	19	0.8	1.2	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.21	1.104	10,442	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.94	1.582	10,280	3	48	1	0	3	1	1	6	1.0	2.9	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	2.24	1.107	5,551	3	18	0	1	0	1	0	2	0.9	2.7	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	12.68	13.666	2,542	3	1	0	0	0	2	10	12	0.9	1.1	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	17.36	4.722	10,074	3	18	0	0	1	9	12	22	1.3	1.9	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JENI	Sep-03	8.35	2.381	9,604	3	18	1	0	1	0	3	5	0.6	1.3	55	RC2N1

TABLE A-19

Section Analysis: 2-Lane Rural Roads with CLRS
2000

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes								SL	CATEG
												F	A	B	C	PD	Total	CR	SR		
USTH	14	4a	104.376	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	13.74	5.796	6,496	7	52	0	0	0	3	10	13	0.9	1.2	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.95	0.397	6,572	7	52	0	0	0	0	0	0	0.0	0.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	12.97	6.686	5,300	7	52	0	0	0	0	2	2	0.2	0.2	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	19.52	8.568	6,224	3	73	0	1	1	3	8	13	0.7	1.1	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.90	1.875	8,600	3	73	0	0	1	1	4	6	1.0	1.5	55	RC2N1
MNTH	18	7	3.159	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	35.85	16.434	5,960	3	18	1	0	6	8	16	31	0.9	1.5	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	9.1	3.491	7,100	8	34	0	1	1	2	4	8	0.9	1.7	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	4.8	1.288	10,141	8	34	0	1	3	3	6	13	2.7	5.2	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Aug-00	7.0	2.246	8,550	8	34	0	0	2	5	5	12	1.7	3.0	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Aug-00	7.5	3.506	5,808	8	34	0	0	2	2	4	8	1.1	1.9	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	9.5	5.448	4,769	8	34	1	0	0	0	5	6	0.6	1.1	55	RC2N1
MNTH	23	10	212.950	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	20.44	7.867	7,100	3	5	0	0	0	1	10	11	0.5	0.6	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.27	1.033	5,995	3	5	0	0	0	1	0	1	0.4	0.9	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.89	2.146	4,950	3	5	0	0	1	2	1	4	1.0	2.1	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.44	3.003	4,950	3	5	0	0	0	0	1	1	0.2	0.2	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	3.98	2.195	4,950	3	48	0	0	0	0	2	2	0.5	0.5	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.69	1.778	7,200	3	48	0	0	0	0	4	4	0.9	0.9	55	RC2N1
MNTH	25	16	93.919	97.734	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	3.52	3.815	2,524	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	104.681	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKN	Sep-03	3.40	5.281	1,760	3	5	0	0	1	2	3	6	1.8	2.9	55	RC2N1
MNTH	25	18,19	105+00.140	117+00.527		Sep-03	7.98	12.387	1,760	3	5	0	0	1	1	3	5	0.6	1.0		
MNTH	25	20	118+00.034	121+00.658		Sep-03	2.33	3.624	1,760	3	5	0	0	0	3	1	4	1.7	3.0		
MNTH	25	21	122.816	126.593	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.50	3.777	2,531	3	49	0	0	1	2	2	5	1.4	2.6	55	RC2N1
MNTH	25	22	129+00.605	155.277	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	20.14	25.672	2,144	3	49	1	1	4	0	10	16	0.8	1.5	55	RC2N1
MNTH	55	23	142+00.070	143.985	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	5.99	1.915	8,552	3	86	0	0	0	0	1	1	0.2	0.2	45	RC2N1
MNTH	55	24	144.517	146.706	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	6.76	2.189	8,433	3	86	0	0	1	2	3	6	0.9	1.5	55	RC2N1
MNTH	55	25	147+00.221	147+00.325		Sep-03	0.32	0.104	8,433	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	23.89	6.23	10,477	3	86	0	1	5	1	9	16	0.7	1.3	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	10.74	3.914	7,500	6	50	0	0	0	0	3	3	0.3	0.3	55	RC2N1
MNTH	65	28	51.539	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	30.30	11.461	7,242	3	30	0	1	0	6	13	20	0.7	1.0	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.29	0.267	13,200	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.23	0.471	12,935	8	34	1	0	0	0	1	2	0.9	2.7	60	RC2N1
MNTH	95	30	9.204	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	19.57	12.801	4,177	3	5	0	0	1	3	14	18	0.9	1.2	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	9.25	3.503	7,218	3	48	0	0	2	1	2	5	0.5	1.1	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	25.55	7.061	9,887	3	48	0	0	1	4	10	15	0.6	0.8	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.10	1.104	10,157	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	4.46	1.582	7,700	3	48	0	0	0	1	2	3	0.7	0.9	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	1.64	1.107	4,050	3	18	0	0	0	1	0	1	0.6	1.2	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	15.03	13.666	3,004	3	1	0	0	0	3	9	12	0.8	1.0	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	17.63	4.722	10,200	3	18	0	1	2	1	14	18	1.0	1.5	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	7.96	2.381	9,133	3	18	1	1	0	0	3	5	0.6	1.5	55	RC2N1

TABLE A-20

Section Analysis: 2-Lane Rural Roads with CLRS
2001

Route	Route	sect				Install						All Crashes									
Sys	Num	x-ref	Start Ref	End Ref	Location Description	Date	MVM	Length	ADT	Dist	Cnty	F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	104.376	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	14.29	5.796	6,755	7	52	1	0	4	3	12	20	1.4	2.4	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.99	0.397	6,835	7	52	0	0	0	0	1	1	1.0	1.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	13.45	6.686	5,512	7	52	0	1	0	2	9	12	0.9	1.3	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	20.24	8.568	6,473	3	73	1	0	3	4	7	15	0.7	1.4	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	6.12	1.875	8,944	3	73	0	0	4	3	4	11	1.8	3.6	55	RC2N1
MNTH	18	7	3.159	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	37.18	16.434	6,198	3	18	2	0	2	6	24	34	0.9	1.4	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	9.4	3.491	7,384	8	34	0	0	1	2	1	4	0.4	0.9	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	5.0	1.288	10,547	8	34	0	0	0	2	7	9	1.8	2.2	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Aug-00	7.3	2.246	8,892	8	34	0	1	1	2	6	10	1.4	2.3	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Aug-00	7.7	3.506	6,040	8	34	0	0	1	1	6	8	1.0	1.4	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	9.9	5.448	4,960	8	34	0	0	1	2	2	5	0.5	0.9	55	RC2N1
MNTH	23	10	212.950	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	21.20	7.867	7,384	3	5	1	0	1	5	11	18	0.8	1.4	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.35	1.033	6,235	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	4.03	2.146	5,148	3	5	0	0	0	0	3	3	0.7	0.7	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.64	3.003	5,148	3	5	1	0	1	0	0	2	0.4	1.4	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.12	2.195	5,148	3	48	0	0	1	0	2	3	0.7	1.2	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.86	1.778	7,488	3	48	0	0	0	2	0	2	0.4	0.8	55	RC2N1
MNTH	25	16	93.919	97.734	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	3.66	3.815	2,625	3	71	0	0	1	0	7	8	2.2	2.7	55	RC2N1
MNTH	25	17	099+00.400	104.681	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKN	Sep-03	3.53	5.281	1,831	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	18,19	105+00.140	117+00.527		Sep-03	8.28	12.387	1,831	3	5	0	1	1	3	2	7	0.8	1.8		
MNTH	25	20	118+00.034	121+00.658		Sep-03	2.42	3.624	1,831	3	5	0	1	0	1	2	4	1.7	3.3		
MNTH	25	21	122.816	126.593	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.63	3.777	2,632	3	49	0	0	1	2	1	4	1.1	2.2	55	RC2N1
MNTH	25	22	129+00.605	155.277	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	20.90	25.672	2,230	3	49	2	0	6	5	18	31	1.5	2.7	55	RC2N1
MNTH	55	23	142+00.070	143.985	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	6.22	1.915	8,894	3	86	0	0	0	1	1	2	0.3	0.5	45	RC2N1
MNTH	55	24	144.517	146.706	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	7.01	2.189	8,770	3	86	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	55	25	147+00.221	147+00.325		Sep-03	0.33	0.104	8,770	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	24.78	6.23	10,896	3	86	0	0	3	4	12	19	0.8	1.2	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	11.14	3.914	7,800	6	50	0	0	1	2	5	8	0.7	1.1	55	RC2N1
MNTH	65	28	51.539	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	31.51	11.461	7,532	3	30	1	0	4	4	9	18	0.6	1.1	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.34	0.267	13,728	8	34	0	0	0	0	1	1	0.7	0.7	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.31	0.471	13,452	8	34	0	0	0	0	0	0	0.0	0.0	60	RC2N1
MNTH	95	30	9.204	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	20.30	12.801	4,344	3	5	1	1	3	3	6	14	0.7	1.5	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	9.60	3.503	7,507	3	48	0	0	4	3	3	10	1.0	2.2	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	26.50	7.061	10,282	3	48	1	0	0	6	8	15	0.6	0.9	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.26	1.104	10,563	3	48	1	0	0	0	1	2	0.5	1.4	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	4.62	1.582	8,008	3	48	0	0	0	0	3	3	0.6	0.6	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	1.70	1.107	4,212	3	18	0	0	1	0	2	3	1.8	2.9	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	15.59	13.666	3,125	3	1	0	0	1	1	10	12	0.8	1.0	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	18.28	4.722	10,608	3	18	1	0	2	2	7	12	0.7	1.2	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	8.25	2.381	9,498	3	18	0	0	1	1	9	11	1.3	1.7	55	RC2N1

TABLE A-21

Section Analysis: 2-Lane Rural Roads with CLRS
2002

Route	Route	sect				Install						All Crashes									
Sys	Num	x-ref	Start Ref	End Ref	Location Description	Date	MVM	Length	ADT	Dist	Cnty	F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	13.17	5.796	6,223	7	52	0	1	3	1	9	14	1.1	1.8	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.97	0.397	6,676	7	52	0	0	1	0	1	2	2.1	4.1	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	14.15	6.686	5,800	7	52	0	0	0	2	3	5	0.4	0.5	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	21.09	8.568	6,745	3	73	0	0	1	1	12	14	0.7	0.8	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.20	1.875	7,600	3	73	0	0	1	0	7	8	1.5	1.9	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	41.13	16.434	6,856	3	18	0	1	7	7	20	35	0.9	1.4	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	10.4	3.491	8,200	8	34	0	1	5	1	8	15	1.4	2.8	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	4.9	1.288	10,347	8	34	0	0	1	1	11	13	2.7	3.3	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Aug-00	7.3	2.246	8,845	8	34	0	0	4	2	4	10	1.4	2.8	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Aug-00	7.9	3.506	6,208	8	34	0	0	1	3	6	10	1.3	1.9	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	10.2	5.448	5,123	8	34	0	0	2	2	4	8	0.8	1.4	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	20.39	7.867	7,100	3	5	0	0	2	2	8	12	0.6	0.9	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.35	1.033	6,241	3	5	0	1	1	0	1	3	1.3	3.4	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.99	2.146	5,100	3	5	0	0	1	0	4	5	1.3	1.8	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.59	3.003	5,100	3	5	0	0	0	0	5	5	0.9	0.9	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.09	2.195	5,100	3	48	0	0	1	0	0	1	0.2	0.7	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.67	1.778	7,200	3	48	0	0	0	2	2	4	0.9	1.3	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	4.68	3.815	3,361	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKM	Sep-03	3.63	5.281	1,885	3	5	0	0	2	0	1	3	0.8	1.9	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	8.52	12.387	1,885	3	5	0	1	1	2	5	9	1.1	1.9		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.49	3.624	1,885	3	5	0	1	0	1	2	4	1.6	3.2		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.92	3.777	2,844	3	49	0	0	2	1	2	5	1.3	2.6	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	20.70	25.672	2,209	3	49	0	0	2	7	9	18	0.9	1.4	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	6.40	1.915	9,157	3	86	0	0	0	1	8	9	1.4	1.6	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	7.08	2.189	8,865	3	86	0	0	1	0	2	3	0.4	0.7	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.34	0.104	8,865	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	24.22	6.23	10,652	3	86	0	0	3	3	13	19	0.8	1.2	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	10.57	3.914	7,400	6	50	1	0	0	0	8	9	0.9	1.2	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	33.57	11.461	8,026	3	30	0	1	4	6	22	33	1.0	1.5	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.35	0.267	13,900	8	34	0	0	1	1	2	4	3.0	5.2	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.34	0.471	13,615	8	34	0	0	0	0	0	0	0.0	0.0	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	21.17	12.801	4,530	3	5	0	1	2	4	7	14	0.7	1.2	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	8.65	3.503	6,764	3	48	2	0	2	1	5	10	1.2	2.7	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	29.03	7.061	11,264	3	48	0	1	3	2	14	20	0.7	1.1	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.68	1.104	11,609	3	48	0	0	0	1	0	1	0.2	0.4	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.89	1.582	10,200	3	48	0	0	1	1	4	6	1.0	1.5	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	2.00	1.107	4,950	3	18	0	0	0	0	3	3	1.5	1.5	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	14.98	13.666	3,004	3	1	0	0	1	3	13	17	1.1	1.5	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	16.89	4.722	9,800	3	18	0	0	3	3	13	19	1.1	1.7	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	7.68	2.381	8,840	3	18	0	1	0	0	3	4	0.5	0.9	55	RC2N1

TABLE A-22

Section Analysis: 2-Lane Rural Roads with CLRS
2003

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 1	Jun-04	13.31	5.796	6,291	7	52	0	0	0	3	11	14	1.1	1.3	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.98	0.397	6,750	7	52	0	0	1	0	0	1	1.0	3.1	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLI	Jun-04	14.31	6.686	5,864	7	52	1	0	1	0	7	9	0.6	1.0	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	21.33	8.568	6,819	3	73	0	0	1	4	14	19	0.9	1.2	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.26	1.875	7,684	3	73	0	0	3	3	3	9	1.7	3.4	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	41.58	16.434	6,932	3	18	3	1	0	5	16	25	0.6	1.1	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	10.6	3.491	8,290	8	34	0	0	3	3	10	16	1.5	2.4	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	4.9	1.288	10,461	8	34	0	0	1	2	6	9	1.8	2.6	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Aug-00	7.3	2.246	8,942	8	34	0	0	1	1	5	7	1.0	1.4	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Aug-00	8.0	3.506	6,276	8	34	0	0	0	0	6	6	0.7	0.7	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	10.3	5.448	5,179	8	34	0	1	0	2	3	6	0.6	1.1	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	20.61	7.867	7,178	3	5	0	0	3	2	10	15	0.7	1.1	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.38	1.033	6,309	3	5	0	0	0	1	1	2	0.8	1.3	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	4.04	2.146	5,156	3	5	0	0	0	1	4	5	1.2	1.5	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.65	3.003	5,156	3	5	0	0	3	0	3	6	1.1	2.1	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.13	2.195	5,156	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.72	1.778	7,279	3	48	0	0	0	1	1	2	0.4	0.6	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	4.73	3.815	3,398	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKM	Sep-03	3.67	5.281	1,905	3	5	0	0	1	0	5	6	1.6	2.2	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	8.61	12.387	1,905	3	5	0	0	1	0	2	3	0.3	0.6		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.52	3.624	1,905	3	5	0	0	0	1	1	2	0.8	1.2		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.96	3.777	2,875	3	49	0	0	0	0	4	4	1.0	1.0	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	20.92	25.672	2,233	3	49	0	1	0	3	5	9	0.4	0.7	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	6.47	1.915	9,258	3	86	0	0	1	0	1	2	0.3	0.6	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	7.16	2.189	8,963	3	86	0	0	1	0	0	1	0.1	0.4	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.34	0.104	8,963	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	24.49	6.23	10,769	3	86	0	0	1	3	14	18	0.7	0.9	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	10.69	3.914	7,481	6	50	0	0	0	2	0	2	0.2	0.4	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	33.94	11.461	8,114	3	30	0	0	5	8	17	30	0.9	1.4	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.37	0.267	14,053	8	34	0	0	0	0	3	3	2.2	2.2	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.37	0.471	13,764	8	34	0	0	1	1	0	2	0.8	2.1	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	21.40	12.801	4,580	3	5	0	0	2	1	8	11	0.5	0.7	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	8.74	3.503	6,838	3	48	0	0	1	0	2	3	0.3	0.6	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	29.35	7.061	11,388	3	48	0	0	3	4	18	25	0.9	1.2	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.73	1.104	11,737	3	48	0	0	0	1	3	4	0.8	1.1	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.95	1.582	10,312	3	48	0	1	0	0	0	1	0.2	0.7	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	2.02	1.107	5,004	3	18	0	0	0	0	1	1	0.5	0.5	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	15.15	13.666	3,037	3	1	0	0	5	3	8	16	1.1	1.9	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	17.08	4.722	9,908	3	18	0	1	0	5	14	20	1.2	1.6	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	7.77	2.381	8,936	3	18	0	0	1	1	8	10	1.3	1.7	55	RC2N1

TABLE A-23

Section Analysis: 2-Lane Rural Roads with CLRS
2004

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 1	Jun-04	14.46	5.796	6,837	7	52	0	0	0	2	13	15	1.0	1.2	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	1.07	0.397	7,352	7	52	0	0	0	0	0	0	0.0	0.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOL	Jun-04	14.93	6.686	6,100	7	52	0	0	0	1	6	7	0.5	0.5	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	21.65	8.568	6,904	3	73	2	0	0	2	8	12	0.6	1.0	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	6.11	1.875	8,900	3	73	0	0	1	4	3	8	1.3	2.3	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	39.61	16.434	6,585	3	18	1	0	4	10	9	24	0.6	1.2	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	8.9	3.491	7,000	8	34	0	0	1	0	3	4	0.4	0.7	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	4.3	1.288	9,057	8	34	0	0	1	2	7	10	2.3	3.3	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNES\	Aug-00	6.4	2.246	7,805	8	34	0	0	0	2	5	7	1.1	1.4	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED RO/	Aug-00	7.9	3.506	6,123	8	34	0	0	1	1	6	8	1.0	1.4	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNES\	Sep-03	10.7	5.448	5,354	8	34	0	0	2	2	3	7	0.7	1.2	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY	Sep-03	23.03	7.867	8,000	3	5	1	0	3	4	7	15	0.7	1.3	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.50	1.033	6,624	3	5	0	0	0	2	0	2	0.8	1.6	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	4.40	2.146	5,600	3	5	0	0	0	0	1	1	0.2	0.2	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	6.15	3.003	5,600	3	5	0	0	0	1	0	1	0.2	0.3	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.50	2.195	5,600	3	48	0	0	2	0	0	2	0.4	1.3	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	5.21	1.778	8,000	3	48	0	0	2	1	2	5	1.0	1.9	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	4.67	3.815	3,345	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKI	Sep-03	3.86	5.281	1,996	3	5	0	0	2	0	4	6	1.6	2.6	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	9.05	12.387	1,996	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.65	3.624	1,996	3	5	0	0	0	0	1	1	0.4	0.4		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.13	3.777	2,265	3	49	1	0	1	1	1	4	1.3	3.5	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	19.86	25.672	2,114	3	49	0	1	2	4	13	20	1.0	1.6	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	7.35	1.915	10,492	3	86	0	0	0	0	1	1	0.1	0.1	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	7.60	2.189	9,491	3	86	0	0	0	0	2	2	0.3	0.3	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.36	0.104	9,491	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUI	Sep-03	26.26	6.23	11,517	3	86	0	1	1	7	6	15	0.6	1.0	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	9.88	3.914	6,900	6	50	0	0	0	1	3	4	0.4	0.5	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MC	Sep-03	32.85	11.461	7,852	3	30	0	1	1	7	11	20	0.6	1.0	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.31	0.267	13,400	8	34	0	0	1	0	2	3	2.3	3.8	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.27	0.471	13,186	8	34	0	0	1	1	3	5	2.2	3.5	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	21.75	12.801	4,642	3	5	0	0	1	2	12	15	0.7	0.9	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	8.51	3.503	6,636	3	48	0	0	0	0	5	5	0.6	0.6	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	30.68	7.061	11,872	3	48	1	0	8	6	8	23	0.7	1.6	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.44	1.104	11,000	3	48	0	0	1	1	2	4	0.9	1.6	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.50	1.582	9,500	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	1.72	1.107	4,250	3	18	0	0	0	1	0	1	0.6	1.2	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	16.54	13.666	3,307	3	1	2	0	0	2	9	13	0.8	1.4	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	18.84	4.722	10,900	3	18	0	1	2	3	10	16	0.8	1.4	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	7.85	2.381	9,003	3	18	0	0	2	3	4	9	1.1	2.0	55	RC2N1

TABLE A-24

Section Analysis: 2-Lane Rural Roads with CLRS
2005

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes								SL	CATEG
												F	A	B	C	PD	Total	CR	SR		
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH	Jun-04	14.54	5.796	6,871	7	52	0	0	0	2	11	13	0.9	1.0	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	1.07	0.397	7,389	7	52	0	0	0	0	2	2	1.9	1.9	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICO	Jun-04	14.96	6.686	6,130	7	52	0	0	2	1	3	6	0.4	0.7	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	21.70	8.568	6,939	3	73	0	0	0	1	7	8	0.4	0.4	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	6.12	1.875	8,944	3	73	0	0	2	4	5	11	1.8	3.1	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	39.69	16.434	6,617	3	18	0	0	1	12	17	30	0.8	1.1	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Aug-00	9.0	3.491	7,035	8	34	0	0	0	2	2	4	0.4	0.7	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Aug-00	4.3	1.288	9,102	8	34	0	0	0	1	7	8	1.9	2.1	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNES	Aug-00	6.4	2.246	7,844	8	34	0	0	2	3	4	9	1.4	2.5	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED RO	Aug-00	7.9	3.506	6,153	8	34	0	0	0	1	3	4	0.5	0.6	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNES	Sep-03	10.7	5.448	5,381	8	34	0	0	2	5	0	7	0.7	1.5	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY	Sep-03	23.09	7.867	8,040	3	5	0	1	1	2	11	15	0.6	1.0	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.51	1.033	6,657	3	5	0	0	1	0	0	1	0.4	1.2	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	4.41	2.146	5,628	3	5	0	0	1	0	0	1	0.2	0.7	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	6.17	3.003	5,628	3	5	0	0	0	0	2	2	0.3	0.3	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.51	2.195	5,628	3	48	0	0	0	1	0	1	0.2	0.4	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	5.22	1.778	8,040	3	48	0	0	1	1	4	6	1.1	1.7	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.2	Sep-03	4.68	3.815	3,361	3	71	0	0	0	1	0	1	0.2	0.4	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCK	Sep-03	3.86	5.281	2,005	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	9.07	12.387	2,005	3	5	0	0	0	0	3	3	0.3	0.3		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.65	3.624	2,005	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT T	Sep-03	3.14	3.777	2,276	3	49	0	1	0	0	1	2	0.6	1.6	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAIN	Sep-03	19.91	25.672	2,125	3	49	0	0	5	3	12	20	1.0	1.7	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDAL	Sep-03	7.37	1.915	10,544	3	86	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPL	Sep-03	7.62	2.189	9,538	3	86	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.36	0.104	9,538	3	86	0	0	0	0	2	2	5.5	5.5		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BU	Sep-03	26.32	6.23	11,575	3	86	0	0	4	6	7	17	0.6	1.2	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWA	Nov-99	9.91	3.914	6,934	6	50	0	0	1	1	1	3	0.3	0.6	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE M	Sep-03	33.01	11.461	7,891	3	30	0	2	8	8	18	36	1.1	2.0	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.31	0.267	13,467	8	34	0	0	0	1	1	2	1.5	2.3	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.28	0.471	13,252	8	34	0	0	0	0	1	1	0.4	0.4	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(ori	Sep-03	21.80	12.801	4,665	3	5	1	1	4	2	5	13	0.6	1.4	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAM	Sep-03	8.53	3.503	6,670	3	48	0	0	1	2	3	6	0.7	1.2	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	30.75	7.061	11,931	3	48	1	0	0	0	14	15	0.5	0.6	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.45	1.104	11,055	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.51	1.582	9,547	3	48	0	0	0	0	3	3	0.5	0.5	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	1.73	1.107	4,271	3	18	0	0	0	1	2	3	1.7	2.3	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	16.58	13.666	3,323	3	1	1	0	2	1	6	10	0.6	1.1	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	18.88	4.722	10,954	3	18	0	0	3	7	3	13	0.7	1.4	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JE	Sep-03	7.86	2.381	9,048	3	18	1	0	1	3	6	11	1.4	2.5	55	RC2N1

TABLE A-25

Section Analysis: 2-Lane Rural Roads with CLRS
1996: ROR left, head on, sd swipe opp crashes only

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	12.49	5.796	5,906	7	52	0	0	1	0	0	1	0.1	0.2	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.89	0.397	6,124	7	52	0	0	0	1	1	2	2.2	3.4	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	12.97	6.686	5,300	7	52	0	1	0	0	0	1	0.1	0.3	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	15.95	8.568	5,085	3	73	1	1	1	1	2	6	0.4	1.0	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	4.60	1.875	6,700	3	73	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	32.37	16.434	5,381	3	18	0	0	0	1	1	2	0.1	0.1	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	8.4	3.491	6,600	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	3.7	1.288	7,942	8	34	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Sep-03	6.1	2.246	7,385	8	34	0	0	1	0	0	1	0.2	0.5	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Sep-03	6.8	3.506	5,308	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	8.6	5.448	4,300	8	34	0	0	0	2	0	2	0.2	0.5	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	21.59	7.867	7,500	3	5	0	1	0	3	1	5	0.2	0.5	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	1.69	1.033	4,457	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.61	2.146	4,600	3	5	1	0	0	1	0	2	0.6	1.9	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.06	3.003	4,600	3	5	0	0	0	1	1	2	0.4	0.6	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	3.70	2.195	4,600	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.10	1.778	6,300	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	3.90	3.815	2,794	3	71	0	0	0	0	1	1	0.3	0.3	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKN	Sep-03	3.02	5.281	1,565	3	5	0	0	0	0	1	1	0.3	0.3	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	7.10	12.387	1,565	3	5	1	0	0	0	1	2	0.3	0.8		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.08	3.624	1,565	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.02	3.777	2,187	3	49	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	17.64	25.672	1,877	3	49	0	0	2	1	2	5	0.3	0.6	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	5.69	1.915	8,122	3	86	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	6.30	2.189	7,865	3	86	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.30	0.104	7,865	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	22.48	6.23	9,860	3	86	0	0	1	2	3	6	0.3	0.4	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	9.88	3.914	6,900	6	50	3	0	0	0	1	4	0.4	1.6	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	23.94	11.461	5,723	3	30	0	0	2	1	3	6	0.3	0.5	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.21	0.267	12,400	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.10	0.471	12,179	8	34	0	0	0	0	1	1	0.5	0.5	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	17.42	12.801	3,719	3	5	0	0	0	0	3	3	0.2	0.2	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	6.43	3.503	5,018	3	48	0	0	0	1	1	2	0.3	0.5	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	25.68	7.061	9,938	3	48	1	0	0	2	1	4	0.2	0.4	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.26	1.104	10,548	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.10	1.582	8,800	3	48	0	0	1	0	1	2	0.4	0.8	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	1.80	1.107	4,450	3	18	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	14.69	13.666	2,937	3	1	0	0	0	2	1	3	0.2	0.3	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	13.13	4.722	7,600	3	18	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	6.34	2.381	7,271	3	18	1	0	1	0	1	3	0.5	1.4	55	RC2N1

TABLE A-26

Section Analysis: 2-Lane Rural Roads with CLRS
1997: ROR left, head on, sd swipe opp crashes only

Route	Route	sect				Install						All Crashes									
Sys	Num	x-ref	Start Ref	End Ref	Location Description	Date	MVM	Length	ADT	Dist	Cnty	F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 1	Jun-04	12.85	5.796	6,072	7	52	0	0	0	1	1	2	0.2	0.2	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.91	0.397	6,296	7	52	0	0	0	0	0	0	0.0	0.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOL	Jun-04	13.30	6.686	5,448	7	52	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	16.35	8.568	5,227	3	73	0	0	0	1	2	3	0.2	0.2	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	4.71	1.875	6,888	3	73	0	0	0	0	1	1	0.2	0.2	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	33.18	16.434	5,531	3	18	0	0	1	4	3	8	0.2	0.4	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	8.6	3.491	6,785	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	3.8	1.288	8,164	8	34	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNES\	Sep-03	6.2	2.246	7,592	8	34	0	0	1	0	3	4	0.6	1.0	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED RO/	Sep-03	7.0	3.506	5,456	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNES\	Sep-03	8.8	5.448	4,420	8	34	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY	Sep-03	22.14	7.867	7,710	3	5	2	0	2	0	2	6	0.3	0.8	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	1.73	1.033	4,582	3	5	0	0	0	0	1	1	0.6	0.6	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.70	2.146	4,729	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.18	3.003	4,729	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	3.79	2.195	4,729	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.20	1.778	6,476	3	48	0	0	0	1	0	1	0.2	0.5	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	4.00	3.815	2,872	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKI	Sep-03	3.10	5.281	1,609	3	5	0	1	0	1	1	3	1.0	2.3	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	7.27	12.387	1,609	3	5	0	0	0	1	0	1	0.1	0.3		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.13	3.624	1,609	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.10	3.777	2,248	3	49	0	1	0	0	1	2	0.6	1.6	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	18.08	25.672	1,930	3	49	0	1	0	2	1	4	0.2	0.5	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	5.84	1.915	8,350	3	86	0	0	0	0	1	1	0.2	0.2	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	6.46	2.189	8,085	3	86	0	0	0	1	0	1	0.2	0.3	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.31	0.104	8,085	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BU	Sep-03	23.05	6.23	10,136	3	86	0	0	0	1	3	4	0.2	0.2	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	10.13	3.914	7,093	6	50	1	0	0	0	1	2	0.2	0.6	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MC	Sep-03	24.61	11.461	5,883	3	30	0	1	2	0	0	3	0.1	0.4	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.24	0.267	12,747	8	34	0	0	0	1	2	3	2.4	3.2	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.15	0.471	12,520	8	34	0	0	0	0	0	0	0.0	0.0	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	17.86	12.801	3,823	3	5	0	0	1	1	1	3	0.2	0.3	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	6.60	3.503	5,159	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	26.33	7.061	10,216	3	48	0	0	0	0	2	2	0.1	0.1	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.37	1.104	10,844	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.22	1.582	9,046	3	48	0	0	0	1	0	1	0.2	0.4	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	3.66	1.107	9,046	3	18	0	1	0	0	0	1	0.3	1.1	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	15.06	13.666	3,020	3	1	0	0	2	0	1	3	0.2	0.5	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	13.47	4.722	7,813	3	18	0	0	1	0	0	1	0.1	0.2	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	6.50	2.381	7,475	3	18	0	0	2	0	0	2	0.3	0.9	55	RC2N1

Table A-27

Section Analysis: 2-Lane Rural Roads with CLRS
1998: ROR left, head on, sd swipe opp crashes only

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	13.56	5.796	6,409	7	52	0	0	1	0	0	1	0.1	0.2	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.79	0.397	5,459	7	52	0	0	0	0	0	0	0.0	0.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	13.18	6.686	5,400	7	52	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	18.49	8.568	5,914	3	73	2	0	0	0	1	3	0.2	0.6	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.54	1.875	8,100	3	73	0	0	0	1	1	2	0.4	0.5	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	39.05	16.434	6,510	3	18	0	0	1	0	3	4	0.1	0.2	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	8.7	3.491	6,800	8	34	0	0	0	0	1	1	0.1	0.1	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	4.4	1.288	9,394	8	34	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Sep-03	6.7	2.246	8,140	8	34	0	2	0	0	1	3	0.4	1.3	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Sep-03	7.7	3.506	5,984	8	34	0	0	1	0	1	2	0.3	0.5	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	10.0	5.448	5,031	8	34	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	20.67	7.867	7,200	3	5	2	0	0	0	0	2	0.1	0.5	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.19	1.033	5,819	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.84	2.146	4,900	3	5	0	0	0	0	1	1	0.3	0.3	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.37	3.003	4,900	3	5	0	0	0	1	0	1	0.2	0.4	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	3.93	2.195	4,900	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.02	1.778	6,200	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	3.72	3.815	2,668	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKN	Sep-03	2.63	5.281	1,363	3	5	0	0	0	1	0	1	0.4	0.8	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	6.16	12.387	1,363	3	5	0	0	0	0	1	1	0.2	0.2		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	1.80	3.624	1,363	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.38	3.777	2,453	3	49	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	18.26	25.672	1,949	3	49	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	5.77	1.915	8,248	3	86	0	0	0	0	1	1	0.2	0.2	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	6.20	2.189	7,761	3	86	0	0	1	1	0	2	0.3	0.8	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.29	0.104	7,761	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	23.76	6.23	10,448	3	86	0	0	0	0	1	1	0.0	0.0	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	9.57	3.914	6,700	6	50	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	26.70	11.461	6,383	3	30	0	0	2	3	1	6	0.2	0.5	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.26	0.267	12,900	8	34	0	0	0	0	1	1	0.8	0.8	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.18	0.471	12,659	8	34	0	0	0	0	0	0	0.0	0.0	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	18.82	12.801	4,029	3	5	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	6.56	3.503	5,127	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	24.36	7.061	9,451	3	48	1	0	1	0	0	2	0.1	0.3	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.09	1.104	10,157	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.77	1.582	10,000	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	2.18	1.107	5,400	3	18	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	12.34	13.666	2,473	3	1	0	1	3	0	1	5	0.4	1.1	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	16.89	4.722	9,800	3	18	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	8.12	2.381	9,343	3	18	2	0	0	0	2	4	0.5	1.5	55	RC2N1

TABLE A-28

Section Analysis: 2-Lane Rural Roads with CLRS
1999: ROR left, head on, sd swipe opp crashes only

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	13.94	5.796	6,589	7	52	0	0	0	2	0	2	0.1	0.3	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.81	0.397	5,612	7	52	0	0	0	0	0	0	0.0	0.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	13.55	6.686	5,551	7	52	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	19.01	8.568	6,080	3	73	1	0	1	2	1	5	0.3	0.7	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.70	1.875	8,327	3	73	0	0	0	1	0	1	0.2	0.4	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	40.14	16.434	6,692	3	18	0	0	2	1	1	4	0.1	0.2	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	8.9	3.491	6,990	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	4.5	1.288	9,657	8	34	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Sep-03	6.9	2.246	8,368	8	34	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Sep-03	7.9	3.506	6,152	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	10.3	5.448	5,172	8	34	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	21.25	7.867	7,402	3	5	0	1	1	0	0	2	0.1	0.3	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.26	1.033	5,982	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.95	2.146	5,037	3	5	0	0	0	0	2	2	0.5	0.5	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.52	3.003	5,037	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.04	2.195	5,037	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.14	1.778	6,374	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	3.82	3.815	2,742	3	71	0	0	0	0	1	1	0.3	0.3	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKN	Sep-03	2.70	5.281	1,401	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	6.33	12.387	1,401	3	5	0	0	0	0	1	1	0.2	0.2		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	1.85	3.624	1,401	3	5	0	0	0	1	0	1	0.5	1.1		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.48	3.777	2,522	3	49	0	0	0	0	1	1	0.3	0.3	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	18.77	25.672	2,003	3	49	0	0	3	2	4	9	0.5	0.9	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	5.93	1.915	8,478	3	86	0	0	0	0	2	2	0.3	0.3	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	6.37	2.189	7,978	3	86	0	1	1	0	0	2	0.3	1.1	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.30	0.104	7,978	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	24.42	6.23	10,741	3	86	0	0	1	2	0	3	0.1	0.3	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWART	Nov-99	9.84	3.914	6,888	6	50	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	27.45	11.461	6,561	3	30	0	0	2	1	1	4	0.1	0.3	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.29	0.267	13,261	8	34	0	0	0	0	1	1	0.8	0.8	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.24	0.471	13,013	8	34	0	0	0	0	0	0	0.0	0.0	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	19.35	12.801	4,142	3	5	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMBI	Sep-03	6.74	3.503	5,271	3	48	0	0	0	1	2	3	0.4	0.6	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	25.04	7.061	9,715	3	48	0	0	0	1	1	2	0.1	0.1	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.21	1.104	10,442	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.94	1.582	10,280	3	48	1	0	2	0	0	3	0.5	1.9	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	2.24	1.107	5,551	3	18	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	12.68	13.666	2,542	3	1	0	0	0	1	0	1	0.1	0.2	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	17.36	4.722	10,074	3	18	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	8.35	2.381	9,604	3	18	0	0	1	0	0	1	0.1	0.4	55	RC2N1

TABLE A-29

Section Analysis: 2-Lane Rural Roads with CLRS
2000: ROR left, head on, sd swipe opp crashes only

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 1	Jun-04	13.74	5.796	6,496	7	52	0	0	0	0	1	1	0.1	0.1	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.95	0.397	6,572	7	52	0	0	0	0	0	0	0.0	0.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOL	Jun-04	12.97	6.686	5,300	7	52	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	19.52	8.568	6,224	3	73	0	1	0	0	2	3	0.2	0.3	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.90	1.875	8,600	3	73	0	0	1	0	2	3	0.5	0.8	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	35.85	16.434	5,960	3	18	0	0	3	3	2	8	0.2	0.5	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	9.1	3.491	7,100	8	34	0	1	0	0	1	2	0.2	0.6	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	4.8	1.288	10,141	8	34	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Sep-03	7.0	2.246	8,550	8	34	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Sep-03	7.5	3.506	5,808	8	34	0	0	0	0	2	2	0.3	0.3	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	9.5	5.448	4,769	8	34	1	0	0	0	1	2	0.2	0.6	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY	Sep-03	20.44	7.867	7,100	3	5	0	0	0	0	2	2	0.1	0.1	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.27	1.033	5,995	3	5	0	0	0	1	0	1	0.4	0.9	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.89	2.146	4,950	3	5	0	0	1	0	0	1	0.3	0.8	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.44	3.003	4,950	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	3.98	2.195	4,950	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.69	1.778	7,200	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	3.52	3.815	2,524	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKI	Sep-03	3.40	5.281	1,760	3	5	0	0	0	2	0	2	0.6	1.2	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	7.98	12.387	1,760	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.33	3.624	1,760	3	5	0	0	0	2	0	2	0.9	1.7		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.50	3.777	2,531	3	49	0	0	0	0	2	2	0.6	0.6	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	20.14	25.672	2,144	3	49	0	1	1	0	0	2	0.1	0.3	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	5.99	1.915	8,552	3	86	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	6.76	2.189	8,433	3	86	0	0	0	1	2	3	0.4	0.6	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.32	0.104	8,433	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BU	Sep-03	23.89	6.23	10,477	3	86	0	0	1	0	1	2	0.1	0.2	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	10.74	3.914	7,500	6	50	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MC	Sep-03	30.30	11.461	7,242	3	30	0	1	0	0	2	3	0.1	0.2	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.29	0.267	13,200	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.23	0.471	12,935	8	34	1	0	0	0	0	1	0.4	2.2	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	19.57	12.801	4,177	3	5	0	0	0	0	2	2	0.1	0.1	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	9.25	3.503	7,218	3	48	0	0	2	0	0	2	0.2	0.6	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	25.55	7.061	9,887	3	48	0	0	1	0	0	1	0.0	0.1	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.10	1.104	10,157	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	4.46	1.582	7,700	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	1.64	1.107	4,050	3	18	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	15.03	13.666	3,004	3	1	0	0	0	2	1	3	0.2	0.3	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	17.63	4.722	10,200	3	18	0	0	0	1	1	2	0.1	0.2	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	7.96	2.381	9,133	3	18	1	0	0	0	0	1	0.1	0.6	55	RC2N1

TABLE A-30

Section Analysis: 2-Lane Rural Roads with CLRS
2001: ROR left, head on, sd swipe opp crashes only

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	14.29	5.796	6,755	7	52	1	0	0	0	0	1	0.1	0.3	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.99	0.397	6,835	7	52	0	0	0	0	1	1	1.0	1.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	13.45	6.686	5,512	7	52	0	1	0	0	2	3	0.2	0.4	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	20.24	8.568	6,473	3	73	1	0	1	0	2	4	0.2	0.5	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	6.12	1.875	8,944	3	73	0	0	1	0	0	1	0.2	0.5	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	37.18	16.434	6,198	3	18	2	0	1	1	4	8	0.2	0.5	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	9.4	3.491	7,384	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	5.0	1.288	10,547	8	34	0	0	0	0	2	2	0.4	0.4	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Sep-03	7.3	2.246	8,892	8	34	0	1	0	1	0	2	0.3	0.8	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Sep-03	7.7	3.506	6,040	8	34	0	0	0	0	1	1	0.1	0.1	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	9.9	5.448	4,960	8	34	0	0	0	1	1	2	0.2	0.3	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	21.20	7.867	7,384	3	5	1	0	0	1	1	3	0.1	0.4	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.35	1.033	6,235	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	4.03	2.146	5,148	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.64	3.003	5,148	3	5	1	0	0	0	0	1	0.2	0.9	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.12	2.195	5,148	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.86	1.778	7,488	3	48	0	0	0	1	0	1	0.2	0.4	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	3.66	3.815	2,625	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKM	Sep-03	3.53	5.281	1,831	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	8.28	12.387	1,831	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.42	3.624	1,831	3	5	0	0	0	0	1	1	0.4	0.4		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.63	3.777	2,632	3	49	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	20.90	25.672	2,230	3	49	2	0	0	0	3	5	0.2	0.6	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	6.22	1.915	8,894	3	86	0	0	0	0	1	1	0.2	0.2	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	7.01	2.189	8,770	3	86	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.33	0.104	8,770	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	24.78	6.23	10,896	3	86	0	0	0	0	2	2	0.1	0.1	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	11.14	3.914	7,800	6	50	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	31.51	11.461	7,532	3	30	1	0	2	0	1	4	0.1	0.4	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.34	0.267	13,728	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.31	0.471	13,452	8	34	0	0	0	0	0	0	0.0	0.0	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	20.30	12.801	4,344	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	9.60	3.503	7,507	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	26.50	7.061	10,282	3	48	1	0	0	1	3	5	0.2	0.4	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.26	1.104	10,563	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	4.62	1.582	8,008	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	1.70	1.107	4,212	3	18	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	15.59	13.666	3,125	3	1	0	0	1	0	5	6	0.4	0.5	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	18.28	4.722	10,608	3	18	1	0	1	0	1	3	0.2	0.5	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	8.25	2.381	9,498	3	18	0	0	1	0	2	3	0.4	0.6	55	RC2N1

TABLE A-31

Section Analysis: 2-Lane Rural Roads with CLRS
2002: ROR left, head on, sd swipe opp crashes only

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	13.17	5.796	6,223	7	52	0	0	1	0	1	2	0.2	0.3	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.97	0.397	6,676	7	52	0	0	1	0	0	1	1.0	3.1	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	14.15	6.686	5,800	7	52	0	0	0	1	3	4	0.3	0.4	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	21.09	8.568	6,745	3	73	0	0	1	1	3	5	0.2	0.4	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.20	1.875	7,600	3	73	0	0	0	0	3	3	0.6	0.6	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	41.13	16.434	6,856	3	18	0	1	2	1	2	6	0.1	0.3	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	10.4	3.491	8,200	8	34	0	0	0	1	0	1	0.1	0.2	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	4.9	1.288	10,347	8	34	0	0	0	0	1	1	0.2	0.2	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Sep-03	7.3	2.246	8,845	8	34	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Sep-03	7.9	3.506	6,208	8	34	0	0	0	1	0	1	0.1	0.3	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	10.2	5.448	5,123	8	34	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	20.39	7.867	7,100	3	5	0	0	1	0	0	1	0.0	0.1	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.35	1.033	6,241	3	5	0	1	0	0	1	2	0.8	2.1	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	3.99	2.146	5,100	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.59	3.003	5,100	3	5	0	0	0	0	1	1	0.2	0.2	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.09	2.195	5,100	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.67	1.778	7,200	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	4.68	3.815	3,361	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKN	Sep-03	3.63	5.281	1,885	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	8.52	12.387	1,885	3	5	0	0	0	1	0	1	0.1	0.2		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.49	3.624	1,885	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.92	3.777	2,844	3	49	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	20.70	25.672	2,209	3	49	0	0	0	0	1	1	0.0	0.0	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	6.40	1.915	9,157	3	86	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	7.08	2.189	8,865	3	86	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.34	0.104	8,865	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	24.22	6.23	10,652	3	86	0	0	1	0	0	1	0.0	0.1	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	10.57	3.914	7,400	6	50	1	0	0	0	1	2	0.2	0.6	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	33.57	11.461	8,026	3	30	0	0	1	0	4	5	0.1	0.2	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.35	0.267	13,900	8	34	0	0	0	1	0	1	0.7	1.5	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.34	0.471	13,615	8	34	0	0	0	0	0	0	0.0	0.0	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	21.17	12.801	4,530	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	8.65	3.503	6,764	3	48	1	0	0	0	1	2	0.2	0.7	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	29.03	7.061	11,264	3	48	0	0	2	0	2	4	0.1	0.3	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.68	1.104	11,609	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.89	1.582	10,200	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	2.00	1.107	4,950	3	18	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	14.98	13.666	3,004	3	1	0	0	0	2	4	6	0.4	0.5	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	16.89	4.722	9,800	3	18	0	0	0	0	2	2	0.1	0.1	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	7.68	2.381	8,840	3	18	0	0	0	0	0	0	0.0	0.0	55	RC2N1

TABLE A-32

Section Analysis: 2-Lane Rural Roads with CLRS
2003: ROR left, head on, sd swipe opp crashes only

Route Sys	Route Num	sect x-ref	Start Ref	End Ref	Location Description	Install Date	MVM	Length	ADT	Dist	Cnty	All Crashes F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	13.31	5.796	6,291	7	52	0	0	0	1	1	2	0.2	0.2	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	0.98	0.397	6,750	7	52	0	0	0	0	0	0	0.0	0.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	14.31	6.686	5,864	7	52	1	0	0	0	0	1	0.1	0.3	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	21.33	8.568	6,819	3	73	0	0	1	0	3	4	0.2	0.3	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	5.26	1.875	7,684	3	73	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	41.58	16.434	6,932	3	18	0	0	0	0	2	2	0.0	0.0	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	10.6	3.491	8,290	8	34	0	0	2	0	4	6	0.6	0.9	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	4.9	1.288	10,461	8	34	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Sep-03	7.3	2.246	8,942	8	34	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Sep-03	8.0	3.506	6,276	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	10.3	5.448	5,179	8	34	0	1	0	0	0	1	0.1	0.4	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	20.61	7.867	7,178	3	5	0	0	0	1	4	5	0.2	0.3	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.38	1.033	6,309	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	4.04	2.146	5,156	3	5	0	0	0	1	2	3	0.7	1.0	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	5.65	3.003	5,156	3	5	0	0	2	0	1	3	0.5	1.2	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.13	2.195	5,156	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	4.72	1.778	7,279	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	4.73	3.815	3,398	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKN	Sep-03	3.67	5.281	1,905	3	5	0	0	0	0	1	1	0.3	0.3	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	8.61	12.387	1,905	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.52	3.624	1,905	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.96	3.777	2,875	3	49	0	0	0	0	1	1	0.3	0.3	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINE	Sep-03	20.92	25.672	2,233	3	49	0	0	0	1	1	2	0.1	0.1	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	6.47	1.915	9,258	3	86	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	7.16	2.189	8,963	3	86	0	0	1	0	0	1	0.1	0.4	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.34	0.104	8,963	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	24.49	6.23	10,769	3	86	0	0	0	0	1	1	0.0	0.0	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWAR	Nov-99	10.69	3.914	7,481	6	50	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	33.94	11.461	8,114	3	30	0	0	2	2	5	9	0.3	0.4	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.37	0.267	14,053	8	34	0	0	0	0	2	2	1.5	1.5	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.37	0.471	13,764	8	34	0	0	1	0	0	1	0.4	1.3	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	21.40	12.801	4,580	3	5	0	0	0	0	1	1	0.0	0.0	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMB	Sep-03	8.74	3.503	6,838	3	48	0	0	1	0	0	1	0.1	0.3	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	29.35	7.061	11,388	3	48	0	0	1	1	4	6	0.2	0.3	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.73	1.104	11,737	3	48	0	0	0	1	1	2	0.4	0.6	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.95	1.582	10,312	3	48	0	1	0	0	0	1	0.2	0.7	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	2.02	1.107	5,004	3	18	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	15.15	13.666	3,037	3	1	0	0	2	3	2	7	0.5	0.9	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	17.08	4.722	9,908	3	18	0	0	0	2	4	6	0.4	0.5	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	7.77	2.381	8,936	3	18	0	0	0	0	2	2	0.3	0.3	55	RC2N1

TABLE A-33

Section Analysis: 2-Lane Rural Roads with CLRS
2004: ROR left, head on, sd swipe opp crashes only

Route	Route	sect				Install						All Crashes									
Sys	Num	x-ref	Start Ref	End Ref	Location Description	Date	MVM	Length	ADT	Dist	Cnty	F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	14.46	5.796	6,837	7	52	0	0	0	0	6	6	0.4	0.4	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	1.07	0.397	7,352	7	52	0	0	0	0	0	0	0.0	0.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	14.93	6.686	6,100	7	52	0	0	0	1	1	2	0.1	0.2	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	21.65	8.568	6,904	3	73	2	0	0	1	1	4	0.2	0.6	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	6.11	1.875	8,900	3	73	0	0	0	1	1	2	0.3	0.5	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	39.61	16.434	6,585	3	18	1	0	1	0	2	4	0.1	0.3	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	8.9	3.491	7,000	8	34	0	0	0	0	2	2	0.2	0.2	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	4.3	1.288	9,057	8	34	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Sep-03	6.4	2.246	7,805	8	34	0	0	0	1	3	4	0.6	0.8	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Sep-03	7.9	3.506	6,123	8	34	0	0	0	0	1	1	0.1	0.1	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	10.7	5.448	5,354	8	34	0	0	0	2	0	2	0.2	0.4	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	23.03	7.867	8,000	3	5	1	0	1	2	1	5	0.2	0.6	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.50	1.033	6,624	3	5	0	0	0	1	0	1	0.4	0.8	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	4.40	2.146	5,600	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	6.15	3.003	5,600	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.50	2.195	5,600	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	5.21	1.778	8,000	3	48	0	0	0	1	1	2	0.4	0.6	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	4.67	3.815	3,345	3	71	0	0	0	0	1	1	0.2	0.2	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKM	Sep-03	3.86	5.281	1,996	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	9.05	12.387	1,996	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.65	3.624	1,996	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.13	3.777	2,265	3	49	1	0	0	0	0	1	0.3	1.6	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINEI	Sep-03	19.86	25.672	2,114	3	49	0	0	0	0	3	3	0.2	0.2	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	7.35	1.915	10,492	3	86	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	7.60	2.189	9,491	3	86	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.36	0.104	9,491	3	86	0	0	0	0	0	0	0.0	0.0		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	26.26	6.23	11,517	3	86	0	1	0	0	0	1	0.0	0.2	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWART	Nov-99	9.88	3.914	6,900	6	50	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	32.85	11.461	7,852	3	30	0	0	0	1	1	2	0.1	0.1	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.31	0.267	13,400	8	34	0	0	1	0	2	3	2.3	3.8	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.27	0.471	13,186	8	34	0	0	0	1	0	1	0.4	0.9	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	21.75	12.801	4,642	3	5	0	0	0	1	6	7	0.3	0.4	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMBI	Sep-03	8.51	3.503	6,636	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	30.68	7.061	11,872	3	48	1	0	1	0	2	4	0.1	0.3	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.44	1.104	11,000	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.50	1.582	9,500	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	1.72	1.107	4,250	3	18	0	0	0	1	0	1	0.6	1.2	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	16.54	13.666	3,307	3	1	2	0	0	1	1	4	0.2	0.8	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	18.84	4.722	10,900	3	18	0	1	1	1	3	6	0.3	0.6	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	7.85	2.381	9,003	3	18	0	0	0	0	2	2	0.3	0.3	55	RC2N1

TABLE A-34

Section Analysis: 2-Lane Rural Roads with CLRS
2005: ROR left, head on, sd swipe opp crashes only

Route	Route	sect				Install						All Crashes									
Sys	Num	x-ref	Start Ref	End Ref	Location Description	Date	MVM	Length	ADT	Dist	Cnty	F	A	B	C	PD	Total	CR	SR	SL	CATEG
USTH	14	4a	*104.376*	110+00.172	BEG SL 55 .06 MI E MINN RVR BR TO .1 MI W CSAH 12	Jun-04	14.54	5.796	6,871	7	52	0	0	0	0	4	4	0.3	0.3	55	RC2N1
USTH	14	4b	110+00.172	110+00.569	BEG SL 45 .1 MI W CSAH 12 TO .3 MI W CSAH 24	Jun-04	1.07	0.397	7,389	7	52	0	0	0	0	0	0	0.0	0.0	45	RC2N1
USTH	14	4c	111+00.165	117+00.900	BEG SL 55 .3 MI E CSAH 24 TO .1 MI W TH 111/NICOLL	Jun-04	14.96	6.686	6,130	7	52	0	0	0	0	3	3	0.2	0.2	55	RC2N1
MNTH	15	5	134+00.155	142+00.705	BGN NB BYPASS LANE	Sep-03	21.70	8.568	6,939	3	73	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	15	6	143+00.616	145+00.492	BGN SB RTL	Sep-03	6.12	1.875	8,944	3	73	0	0	1	0	0	1	0.2	0.5	55	RC2N1
MNTH	18	7	*3.159*	019+00.593	BGN EB RTL (orig 4.752-19.593)	Sep-03	39.69	16.434	6,617	3	18	0	0	1	2	6	9	0.2	0.3	55	RC2N1
MNTH	23	8a	152+00.705	156+00.081	WB LEG TO USTH-71 NB	Sep-03	9.0	3.491	7,035	8	34	0	0	0	1	1	2	0.2	0.3	65	RC4D1
MNTH	23	8b	156+00.081	157+00.362	BEG SL 45 TO SL 30 S SIDE SPICER	Sep-03	4.3	1.288	9,102	8	34	0	0	0	0	1	1	0.2	0.2	45	RC2N1
MNTH	23	8c	157+00.362	159+00.616	BEG SL 55 N SIDE SPICER TO SL 45 S SIDE PAYNESV	Sep-03	6.4	2.246	7,844	8	34	0	0	0	1	0	1	0.2	0.3	55	RC2N1
MNTH	23	8d	159+00.616	163+00.123	BEG SL 65 .1 M N CR-131 TO SL 55 END DIVIDED ROA	Sep-03	7.9	3.506	6,153	8	34	0	0	0	0	0	0	0.0	0.0	65	RC4D1
MNTH	23	8e	163+00.123	168+00.559	BEG SL 55 END DIV ROAD TO SL 45 S SIDE PAYNESV	Sep-03	10.7	5.448	5,381	8	34	0	0	0	1	0	1	0.1	0.2	55	RC2N1
MNTH	23	10	*212.950*	220+00.817	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY (	Sep-03	23.09	7.867	8,040	3	5	0	0	1	0	2	3	0.1	0.2	55	RC2N1
MNTH	23	11	222+00.811	223+00.833	BGN EB RTL	Sep-03	2.51	1.033	6,657	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	12	224+00.041	226+00.187	BGN WB RTL	Sep-03	4.41	2.146	5,628	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	13	226+00.630	229+00.641	BGN WB RTL	Sep-03	6.17	3.003	5,628	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	23	14	229+00.641	231+00.816	BENTON-MILLE LACS CO LINE T-194 X-ING	Sep-03	4.51	2.195	5,628	3	48	0	0	0	1	0	1	0.2	0.4	55	RC2N1
MNTH	23	15	232+00.495	234+00.281	BGN WB RTL	Sep-03	5.22	1.778	8,040	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
MNTH	25	16	*93.919*	*97.734*	W JCT TH 10 TO .1 MI S TH 23/N OF FOLEY (orig 81.24	Sep-03	4.68	3.815	3,361	3	71	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	17	099+00.400	*104.681*	.1 MI N TH 23/N OF FOLEY TO BEG SL 30 S OF BUCKM	Sep-03	3.86	5.281	2,005	3	5	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	18,19	*105+00.140*	*117+00.527*		Sep-03	9.07	12.387	2,005	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	20	*118+00.034*	*121+00.658*		Sep-03	2.65	3.624	2,005	3	5	0	0	0	0	0	0	0.0	0.0		
MNTH	25	21	*122.816*	*126.593*	BG SL 55 N SIDE BUCKMN TO SL 40 .9 MI S S JCT TH	Sep-03	3.14	3.777	2,276	3	49	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	25	22	129+00.605	*155.277*	BEG SL 55 N OF PIERZ TO BEG SL 50 S SIDE BRAINEI	Sep-03	19.91	25.672	2,125	3	49	0	0	0	0	5	5	0.3	0.3	55	RC2N1
MNTH	55	23	142+00.070	*143.985*	BG SL 45 .5 MI E TH 24 TO SL 55 E SIDE ANNANDALE	Sep-03	7.37	1.915	10,544	3	86	0	0	0	0	0	0	0.0	0.0	45	RC2N1
MNTH	55	24	*144.517*	*146.706*	BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE	Sep-03	7.62	2.189	9,538	3	86	0	0	0	0	1	1	0.1	0.1	55	RC2N1
MNTH	55	25	*147+00.221*	*147+00.325*		Sep-03	0.36	0.104	9,538	3	86	0	0	0	0	1	1	2.8	2.8		
MNTH	55	26	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUF	Sep-03	26.32	6.23	11,575	3	86	0	0	0	1	0	1	0.0	0.1	55	RC2N1
USTH	63	27	023+00.552	027+00.456	BEG SL 55 N SIDE RACINE TO SL 30 S SIDE STEWART	Nov-99	9.91	3.914	6,934	6	50	0	0	0	0	0	0	0.0	0.0	55	RC2N1
MNTH	65	28	*51.539*	063+00.000	BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MO	Sep-03	33.01	11.461	7,891	3	30	0	0	2	0	2	4	0.1	0.2	55	RC2N1
USTH	71	29a	128+00.964	129+00.204	CR-93 RT	Aug-00	1.31	0.267	13,467	8	34	0	0	0	0	1	1	0.8	0.8	65	RC4D1
USTH	71	29b	129+00.204	129+00.675	BEG SL 60 N JCT TH 23 TO SL 40 S SIDE BELGRADE	Sep-03	2.28	0.471	13,252	8	34	0	0	0	0	1	1	0.4	0.4	60	RC2N1
MNTH	95	30	*9.204*	022+00.005	TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169(orig	Sep-03	21.80	12.801	4,665	3	5	1	1	1	0	0	3	0.1	0.6	55	RC2N1
MNTH	95	31	024+00.495	028+00.000	BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMBI	Sep-03	8.53	3.503	6,670	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	32	216+00.650	223+00.687	MURRAY BEACH RD T-306 RT	Sep-03	30.75	7.061	11,931	3	48	1	0	0	0	5	6	0.2	0.3	55	RC2N1
USTH	169	33	225+00.787	226+00.896	BGN NB RTL	Sep-03	4.45	1.104	11,055	3	48	0	0	0	0	0	0	0.0	0.0	55	RC2N1
USTH	169	34	228+00.326	229+00.894	BGN NB RTL	Sep-03	5.51	1.582	9,547	3	48	0	0	0	0	1	1	0.2	0.2	55	RC2N1
USTH	169	35	234+00.246	235+00.357	BEG SL 55 .4 MI N TH 18 TO SL 45 S SIDE AITKIN	Sep-03	1.73	1.107	4,271	3	18	0	0	0	1	1	2	1.2	1.7	55	RC2N1
MNTH	210	36	160+00.459	174+00.122	LEG LT TO USTH-169	Sep-03	16.58	13.666	3,323	3	1	0	0	0	0	4	4	0.2	0.2	55	RC2N1
MNTH	371	38a	046+00.796	051+00.530	BGN NB RTL	Sep-03	18.88	4.722	10,954	3	18	0	0	0	2	0	2	0.1	0.2	55	RC2N1
MNTH	371	38b	052+00.220	054+00.595	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JEN	Sep-03	7.86	2.381	9,048	3	18	1	0	0	0	1	2	0.3	0.8	55	RC2N1

TABLE A-35

Section Analysis: D3 2-Lane Rural Roads ADT > 4500
2004 & 2005

Route Sys	Route Num	CLRS?	Start Ref	End Ref	Location Description	MVM	Length	Average ADT	Dist	Cnty	All Crashes (total over two years) F	A	B	C	PD	Total	CR	SR	Density	SL	CATEG
MNTH	15	YES	133+00.260	142+00.740	BEG SL 55 N SIDE KIMBALL TO SL 35 S SIDE LUXEMBERG	48.01	9.492	6,919	3	73	2	0	0	4	17	23	0.5	0.7	2.4	55	RC2N1
MNTH	15	YES	143+00.540	145+00.650	BEG SL 55 N SIDE LXMBRG TO SL 65 4 LN .7 MI S I-94	13.75	2.109	8,922	3	73	0	0	4	8	8	20	1.5	2.6	9.5	55	RC2N1
MNTH	18	YES	002+00.930	020+00.200	BEG SL 55 E SIDE BRAINERD TO SL 35 W SIDE GARRISON	84.21	17.26	6,675	3	18	1	0	6	22	29	58	0.7	1.1	3.4	55	RC2N1
MNTH	23	YES	213+00.915	221+00.000	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY	41.86	7.121	8,042	3	5	1	1	4	6	22	34	0.8	1.3	4.8	55	RC2N1
MNTH	23	YES	*222.435*	*223.833*	*BEG SL 55 E SIDE FOLEY TO SL 50 W SIDE FORESTON*	5.98	1.398	5,861	3	5	0	0	1	2	1	4	0.7	1.3	2.9	55	RC2N1
MNTH	23	YES	*223.997*	*226.187*		9.37	2.19	5,861	3	5	0	0	1	0	1	2	0.2	0.4	0.9	55	RC2N1
MNTH	23	YES	*226.617*	*231.816*		22.24	5.199	5,861	3	5	0	0	2	2	2	6	0.3	0.5	1.2	55	RC2N1
MNTH	23	YES	232+00.035	232+00.438	BEG SL 50 W SIDE TO BEG SL 55 E SIDE FORESTON	2.06	0.403	6,994	3	48	1	0	1	2	4	8	3.9	7.8	19.9	50	RC2N1
MNTH	23	YES	232+00.438	234+00.801	BG SL 55 E SIDE FORESTON TO BEG SL 30 W SIDE MILACA	13.86	2.355	8,049	3	48	0	0	3	4	10	17	1.2	1.9	7.2	55	RC2N1
MNTH	55	YES	*142.218*	*143.985*	*BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE LAKE*	12.65	1.767	9,808	3	86	0	0	0	0	1	1	0.1	0.1	0.6	45	RC2N1
MNTH	55	YES	*144.517*	*146.706*		15.20	2.189	9,515	3	86	0	0	0	0	3	3	0.2	0.2	1.4	55	RC2N1
MNTH	55	YES	*147.221*	*147.325*		0.72	0.104	9,515	3	86	0	0	0	0	2	2	2.8	2.8	19	55	RC2N1
MNTH	55	YES	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUFFALO	52.58	6.23	11,546	3	86	0	1	5	13	13	32	0.6	1.1	5.1	55	RC2N1
MNTH	65	YES	*51.539*	*62.827*		65.84	11.288	7,991	3	30	0	3	9	14	29	55	0.8	1.5	4.9	55	RC2N1
MNTH	95	YES	*9.204*	*21.917*		43.19	12.713	4,654	3	5	1	1	5	4	17	28	0.6	1.1	2.2	55	RC2N1
MNTH	95	YES	*24.519*	*27.488*	*BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMBRIDGE*	13.89	2.969	6,408	3	48	0	0	0	2	8	10	0.7	0.9	3.4	55	RC2N1
USTH	169	YES	*216.513*	*223.687*		62.40	7.174	11,915	3	48	2	0	8	6	22	38	0.6	1.1	5.3	55	RC2N1
USTH	169	YES	*225.748*	*226.896*	*BEG SL 55 .6 MI S CSAH 35 TO SL 35 .3 MI S TH 18*	8.17	1.148	9,749	3	48	0	0	1	1	3	5	0.6	1.0	4.4	55	RC2N1
USTH	169	YES	*227.979*	*229.894*		13.63	1.915	9,749	3	48	0	0	0	1	6	7	0.5	0.6	3.7	55	RC2N1
MNTH	371	YES	046+00.050	051+00.530	BEG SL 55 N SIDE NISSWA TO SL 35 S SIDE PEQUOT LKS	43.68	5.468	10,927	3	18	0	1	5	10	14	30	0.7	1.2	5.5	55	RC2N1
MNTH	371	YES	052+00.220	055+00.032	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JENKINS	18.14	2.812	8,825	3	18	1	0	3	6	11	21	1.2	2.0	7.5	55	RC2N1
MNTH	371	YES	055+00.411	060+00.835	BEG SL 55 N SIDE JENKINS TO SL 30 S SIDE PINE RIVER	28.52	5.425	7,191	3	18	0	0	0	2	9	11	0.4	0.5	2.0	55	RC2N1
						620	***109***	***7,805***			***9***	***7***	***58***	***109***	***232***	***415***	***0.67***	***1.12***	***3.82***		

TABLE A-36

Section Analysis: D3 2-Lane Rural Roads ADT > 4500
2004 & 2005

Route Sys	Route Num	CLRS?	Start Ref	End Ref	Location Description	Total MVM	Length	Average ADT	Dist	Cnty	All Crashes (total over two years) F	A	B	C	PD	Total	CR	SR	Density	SL	CATEG
USTH	10	NO	090+00.393	090+00.820	BEG SL 50 END 3 LN .3 MI E TH 71 TO BG SL 55/WADENA	3.00	0.427	9,624	3	80	0	0	0	1	1	2	0.7	1.0	4.7	50	RC2N1
USTH	10	NO	090+00.820	092+00.620	BEG SL 55 .9 MI E TH 71 TO BEG DIV .5 MI E CR 108	9.92	1.787	7,591	3	80	0	1	1	2	4	8	0.8	1.5	4.5	55	RC2N1
USTH	10	NO	105+00.874	106+00.815	BEG 2 LN TO BEG SL 40/W SIDE STAPLES	5.71	0.938	8,321	3	77	0	0	0	0	3	3	0.5	0.5	3.2	55	RC2N1
USTH	12	NO	114+00.641	117+00.340	BEG D3 MEEKER-WRIGHT CN TO BEG SL 35/W COKATO	15.56	2.687	7,920	8	86	0	0	2	2	11	15	1.0	1.4	5.6	55	RC2N1
USTH	12	NO	118+00.890	119+00.931	BEG SL 55 .5 MI E COKATO TO 4 LN PASS/E COKATO	6.11	1.03	8,120	3	86	0	0	1	0	2	3	0.5	0.8	2.9	55	RC2N1
USTH	12	NO	121+00.551	123+00.700	END 4 LN PASS/E COKATO TO SL 30 W SIDE HOWARD LAKE	13.02	2.143	8,315	3	86	1	0	1	0	4	6	0.5	0.9	2.8	55	RC2N1
USTH	12	NO	125+00.003	128+00.800	BG SL 55 .2 MI E CSAH 7 TO BEG SL 45 .3 MI W CSAH 8	25.76	3.788	9,303	3	86	0	0	1	1	4	6	0.2	0.3	1.6	55	RC2N1
USTH	12	NO	132+00.260	134+00.217	BEG SL 55 .2 MI E TH 25 TO BEG 4LN PASS/E JCT TH 25	17.02	1.964	11,853	3	86	2	2	1	4	4	13	0.8	1.9	6.6	55	RC2N1
MNTH	18	NO	002+00.327	002+00.380	BEG SL 45 .6 MI E CSAH 45 TO SL 50 E SIDE BRAINERD	0.31	0.053	7,920	3	18	0	1	0	0	0	1	3.3	13.0	18.9	45	RC2N1
MNTH	23	NO	174+00.922	185+00.832	BEG SL 55 E SIDE PAYNSVLLE TO SL 50 W SIDE RICHMOND	50.51	10.895	6,342	3	73	0	2	3	11	21	37	0.7	1.2	3.4	55	RC2N1
MNTH	23	NO	186+00.503	190+00.161	BG SL 55 E SIDE RCHMOND TO SL 30 W SIDE COLD SPRING	30.09	3.684	11,172	3	73	1	1	11	21	23	57	1.9	3.6	15.5	55	RC2N1
MNTH	23	NO	*223.833*	*223.997*		0.70	0.164	5,861	3	5	0	1	2	0	3	6	8.6	18.5	36.6	55	RC2N1
MNTH	23	NO	*226.187*	*226.617*		1.84	0.43	5,861	3	5	0	0	0	1	1	2	1.1	1.6	5	55	RC2N1
MNTH	23	NO	235+00.882	236+00.772	BG SL 45 E SIDE MILACA TO SL 55 E SIDE MILACA	4.12	0.899	6,263	3	48	0	0	1	3	9	13	3.2	4.4	14.5	45	RC2N1
MNTH	23	NO	236+00.772	247+00.410	BG SL 55 E SIDE MILACA TO SL 40 W JCT TH 47 OGILVIE	42.42	10.633	5,457	3	48	0	1	5	9	21	36	0.8	1.4	3.4	55	RC2N1
MNTH	23	NO	247+00.780	248+00.700	BG SL 50 .4 MI E W JCT TH 47 TO SL 55 E SIDE OGLVIE	4.02	0.924	5,949	3	33	0	0	1	0	4	5	1.2	1.7	5.4	50	RC2N1
MNTH	23	NO	248+00.700	254+00.577	BEG SL 55 E SIDE OGILVIE TO S JCT TH 65 SW OF MORA	21.84	5.859	5,099	3	33	2	0	3	4	3	12	0.5	1.4	2.0	55	RC2N1
MNTH	23	NO	256+00.850	262+00.070	BEG SL 55 W SIDE MORA TO BEG SL 50 W SIDE QUAMBA	18.67	5.207	4,905	3	33	1	2	4	3	9	19	1.0	2.1	3.6	55	RC2N1
MNTH	24	NO	031+00.737	035+00.312	BEG SL 45 .7 MI N CSAH 50 TO SL 55 N SIDE ANNANDALE	17.64	3.567	6,767	3	86	1	1	4	6	12	24	1.4	2.6	6.7	45	RC2N1
MNTH	24	NO	035+00.312	043+00.820	BEG SL 55 N SIDE ANNANDALE TO SL 40 S SIDE CLRWATER	34.93	8.449	5,655	3	86	1	0	2	12	18	33	0.9	1.5	3.9	55	RC2N1
MNTH	25	NO	050+00.481	057+00.223	E JCT TH 12 TO BEG SL 30 S SIDE BUFFALO	28.62	6.721	5,826	3	86	0	0	2	2	6	10	0.3	0.6	1.5	55	RC2N1
MNTH	25	NO	155+00.940	157+00.069	BG SL 50 S OF BRNRD TO TH 210 (RP 157.059)	5.94	1.128	7,200	3	18	0	1	1	2	15	19	3.2	4.4	16.8	50	RC2N1
MNTH	55	NO	108+00.965	110+00.330	BEG SL 50 TO SL 55 E OF PAYNESVILLE	5.48	1.383	5,416	3	73	0	0	2	0	6	8	1.5	2.2	5.8	50	RC2N1
MNTH	55	NO	132+00.610	136+00.305	BEG SL 55 E KIMBALL TO SL 30 W SOUTH HAVEN	13.60	3.711	5,013	3	73	0	0	1	1	4	6	0.4	0.7	1.6	55	RC2N1
MNTH	55	NO	136+00.848	141+00.334	BEG SL 55 E SOUTH HAVEN TO SL 30 W SIDE ANNANDALE	22.49	4.47	6,882	3	86	0	0	2	2	7	11	0.5	0.8	2.5	55	RC2N1
MNTH	55	NO	*143.985*	*144.517*		3.70	0.532	9,515	3	86	0	1	0	0	1	2	0.5	1.4	3.8	55	RC2N1
MNTH	55	NO	*146.706*	*147.221*		3.58	0.515	9,515	3	86	0	0	1	0	2	3	0.8	1.4	5.8	55	RC2N1
MNTH	55	NO	147+00.341	148+00.777	BEG SL 45 W SIDE TO SL 55 E SIDE MAPLE LAKE	9.81	1.442	9,306	3	86	0	0	4	5	12	21	2.1	3.5	14.6	45	RC2N1
MNTH	65	NO	044+00.830	046+00.000	BG SL 55 N END CAMBRD BYPSS TO SL 50 S SIDE GRANDY	10.30	1.212	11,629	3	30	0	0	0	2	3	5	0.5	0.7	4.1	55	RC2N1
MNTH	65	NO	046+00.000	046+00.482	BEG SL 50 S SIDE TO BEG SL 55 N SIDE GRANDY	3.74	0.482	10,618	3	30	0	0	0	2	8	10	2.7	3.2	20.7	50	RC2N1
MNTH	65	NO	*46.482*	*51.539*	*BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MORA*	29.50	5.057	7,991	3	30	1	4	10	4	22	41	1.4	2.7	8.1	55	RC2N1
MNTH	65	NO	*62.827*	*64.01*		6.90	1.183	7,991	3	30	0	3	1	4	8	16	2.3	4.5	13.5	55	RC2N1
MNTH	65	NO	065+00.310	081+00.783	BEG SL 55 N SIDE MORA TO TH 27/END D3	58.01	16.474	4,817	3	33	0	1	1	10	27	39	0.7	0.9	2.4	55	RC2N1
USTH	71	NO	169+00.054	169+00.455	BEG SL 45 S MAIN ST TO SL 55 .3 MI N TH 302/SAUK CN	1.76	0.401	6,004	3	73	0	0	0	0	2	2	1.1	1.1	5.0	45	RC2N1
USTH	71	NO	185+00.320	185+00.815	BEG SL 45 S LNG PRAIRIE TO BEG SL 30 .4 MI S TH 287	3.92	0.495	10,827	3	77	0	0	0	1	6	7	1.8	2.0	14.1	45	RC2N1
USTH	71	NO	186+00.695	187+00.041	BEG SL 45 .2 MI N TH 27 TO SL 60 .6 MI N TH 27/LON	1.17	0.35	4,562	3	77	0	0	0	0	0	0	0.0	0.0	0	45	RC2N1
USTH	71	NO	187+00.041	193+00.621	BEG SL 60 .6 MI N TH 27 TO SL 30 S SIDE BROWERVILLE	21.90	6.568	4,562	3	77	0	1	0	2	7	10	0.5	0.7	1.5	60	RC2N1
USTH	71	NO	225+00.560	226+00.277	BEG SL 45 .6 MI N TH 10 TO SL 60 N SIDE WADENA	2.96	0.728	5,565	3	80	0	0	0	2	2	4	1.4	2.0	5.5	45	RC2N1
USTH	71	NO	246+00.658	247+00.084	BEG SL 45 1 MI S TH 87 TO SL 30 .6 MI S TH 87/MENAG	1.60	0.429	5,113	3	80	0	0	0	0	0	0	0.0	0.0	0	45	RC2N1
USTH	71	NO	247+00.846	251+00.366	BEG SL 55 .4 MI N TH 87 TO END D3 WADENA/HUBBARD CL	15.88	3.519	6,172	3	80	0	0	1	5	7	13	0.8	1.3	3.7	55	RC2N1
MNTH	95	NO	*0.05*	*9.204*	*TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169*	31.10	9.154	4,654	3	5	2	0	2	4	8	16	0.5	1.0	1.7	55	RC2N1
MNTH	95	NO	022+00.005	023+00.501	BEG SL 50 W SIDE JCT 169 TO SL 45 W SIDE PRINCETON	4.47	0.915	6,682	3	48	0	0	2	3	13	18	4.0	5.6	19.7	50	RC2N1
MNTH	95	NO	023+00.501	024+00.495	BEG SL 45 W SIDE PRINCETON TO SL 55 E OF PRINCETON	5.45	0.961	7,763	3	48	0	1	1	6	23	31	5.7	7.7	32.3	45	RC2N1
MNTH	95	NO	*27.488*	*41.079*		63.57	13.591	6,408	3	48	0	0	10	13	43	66	1.0	1.6	4.9	55	RC2N1
MNTH	95	NO	042+00.840	052+00.045	BEG SL 55 E SIDE CAMBRIDGE TO ISANTI CO LN/END D3	59.73	9.001	9,079	3	30	1	1	9	10	36	57	1.0	1.5	6.3	55	RC2N1
MNTH	107	NO	000+00.000	000+00.900	TH 65 TO BEG SL 50 S SIDE BRAHAM	3.10	0.9	4,712	3	30	0	0	0	0	1	1	0.3	0.3	1.1	55	RC2N1
MNTH	107	NO	000+00.900	001+00.505	BEG SL 50 S SIDE BRAHAM TO SL 30 BRAHAM	2.30	0.64	4,921	3	30	0	0	0	0	3	3	1.3	1.3	4.7	50	RC2N1
USTH	169	NO	*215.541*	*216.513*	*BG SL 55 .2 MI S N JCT TH 27 TO SL 45 S N SCENIC DR*	8.45	0.97	11,915	3	48	0	0	2	0	12	14	1.7	2.1	14.4	55	RC2N1
USTH	169	NO	223+00.992	225+00.245	BEG SL 45 S N SCENIC DR TO BG SL 55 .6 MI S CSAH 35	10.00	1.241	11,028	3	48	0	0	0	3	6	9	0.9	1.2	7.3	45	RC2N1
USTH	169	NO	*226.896*	*227.979*		7.71	1.083	9,749	3	48	0	0	0	5	5	10	1.3	1.9	9.2	55	RC2N1
USTH	169	NO	251+00.560	251+00.980	BEG SL 45 S SIDE AITKIN TO SL 30 .2 MI S TH 47	2.31	0.42	7,519	3	1	0	0	0	0	2	2	0.9	0.9	5	45	RC2N1
MNTH	210	NO	101+00.327	117+00.960	BEG SL 55 E SIDE MOTLEY TO BEG 4LN DIV 3 MI W TH371	82.87	16.634	6,815	3	11	2	1	9	18	59	89	1.1	1.6	5.4	55	RC2N1
MNTH	210	NO	125+00.479	136+00.283	BEG SL 55 E OF BRAINERD TO SL 30 W SIDE IRONTON	65.31	10.815	8,261	3	18	1	2	7	10	22	42	0.6	1.2	3.9	55	RC2N1
MNTH	210	NO	138+00.645	141+00.550	BEG SL 55 E OF CROSBY TO SL 45 W OF DEERWOOD	10.90	2.898	5,144	3	18	1	0	1	2	5	9	0.8	1.6	3.1	55	RC2N1
MNTH	210	NO	142+00.390	151+00.449	BEG SL 55 E SIDE DEERWOOD TO SL 45 W SIDE AITKIN	32.59	9.058	4,922	3	18	0	1	1	1	16	19	0.6	0.8	2.1	55	RC2N1
MNTH	210	NO	151+00.449	151+00.747	BEG SL 45 TO SL 30 W SIDE AITKIN	1.70	0.298	7,820	3	1	0	0	0	0	3	3	1.8	1.8	10.1	45	RC2N1
MNTH	210	NO	152+00.741	153+00.530	BEG SL 45 TO SL 55 E SIDE AITKIN	4.62	0.794	7,962	3	1	0	0	0	0	4	4	0.9	0.9	5.0	45	RC2N1
MNTH	371	NO	045+00.510	046+00.050	BEG SL 45 END 4 LN TO SL 55 N SIDE NISSWA	4.26	0.55	10,588	3	18	0	0	0	1	7	8	1.9	2.1	14.5	45	RC2N1
MNTH	371	NO	055+00.032	055+00.411	BEG SL 45 S SIDE TO SL 55 N SIDE JENKINS	2.14	0.379	7,719	3	18	0	0	2	2	2	6	2.8	5.6	15.8	45	RC2N1
MNTH	371	NO	077+00.445	077+00.735	BEG SL 45 .03 MI S TO SL 30 .3 MI N CR 40/HACKNSACK	1.14	0.29	5,375	3	11	0	0	0	0	1	1	0.9	0.9	3	45	RC2N1
MNTH	371	NO	078+00.360	078+00.650	BEG SL 45 .2 MI S CR 5 TO SL 55 N SIDE HACKENSACK	1.15	0.29	5,414	2	11	0	0	0	0	1	1	0.9	0.9	3.4	45	RC2N1
MNTH	371	NO	078+00.650	090+00.410	BEG SL 55 N SIDE HACKENSACK TO SL 45 S SIDE WALKER	50.51	11.8	5,856	2	11	0	0	7	10	23	40	0.8	1.3	3.4	55	RC2N1
MNTH	371	NO	090+00.410	090+00.790	BEG SL 45 S SIDE WALKER TO SL 30 1.08 MI S TH 34	2.35	0.38	8,443	2	11	0	0	0	0	2	2	0.9	0.9	5.3	45	RC2N1
						1032	***215***	***6,554***			***17***	***29***	***122***	***212***	***599***	***979***	***0.95***	***1.54***	***4.55***		

TABLE A-37

Section Analysis: D3 2-Lane Rural Roads ADT > 4500
2004 & 2005 - only head on, sideswipe opposing, run off road left

Route	Route	CLRS?						Average			Target Crashes (total over 2 years)										
Sys	Num		Start Ref	End Ref	Location Description	MVM	Length	ADT	Dist	Cnty	F	A	B	C	PD	Total	CR	SR	Density	SL	CATEG
MNTH	15	YES	133+00.260	142+00.740	BEG SL 55 N SIDE KIMBALL TO SL 35 S SIDE LUXEMBERG	48.01	9.492	6,919	3	73	2	0	0	1	2	5	0.1	0.3	0.5	55	RC2N1
MNTH	15	YES	143+00.540	145+00.650	BEG SL 55 N SIDE LXMBRG TO SL 65 4 LN .7 MI S I-94	13.75	2.109	8,922	3	73	0	0	1	1	1	3	0.2	0.4	1.4	55	RC2N1
MNTH	18	YES	002+00.930	020+00.200	BEG SL 55 E SIDE BRAINERD TO SL 35 W SIDE GARRISON	84.21	17.26	6,675	3	18	1	0	2	2	9	14	0.2	0.3	0.8	55	RC2N1
MNTH	23	YES	213+00.915	221+00.000	BEG SL 55 2 MI E TH95 TO SL 45 3LN W SIDE FOLEY	41.86	7.121	8,042	3	5	1	0	1	2	3	7	0.2	0.4	1.0	55	RC2N1
MNTH	23	YES	*222.435*	*223.833*	*BEG SL 55 E SIDE FOLEY TO SL 50 W SIDE FORESTON*	5.98	1.398	5,861	3	5	0	0	0	1	0	1	0.2	0.3	0.7	55	RC2N1
MNTH	23	YES	*223.997*	*226.187*		9.37	2.19	5,861	3	5	0	0	0	0	0	0	0.0	0.0	0.0	55	RC2N1
MNTH	23	YES	*226.617*	*231.816*		22.24	5.199	5,861	3	5	0	0	0	1	0	1	0.0	0.1	0.2	55	RC2N1
MNTH	23	YES	232+00.035	232+00.438	BEG SL 50 W SIDE TO BEG SL 55 E SIDE FORESTON	2.06	0.403	6,994	3	48	0	0	0	0	0	0	0.0	0.0	0.0	50	RC2N1
MNTH	23	YES	232+00.438	234+00.801	BG SL 55 E SIDE FORESTON TO BEG SL 30 W SIDE MILACA	13.86	2.355	8,049	3	48	0	0	0	1	2	3	0.2	0.3	1.3	55	RC2N1
MNTH	55	YES	*142.218*	*143.985*	*BEG SL 55 E SIDE ANNANDL TO SL 45 W SIDE MAPLE LAKE*	12.65	1.767	9,808	3	86	0	0	0	0	0	0	0.0	0.0	0.0	45	RC2N1
MNTH	55	YES	*144.517*	*146.706*		15.20	2.189	9,515	3	86	0	0	0	0	2	2	0.1	0.1	0.9	55	RC2N1
MNTH	55	YES	*147.221*	*147.325*		0.72	0.104	9,515	3	86	0	0	0	0	1	1	1.4	1.4	10	55	RC2N1
MNTH	55	YES	148+00.777	155+00.013	BEG SL 55 E SIDE MAPLE LAKE TO SL 45 W SIDE BUFFALO	52.58	6.23	11,546	3	86	0	1	0	1	0	2	0.0	0.1	0.3	55	RC2N1
MNTH	65	YES	*51.539*	*62.827*		65.84	11.288	7,991	3	30	0	0	2	1	3	6	0.1	0.2	0.5	55	RC2N1
MNTH	95	YES	*9.204*	*21.917*		43.19	12.713	4,654	3	5	1	1	1	1	6	10	0.2	0.5	0.8	55	RC2N1
MNTH	95	YES	*24.519*	*27.488*	*BEG SL 55 E OF PRINCETON TO SL 30 W SIDE CAMBRIDGE*	13.89	2.969	6,408	3	48	0	0	0	0	0	0	0.0	0.0	0.0	55	RC2N1
USTH	169	YES	*216.513*	*223.687*		62.40	7.174	11,915	3	48	2	0	1	0	7	10	0.2	0.3	1.4	55	RC2N1
USTH	169	YES	*225.748*	*226.896*	*BEG SL 55 .6 MI S CSAH 35 TO SL 35 .3 MI S TH 18*	8.17	1.148	9,749	3	48	0	0	0	0	0	0	0.0	0.0	0.0	55	RC2N1
USTH	169	YES	*227.979*	*229.894*		13.63	1.915	9,749	3	48	0	0	0	0	3	3	0.2	0.2	1.6	55	RC2N1
MNTH	371	YES	046+00.050	051+00.530	BEG SL 55 N SIDE NISSWA TO SL 35 S SIDE PEQUOT LKS	43.68	5.468	10,927	3	18	0	1	1	3	3	8	0.2	0.4	1.5	55	RC2N1
MNTH	371	YES	052+00.220	055+00.032	BEG SL 55 N SIDE PEQUOT LKS TO SL 45 S SIDE JENKINS	18.14	2.812	8,825	3	18	1	0	0	0	4	5	0.3	0.5	1.8	55	RC2N1
MNTH	371	YES	055+00.411	060+00.835	BEG SL 55 N SIDE JENKINS TO SL 30 S SIDE PINE RIVER	28.52	5.425	7,191	3	18	0	0	0	0	2	2	0.1	0.1	0.4	55	RC2N1
						620	***109***	***7,805***			***8***	***3***	***9***	***15***	***48***	***83***	***0.13***	***0.25***	***0.76***		

TABLE A-38

Section Analysis: D3 2-Lane Rural Roads ADT > 4500
2004 & 2005 - only head on, sideswipe opposing, run off road left

Route Sys	Route Num	CLRS?	Start Ref	End Ref	Location Description	MVM	Length	Average ADT	Dist	Cnty	Target Crashes (total over 2 years) F	A	B	C	PD	Total	CR	SR	Density	SL	CATEG
USTH	10	NO	090+00.393	090+00.820	BEG SL 50 END 3 LN .3 MI E TH 71 TO BG SL 55/WADENA	3.00	0.427	9,624	3	80	0	0	0	0	0	0	0.0	0.0	0.0	50	RC2N1
USTH	10	NO	090+00.820	092+00.620	BEG SL 55 .9 MI E TH 71 TO BEG DIV .5 MI E CR 108	9.92	1.787	7,591	3	80	0	1	0	0	1	2	0.2	0.5	1.1	55	RC2N1
USTH	10	NO	105+00.874	106+00.815	BEG 2 LN TO BEG SL 40/W SIDE STAPLES	5.71	0.938	8,321	3	77	0	0	0	0	1	1	0.2	0.2	1.1	55	RC2N1
USTH	12	NO	114+00.641	117+00.340	BEG D3 MEEKER-WRIGHT CN TO BEG SL 35/W COKATO	15.56	2.687	7,920	8	86	0	0	2	0	0	2	0.1	0.4	0.7	55	RC2N1
USTH	12	NO	118+00.890	119+00.931	BEG SL 55 .5 MI E COKATO TO 4 LN PASS/E COKATO	6.11	1.03	8,120	3	86	0	0	0	0	1	1	0.2	0.2	1.0	55	RC2N1
USTH	12	NO	121+00.551	123+00.700	END 4 LN PASS/E COKATO TO SL 30 W SIDE HOWARD LAKE	13.02	2.143	8,315	3	86	0	0	1	0	1	2	0.2	0.3	0.9	55	RC2N1
USTH	12	NO	125+00.003	128+00.800	BG SL 55 .2 MI E CSAH 7 TO BEG SL 45 .3 MI W CSAH 8	25.76	3.788	9,303	3	86	0	0	0	0	0	0	0.0	0.0	0.0	55	RC2N1
USTH	12	NO	132+00.260	134+00.217	BEG SL 55 .2 MI E TH 25 TO BEG 4LN PASS/E JCT TH 25	17.02	1.964	11,853	3	86	1	0	1	0	0	2	0.1	0.5	1.0	55	RC2N1
MNTH	18	NO	002+00.327	002+00.380	BEG SL 45 .6 MI E CSAH 45 TO SL 50 E SIDE BRAINERD	0.31	0.053	7,920	3	18	0	0	0	0	0	0	0.0	0.0	0.0	45	RC2N1
MNTH	23	NO	174+00.922	185+00.832	BEG SL 55 E SIDE PAYNSVLLE TO SL 50 W SIDE RICHMOND	50.51	10.895	6,342	3	73	0	0	1	4	3	8	0.2	0.3	0.7	55	RC2N1
MNTH	23	NO	186+00.503	190+00.161	BG SL 55 E SIDE RCHMOND TO SL 30 W SIDE COLD SPRING	30.09	3.684	11,172	3	73	0	0	0	2	5	7	0.2	0.3	1.9	55	RC2N1
MNTH	23	NO	*223.833*	*223.997*		0.70	0.164	5,861	3	5	0	0	0	0	0	0	0.0	0.0	0.0	55	RC2N1
MNTH	23	NO	*226.187*	*226.617*		1.84	0.43	5,861	3	5	0	0	0	0	0	0	0.0	0.0	0	55	RC2N1
MNTH	23	NO	235+00.882	236+00.772	BG SL 45 E SIDE MILACA TO SL 55 E SIDE MILACA	4.12	0.899	6,263	3	48	0	0	1	0	0	1	0.2	0.7	1.1	45	RC2N1
MNTH	23	NO	236+00.772	247+00.410	BG SL 55 E SIDE MILACA TO SL 40 W JCT TH 47 OGILVIE	42.42	10.633	5,457	3	48	0	0	2	2	6	10	0.2	0.4	0.9	55	RC2N1
MNTH	23	NO	247+00.780	248+00.700	BG SL 50 .4 MI E W JCT TH 47 TO SL 55 E SIDE OGLVIE	4.02	0.924	5,949	3	33	0	0	1	0	1	2	0.5	1.0	2.2	50	RC2N1
MNTH	23	NO	248+00.700	254+00.577	BEG SL 55 E SIDE OGILVIE TO S JCT TH 65 SW OF MORA	21.84	5.859	5,099	3	33	1	0	0	0	1	2	0.1	0.3	0.3	55	RC2N1
MNTH	23	NO	256+00.850	262+00.070	BEG SL 55 W SIDE MORA TO BEG SL 50 W SIDE QUAMBA	18.67	5.207	4,905	3	33	1	0	2	0	1	4	0.2	0.6	0.8	55	RC2N1
MNTH	24	NO	031+00.737	035+00.312	BEG SL 45 .7 MI N CSAH 50 TO SL 55 N SIDE ANNANDALE	17.64	3.567	6,767	3	86	0	1	0	2	3	6	0.3	0.6	1.7	45	RC2N1
MNTH	24	NO	035+00.312	043+00.820	BEG SL 55 N SIDE ANNANDALE TO SL 40 S SIDE CLRWATER	34.93	8.449	5,655	3	86	0	0	0	2	8	10	0.3	0.3	1.2	55	RC2N1
MNTH	25	NO	050+00.481	057+00.223	E JCT TH 12 TO BEG SL 30 S SIDE BUFFALO	28.62	6.721	5,826	3	86	0	0	0	0	1	1	0.0	0.0	0.1	55	RC2N1
MNTH	25	NO	155+00.940	157+00.069	BG SL 50 S OF BRNRD TO TH 210 (RP 157.059)	5.94	1.128	7,200	3	18	0	0	1	0	0	1	0.2	0.5	0.9	50	RC2N1
MNTH	55	NO	108+00.965	110+00.330	BEG SL 50 TO SL 55 E OF PAYNESVILLE	5.48	1.383	5,416	3	73	0	0	0	0	0	0	0.0	0.0	0.0	50	RC2N1
MNTH	55	NO	132+00.610	136+00.305	BEG SL 55 E KIMBALL TO SL 30 W SOUTH HAVEN	13.60	3.711	5,013	3	73	0	0	0	0	2	2	0.1	0.1	0.5	55	RC2N1
MNTH	55	NO	136+00.848	141+00.334	BEG SL 55 E SOUTH HAVEN TO SL 30 W SIDE ANNANDALE	22.49	4.47	6,882	3	86	0	0	1	0	1	2	0.1	0.2	0.4	55	RC2N1
MNTH	55	NO	*143.985*	*144.517*		3.70	0.532	9,515	3	86	0	0	0	0	0	0	0.0	0.0	0.0	55	RC2N1
MNTH	55	NO	*146.706*	*147.221*		3.58	0.515	9,515	3	86	0	0	0	0	0	0	0.0	0.0	0.0	55	RC2N1
MNTH	55	NO	147+00.341	148+00.777	BEG SL 45 W SIDE TO SL 55 E SIDE MAPLE LAKE	9.81	1.442	9,306	3	86	0	0	1	0	0	1	0.1	0.3	0.7	45	RC2N1
MNTH	65	NO	044+00.830	046+00.000	BG SL 55 N END CAMBRD BYPSS TO SL 50 S SIDE GRANDY	10.30	1.212	11,629	3	30	0	0	0	1	1	2	0.2	0.3	1.7	55	RC2N1
MNTH	65	NO	046+00.000	046+00.482	BEG SL 50 S SIDE TO BEG SL 55 N SIDE GRANDY	3.74	0.482	10,618	3	30	0	0	0	1	0	1	0.3	0.5	2.1	50	RC2N1
MNTH	65	NO	*46.482*	*51.539*	*BEG SL 55 N SIDE GRANDY TO BEG SL 40 S SIDE MORA*	29.50	5.057	7,991	3	30	1	0	2	0	3	6	0.2	0.5	1.2	55	RC2N1
MNTH	65	NO	*62.827*	*64.010*		6.90	1.183	7,991	3	30	0	0	0	0	1	1	0.1	0.1	0.8	55	RC2N1
MNTH	65	NO	065+00.310	081+00.783	BEG SL 55 N SIDE MORA TO TH 27/END D3	58.01	16.474	4,817	3	33	0	1	1	1	9	12	0.2	0.3	0.7	55	RC2N1
USTH	71	NO	169+00.054	169+00.455	BEG SL 45 S MAIN ST TO SL 55 .3 MI N TH 302/SAUK CN	1.76	0.401	6,004	3	73	0	0	0	0	0	0	0.0	0.0	0.0	45	RC2N1
USTH	71	NO	185+00.320	185+00.815	BEG SL 45 S LNG PRAIRIE TO BEG SL 30 .4 MI S TH 287	3.92	0.495	10,827	3	77	0	0	0	0	0	0	0.0	0.0	0.0	45	RC2N1
USTH	71	NO	186+00.695	187+00.041	BEG SL 45 .2 MI N TH 27 TO SL 60 .6 MI N TH 27/LON	1.17	0.35	4,562	3	77	0	0	0	0	0	0	0.0	0.0	0	45	RC2N1
USTH	71	NO	187+00.041	193+00.621	BEG SL 60 .6 MI N TH 27 TO SL 30 S SIDE BROWERVILLE	21.90	6.568	4,562	3	77	0	1	0	0	2	3	0.1	0.3	0.5	60	RC2N1
USTH	71	NO	225+00.560	226+00.277	BEG SL 45 .6 MI N TH 10 TO SL 60 N SIDE WADENA	2.96	0.728	5,565	3	80	0	0	0	0	0	0	0.0	0.0	0.0	45	RC2N1
USTH	71	NO	246+00.658	247+00.084	BEG SL 45 1 MI S TH 87 TO SL 30 .6 MI S TH 87/MENAG	1.60	0.429	5,113	3	80	0	0	0	0	0	0	0.0	0.0	0	45	RC2N1
USTH	71	NO	247+00.846	251+00.366	BEG SL 55 .4 MI N TH 87 TO END D3 WADENA/HUBBARD CL	15.88	3.519	6,172	3	80	0	0	0	2	5	7	0.4	0.6	2.0	55	RC2N1
MNTH	95	NO	*0.050*	*9.204*	*TH 23 E OF ST CLOUD TO SL 50 W SIDE JCT 169*	31.10	9.154	4,654	3	5	2	0	0	4	2	8	0.3	0.6	0.9	55	RC2N1
MNTH	95	NO	022+00.005	023+00.501	BEG SL 50 W SIDE JCT 169 TO SL 45 W SIDE PRINCETON	4.47	0.915	6,682	3	48	0	0	0	0	3	3	0.7	0.7	3.3	50	RC2N1
MNTH	95	NO	023+00.501	024+00.495	BEG SL 45 W SIDE PRINCETON TO SL 55 E OF PRINCETON	5.45	0.961	7,763	3	48	0	0	1	0	3	4	0.7	1.1	4.2	45	RC2N1
MNTH	95	NO	*27.488*	*41.079*		63.57	13.591	6,408	3	48	0	0	4	1	11	16	0.3	0.4	1.2	55	RC2N1
MNTH	95	NO	042+00.840	052+00.045	BEG SL 55 E SIDE CAMBRIDGE TO ISANTI CO LN/END D3	59.73	9.001	9,079	3	30	1	0	4	4	13	22	0.4	0.6	2.4	55	RC2N1
MNTH	107	NO	000+00.000	000+00.900	TH 65 TO BEG SL 50 S SIDE BRAHAM	3.10	0.9	4,712	3	30	0	0	0	0	0	0	0.0	0.0	0.0	55	RC2N1
MNTH	107	NO	000+00.900	001+00.505	BEG SL 50 S SIDE BRAHAM TO SL 30 BRAHAM	2.30	0.64	4,921	3	30	0	0	0	0	0	0	0.0	0.0	0.0	50	RC2N1
USTH	169	NO	*215.541*	*216.513*	*BG SL 55 .2 MI S N JCT TH 27 TO SL 45 S N SCENIC DR*	8.45	0.97	11,915	3	48	0	0	1	0	2	3	0.4	0.6	3.1	55	RC2N1
USTH	169	NO	223+00.992	225+00.245	BEG SL 45 S N SCENIC DR TO BG SL 55 .6 MI S CSAH 35	10.00	1.241	11,028	3	48	0	0	0	1	0	1	0.1	0.2	0.8	45	RC2N1
USTH	169	NO	*226.896*	*227.979*		7.71	1.083	9,749	3	48	0	0	0	0	1	1	0.1	0.1	0.9	55	RC2N1
USTH	169	NO	251+00.560	251+00.980	BEG SL 45 S SIDE AITKIN TO SL 30 .2 MI S TH 47	2.31	0.42	7,519	3	1	0	0	0	0	1	1	0.4	0.4	2	45	RC2N1
MNTH	210	NO	101+00.327	117+00.960	BEG SL 55 E SIDE MOTLEY TO BEG 4LN DIV 3 MI W TH371	82.87	16.634	6,815	3	11	1	1	3	4	5	14	0.2	0.4	0.8	55	RC2N1
MNTH	210	NO	125+00.479	136+00.283	BEG SL 55 E OF BRAINERD TO SL 30 W SIDE IRONTON	65.31	10.815	8,261	3	18	0	2	2	3	9	16	0.2	0.4	1.5	55	RC2N1
MNTH	210	NO	138+00.645	141+00.550	BEG SL 55 E OF CROSBY TO SL 45 W OF DEERWOOD	10.90	2.898	5,144	3	18	0	0	0	0	1	1	0.1	0.1	0.3	55	RC2N1
MNTH	210	NO	142+00.390	151+00.449	BEG SL 55 E SIDE DEERWOOD TO SL 45 W SIDE AITKIN	32.59	9.058	4,922	3	18	0	1	0	0	1	2	0.1	0.2	0.2	55	RC2N1
MNTH	210	NO	151+00.449	151+00.747	BEG SL 45 TO SL 30 W SIDE AITKIN	1.70	0.298	7,820	3	1	0	0	0	0	0	0	0.0	0.0	0.0	45	RC2N1
MNTH	210	NO	152+00.741	153+00.530	BEG SL 45 TO SL 55 E SIDE AITKIN	4.62	0.794	7,962	3	1	0	0	0	0	0	0	0.0	0.0	0.0	45	RC2N1
MNTH	371	NO	045+00.510	046+00.050	BEG SL 45 END 4 LN TO SL 55 N SIDE NISSWA	4.26	0.55	10,588	3	18	0	0	0	0	0	0	0.0	0.0	0.0	45	RC2N1
MNTH	371	NO	055+00.032	055+00.411	BEG SL 45 S SIDE TO SL 55 N SIDE JENKINS	2.14	0.379	7,719	3	18	0	0	0	0	1	1	0.5	0.5	2.6	45	RC2N1
MNTH	371	NO	077+00.445	077+00.735	BEG SL 45 .03 MI S TO SL 30 .3 MI N CR 40/HACKNSACK	1.14	0.29	5,375	3	11	0	0	0	0	0	0	0.0	0.0	0	45	RC2N1
MNTH	371	NO	078+00.360	078+00.650	BEG SL 45 .2 MI S CR 5 TO SL 55 N SIDE HACKENSACK	1.15	0.29	5,414	2	11	0	0	0	0	0	0	0.0	0.0	0.0	45	RC2N1
MNTH	371	NO	078+00.650	090+00.410	BEG SL 55 N SIDE HACKENSACK TO SL 45 S SIDE WALKER	50.51	11.8	5,856	2	11	0	0	2	1	2	5	0.1	0.2	0.4	55	RC2N1
MNTH	371	NO	090+00.410	090+00.790	BEG SL 45 S SIDE WALKER TO SL 30 1.08 MI S TH 34	2.35	0.38	8,443	2	11	0	0	0	0	1	1	0.4	0.4	2.6	45	RC2N1
						1032	***215***	***6,554***			***8***	***8***	***34***	***35***	***113***	***198***	***0.19***	***0.35***	***0.92***		