Intersection Control Evaluation

South Victory Drive (CSAH 82) at Hoffman Road

in Mankato, Blue Earth County, Minnesota

Mankato/North Mankato Area Planning Organization

Prepared by:

SRF

January 2019

SRF No. 11876

Intersection Control Evaluation

South Victory Drive (CSAH 82) at Hoffman Road

Proposed Letting Date: TBD

Report Certification:

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Adrian S. Potter — 42785
Print Name — Reg. No.

Adrian S. Potter

1/7/19
Signature — Date

Approved:

City of Mankato
City Engineer — 1/8/2019 Date

Blue Earth County
Public Works Director — 1/14/2019 Date

Table of Contents

Introduction 4
Existing Intersection Characteristics 6
Future Conditions 9
Traffic Volumes 12
Analysis of Alternatives 15
Alternatives Assessment 21
Conclusions and Recommendations 23
Appendix 26

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Introduction

This report contains the intersection control evaluation results for the South Victory Drive (CSAH 82) at Hoffman Road intersection in Mankato, Blue Earth County, Minnesota (see Figure 1). The purpose of the evaluation was to analyze the intersection control alternatives for the intersection to identify the long-term alternative that ranks highest based on the criteria outlined in the report. There is an apparent safety concern at this key intersection located near the City of Mankato Public Works Center, Mankato Transit System Bus Hub, and Mankato East High School. Additionally, the traffic signal at this intersection is older and likely approaching the end of its useful life; therefore, it makes sense to examine intersection control alternatives prior to making a decision about signal replacement. The following intersection control alternatives were considered applicable and are analyzed within this report:

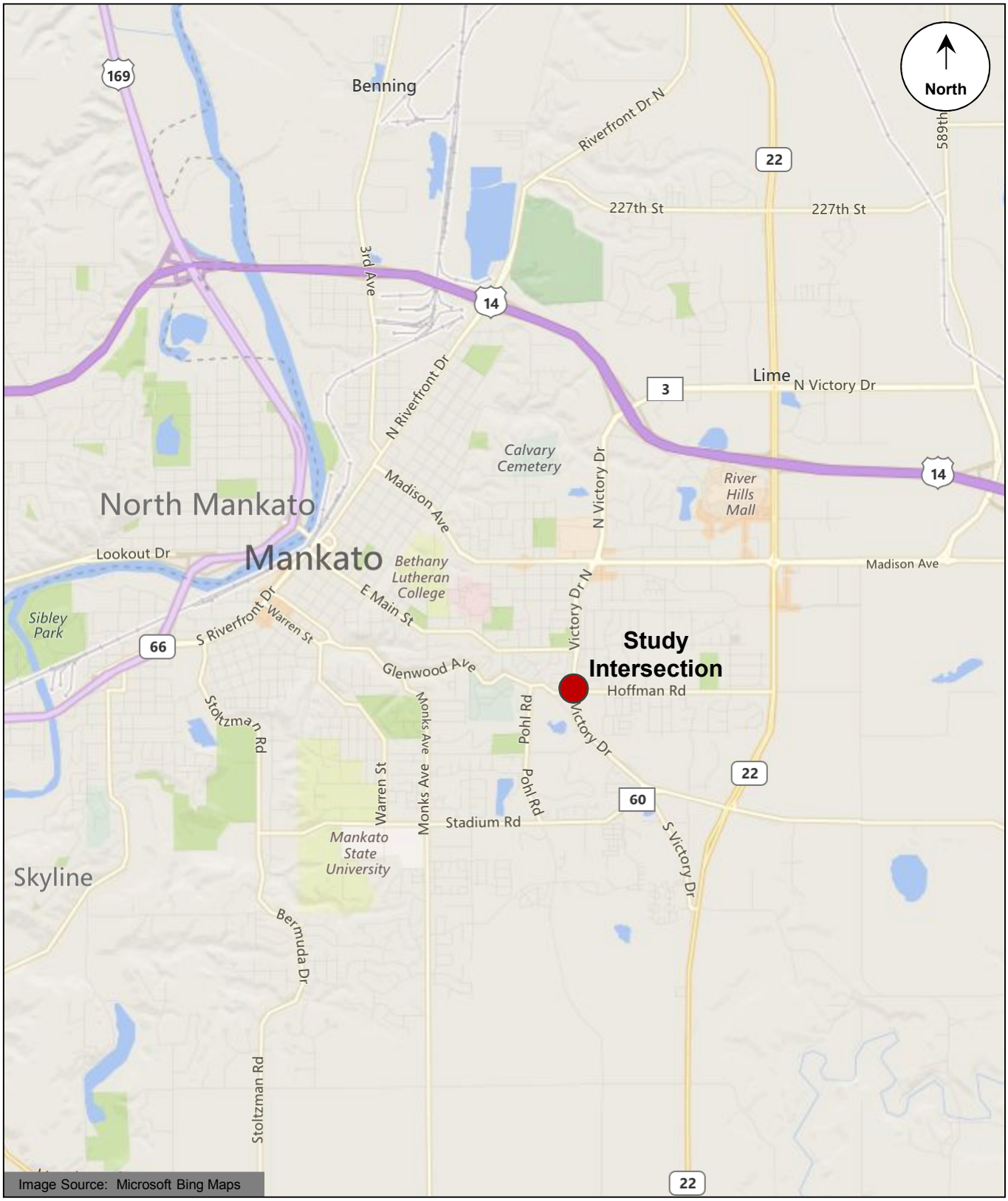
- Traffic Signal Control with Existing Conditions
- Traffic Signal Control with Geometric Improvements
- Roundabout Control

Side-street and all-way stop control were determined to not be applicable at this intersection due to intersection size and large traffic volumes. Other non-traditional intersection control alternatives were considered qualitatively but deemed to not be applicable at this location.

A detailed warrants analysis, operational analysis, safety analysis, and planning-level cost analysis were performed to determine the highest-ranking alternative. In addition to these analyses, other factors considered for this evaluation that were applicable to determining the long-term intersection control of greatest overall benefit included:

- Right-of-Way Considerations
- Transportation System Considerations
- Pedestrian and Bicycle Considerations
- Local Acceptance

This evaluation was also completed to analyze potential alternatives to address future capacity and safety concerns. With its proximity to a high school, this intersection is frequently traveled by less-experienced drivers, as well as bicycles and pedestrians.



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October 2018

Study Intersection

Intersection Control Evaluation
South Victory Drive at Hoffman Road
Mankato, Blue Earth County, Minnesota

Figure 1

Existing Intersection Characteristics

Existing Conditions

The study intersection is located in the City of Mankato, Blue Earth County as shown in Figure 1. South Victory Drive (CSAH 82) is a five-lane undivided roadway at the study intersection and is functionally classified as a minor arterial. South Victory Drive has a posted speed limit of 40 mph and the speed limit changes to 45 mph approximately 500 feet south of Hoffman Road. Hoffman Road is a four-lane undivided roadway east of the study intersection, and changes to a segment of Agency Road approximately 500 feet west of the intersection before changing to Glenwood Avenue approximately 500 feet farther west. Hoffman Road is a city street with a speed limit of 30 mph and is functionally classified as a minor arterial.

The intersection of South Victory Drive and Hoffman Road is currently signalized. The existing signal is older and near the end of its useful life, and the side-street approaches only have pole mounted signal heads with no overhead indications. There are trails on both sides of South Victory Drive north of the intersection, and on the west side only to the south. There are sidewalks on both sides of Hoffman Road east of the intersection, and on the south side only to the west. There are marked pedestrian crossings on three legs of the intersection (all except the east leg). The adjacent area has primarily residential land uses, though retail shops are in the northeast quadrant of the intersection and a public works facility with transit hub is in the southeast quadrant. Mankato East High School is half a mile to the east of the study intersection.

The existing lane configurations for the South Victory Drive at Hoffman Road intersection are listed in Table 1 below and are shown in Figure 2.

Table 1. Existing Conditions

Approach	Configuration
Northbound Victory Drive	One left-turn lane, one thru lane, one shared thru/right-turn lane
Southbound Victory Drive	One left-turn lane, one thru lane, one shared thru/right-turn lane
Eastbound Hoffman Road	One shared thru/left-turn lane and one shared thru/right-turn lane
Westbound Hoffman Road	One left-turn lane and one shared thru/right-turn lane

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Existing Conditions

Intersection Control Evaluation

South Victory Drive at Hoffman Road

Figure 2

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Crash History

Crash data was obtained from the Minnesota Crash Mapping Analysis Tool (MnCMAT) database for a five-year period from 2011 to 2015. There were 70 recorded crashes at the study intersection during the analysis period, of which none were fatal or serious injury. Detailed crash data is provided in the Appendix and a summary is shown in Table 2 below.

When analyzing crash data, the critical crash rate is used to determine if there is a statistically significant crash problem compared to similar facilities. If an existing crash rate exceeds the critical rate, a safety issue exists and it is highly recommended that action is taken to improve the safety at that intersection and reduce negative impacts to the driving public.

The existing number of crashes and daily entering volume of 27,200 vehicles results in a crash rate of 1.41 crashes per million entering vehicles, which is above the statewide average of 0.70 for similar signalized intersections, and is above the critical crash rate of 1.01 (0.995 level of confidence) for this intersection, indicating that there is an existing crash problem.

Table 2. Crash Type and Severity Summary

		Crash Severity			
		All	Property Damage Only	Possibly Injury (Type C)	Non-incapacitating Injury (Type B)
Crash Type	All	70	43	22	5
	Sideswipe – Same Direction	3	1	2	0
	Left Turn	13	9	3	1
	Right Angle	20	10	7	3
	Right Turn	1	1	0	0
	Head On	2	1	1	0
	Sideswipe – Opposing Direction	1	1	0	0
	Rear End	20	14	6	0
	Other/Unknown/Not Stated	10	6	3	1

Future Conditions

Based on discussions with City and County staff, the existing traffic signal system is nearing the end of its useful life, which prompted the consideration of improvements. For the alternatives analysis, one option is using the existing lane configurations (listed in Table 1 and shown in Figure 2) and replacing the traffic signal with an upgraded system.

Another option is including geometric improvements (dedicated turn lanes) for a new traffic signal, and these lane configurations are listed in Table 3 and are shown in Figure 3. Both traffic signal alternatives would include ADA improvements and other enhancements such as flashing yellow arrow phasing. A new signal would also provide the opportunity to have mast arms on all approaches, which would increase the visibility of indications for the Hoffman Road approaches.

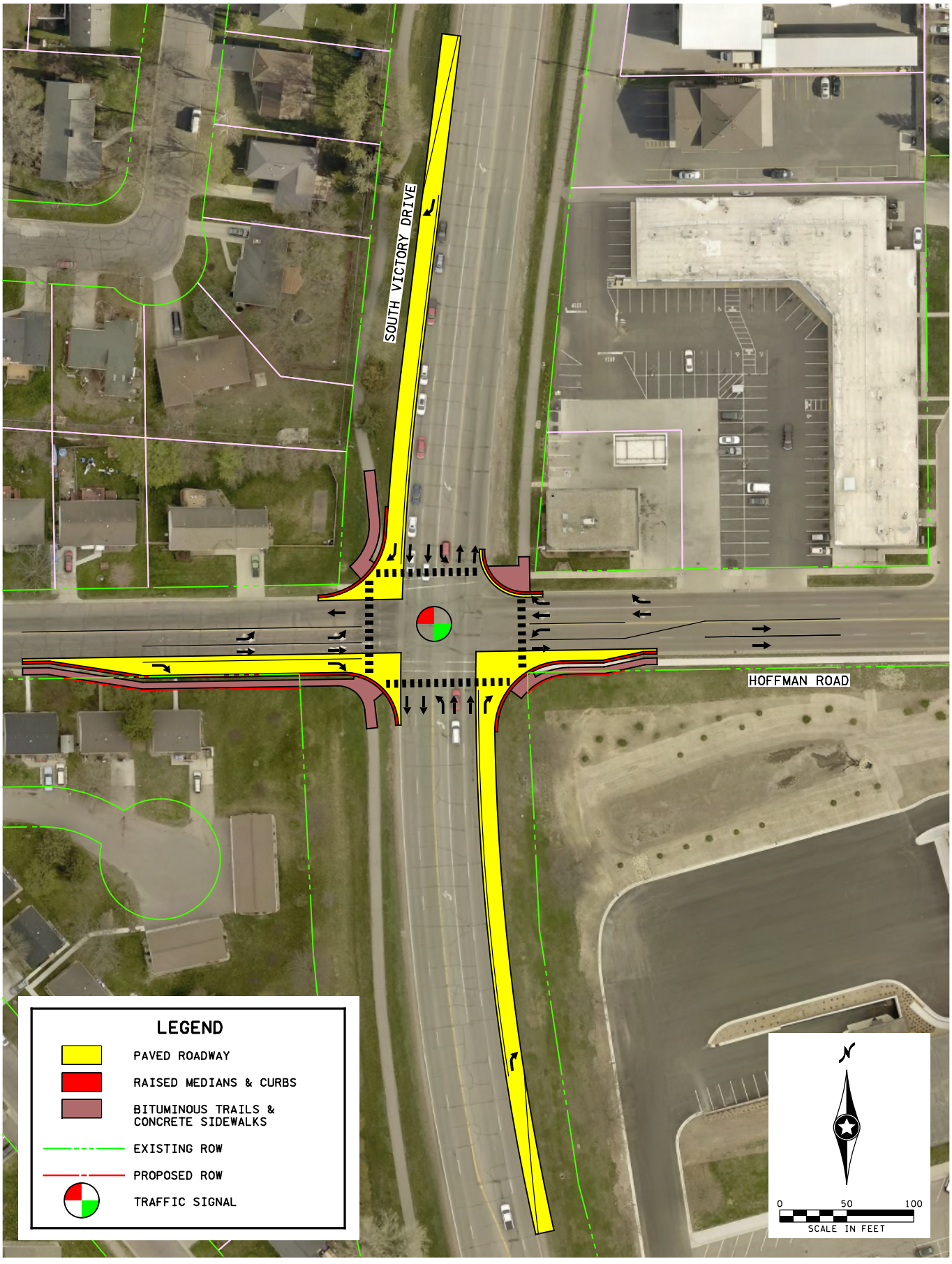
The lane configurations for the roundabout control alternative are listed in Table 4 and are shown in Figure 4. The roundabout concept shown is offset from the center of the existing intersection to minimize impacts to the property in the northeast quadrant. The concept shown represents a preliminary design level alternative; more detailed examinations of access to existing developments on the east leg and level of impacts to right-of-way would be required to refine this alternative for final design.

Table 3. Proposed Lane Configurations for Traffic Signal Control with Geometric Improvements

Approach	Configuration
Northbound Victory Drive	One left-turn lane, two thru lanes, and one right-turn lane
Southbound Victory Drive	One left-turn lane, two thru lanes, and one right-turn lane
Eastbound Hoffman Road	One left-turn lane, one thru lane, and one right-turn lane
Westbound Hoffman Road	One left-turn lane, one thru lane, and one right-turn lane

Table 4. Proposed Lane Configurations for Roundabout Control Alternative

Approach	Configuration
Northbound Victory Drive	One shared thru/left-turn lane, one thru lane, and one right-turn lane
Southbound Victory Drive	One shared thru/left-turn lane and one shared thru/right-turn lane
Eastbound Hoffman Road	One shared lane (all movements)
Westbound Hoffman Road	One shared thru/left-turn lane and one right-turn lane



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Traffic Signal Control with Geometric Improvements Alternative

Intersection Control Evaluation

South Victory Drive at Hoffman Road

Figure 3

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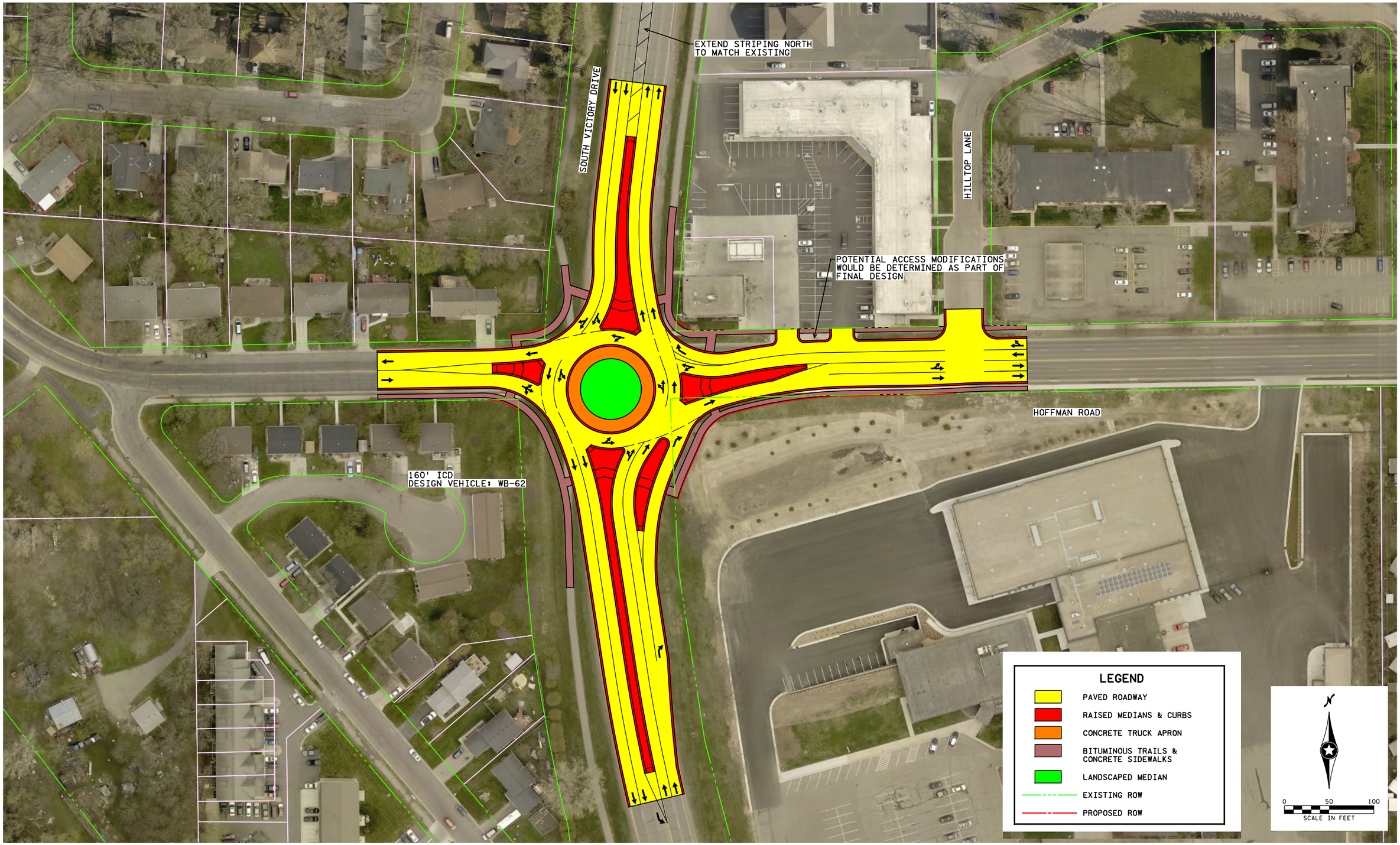

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Roundabout Control Alternative

Intersection Control Evaluation

South Victory Drive at Hoffman Road

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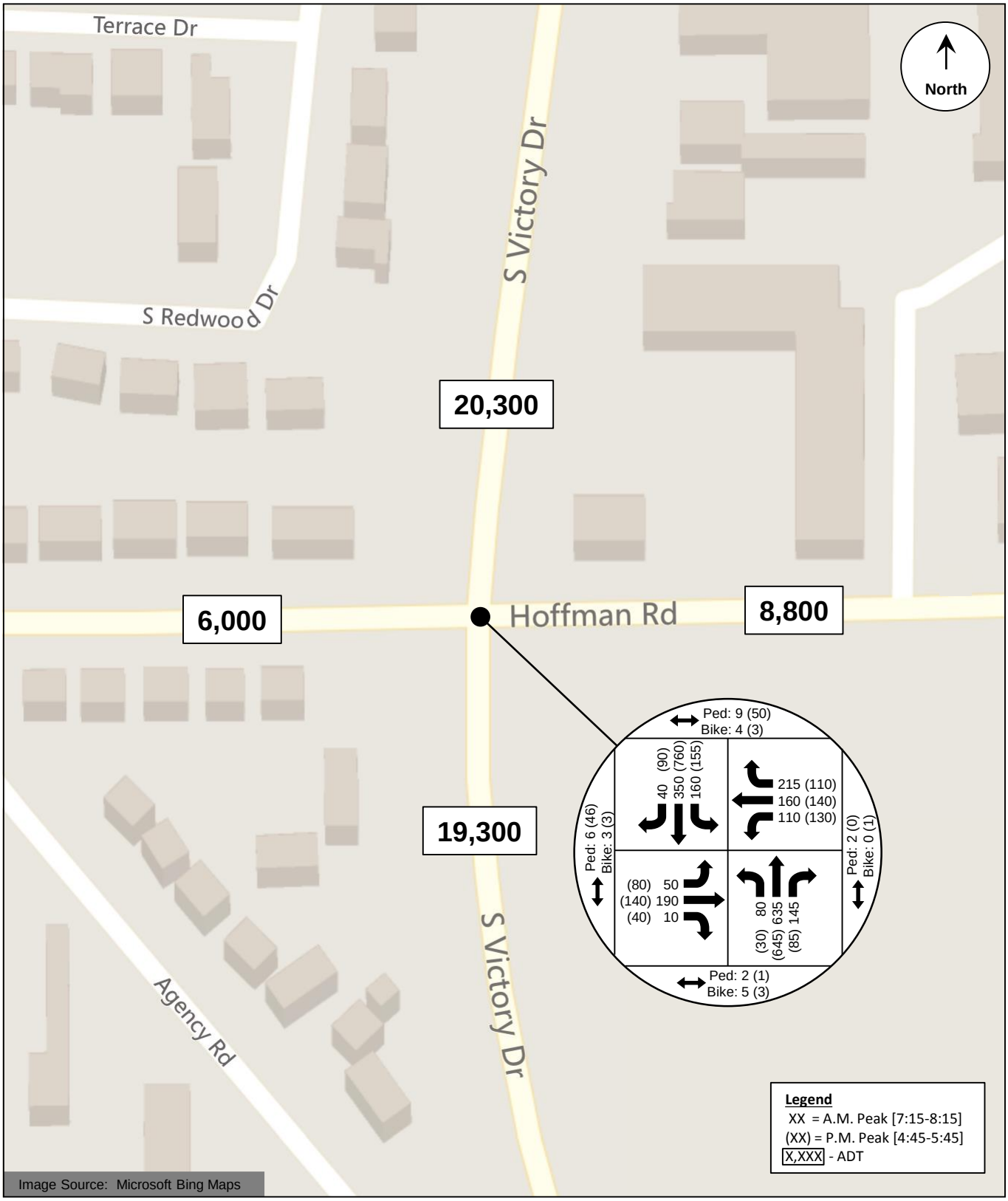
Figure 4

Traffic Volumes

Traffic volumes including the existing a.m. and p.m. peak hours were collected by SRF in September 2018 after the start of the fall terms at Minnesota State University, Mankato and Mankato East High School; these traffic volumes are shown in Figure 5. Pedestrian and bicycle volumes were also collected during the peak hours. Growth rates from the MAPO 2045 Transportation Plan were used to determine Forecasted Year 2038 volumes, which are shown in Figure 6.



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Existing Year 2018 Volumes

Figure 5

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South Victory Drive at Hoffman Road
Mankato, Blue Earth County, Minnesota

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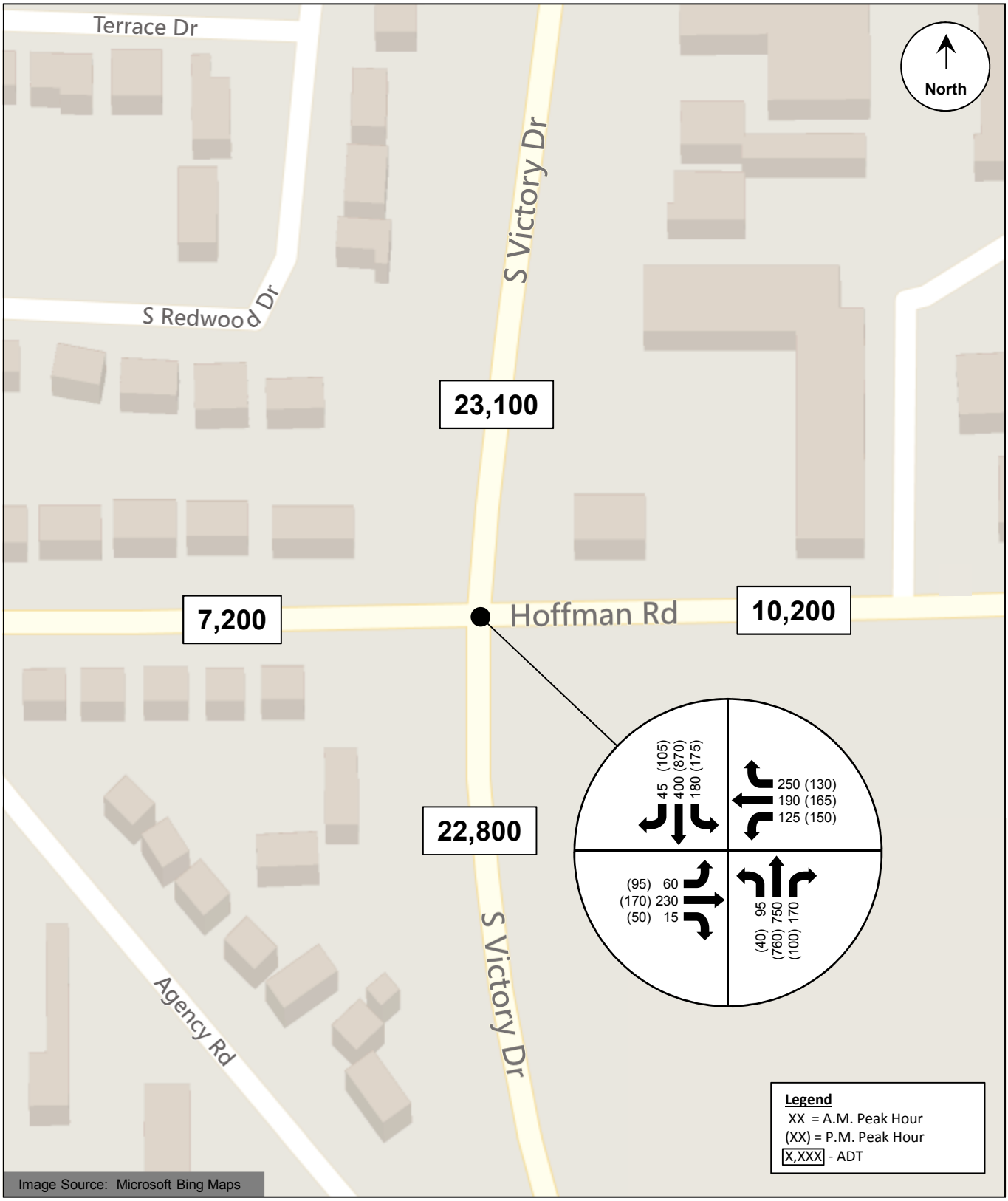

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Forecasted Year 2038 Volumes

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South Victory Drive at Hoffman Road
Mankato, Blue Earth County, Minnesota

Figure 6

Analysis of Alternatives

The analysis of the traffic signal control with existing conditions, traffic signal control with geometric improvements, and roundabout control alternatives included a warrants analysis, operational analysis, planning-level crash analysis, and a planning-level cost analysis. Existing Year 2018 and Forecasted Year 2038 volumes with proposed lane configurations discussed previously were used for the analysis.

Warrants Analysis

A warrants analysis was performed for the traffic signal control alternative as outlined in the February 2018 *Minnesota Manual on Uniform Traffic Control Devices* (MN MUTCD). The signal warrants analysis was based on the assumptions shown in Table 5.

Table 5. Warrants Analysis Assumptions

Approach	Geometry	Speed
Northbound Major Street (Victory Drive)	2 or more approach lanes	40 mph
Southbound Major Street (Victory Drive)	2 or more approach lanes	40 mph
Eastbound Minor Street (Hoffman Road)	2 or more approach lanes	30 mph
Westbound Minor Street (Hoffman Road)	2 or more approach lanes	30 mph

Minor street right-turns were included in the warrants analysis for the traffic signal control with existing conditions alternative because of the shared eastbound and westbound thru/right-turn lanes. Minor street right-turns were excluded from the warrants analysis for the traffic signal control with geometric improvements alternative because of the dedicated eastbound and westbound right-turn lanes. Table 6 and Table 7 provides a summary of the results of the warrants analysis. The detailed warrants analysis can be found in the Appendix.

Table 6. Existing Conditions Warrants Analysis Results

MN MUTCD Warrant	Hours Required	Existing Year 2018 Volumes		Forecasted Year 2038 Volumes	
		Hours Met	Warrant Met	Hours Met	Warrant Met
Warrant 1A: Minimum Vehicular Volume	8	11	Yes	12	Yes
Warrant 1B: Interruption of Continuous Traffic	8	13	Yes	14	Yes
Warrant 1C: Combination of Warrants	8	14	Yes	14	Yes
Warrant 2: Four-Hour Volume	4	11	Yes	14	Yes
Warrant 3B: Peak-Hour Volume	1	6	Yes	10	Yes

Table 7. Geometric Improvements Warrants Analysis Results

MN MUTCD Warrant	Hours Required	Existing Year 2018 Volumes		Forecasted Year 2038 Volumes	
		Hours Met	Warrant Met	Hours Met	Warrant Met
Warrant 1A: Minimum Vehicular Volume	8	5	No	8	Yes
Warrant 1B: Interruption of Continuous Traffic	8	13	Yes	14	Yes
Warrant 1C: Combination of Warrants	8	10	Yes	12	Yes
Warrant 2: Four-Hour Volume	4	9	Yes	11	Yes
Warrant 3B: Peak-Hour Volume	1	3	Yes	6	Yes

Warrants 4-9 were investigated but were determined to be not applicable. Results of the warrants analysis indicate that both Existing Year 2018 volumes and Forecasted Year 2038 volumes satisfy the MN MUTCD warrant requirements for traffic signal Warrants 1, 2, and 3B.

Operational Analysis

An initial planning-level analysis was performed for the roundabout control alternative based on methods found in the *Highway Capacity Manual, Sixth Edition* (Transportation Research Board, 2016). The analysis involved testing the theoretical capacity of a single-lane roundabout against the Forecasted Year 2038 entering and circulating volumes. As shown in Chart 1, the Forecasted Year 2038 volumes exceed the theoretical capacity of a single-lane roundabout.

Therefore, the roundabout alternative included additional lanes needed to support the traffic volumes and match into the existing roadway layout.

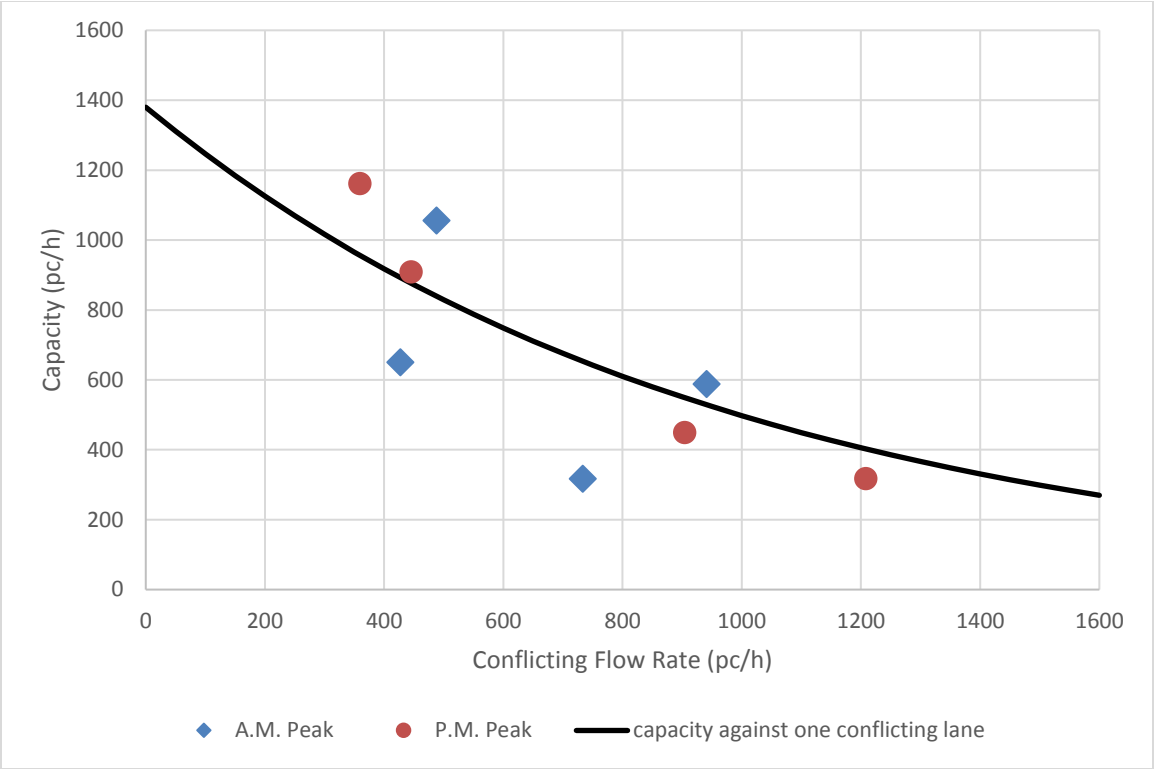


Chart 1. Single-Lane Roundabout Entry Lane Capacity (Forecasted Year 2038 volumes)

Operational analysis of the roundabout control alternative was performed using Highway Capacity Software (HCS) and RODEL. HCS is based on methodologies found in the *Highway Capacity Manual, 6th Edition* (HCM). RODEL is based on existing roundabout operational research and uses an empirical formula method to determine roundabout delay based on geometric features and traffic flows.

The detailed operational analysis of traffic signal control was performed using methods outlined in the HCM using Synchro/SimTraffic. Synchro/SimTraffic can calculate various measures of effectiveness such as control delay, queuing, and total travel time impacts. SimTraffic results are reported for the analysis.

The operational analysis identified a Level of Service (LOS), which indicates how well an intersection is operating based on average delay per vehicle. Delay is calculated based on procedures outlined in the HCM. Intersections are given a ranking from LOS A to LOS F. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. LOS A through LOS D are generally considered acceptable.

HCS results with and without a peak hour factor (PHF) were both determined. The results with the PHF represent the peak 15-minute period, while the results without the PHF reflect the average for the whole peak hour. RODEL results for a Confidence Level (CL) of 50

percent and 85 percent were determined. 50 percent CL results are typically used for roundabout analysis while the 85 percent CL results indicate the sensitivity of the roundabout design. When a substantial degradation in LOS is expected from 50 percent CL to 85 percent CL, designers should exercise caution in the design of the roundabout to ensure adequate capacity is provided.

Table 8 and Table 9 provide a summary of the operational analysis for Existing Year 2018 and Forecasted Year 2038 conditions, respectively. Detailed operational analysis results can be found in the Appendix.

Table 8. Existing Year 2018 Operational Analysis Results

Alternative	Analysis Tool		A.M. Peak		P.M. Peak	
			Delay (1) (sec/veh)	LOS	Delay (1) (sec/veh)	LOS
Traffic Signal Control with Existing Conditions	Synchro/SimTraffic		16/18	B/B	11/14	B/B
Traffic Signal Control with Geometric Improvements	Synchro/SimTraffic		14/19	B/B	12/18	B/B
Roundabout Control	HCS	No PHF	8/11	A/B	9/14	A/B
		With PHF	14/23	B/C	9/15	A/C
	RODEL	50% CL	5/6	A/A	4/6	A/A
		85% CL	6/9	A/A	5/10	A/A

(1) Control/stop delay is reported. Overall results are followed by the worst approach results.

Table 9. Forecasted Year 2038 Operational Analysis Results

Alternative	Analysis Tool (Variation)		A.M. Peak		P.M. Peak	
			Delay (1) (sec/veh)	LOS	Delay (1) (sec/veh)	LOS
Traffic Signal Control with Existing Conditions	Synchro/SimTraffic		26/50	C/D	14/15	B/B
Traffic Signal Control with Geometric Improvements	Synchro/SimTraffic		18/22	B/C	14/19	B/B
Roundabout Control	HCS	No PHF	11/15	B/C	12/22	B/C
		With PHF	27/59	D/F	13/25	B/D
	RODEL	50% CL	7/8	A/A	5/8	A/A
		85% CL	10/13	A/B	6/14	A/B

(1) Control/stop delay is reported. Overall results are followed by the worst approach results.

Results of the operational analysis indicate that all alternatives would operate with acceptable levels of service under Existing Year 2018 and Forecasted Year 2038 conditions. However, during the a.m. peak under forecasted conditions, the traffic signal with existing conditions

would have noticeably higher delay than the alternative with geometric improvements. Also, the roundabout control alternative may have significant delay during the peak 15-minute period but should have an acceptable level of delay outside that time period.

Safety Analysis

A crash analysis was performed to determine the projected crashes per year for Existing Year 2018 and Forecasted Year 2038 conditions for the study intersection. The existing crash rate for traffic signal control was used for that alternative, as the existing crash rate is double the average crash rate from the MnDOT Green Sheets (2011 to 2015 data). Projected crash rates for the traffic signal control with geometric improvements and roundabout control alternatives were determined using values from the Crash Modification Factors (CMF) Clearinghouse. A summary of the crash analysis is shown in Table 10.

Table 10. Crash Analysis Results

Alternative	Intersection AADT (2018)	Intersection AADT (2038)	Projected Crash Rate	Projected Crashes/Year (2018)	Projected Crashes/Year (2038)
Traffic Signal Control with Existing Conditions	27,200	31,600	1.41	14	16
Traffic Signal Control with Geometric Improvements			1.30 (1)	13	15
Roundabout Control			0.82 (2)	8	9

(1) CMF used was for providing a right-turn lane on both major-road approaches of a signalized intersection http://www.cmfclearinghouse.org/detail.cfm?facid=290
(2) CMF used was for converting a signalized intersection to a modern roundabout http://www.cmfclearinghouse.org/detail.cfm?facid=4186

Based on the results of the crash analysis, the roundabout control alternative is anticipated to have fewer crashes than the traffic signal control alternatives. The traffic signal control alternative with geometric improvements is expected to have fewer crashes than existing conditions, and because of the applicable factors available, the reduction factor used for this alternative does not account for the potential additional safety benefit of having dedicated minor approach turn lanes.

Studies have determined that the installation of a roundabout can improve the overall safety of an intersection when compared to other forms of intersection control. Roundabouts typically have fewer conflict points than conventional intersections and the geometry of a roundabout induces lower speeds for vehicles approaching and traversing an intersection. With lower speeds, the severity of the crashes is decreased. A roundabout virtually eliminates right-angle and left-turn head-on crashes. Studies have shown the frequency of injury crashes is reduced more than property damage only crashes.

At a roundabout, drivers must be aware of traffic traveling around the circle when merging on or off the roundabout. Conversely, drivers at a traditional intersection must be aware of vehicles at all approaches and the movements they are making. This issue is most prevalent at stop-controlled intersections where there is not a traffic signal to control vehicle movements.

Planning-Level Cost Analysis

Capital Costs

The traffic signal control with existing conditions alternative utilizes the existing geometrics, therefore the cost for this alternative would only be the cost of installing a new traffic signal system, along with ADA improvements. The traffic signal control with geometric improvements would have increased cost due to additional reconstruction and right-of-way. The roundabout control alternative would require substantial reconstruction at and leading up to the intersection, which results in a much higher cost than the traffic signal control alternatives.

Operation and Maintenance Costs

Traffic signals typically have higher operation and maintenance costs than roundabouts because of the electricity required to operate the signal and routine maintenance required to keep the signal in operation. Operation and maintenance costs associated with a roundabout can vary depending on the amount of illumination required or landscaping alternatives used for the center island.

A cost analysis summary is shown in Table 11. Detailed cost analysis results can be found in the Appendix.

Table 11. Cost Analysis Summary

Alternative	Capital Costs (1)	Operation/Maintenance Costs (annual)
Traffic Signal Control with Existing Conditions	$440,000	$4,000-$6,000
Traffic Signal Control with Geometric Improvements	$620,000	$4,000-$6,000
Roundabout Control	$1,360,000	$500-$1,000

(1) Does not include engineering or right-of-way costs.

Alternatives Assessment

Right-of-Way Considerations

The roadway geometry for the traffic signal control with existing conditions alternative would use the existing intersection footprint and therefore no additional right-of-way would be required. The traffic signal control with geometric improvements alternative would have some right-of-way impacts (at least 1800 square feet). Construction of a roundabout at the study intersection would require some additional right-of-way in all four quadrants of the intersection (at least 5300 square feet total), with substantial impacts to the southeast quadrant (4700 square feet of the 5300 total), though that quadrant is city property.

Transportation System Considerations

There are existing traffic signals approximately one-quarter of a mile north and south of the study intersection, and the traffic signal control alternatives would maintain this intersection control continuity along South Victory Drive. The roundabout control alternative could be considered a traffic calming measure for the surrounding residential area. The roundabout would impact access of one business driveway. Mankato East High School is half a mile to the east of the study intersection and therefore there are many student drivers, pedestrians, and bicyclists who travel through this intersection. The multi-lane roundabout may be challenging for newer student drivers, as well as pedestrians and bicyclists.

Pedestrian and Bicycle Considerations

As previously mentioned, there are trails on both sides of South Victory Drive north of the intersection, and on the west side only to the south. There are sidewalks on both sides of Hoffman Road east of the intersection, and on the south side only to the west. There are marked pedestrian crossings on three legs of the intersection (all except the east leg). There is also a trail along Glenwood Avenue west of the intersection that connects to the trail along Victory Drive south of the intersection. The subject intersection is important to bicycle connectivity in the city, but along Hoffman Road, there is a lack of bicycle accommodations. Pedestrian and bicycle accommodations can be provided regardless of the selected intersection control.

The design of a roundabout allows pedestrians to cross one direction of traffic (which is multiple lanes for a multi-lane roundabout) at a time with a refuge space in the middle of each leg of the roundabout, and these short crossing distances and reduced travel speeds of vehicle traffic improve pedestrian safety. However, their route is slightly longer since they are kept to the outside of the inscribed circle.

The design of a traffic signal can create a safe environment for pedestrian crossings with the use of pedestrian signal phasing. This phasing allows pedestrians to safely cross an intersection while vehicular movements are served. Although signalized intersections can provide

indications showing pedestrian right-of-way, potential conflicts can come from red-light running through vehicles and permissive turning traffic.

Local Acceptance

Drivers are familiar with traveling through signalized intersections since there are many intersections in the area under this types of traffic control. Drivers are also familiar with traveling through roundabout controlled intersections since there are many existing roundabouts throughout the greater Mankato area.

The multi-lane roundabout may be challenging for the many student drivers that travel through this intersection, as well as pedestrians and bicyclists.

Conclusions and Recommendations

The following conclusions are provided for this intersection control evaluation for the South Victory Drive (CSAH 82) at Hoffman Drive intersection in Mankato, Blue Earth County, Minnesota:

- *Warrants Analysis*
  Results of the warrants analysis indicate that both existing and Forecasted Year 2038 volumes satisfy the MN MUTCD warrant requirements for traffic signal Warrants 1, 2, and 3B.

- *Operational Analysis*
  Results of the operational analysis indicate that all alternatives would operate with acceptable levels of service under Existing Year 2018 and Forecasted Year 2038 conditions. However, during the a.m. peak under forecasted conditions, the traffic signal with existing conditions would have noticeably higher delay than the alternative with geometric improvements. Also, the roundabout control alternative may have significant delay during the peak 15-minute period but should have an acceptable level of delay outside that time period.

- *Safety Analysis*
  Based on the results of the crash analysis, the roundabout control alternative is anticipated to have fewer crashes than the traffic signal control alternatives. The traffic signal control alternative with geometric improvements is expected to have fewer crashes than existing conditions. Roundabouts typically have fewer conflict points than conventional intersections and the geometry of a roundabout induces lower speeds for vehicles approaching and traversing an intersection. With lower speeds, the severity of the crashes is decreased.

- *Planning-Level Cost Analysis*
  The traffic signal control with existing conditions alternative utilizes the existing geometrics, therefore the cost for this alternative would only be the cost of installing a new traffic signal system, along with ADA improvements. The traffic signal control with geometric improvements would have increased cost due to additional reconstruction. The roundabout control alternative would require substantial reconstruction at and leading up to the intersection, which results in a much higher cost than the traffic signal control alternatives. Traffic signals typically have higher operation and maintenance costs because of the electricity required to operate the signal and routine maintenance required to keep the signal in operation. Operation and maintenance costs associated with a roundabout can vary depending on the amount of illumination required or landscaping alternatives used for the center island.

- *Right-of-Way Considerations*
  The roadway geometry for the traffic signal control with existing conditions alternative would use the existing intersection footprint and therefore no additional right-of-way would be required. The traffic signal control with geometric improvements alternative would have some right-of-way impacts (at least 1800 square feet). Construction of a roundabout at the study intersection would require some additional right-of-way in all four quadrants of the intersection (at least 5300 square feet).

- *Transportation System Considerations*
  There are existing traffic signals approximately one-quarter of a mile north and south of the study intersection. The roundabout control alternative could be considered a traffic calming measure for the surrounding residential area. The multi-lane roundabout may be challenging for newer student drivers, as well as pedestrians and bicyclists.

- *Pedestrian and Bicycle Considerations*
  The design of signalized intersections can take pedestrian crossings and safety into consideration with the use of pedestrian signal phasing. The design of a roundabout allows pedestrians to cross one direction of traffic at a time on each leg of the roundabout. Their route is slightly longer since they are kept to the outside of the inscribed circle.

- *Local Acceptance*
  Drivers are familiar with traveling through signalized intersections since there are many intersections in the area under this types of traffic control. Drivers are also familiar with traveling through roundabout controlled intersections since there are many existing roundabouts throughout the greater Mankato area.

A decision matrix was developed to help evaluate the key factors and is provided on the following page. Based on the results of this Intersection Control Evaluation, the traffic signal control with existing conditions, traffic signal control with geometric upgrades, and roundabout control alternatives are all viable options for the South Victory Drive at Hoffman Road intersection. All alternatives have acceptable operations under forecasted conditions. However, because of the existing crash problem, replacing the traffic signal while keeping existing lane configurations is not practical at this intersection. Compared to the traffic signal with geometric upgrades, a roundabout would have more consistent off-peak operations throughout the day when traffic volumes are lower. However, the surrounding intersections are signalized.

The traffic signal control with geometric upgrades alternative is recommended because it would provide acceptable operations, is expected to improve safety compared to existing conditions, would have significantly lower costs than a roundabout, and is the best fit in the surrounding transportation system.

DRAFT Alternatives Decision Matrix: South Victory Drive at Hoffman Road

Factor		Traffic Signal Existing Conditions	Traffic Signal Geometric Improvements	Roundabout Control	Recommended Alternative(s) Based on Factor
Warrants Analysis	2018	• Existing Year 2018 volumes meet traffic signal control warrants	• Existing Year 2018 volumes meet traffic signal control warrants	N/A	Traffic Signal Existing Conditions Traffic Signal Geometric Improvements Roundabout Control
	2038	• Forecasted Year 2038 volumes meet traffic signal control warrants	• Forecasted Year 2038 volumes meet traffic signal control warrants	N/A	
Operational Analysis	2018	• Acceptable LOS	• Acceptable LOS	• Acceptable LOS • Consistent off-peak operations	Traffic Signal Geometric Improvements Roundabout Control
	2038	• Acceptable LOS, significant delay during A.M. peak	• Acceptable LOS	• Acceptable LOS • Significant delay during A.M. peak 15 • Consistent off-peak operations	
Safety Analysis	Pro(s):	• Signal indications show vehicle right-of-way	• Signal indications show vehicle right-of-way • Expected to lower crash rate	• Least number of crashes expected • Lower vehicle speeds through intersection	Roundabout Control
	Con(s):	• More crashes expected than roundabout	• More crashes expected than roundabout	• Drivers select acceptable gaps	
Cost Analysis	Pro(s):	• Lower capital costs ($440,000) than roundabout control	• Lower capital costs ($620,000) than roundabout control	• Lower operation/maintenance costs than traffic signal control	Traffic Signal Existing Conditions Traffic Signal Geometric Improvements
	Con(s):	• Higher operation/maintenance costs than roundabout control	• Higher operation/maintenance costs than roundabout control	• Higher capital costs ($1,360,000) that traffic signal control • Requires substantial reconstruction	
Right-of-Way	Pro(s):	N/A (existing control)	• Less ROW impacts than roundabout control	none	Traffic Signal Existing Conditions
	Con(s):		• Requires additional ROW in the southwest and southeast quadrants	• Requires additional ROW in all four quadrants	
Transportation System Considerations	Pro(s):	• Existing control • Adjacent intersections on Victory Drive are signalized	• Existing control • Adjacent intersections on Victory Drive are signalized	• Traffic calming through residential area	Traffic Signal Existing Conditions Traffic Signal Geometric Improvements
	Con(s):	none	none	• Adjacent intersections are signalized	
Pedestrian and Bicycle Considerations	Pro(s):	• Pedestrian pushbuttons and signal phasing	• Pedestrian pushbuttons and signal phasing	• Pedestrian Refuge islands • Lower vehicle speeds thru intersection	Traffic Signal Existing Conditions Traffic Signal Geometric Improvements
	Con(s):	• Pedestrian signal phasing can lead to a false sense of security	• Pedestrian signal phasing can lead to a false sense of security	• Longer route • No pedestrian phase	
Local Acceptance	Pro(s):	N/A (existing control)	• Similar to existing control • Familiar to drivers	• Familiar to drivers • Positive public feedback	Traffic Signal Existing Conditions Traffic Signal Geometric Improvements Roundabout Control
	Con(s):		none	none	

Appendix

- 2011-2015 Crash History
- Existing Year 2018 Warrants Analysis
    - Traffic Signal Control with Existing Conditions
    - Traffic Signal Control with Geometric Improvements
- Forecasted Year 2038 Warrants Analysis
    - Traffic Signal Control with Existing Conditions
    - Traffic Signal Control with Geometric Improvements
- Existing Year 2018 Detailed Operational Analysis
    - Traffic Signal Control with Existing Conditions
    - Traffic Signal Control with Geometric Improvements
    - Roundabout Control
- Forecasted Year 2038 Detailed Operational Analysis
    - Traffic Signal Control with Existing Conditions
    - Traffic Signal Control with Geometric Improvements
    - Roundabout Control
- Detailed Cost Analysis

2011-2015 Crash History

Intersection Safety Screening

Intersection: South Victory Drive at Hoffman Road

Crash Data, 2011-2015.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	5
Possible Injury	22
Property Damage	43
Total Crashes	70

Intersection Characteristics	
Entering Volume	27,200
Traffic Control	Signals
Environment	Suburban
Speed Limit	40 mph

Annual crash cost = $600,560

Statewide Comparison

Signals: high volume, low speed

Total Crash Rate	
Observed	1.41
Statewide Average	0.70
Critical Rate	1.01
Critical Index	**1.40**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.76
Critical Rate	3.36
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 1.41 per MEV; this is 1.4 times the critical rate. If crashes were reduced by 19 over five years, this intersection would perform within normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Crash Type Summary

Victory Drive at Hoffman Road

Report Version 1.0 March 2010

Analysis Years: 2011, 2012, 2013, 2014, 2015

Crash Summary:

		Number of Vehicles		
		1	2	3+
K - Fatal	0	0	0	0
A - Incapacitating	0	0	0	0
B - Non-Incapacitating	5	1	4	0
C - Possible	22	0	17	5
N - Property Damage	43	1	37	5
X - Not Reported	0	0	0	0
Miscoded	0	0	0	0
Total	70	2	58	10

Surface Condition Summary:

01 - Dry	49
02 - Wet	13
03 - Snow	3
04 - Slush	2
05 - Ice/Packed Snow	2
Other	0
Unknown/Not Specified	1
Miscoded	0
Total	70

Diagram Summary:

02 - Sideswipe - Same Dir	3
03 - Left Turn	13
04 - Ran Off Road - Left Side	0
05 - Right Angle	20
06 - Right Turn	1
07 - Ran Off Road - Right Side	0
08 - Head On	2
09 - Sideswipe - Opposing Dir	1
Other	29
Unknown/Not Stated	1
Miscoded	0
Total	70

Intersection Relation Summary:

01 - Not at Intersection	1
02 - T Intersection	0
03 - Y Intersection	1
04 - 4 Legged Intersection	29
05 - 5 or more Leg Intersection	0
06 - Roundabout/Traffic Circle	0
07 - Intersection Related	4
08 - Alley or Driveway	0
09 - School Crossing	0
10 - RR Crossing	0
11 - Recreational Crossing	0
20 -22 - Interchange	0
Other	0
Unknown/Not Stated	35
Miscoded	0
Total	70

Accident Type Summary

01 - Motor Vehicle in Transport	68
02 - Parked Vehicle	0
03-04 - Road Equipment	0
05 - Train	0
06 - Bike	0
07 - Pedestrian	1
08-09 - Deer/Animal	0
10-14 - Other/Unknown Collision	1
21-42 - Fixed Object	0
51 - Overturn	0
52-65 - Other Non-Collision	0
Other	0
Unknown/Not Stated	0
Miscoded	0
Total	70

Light Condition Summary:

01 - Daylight	43
02 - Before Sunrise	1
03 - After Sunset	4
04 - Dark (Street Lights On)	21
05 - Dark (Street Lights Off)	0
06 - Dark (No Street Lights)	0
07 - Dark (Unknown Lighting)	1
Other	0
Unknown/Not Stated	0
Miscoded	0
Total	70

Selection Filter:

WORK AREA: COUNTY_CODE('07') - FILTER: CRASH_YEAR('2011','2012','2013','2014','2015') - SPATIAL FILTER APPLIED

Analyst:

Luke James

Notes:

Crash Detail Report

Victory Drive at Hoffman Road

Report Version 1.0 March 2010

Crash ID: 111090040 **Date:** 03/16/2011 **Time:** 0805 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: SCHOOL ZONE SIGN
Speed Limit: 30
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	E	
Veh Act:	STRAIGHT AHEAD	RIGHT TURN	
Veh Type:	VAN OR MINIVAN	PASSENGER CAR	
Age:	54	47	
Gender:	M	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 111400049 **Date:** 04/20/2011 **Time:** 1510 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.673

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: OTHER
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	N	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	SPORT UNTILITY VEHICLE	PICKUP TRUCK	
Age:	17	36	
Gender:	F	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 111630063 **Date:** 06/12/2011 **Time:** 1342 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: POSSIBLE INJURY
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: WET
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: RAIN

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: OVERHEAD FLASHERS
Speed Limit: 40
Diagram: SIDESWIPE PASSING
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	NE	N	
Veh Act:	RIGHT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	45	22	
Gender:	M	F	
Cond:	NORMAL	NORMAL	
Cont Fact	IMPROPER PASSING	NO IMPROPER DRIVING	
Cont Fact	IMPROPER LANE	NO IMPROPER DRIVING	

Crash ID: 112510071 **Date:** 09/08/2011 **Time:** 0754 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.675

Severity: PROPERTY DAMAGE
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: ON ROADWAY
To Junction: NON-JUNCTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	W	W
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	STRAIGHT AHEAD
Veh Type:	PASSENGER CAR	PICKUP TRUCK	90
Age:	41	17	22
Gender:	F	M	M
Cond:	NORMAL	NORMAL	NORMAL
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	FOLLOWING TOO CLOSELY
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED

Crash ID: 112650071 **Date:** 09/20/2011 **Time:** 2120
County: BLUE EARTH **City:** MANKATO

Sys: 05-MSAS
Route: 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: NOT APPLICABLE
Speed Limit: 30
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W		
Veh Act:	STRAIGHT AHEAD		
Veh Type:	SPORT UNTILITY VEHICLE		
Age:	16		
Gender:	M		
Cond:	NOT SPECIFIED		
Cont Fact	NOT SPECIFIED		
Cont Fact	NOT SPECIFIED		

Crash ID: 112760144 **Date:** 08/31/2011 **Time:** 2042
County: BLUE EARTH **City:** MANKATO

Sys: 04-CSAH
Route: 07000082 001+00.238

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DARK - STREET LIGHTS ON
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: NOT APPLICABLE
Speed Limit: 30
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	MC	MC	
Veh Act:	SLOWING TRAFFIC	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PICKUP TRUCK	
Age:	19	22	
Gender:	F	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 112780103 **Date:** 09/03/2011 **Time:** 1017 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DARK - STREET LIGHTS ON
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: LEFT TURN INTO TRAFFIC
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	MC	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	PASSENGER CAR	99	
Age:	21	24	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 120800148 **Date:** 03/20/2012 **Time:** 2209 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: NON-INCAPACITATING INJURY
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: WET
Light Cond: DARK - STREET LIGHTS ON
Weather 1: RAIN
Weather 2: NOT SPECIFIED

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	S	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	20	62	
Gender:	F	F	
Cond:	NORMAL	NOT SPECIFIED	
Cont Fact	NO IMPROPER DRIVING	FAIL TO YIELD ROW	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID:	121040009	**Date:**	04/12/2012	**Time:**	2153
County:	BLUE EARTH	**City:**	MANKATO		

Sys: 05-MSAS
Route: 24200109 001+00.670

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	OTHER
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	CLEAR	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	N	
Veh Act:	RIGHT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	MOTORCYCLE	
Age:	81	31	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	

Crash ID:	121070007	**Date:**	04/15/2012	**Time:**	2322
County:	BLUE EARTH	**City:**	MANKATO		

Sys: 05-MSAS
Route: 24200109 001+00.670

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	5 LANES UNDIVIDED	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	WET	**Diagram:**	RIGHT ANGLE
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	RAIN	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	S	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	20	21	
Gender:	M	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 121280030	**Date:** 04/03/2012	**Time:** 1730	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	PROPERTY DAMAGE	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	
Surf Cond:	DRY	**Diagram:**	SIDESWIPE OPPOSING
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	SE	N	
Veh Act:	00	00	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	63	900	
Gender:	F	NULL	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 121370089	**Date:** 04/13/2012	**Time:** 1840	**Sys:** 05-MSAS		
County: BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.670	

Severity:	PROPERTY DAMAGE	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	RIGHT ANGLE
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	W	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	17	27	
Gender:	F	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 121920062 **Date:** 06/06/2012 **Time:** 1500 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED
First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: NOT SPECIFIED
Speed Limit: 30
Diagram: LEFT TURN INTO TRAFFIC
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	E	
Veh Act:	STRAIGHT AHEAD	00	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	79	900	
Gender:	M	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 122070133 **Date:** 06/18/2012 **Time:** 1631 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED
First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 35
Diagram: HEAD ON
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	NE	W	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PICKUP TRUCK	
Age:	22	37	
Gender:	F	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 122290068 **Date:** 07/13/2012 **Time:** 2030 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: SUNSET
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	
Veh Act:	START TRAFFIC	START TRAFFIC	
Veh Type:	SPORT UNTILITY VEHICLE	SPORT UNTILITY VEHICLE	
Age:	46	51	
Gender:	M	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 122560082 **Date:** 08/07/2012 **Time:** 1629 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: POSSIBLE INJURY
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: LEFT TURN INTO TRAFFIC
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	E	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	SPORT UNTILITY VEHICLE	
Age:	40	31	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 122560123 **Date:** 08/08/2012 **Time:** 1826
County: BLUE EARTH **City:** MANKATO

Sys: 05-MSAS
Route: 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: NOT SPECIFIED
Speed Limit: 30
Diagram: NOT CODED
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	E	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	19	19	
Gender:	M	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 122830073 **Date:** 09/24/2012 **Time:** 1753
County: BLUE EARTH **City:** MANKATO

Sys: 04-CSAH
Route: 07000082 001+00.238

Severity: POSSIBLE INJURY
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: HEAD ON
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	SW	E	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	70	23	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 122920049	**Date:** 10/17/2012	**Time:** 1550	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	INTERSECTION-RELATED
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	LEFT TURN INTO TRAFFIC
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	E	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	26	21	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 123300007	**Date:** 11/25/2012	**Time:** 0004	**Sys:** 05-MSAS		
County: BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.670	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND GRADE	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	RIGHT ANGLE
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	CLOUDY	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	SW	E	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PICKUP TRUCK	
Age:	17	22	
Gender:	F	M	
Cond:	UNDER THE INFLUENCE	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	CHEMICAL IMPAIRMENT	NOT SPECIFIED	

Crash ID: 123380066 **Date:** 10/31/2012 **Time:** 1700
County: BLUE EARTH **City:** MANKATO

Sys: 05-MSAS
Route: 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	S	
Veh Act:	LEFT TURN	LEFT TURN	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	17	60	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 123470268 **Date:** 12/12/2012 **Time:** 1714
County: BLUE EARTH **City:** MANKATO

Sys: 04-CSAH
Route: 07000082 001+00.270

Severity: POSSIBLE INJURY
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: WET
Light Cond: DARK - STREET LIGHTS ON
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	S
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	STRAIGHT AHEAD
Veh Type:	PASSENGER CAR	VAN OR MINIVAN	PASSENGER CAR
Age:	21	32	19
Gender:	F	F	M
Cond:	NORMAL	NORMAL	NORMAL
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	DISTRACTION
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED

Crash ID: 130060201 **Date:** 01/03/2013 **Time:** 1845 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: POSSIBLE INJURY
Road Type: 2 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND GRADE
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DARK - STREET LIGHTS ON
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: LEFT TURN INTO TRAFFIC
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	W	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	VAN OR MINIVAN	SPORT UNTILITY VEHICLE	
Age:	60	38	
Gender:	M	M	
Cond:	HAD BEEN DRINKING	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 130290311 **Date:** 01/29/2013 **Time:** 1241 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: POSSIBLE INJURY
Road Type: 2 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: ICE/PACKED SNOW
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: CLOUDY

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	SE	SW	
Veh Act:	LEFT TURN	LEFT TURN	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	48	22	
Gender:	F	M	
Cond:	PHYSICAL DISABILITY	NORMAL	
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	

Crash ID:	130530265	**Date:**	02/22/2013	**Time:**	2050
County:	BLUE EARTH	**City:**	MANKATO		

Sys: 05-MSAS
Route: 24200109 001+00.670

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	45
Surf Cond:	SLUSH	**Diagram:**	RIGHT ANGLE
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	SE	N	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	2-AXLE TRUCK/SETP VAN	
Age:	31	51	
Gender:	M	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID:	130640011	**Date:**	03/04/2013	**Time:**	2140
County:	BLUE EARTH	**City:**	MANKATO		

Sys: 05-MSAS
Route: 24200109 001+00.670

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	SNOW	**Diagram:**	RIGHT ANGLE
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	SNOW	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	E	
Veh Act:	SLOWING TRAFFIC	STOPPED TRAFFIC	
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	
Age:	20	27	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	WEATHER	NO IMPROPER DRIVING	
Cont Fact	SKIDDING	NOT SPECIFIED	

Crash ID: 130690141 **Date:** 03/10/2013 **Time:** 2008 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: POSSIBLE INJURY
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: SNOW
Light Cond: DARK - STREET LIGHTS ON
Weather 1: SNOW
Weather 2: SNOW

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	S	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	
Age:	41	19	
Gender:	M	F	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	FAIL TO YIELD ROW	
Cont Fact	NO IMPROPER DRIVING	FAIL TO YIELD ROW	

Crash ID: 130880029 **Date:** 02/27/2013 **Time:** 0800 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: WET
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: NOT APPLICABLE
Speed Limit: 35
Diagram: OTHER
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	E	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PICKUP TRUCK	SPORT UNTILITY VEHICLE	
Age:	22	26	
Gender:	M	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 131200061	**Date:** 04/30/2013	**Time:** 1248	**Sys:** 05-MSAS		
County: BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.670	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	INTERSECTION-RELATED
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	LEFT TURN INTO TRAFFIC
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	E	
Veh Act:	STRAIGHT AHEAD	BIKE LEFT TURN	
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	
Age:	37	25	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	FAIL TO YIELD ROW	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 131340118	**Date:** 04/12/2013	**Time:** 1525	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	POSSIBLE INJURY	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	REAR END
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	42	23	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 131340123 **Date:** 04/12/2013 **Time:** 0709 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.688

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: SNOW
Light Cond: DAYLIGHT
Weather 1: SNOW
Weather 2: NOT SPECIFIED
First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: NOT APPLICABLE
Speed Limit: 30
Diagram: OTHER
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	W	
Veh Act:	STRAIGHT AHEAD	WRONG WAY	
Veh Type:	PASSENGER CAR	SPORT UNTILITY VEHICLE	
Age:	59	45	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 131390131 **Date:** 05/19/2013 **Time:** 1748 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: NON-INCAPACITATING INJURY
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND GRADE
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: RAIN
First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	W	
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	53	22	
Gender:	M	M	
Cond:	NORMAL	NORMAL	
Cont Fact	DISTRACTION	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 131460003 **Date:** 05/25/2013 **Time:** 1958 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: PROPERTY DAMAGE
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	S	
Veh Act:	START TRAFFIC	STRAIGHT AHEAD	
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	
Age:	42	73	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	DISREGARD TRAFFIC DEVICE	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 131650054 **Date:** 06/14/2013 **Time:** 0904 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: CLOUDY

First Event: ON ROADWAY
To Junction: INTERSECTION-RELATED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	SW	E	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PICKUP TRUCK	
Age:	16	60	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	

Crash ID: 131660084	**Date:** 06/15/2013	**Time:** 1309	**Sys:** 05-MSAS		
County: BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.670	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	WET	**Diagram:**	REAR END
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	RAIN	**Reliability:**	CONFIDENT
Weather 2:	CLOUDY	**# of Vehicles:**	3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	S
Veh Act:	STRAIGHT AHEAD	SLOWING TRAFFIC	STOPPED TRAFFIC
Veh Type:	VAN OR MINIVAN	VAN OR MINIVAN	PASSENGER CAR
Age:	33	61	61
Gender:	F	M	M
Cond:	UNDER THE INFLUENCE	NORMAL	NORMAL
Cont Fact	FOLLOWING TOO CLOSELY	NO IMPROPER DRIVING	NO IMPROPER DRIVING
Cont Fact	CHEMICAL IMPAIRMENT	NOT SPECIFIED	NOT SPECIFIED

Crash ID: 131810006	**Date:** 06/29/2013	**Time:** 2124	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	OTHER
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	E	
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	21	21	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID:	132480151	**Date:** 09/04/2013	**Time:** 1626	**Sys:** 04-CSAH	
County:	BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.242

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	REAR END
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	CLEAR	**# of Vehicles:**	3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	S
Veh Act:	SLOWING TRAFFIC	SLOWING TRAFFIC	RIGHT TURN
Veh Type:	PASSENGER CAR	PASSENGER CAR	PASSENGER CAR
Age:	43	19	47
Gender:	F	F	F
Cond:	NORMAL	NORMAL	NORMAL
Cont Fact	FOLLOWING TOO CLOSELY	NO IMPROPER DRIVING	NO IMPROPER DRIVING
Cont Fact	IMPROPERLY PARKED	NO IMPROPER DRIVING	NO IMPROPER DRIVING

Crash ID:	132630230	**Date:** 09/20/2013	**Time:** 2236	**Sys:** 05-MSAS	
County:	BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.670

Severity:	NON-INCAPACITATING INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/PERDESTRIAN	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	OTHER
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	1.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	MC	MC	
Veh Act:	STRAIGHT AHEAD	PED. DARTING INTO TRAFFIC	
Veh Type:	PASSENGER CAR	PEDESTRIAN	
Age:	20	11	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	UNKNOWN	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 132750186 **Date:** 10/02/2013 **Time:** 2007 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: POSSIBLE INJURY
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: WET
Light Cond: DARK - STREET LIGHTS ON
Weather 1: RAIN
Weather 2: NOT SPECIFIED

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 4.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	S
Veh Act:	PED. INNATTENTION/DISTRACT	STOPPED TRAFFIC	LEFT TURN
Veh Type:	SPORT UNTILITY VEHICLE	SPORT UNTILITY VEHICLE	PICKUP TRUCK
Age:	56	56	52
Gender:	F	F	M
Cond:	NORMAL	NORMAL	NORMAL
Cont Fact	IMPROPER LANE	NO IMPROPER DRIVING	NO IMPROPER DRIVING
Cont Fact	WEATHER	NOT SPECIFIED	NOT SPECIFIED

Crash ID: 133170149 **Date:** 10/10/2013 **Time:** 9998 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.671

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: SUNSET
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: LEFT TURN INTO TRAFFIC
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	NE	N	
Veh Act:	LEFT TURN	CHANGING LANES	
Veh Type:	PASSENGER CAR	SPORT UNTILITY VEHICLE	
Age:	25	34	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 133330027	**Date:** 11/27/2013	**Time:** 1604	**Sys:** 05-MSAS		
County: BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.670	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	Y-INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	NOT APPLICABLE
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	SIDESWIPE PASSING
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	1.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S		
Veh Act:	STRAIGHT AHEAD		
Veh Type:	SPORT UNTILITY VEHICLE		
Age:	39		
Gender:	F		
Cond:	NORMAL		
Cont Fact	NO IMPROPER DRIVING		
Cont Fact	NOT SPECIFIED		

Crash ID: 140130045	**Date:** 12/09/2013	**Time:** 1800	**Sys:** 05-MSAS		
County: BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.672	

Severity:	PROPERTY DAMAGE	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	NOT SPECIFIED	**Diagram:**	RIGHT ANGLE
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	SNOW	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	MC	
Veh Act:	RIGHT TURN	00	
Veh Type:	PASSENGER CAR	99	
Age:	18	902	
Gender:	M	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 140130089 **Date:** 12/09/2013 **Time:** 1750 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.248

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: ICE/PACKED SNOW
Light Cond: DARK - STREET LIGHTS ON
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	
Veh Act:	STOPPED TRAFFIC	START TRAFFIC	
Veh Type:	PASSENGER CAR	SPORT UNTILITY VEHICLE	
Age:	42	25	
Gender:	M	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 140210102 **Date:** 12/16/2013 **Time:** 1653 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: SLUSH
Light Cond: DARK - STREET LIGHTS ON
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: LEFT TURN INTO TRAFFIC
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	S	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	PICKUP TRUCK	PASSENGER CAR	
Age:	21	20	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 140410039	**Date:** 01/06/2014	**Time:** 1758	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	PROPERTY DAMAGE	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	LEFT TURN INTO TRAFFIC
Light Cond:	SUNSET	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	E	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PICKUP TRUCK	SPORT UNTILITY VEHICLE	
Age:	19	28	
Gender:	M	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 140450205	**Date:** 02/14/2014	**Time:** 1818	**Sys:** 05-MSAS		
County: BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.670	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	OTHER DIVIDED HIGHWAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	OTHER
Light Cond:	SUNSET	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	UNKNOWN	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	MC	MC	
Veh Act:	PARKED	STRAIGHT AHEAD	
Veh Type:	VAN OR MINIVAN	PASSENGER CAR	
Age:	43	17	
Gender:	M	F	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	OTHER HUMAN FACTOR	
Cont Fact	NO IMPROPER DRIVING	UNKNOWN	

Crash ID: 140970033 **Date:** 03/03/2014 **Time:** 0802 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: LEFT TURN INTO TRAFFIC
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	S	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	PICKUP TRUCK	PASSENGER CAR	
Age:	43	16	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 141530173 **Date:** 06/02/2014 **Time:** 2024 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: POSSIBLE INJURY
Road Type: OTHER DIVIDED HIGHWAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: CLEAR

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: OTHER
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	S	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	
Age:	29	26	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	

Crash ID: 141950037 **Date:** 07/14/2014 **Time:** 0728 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: NON-INCAPACITATING INJURY
Road Type: UNKNOWN
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: CLEAR

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	S	
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	
Age:	41	22	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	DISREGARD TRAFFIC DEVICE	
Cont Fact	NO IMPROPER DRIVING	FAIL TO YIELD ROW	

Crash ID: 142240077 **Date:** 07/08/2014 **Time:** 1644 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: NON-INCAPACITATING INJURY
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: LEFT TURN INTO TRAFFIC
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	N	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	MOTORCYCLE	
Age:	25	22	
Gender:	M	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 142310077	**Date:** 07/17/2014	**Time:** 2009	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	PROPERTY DAMAGE	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	REAR END
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	
Veh Act:	STRAIGHT AHEAD	RIGHT TURN	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	20	17	
Gender:	M	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 142380120	**Date:** 08/26/2014	**Time:** 1213	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.245	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	REAR END
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	S
Veh Act:	UNKNOWN	START TRAFFIC	START TRAFFIC
Veh Type:	PASSENGER CAR	PASSENGER CAR	PASSENGER CAR
Age:	902	28	42
Gender:	M	F	M
Cond:	UNKNOWN	NORMAL	NORMAL
Cont Fact	UNKNOWN	NO IMPROPER DRIVING	NO IMPROPER DRIVING
Cont Fact	UNKNOWN	NOT SPECIFIED	NO IMPROPER DRIVING

Crash ID:	142400041	**Date:**	08/21/2014	**Time:**	1538
County:	BLUE EARTH	**City:**	MANKATO		

Sys: 04-CSAH
Route: 07000082 001+00.239

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	REAR END
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	SPORT UNTILITY VEHICLE	
Age:	23	19	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FOLLOWING TOO CLOSELY	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID:	142660120	**Date:**	08/21/2014	**Time:**	1158
County:	BLUE EARTH	**City:**	MANKATO		

Sys: 05-MSAS
Route: 24200109 001+00.670

Severity:	PROPERTY DAMAGE	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	LEFT TURN INTO TRAFFIC
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	SE	W	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PICKUP TRUCK	99	
Age:	52	57	
Gender:	M	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 142800074 **Date:** 09/03/2014 **Time:** 1510 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	W	
Veh Act:	STOPPED TRAFFIC	STRAIGHT AHEAD	
Veh Type:	VAN OR MINIVAN	PASSENGER CAR	
Age:	17	17	
Gender:	M	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 142900093 **Date:** 09/15/2014 **Time:** 0800 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: WET
Light Cond: DAYLIGHT
Weather 1: RAIN
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit:
Diagram: REAR END
Officer:
Reliability: LESS CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	SE	W	
Veh Act:	STOPPED TRAFFIC	SLOWING TRAFFIC	
Veh Type:	VAN OR MINIVAN	PASSENGER CAR	
Age:	45	17	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 142950100	**Date:** 08/21/2014	**Time:** 1158	**Sys:** 05-MSAS		
County: BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.670	

Severity:	POSSIBLE INJURY	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	SIDESWIPE PASSING
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	MC	
Veh Act:	STRAIGHT AHEAD	00	
Veh Type:	SPORT UNTILITY VEHICLE	99	
Age:	57	52	
Gender:	F	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 143320173	**Date:** 11/28/2014	**Time:** 2122	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	WET	**Diagram:**	RIGHT ANGLE
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	N	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	VAN OR MINIVAN	PASSENGER CAR	
Age:	58	30	
Gender:	M	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NOT SPECIFIED	
Cont Fact	ILLEGAL SPEED	NOT SPECIFIED	

Crash ID: 143380052 **Date:** 10/30/2014 **Time:** 1534 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED
First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: NOT APPLICABLE
Speed Limit: 30
Diagram: LEFT TURN INTO TRAFFIC
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	W	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	70	19	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 143570158 **Date:** 11/18/2014 **Time:** 1710 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: WET
Light Cond: DARK - UNKNOWN LIGHTING
Weather 1: CLEAR
Weather 2: NOT SPECIFIED
First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	MC	MC	MC
Veh Act:	STOPPED TRAFFIC	00	00
Veh Type:	SPORT UNTILITY VEHICLE	99	99
Age:	16	26	903
Gender:	M	F	NULL
Cond:	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED

Crash ID: 150720042 **Date:** 02/11/2015 **Time:** 1654 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED

First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	S
Veh Act:	STOPPED TRAFFIC	STOPPED TRAFFIC	STRAIGHT AHEAD
Veh Type:	PASSENGER CAR	PASSENGER CAR	PASSENGER CAR
Age:	76	28	19
Gender:	M	F	F
Cond:	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED

Crash ID: 151360123 **Date:** 05/16/2015 **Time:** 2043 **Sys:** 05-MSAS
County: BLUE EARTH **City:** MANKATO **Route:** 24200109 001+00.670

Severity: PROPERTY DAMAGE
Road Type: 2 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND GRADE
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: WET
Light Cond: DARK - STREET LIGHTS ON
Weather 1: CLOUDY
Weather 2: RAIN

First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: OTHER
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	SW	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	17	16	
Gender:	M	F	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	FAIL TO YIELD ROW	
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	

Crash ID: 151590279	**Date:** 06/08/2015	**Time:** 1645	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	RIGHT ANGLE
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	CLEAR	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	E	
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	23	23	
Gender:	M	F	
Cond:	NORMAL	NORMAL	
Cont Fact	DISREGARD TRAFFIC DEVICE	NO IMPROPER DRIVING	
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	

Crash ID: 152110064	**Date:** 06/29/2015	**Time:** 1724	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	PROPERTY DAMAGE	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	
Surf Cond:	DRY	**Diagram:**	RIGHT TURN INTO TRAFFIC
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	N	
Veh Act:	RIGHT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	20	44	
Gender:	M	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 152970079	**Date:** 10/23/2015	**Time:** 1448	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.293	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	INTERSECTION-RELATED
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	WET	**Diagram:**	REAR END
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	RAIN	**Reliability:**	LESS CONFIDENT
Weather 2:	CLOUDY	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	20	26	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	FOLLOWING TOO CLOSELY	
Cont Fact	NO IMPROPER DRIVING	DEFECTIVE TIRE	

Crash ID: 153000180	**Date:** 10/27/2015	**Time:** 1809	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.238	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	4_6 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	WET	**Diagram:**	REAR END
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	RAIN	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	S
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	STRAIGHT AHEAD
Veh Type:	PASSENGER CAR	PASSENGER CAR	PASSENGER CAR
Age:	34	49	21
Gender:	M	F	F
Cond:	NORMAL	NORMAL	NORMAL
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	WEATHER
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	SKIDDING

Crash ID: 153100080 **Date:** 10/02/2015 **Time:** 1240 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: PROPERTY DAMAGE
Road Type: NOT SPECIFIED
Road Char: NOT SPECIFIED
Crash Type: COLL OTHER TYPE
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLEAR
Weather 2: NOT SPECIFIED
First Event: NOT SPECIFIED
To Junction: NOT SPECIFIED
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 30
Diagram: REAR END
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	E	
Veh Act:	STOPPED TRAFFIC	START TRAFFIC	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	61		
Gender:	F	NULL	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 153320055 **Date:** 10/28/2015 **Time:** 1125 **Sys:** 04-CSAH
County: BLUE EARTH **City:** MANKATO **Route:** 07000082 001+00.238

Severity: POSSIBLE INJURY
Road Type: 4_6 LANES UNDIV 2_WAY
Road Char: STRAIGHT AND LEVEL
Crash Type: COLL W/MV IN TRANSPORT
Surf Cond: DRY
Light Cond: DAYLIGHT
Weather 1: CLOUDY
Weather 2: NOT SPECIFIED
First Event: ON ROADWAY
To Junction: 4-LEGGED INTERSECTION
Traffic Device: TRAFFIC SIGNALS
Speed Limit: 40
Diagram: RIGHT ANGLE
Officer:
Reliability: CONFIDENT
# of Vehicles: 2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	S	
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	64	24	
Gender:	M	M	
Cond:	NORMAL	NORMAL	
Cont Fact	DISREGARD TRAFFIC DEVICE	NO IMPROPER DRIVING	
Cont Fact	FAIL TO YIELD ROW	NOT SPECIFIED	

Crash ID: 160130030	**Date:** 12/11/2015	**Time:** 1730	**Sys:** 04-CSAH		
County: BLUE EARTH	**City:** MANKATO		**Route:** 07000082	001+00.239	

Severity:	PROPERTY DAMAGE	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	TRAFFIC SIGNALS
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	DRY	**Diagram:**	REAR END
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	SE	S
Veh Act:	STOPPED TRAFFIC	STRAIGHT AHEAD	SLOWING TRAFFIC
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	SPORT UNTILITY VEHICLE
Age:	19	22	21
Gender:	F	F	F
Cond:	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED

Crash ID: 160190014	**Date:** 12/15/2015	**Time:** 0749	**Sys:** 05-MSAS		
County: BLUE EARTH	**City:** MANKATO		**Route:** 24200109	001+00.671	

Severity:	PROPERTY DAMAGE	**First Event:**	NOT SPECIFIED
Road Type:	NOT SPECIFIED	**To Junction:**	NOT SPECIFIED
Road Char:	NOT SPECIFIED	**Traffic Device:**	STOP SIGN 4-WAY
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	RIGHT ANGLE
Light Cond:	SUNRISE	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	BEST GUESS
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	SE	SE	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	19	35	
Gender:	F	F	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Selection Filter:

WORK AREA: COUNTY_CODE('07') - FILTER: CRASH_YEAR('2011','2012','2013','2014','2015') - SPATIAL FILTER APPLIED

Analyst:

Luke James

Notes:

Existing Year 2018 Warrants Analysis

Traffic Signal Control with Existing Conditions

WARRANTS ANALYSIS

Existing Conditions Year 2018

Victory Drive at Hoffman Road
Intersection Control Evaluation
City of Mankato, Blue Earth County

Background Information

Location :	City of Mankato, Blue Earth County
Date:	10/18/2018
Analysis Prepared By:	Luke James
Population Less than 10,000:	No
Seventy Percent Factor Used:	No

Speed (mph)	Lanes	Approach	
40	2 or more	Major Approach 1:	Northbound Victory Drive
40	2 or more	Major Approach 3:	Southbound Victory Drive
30	2 or more	Minor Approach 2:	Eastbound Hoffman Road
30	2 or more	Minor Approach 4:	Westbound Hoffman Road

Warrants Analysis: Warrants 1A, 1B and 1C

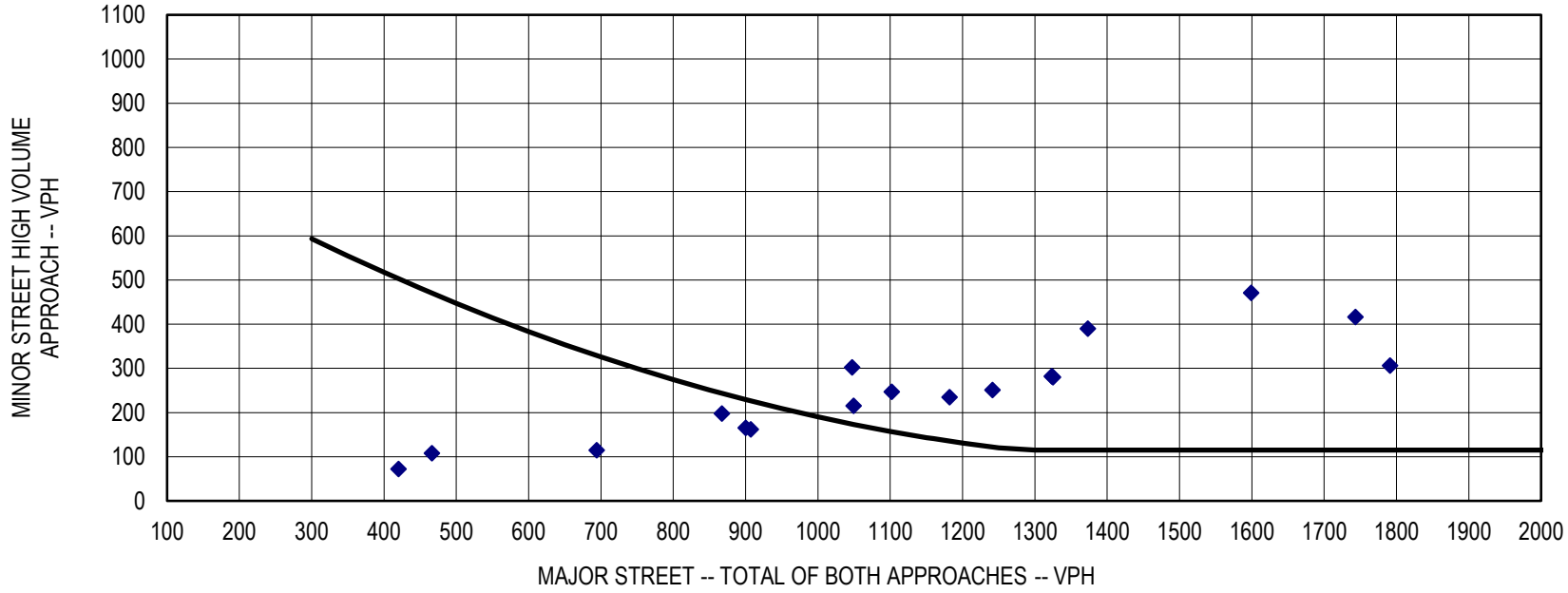
Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 200	Warrant Met 100	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	299	167	466			89	108	108		X					X	
7 - 8 AM	869	504	1373	X	X	223	390	390	X	X	X	X	X	X	X	X
8 - 9 AM	593	454	1047	X	X	141	302	302	X	X	X	X	X	X	X	X
9 - 10 AM	466	401	867	X		122	198	198		X			X	X	X	X
10 - 11 AM	493	407	900	X	X	146	165	165		X		X	X	X	X	X
11 - 12 AM	536	566	1102	X	X	171	247	247	X	X	X	X	X	X	X	X
12 - 1 PM	616	625	1241	X	X	196	251	251	X	X	X	X	X	X	X	X
1 - 2 PM	573	609	1182	X	X	200	235	235	X	X	X	X	X	X	X	X
2 - 3 PM	666	659	1325	X	X	238	280	280	X	X	X	X	X	X	X	X
3 - 4 PM	823	776	1599	X	X	237	471	471	X	X	X	X	X	X	X	X
4 - 5 PM	892	899	1791	X	X	268	306	306	X	X	X	X	X	X	X	X
5 - 6 PM	755	988	1743	X	X	261	416	416	X	X	X	X	X	X	X	X
6 - 7 PM	587	736	1323	X	X	186	282	282	X	X	X	X	X	X	X	X
7 - 8 PM	415	634	1049	X	X	150	215	215	X	X	X	X	X	X	X	X
8 - 9 PM	335	572	907	X	X	111	162	162		X		X	X	X	X	X
9 - 10 PM	252	442	694	X		83	115	115		X					X	
10 - 11 PM	145	275	420			48	72	72							X	
											11	13	14	14	14	

Warrant Summary

Warrant and Description		Hours Met	Hours Required	Met/Not Met
Warrant 1A:	Minimum Vehicular Volume	11	8	Met - Warrant 1A Satisfied
Warrant 1B:	Interruption of Continuous Traffic	13	8	Met - Warrant 1B Satisfied
Warrant 1C:	Combination of Warrants	14	8	Met - Warrant 1C Satisfied
Warrant 2:	Four-Hour Vehicular Volume	11	4	Met - Warrant 2 Satisfied
Warrant 3B:	Peak Hour	6	1	Met - Warrant 3B Satisfied

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

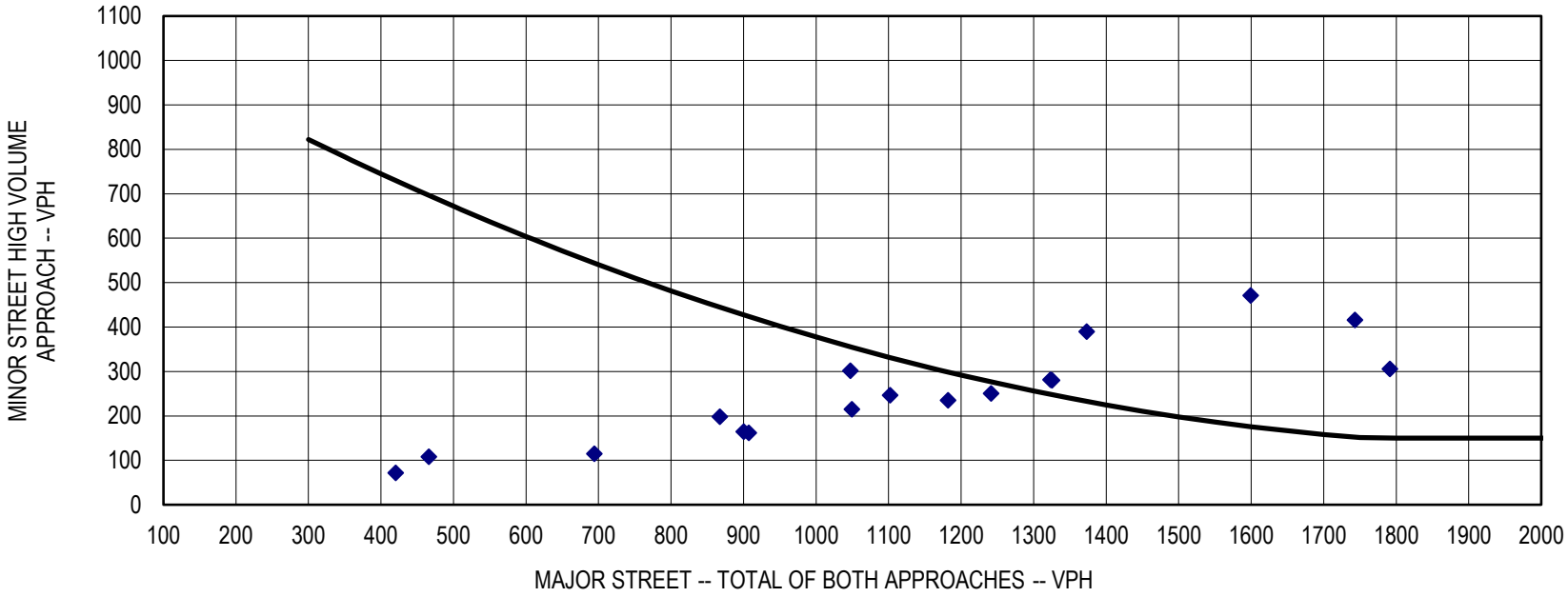


Number of Hours Satisfying Requirements:	11

Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Warrants Analysis: Warrant 3

WARRANT 3 - PEAK HOUR



Number of Hours Satisfying Requirements:	6

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Existing Year 2018 Warrants Analysis

Traffic Signal Control with Geometric Improvements

WARRANTS ANALYSIS

Geometric Improvements Year 2018

Victory Drive at Hoffman Road
Intersection Control Evaluation
City of Mankato, Blue Earth County

Background Information

		Speed (mph)	Lanes	Approach	
Location :	City of Mankato, Blue Earth County	40	2 or more	Major Approach 1:	Northbound Victory Drive
Date:	10/18/2018	40	2 or more	Major Approach 3:	Southbound Victory Drive
Analysis Prepared By:	Luke James	30	2 or more	Minor Approach 2:	Eastbound Hoffman Road
Population Less than 10,000:	No	30	2 or more	Minor Approach 4:	Westbound Hoffman Road
Seventy Percent Factor Used:	No	30	2 or more		

Warrants Analysis: Warrants 1A, 1B, and 1C

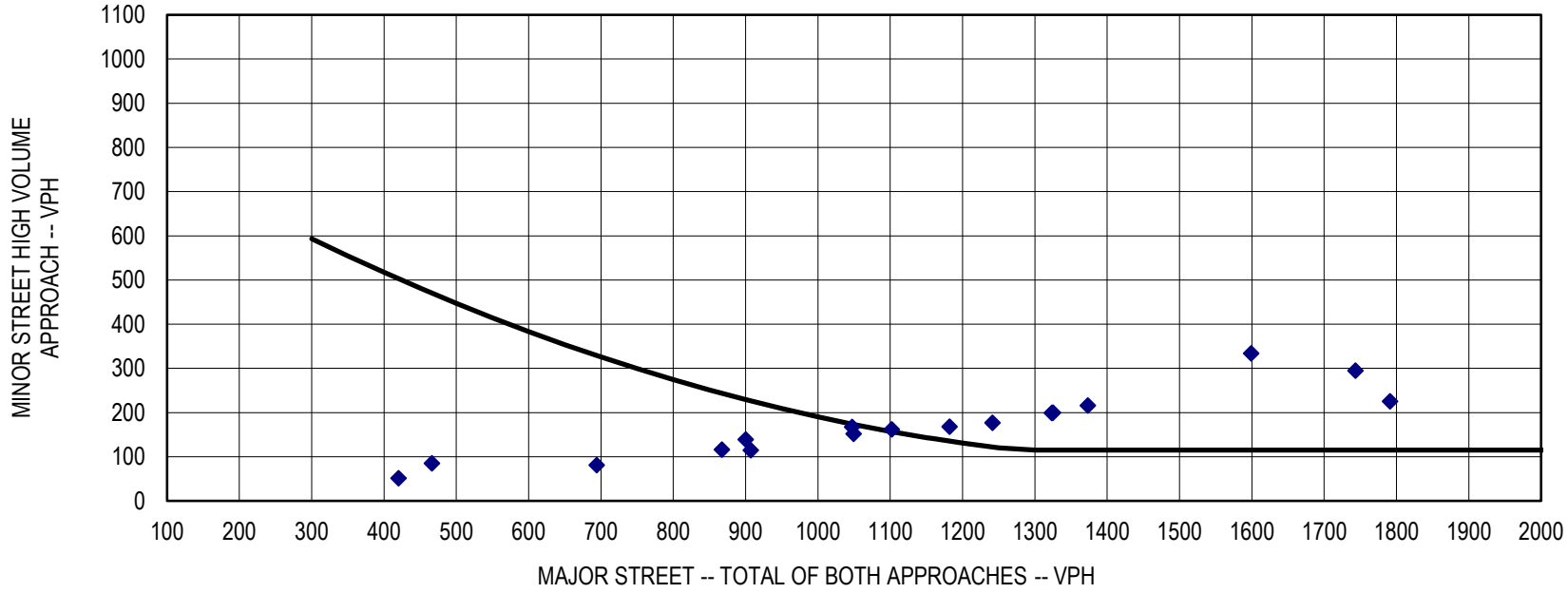
Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 200	Warrant Met 100	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	299	167	466			85	60	85							X	
7 - 8 AM	869	504	1373	X	X	212	216	216	X	X	X	X	X	X	X	X
8 - 9 AM	593	454	1047	X	X	134	167	167		X		X	X	X	X	X
9 - 10 AM	466	401	867	X		116	110	116		X				X	X	X
10 - 11 AM	493	407	900	X	X	139	92	139		X		X		X	X	X
11 - 12 AM	536	566	1102	X	X	162	137	162		X		X	X	X	X	X
12 - 1 PM	616	625	1241	X	X	165	177	177		X		X	X	X	X	X
1 - 2 PM	573	609	1182	X	X	168	166	168		X		X	X	X	X	X
2 - 3 PM	666	659	1325	X	X	200	198	200	X	X	X	X	X	X	X	X
3 - 4 PM	823	776	1599	X	X	199	334	334	X	X	X	X	X	X	X	X
4 - 5 PM	892	899	1791	X	X	225	216	225	X	X	X	X	X	X	X	X
5 - 6 PM	755	988	1743	X	X	219	295	295	X	X	X	X	X	X	X	X
6 - 7 PM	587	736	1323	X	X	156	199	199		X		X	X	X	X	X
7 - 8 PM	415	634	1049	X	X	126	152	152		X		X		X	X	X
8 - 9 PM	335	572	907	X	X	93	115	115		X		X		X	X	X
9 - 10 PM	252	442	694	X		69	81	81							X	
10 - 11 PM	145	275	420			40	51	51							X	
											5	13	10	14	14	

Warrant Summary

Warrant and Description		Hours Met	Hours Required	Met/Not Met
Warrant 1A:	Minimum Vehicular Volume	5	8	Not Met
Warrant 1B:	Interruption of Continuous Traffic	13	8	Met - Warrant 1B Satisfied
Warrant 1C:	Combination of Warrants	10	8	Met - Warrant 1C Satisfied
Warrant 2:	Four-Hour Vehicular Volume	9	4	Met - Warrant 2 Satisfied
Warrant 3B:	Peak Hour	3	1	Met - Warrant 3B Satisfied

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



Number of Hours Satisfying Requirements:	9

Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

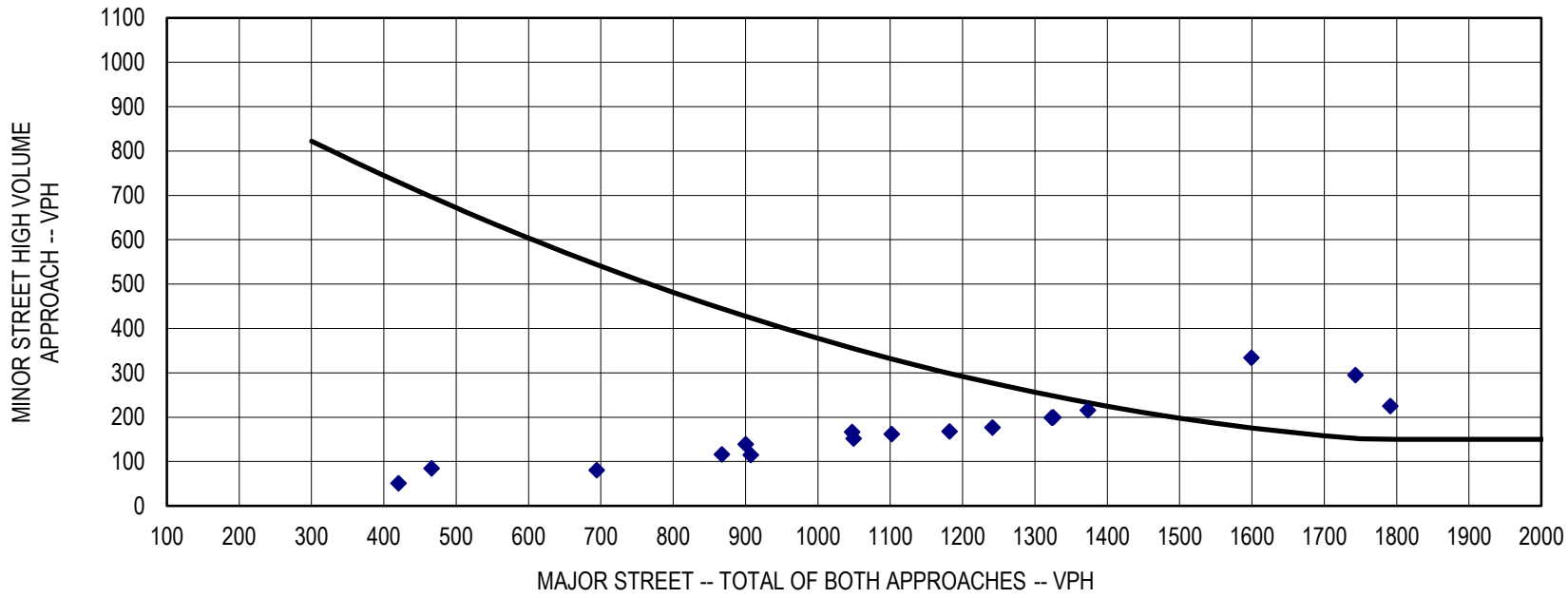
SRF Consulting Group, Inc.

WARRANTS ANALYSIS

Geometric Improvements Year 2018

Victory Drive at Hoffman Road
Intersection Control Evaluation
City of Mankato, Blue Earth County

Warrants Analysis: Warrant 3



Number of Hours Satisfying Requirements:	3

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Forecasted Year 2038 Warrants Analysis

Traffic Signal Control with Existing Conditions

WARRANTS ANALYSIS

Exsting Conditions Forecasted Year 2038

Victory Drive at Hoffman Road
Intersection Control Evaluation
City of Mankato, Blue Earth County

Background Information

		Speed (mph)	Lanes	Approach	
Location :	City of Mankato, Blue Earth County	40	2 or more	Major Approach 1:	Northbound Victory Drive
Date:	10/18/2018	40	2 or more	Major Approach 3:	Southbound Victory Drive
Analysis Prepared By:	Luke James	30	2 or more	Minor Approach 2:	Eastbound Hoffman Road
Population Less than 10,000:	No	30	2 or more	Minor Approach 4:	Westbound Hoffman Road
Seventy Percent Factor Used:	No	30	2 or more		

Warrants Analysis: Warrants 1A, 1B, and 1C

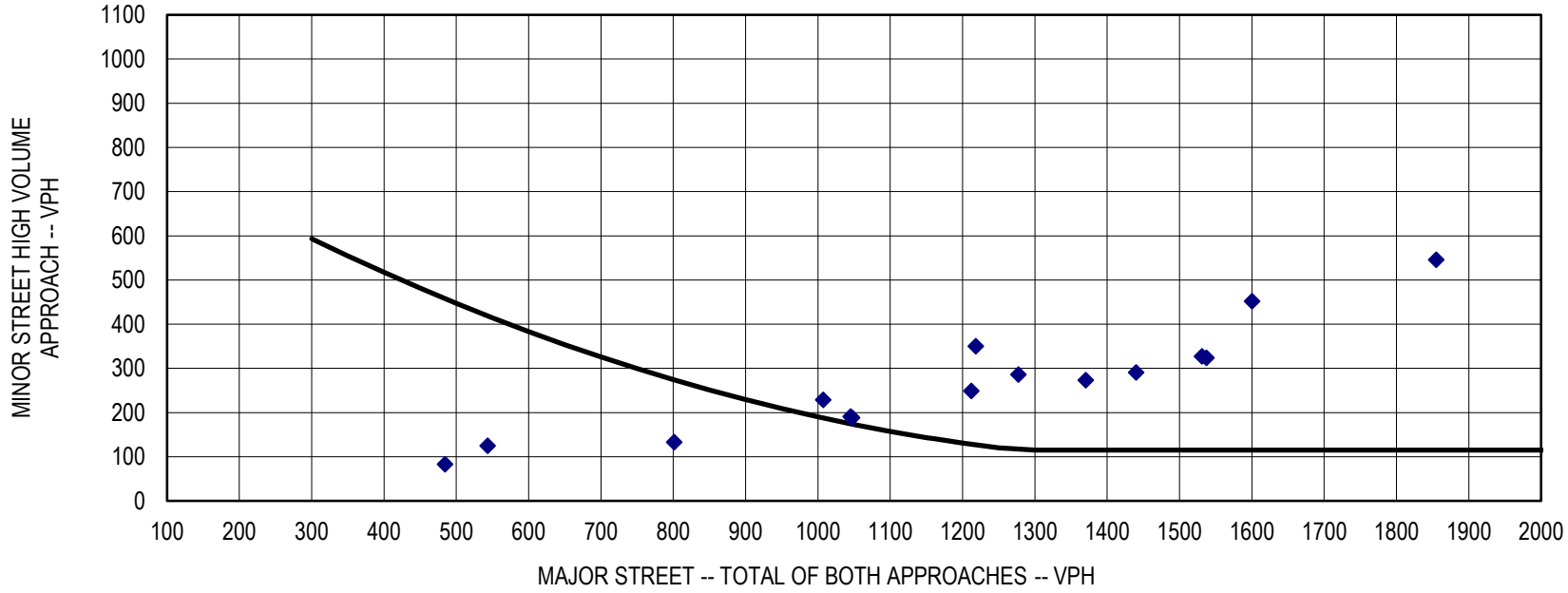
Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 200	Warrant Met 100	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	353	190	543			107	125	125		X					X	X
7 - 8 AM	1025	575	1600	X	X	267	452	452	X	X	X	X	X	X	X	X
8 - 9 AM	700	518	1218	X	X	169	350	350	X	X	X	X	X	X	X	X
9 - 10 AM	550	457	1007	X	X	146	229	229	X	X	X	X	X	X	X	X
10 - 11 AM	582	463	1045	X	X	175	191	191		X		X	X	X	X	X
11 - 12 AM	632	645	1277	X	X	205	286	286	X	X	X	X	X	X	X	X
12 - 1 PM	727	713	1440	X	X	235	291	291	X	X	X	X	X	X	X	X
1 - 2 PM	676	694	1370	X	X	240	273	273	X	X	X	X	X	X	X	X
2 - 3 PM	786	751	1537	X	X	286	324	324	X	X	X	X	X	X	X	X
3 - 4 PM	971	884	1855	X	X	284	546	546	X	X	X	X	X	X	X	X
4 - 5 PM	1052	1024	2076	X	X	322	354	354	X	X	X	X	X	X	X	X
5 - 6 PM	891	1126	2017	X	X	313	483	483	X	X	X	X	X	X	X	X
6 - 7 PM	693	838	1531	X	X	223	327	327	X	X	X	X	X	X	X	X
7 - 8 PM	489	723	1212	X	X	180	249	249	X	X	X	X	X	X	X	X
8 - 9 PM	395	652	1047	X	X	133	188	188		X		X	X	X	X	X
9 - 10 PM	297	504	801	X		99	133	133		X				X	X	X
10 - 11 PM	171	313	484			58	83	83							X	
											12	14	14	15	16	

Warrant Summary

Warrant and Description		Hours Met	Hours Required	Met/Not Met
Warrant 1A:	Minimum Vehicular Volume	12	8	Met - Warrant 1A Satisfied
Warrant 1B:	Interruption of Continuous Traffic	14	8	Met - Warrant 1B Satisfied
Warrant 1C:	Combination of Warrants	14	8	Met - Warrant 1C Satisfied
Warrant 2:	Four-Hour Vehicular Volume	14	4	Met - Warrant 2 Satisfied
Warrant 3B:	Peak Hour	10	1	Met - Warrant 3B Satisfied

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

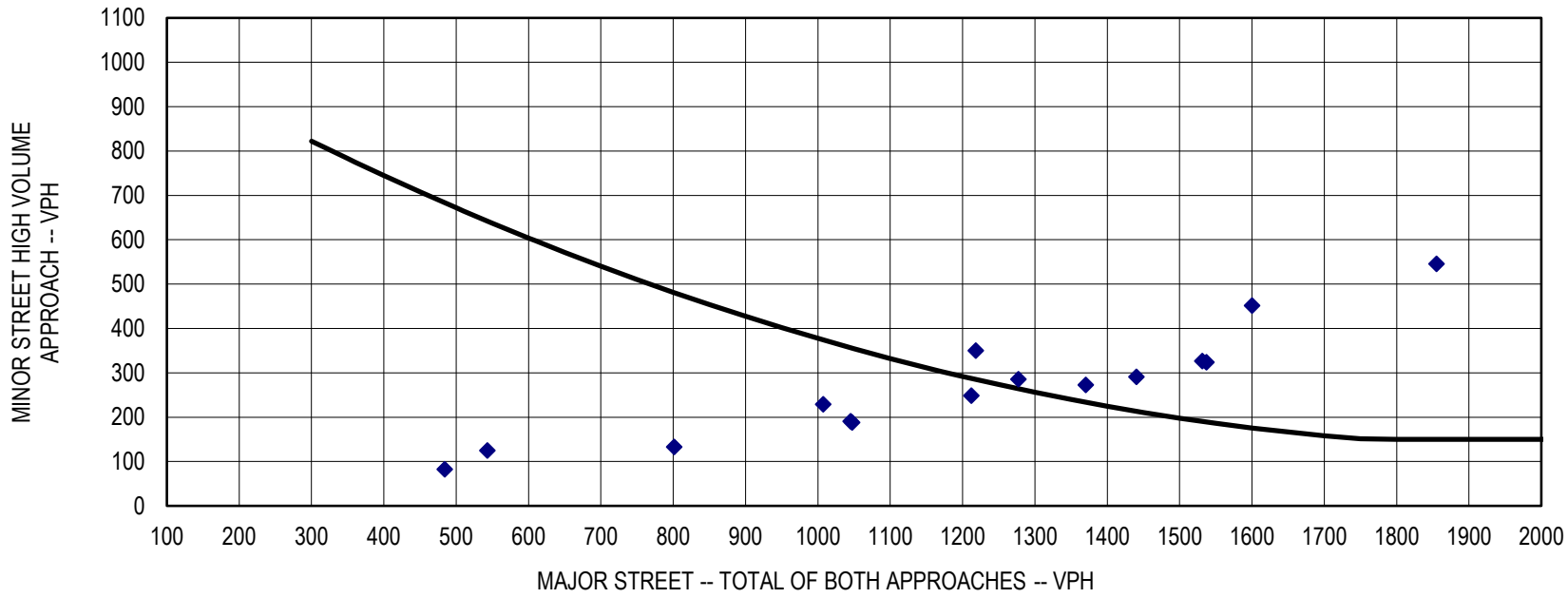


Number of Hours Satisfying Requirements:	14

Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Warrants Analysis: Warrant 3

WARRANT 3 - PEAK HOUR



Number of Hours Satisfying Requirements:	10

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Forecasted Year 2038 Warrants Analysis

Traffic Signal Control with Geometric Improvements

SRF Consulting Group, Inc.

WARRANTS ANALYSIS

Geometric Improvements Forecasted Year 2038

Victory Drive at Hoffman Road
Intersection Control Evaluation
City of Mankato, Blue Earth County

Background Information

		Speed (mph)	Lanes	Approach	
Location :	City of Mankato, Blue Earth County	40	2 or more	Major Approach 1:	Northbound Victory Drive
Date:	10/18/2018	40	2 or more	Major Approach 3:	Southbound Victory Drive
Analysis Prepared By:	Luke James	30	2 or more	Minor Approach 2:	Eastbound Hoffman Road
Population Less than 10,000:	No	30	2 or more	Minor Approach 4:	Westbound Hoffman Road
Seventy Percent Factor Used:	No	30	2 or more		

Warrants Analysis: Warrants 1A, 1B, and 1C

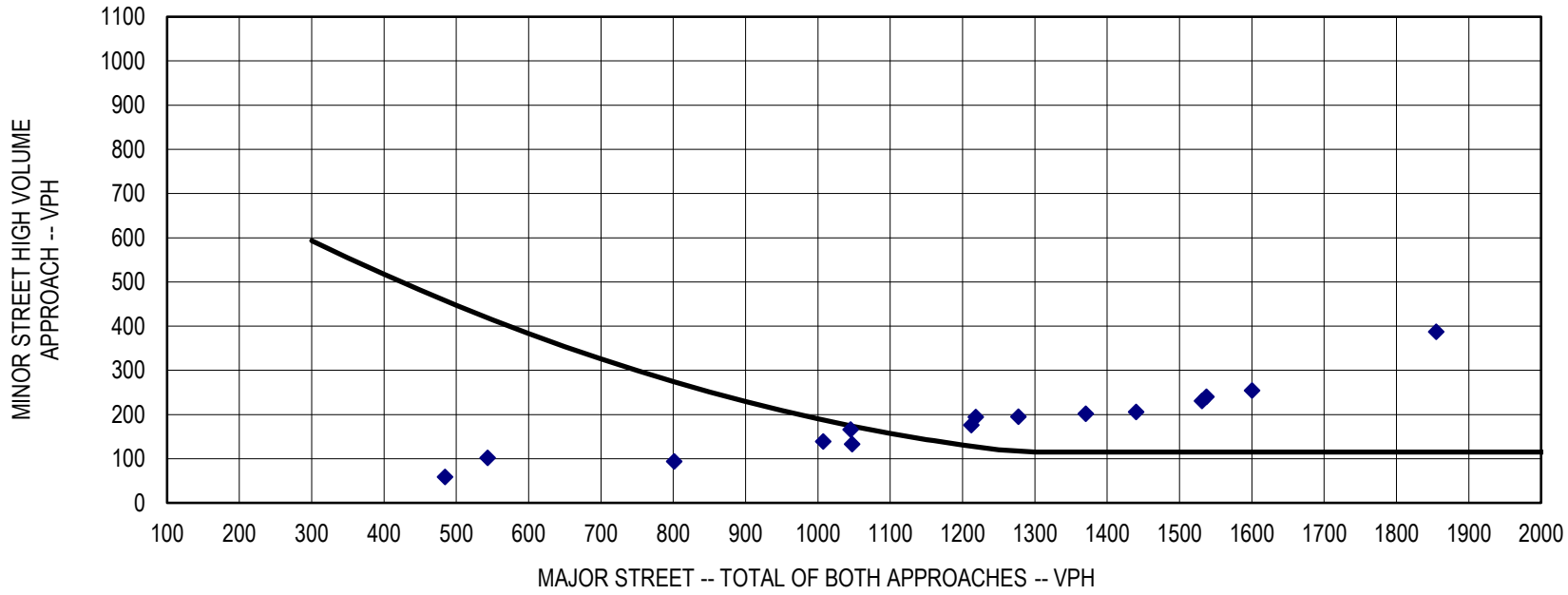
Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 200	Warrant Met 100	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	353	190	543			102	70	102		X					X	
7 - 8 AM	1025	575	1600	X	X	254	251	254	X	X	X	X	X	X	X	X
8 - 9 AM	700	518	1218	X	X	161	194	194		X		X	X	X	X	X
9 - 10 AM	550	457	1007	X	X	139	127	139		X		X		X	X	X
10 - 11 AM	582	463	1045	X	X	166	106	166		X		X	X	X	X	X
11 - 12 AM	632	645	1277	X	X	195	159	195		X		X	X	X	X	X
12 - 1 PM	727	713	1440	X	X	198	206	206	X	X	X	X	X	X	X	X
1 - 2 PM	676	694	1370	X	X	202	193	202	X	X	X	X	X	X	X	X
2 - 3 PM	786	751	1537	X	X	240	230	240	X	X	X	X	X	X	X	X
3 - 4 PM	971	884	1855	X	X	239	387	387	X	X	X	X	X	X	X	X
4 - 5 PM	1052	1024	2076	X	X	270	251	270	X	X	X	X	X	X	X	X
5 - 6 PM	891	1126	2017	X	X	263	342	342	X	X	X	X	X	X	X	X
6 - 7 PM	693	838	1531	X	X	188	231	231	X	X	X	X	X	X	X	X
7 - 8 PM	489	723	1212	X	X	151	176	176		X		X	X	X	X	X
8 - 9 PM	395	652	1047	X	X	112	133	133		X		X		X	X	X
9 - 10 PM	297	504	801	X		83	94	94						X	X	
10 - 11 PM	171	313	484			48	59	59							X	
											8	14	12	15	14	

Warrant Summary

Warrant and Description		Hours Met	Hours Required	Met/Not Met
Warrant 1A:	Minimum Vehicular Volume	8	8	Met - Warrant 1A Satisfied
Warrant 1B:	Interruption of Continuous Traffic	14	8	Met - Warrant 1B Satisfied
Warrant 1C:	Combination of Warrants	12	8	Met - Warrant 1C Satisfied
Warrant 2:	Four-Hour Vehicular Volume	11	4	Met - Warrant 2 Satisfied
Warrant 3B:	Peak Hour	6	1	Met - Warrant 3B Satisfied

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

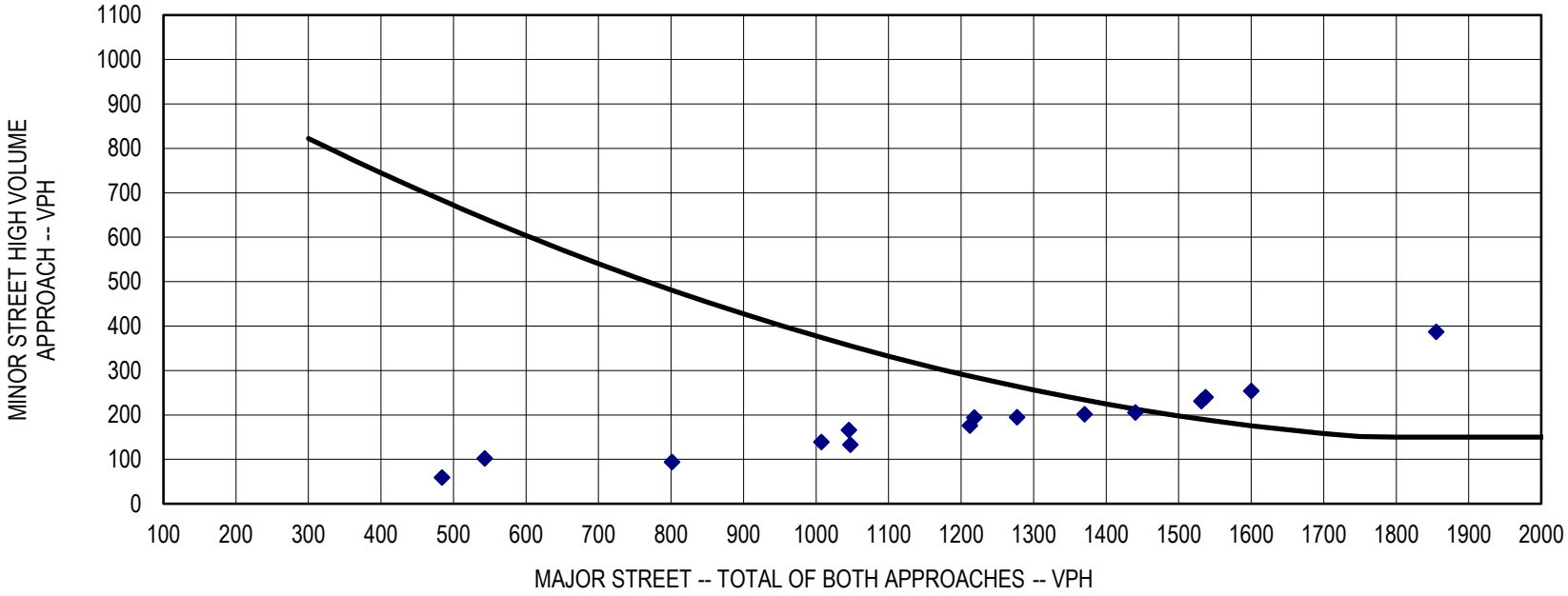


Number of Hours Satisfying Requirements:	11

Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Warrants Analysis: Warrant 3

WARRANT 3 - PEAK HOUR



Number of Hours Satisfying Requirements:	6

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Existing Year 2018 Detailed Operational Analysis

Traffic Signal Control with Existing Conditions

1: Victory Drive & Hoffman Road Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.1	0.0	0.1	0.2	0.4
Denied Del/Veh (s)	1.0	0.3	0.4	1.1	0.6
Total Delay (hr)	1.2	2.9	5.8	2.5	12.4
Total Del/Veh (s)	17.4	20.9	24.5	16.2	20.7
Stop Delay (hr)	1.0	2.3	4.1	1.9	9.3
Stop Del/Veh (s)	14.3	16.7	17.5	12.2	15.6
Total Stops	153	370	608	351	1482
Stop/Veh	0.63	0.73	0.72	0.63	0.69

Intersection: 1: Victory Drive & Hoffman Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	128	145	151	340	91	338	318	150	163	151
Average Queue (ft)	36	68	64	142	37	163	143	69	73	49
95th Queue (ft)	86	122	122	261	77	288	276	124	133	113
Link Distance (ft)		952	949	949		952	952		959	959
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	450				375			450		
Storage Blk Time (%)						0				
Queuing Penalty (veh)						0				

1: Victory Drive & Hoffman Road Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.1	0.0	0.1	0.2	0.3
Denied Del/Veh (s)	1.3	0.2	0.3	0.6	0.5
Total Delay (hr)	1.2	1.9	3.7	4.0	10.8
Total Del/Veh (s)	15.8	17.4	17.8	14.0	15.9
Stop Delay (hr)	1.0	1.5	2.5	2.6	7.5
Stop Del/Veh (s)	13.0	14.2	11.8	8.9	11.1
Total Stops	174	269	460	570	1473
Stop/Veh	0.64	0.70	0.61	0.55	0.60

Intersection: 1: Victory Drive & Hoffman Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	111	112	134	198	55	223	196	98	236	227
Average Queue (ft)	47	59	64	83	17	131	98	53	117	97
95th Queue (ft)	88	101	117	151	44	197	175	90	198	178
Link Distance (ft)		952	949	949		952	952		959	959
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	450				375			450		
Storage Blk Time (%)										
Queuing Penalty (veh)										

Existing Year 2018 Detailed Operational Analysis

Traffic Signal Control with Geometric Improvements

1: Victory Drive & Hoffman Road Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.1	0.1	0.2	0.2	0.6
Denied Del/Veh (s)	1.2	1.0	0.9	1.3	1.0
Total Delay (hr)	1.6	2.3	4.5	2.7	11.1
Total Del/Veh (s)	23.4	16.0	18.9	17.6	18.4
Stop Delay (hr)	1.4	1.9	3.1	2.1	8.5
Stop Del/Veh (s)	19.4	13.5	13.2	13.7	14.1
Total Stops	192	363	549	342	1446
Stop/Veh	0.76	0.71	0.64	0.62	0.67

Intersection: 1: Victory Drive & Hoffman Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	88	191	82	127	164	141	87	269	230	108	192	170
Average Queue (ft)	27	91	7	58	80	51	32	138	96	31	76	67
95th Queue (ft)	66	164	42	102	139	94	68	225	192	73	148	132
Link Distance (ft)		944			942	942		952	952			948
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	450		50	150			375			200	450	
Storage Blk Time (%)		32		0	0				0			
Queuing Penalty (veh)		20		0	1				1			

Intersection: 1: Victory Drive & Hoffman Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	123	40
Average Queue (ft)	39	10
95th Queue (ft)	89	29
Link Distance (ft)	948	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)		
Queuing Penalty (veh)		

1: Victory Drive & Hoffman Road Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.1	0.1	0.1	0.2	0.7
Denied Del/Veh (s)	2.0	1.4	0.6	0.8	1.0
Total Delay (hr)	1.6	2.0	4.0	4.1	11.7
Total Del/Veh (s)	21.5	18.6	18.7	14.4	17.2
Stop Delay (hr)	1.4	1.7	2.7	2.8	8.6
Stop Del/Veh (s)	18.3	16.0	12.8	9.7	12.6
Total Stops	209	296	485	559	1549
Stop/Veh	0.77	0.78	0.63	0.54	0.63

Intersection: 1: Victory Drive & Hoffman Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	87	197	103	131	142	66	63	223	201	49	138	208
Average Queue (ft)	39	74	21	63	67	33	18	135	89	18	58	119
95th Queue (ft)	75	145	62	111	124	59	43	205	171	40	99	192
Link Distance (ft)		944			942	942		952	952			948
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	450		50	150			375			200	450	
Storage Blk Time (%)		24	0	0	0				0			
Queuing Penalty (veh)		29	1	1	0				0			

Intersection: 1: Victory Drive & Hoffman Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	191	53
Average Queue (ft)	94	19
95th Queue (ft)	170	42
Link Distance (ft)	948	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Existing Year 2018 Detailed Operational Analysis

Roundabout Control

HCS7 Roundabouts Report

General Information

Analyst	Luke James
Agency or Co.	SRF Consulting Group, Inc.
Date Performed	11/5/2018
Analysis Year	2018
Time Analyzed	A.M. Peak
Project Description	11876

Site Information

Intersection	Victory Drive at Hoffman Road
E/W Street Name	Hoffman Road
N/S Street Name	Victory Drive
Analysis Time Period (hrs)	0.25
Peak Hour Factor	1.00
Jurisdiction	MAPO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	1	0	0	2	0	0	0	2	0
Lane Assignment			LTR		LT		R		LT		T		LT		TR	
Volume (V), veh/h	0	50	190	10	0	110	160	215	0	80	635	145	0	160	350	40
Percent Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Flow Rate (v_{PCE}), pc/h	0	52	198	10	0	114	166	224	0	83	660	151	0	166	364	42
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276		4.6453	4.3276		4.5436	4.5436	4.9763	4.5436	4.5436	
Follow-Up Headway (s)		2.5352		2.6667	2.5352		2.5352	2.5352	2.6087	2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		260.00		280.00	224.00		349.21	393.79	151.00	268.84	303.16	
Entry Volume veh/h		250.00		269.23	215.38		335.78	378.64	145.19	258.50	291.50	
Circulating Flow (v_c), pc/h	644			795			416			363		
Exiting Flow (v_{ex}), pc/h	364			291			936			488		
Capacity (c_{pce}), pc/h		821.41		649.67	722.46		972.49	972.49	952.00	1020.54	1020.54	
Capacity (c), veh/h		789.81		624.68	694.68		935.08	935.08	915.38	981.29	981.29	
v/c Ratio (x)		0.32		0.43	0.31		0.36	0.40	0.16	0.26	0.30	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		8.2		12.2	9.0		7.8	8.5	5.5	6.3	6.7	
Lane LOS		A		B	A		A	A	A	A	A	
95% Queue, veh		1.4		2.2	1.3		1.6	2.0	0.6	1.1	1.2	
Approach Delay, s/veh	8.2			10.8			7.7			6.5		
Approach LOS	A			B			A			A		
Intersection Delay, s/veh | LOS	8.2						A					

HCS7 Roundabouts Report

General Information

Analyst	Luke James
Agency or Co.	SRF Consulting Group, Inc.
Date Performed	11/5/2018
Analysis Year	2018
Time Analyzed	P.M. Peak
Project Description	11876

Site Information

Intersection	Victory Drive at Hoffman Road
E/W Street Name	Hoffman Road
N/S Street Name	Victory Drive
Analysis Time Period (hrs)	0.25
Peak Hour Factor	1.00
Jurisdiction	MAPO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	1	0	0	2	0	0	0	2	0
Lane Assignment			LTR		LT		R		LT		T		LT		TR	
Volume (V), veh/h	0	80	140	40	0	130	140	110	0	30	645	85	0	155	760	90
Percent Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flow Rate (v_{PCE}), pc/h	0	81	141	40	0	131	141	111	0	30	651	86	0	157	768	91
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276		4.6453	4.3276		4.5436	4.5436	4.9763	4.5436	4.5436	
Follow-Up Headway (s)		2.5352		2.6667	2.5352		2.5352	2.5352	2.6087	2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		262.00		272.00	111.00		320.07	360.93	86.00	477.52	538.48	
Entry Volume veh/h		259.41		269.31	109.90		316.90	357.36	85.15	472.79	533.15	
Circulating Flow (v_c), pc/h	1056			762			379			302		
Exiting Flow (v_{ex}), pc/h	298			262			843			939		
Capacity (c_{pce}), pc/h		578.72		669.69	743.02		1005.79	1005.79	1018.29	1078.79	1078.79	
Capacity (c), veh/h		572.99		663.06	735.66		995.83	995.83	1008.21	1068.11	1068.11	
v/c Ratio (x)		0.45		0.41	0.15		0.32	0.36	0.08	0.44	0.50	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		13.6		11.1	6.5		6.9	7.4	4.3	8.2	9.2	
Lane LOS		B		B	A		A	A	A	A	A	
95% Queue, veh		2.3		2.0	0.5		1.4	1.6	0.3	2.3	2.9	
Approach Delay, s/veh	13.6			9.8			6.8			8.7		
Approach LOS	B			A			A			A		
Intersection Delay, s/veh | LOS	8.8						A					

HCS7 Roundabouts Report

General Information

Analyst	Luke James
Agency or Co.	SRF Consulting Group, Inc.
Date Performed	11/5/2018
Analysis Year	2018
Time Analyzed	A.M. Peak
Project Description	11876

Site Information

Intersection	Victory Drive at Hoffman Road
E/W Street Name	Hoffman Road
N/S Street Name	Victory Drive
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.75
Jurisdiction	MAPO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	1	0	0	2	0	0	0	2	0
Lane Assignment			LTR		LT		R		LT		T		LT		TR	
Volume (V), veh/h	0	50	190	10	0	110	160	215	0	80	635	145	0	160	350	40
Percent Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Flow Rate (v_{PCE}), pc/h	0	69	263	14	0	153	222	298	0	111	881	201	0	222	485	55
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276		4.6453	4.3276		4.5436	4.5436	4.9763	4.5436	4.5436	
Follow-Up Headway (s)		2.5352		2.6667	2.5352		2.5352	2.5352	2.6087	2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		346.00		375.00	298.00		466.24	525.76	201.00	358.14	403.86	
Entry Volume veh/h		332.69		360.58	286.54		448.31	505.54	193.27	344.37	388.33	
Circulating Flow (v_c), pc/h	860			1061			554			486		
Exiting Flow (v_{ex}), pc/h	485			388			1248			652		
Capacity (c_{pce}), pc/h		683.63		508.64	576.26		857.72	857.72	841.46	912.47	912.47	
Capacity (c), veh/h		657.34		489.08	554.10		824.73	824.73	809.10	877.38	877.38	
v/c Ratio (x)		0.51		0.74	0.52		0.54	0.61	0.24	0.39	0.44	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		13.5		29.0	15.8		12.2	14.1	7.0	8.7	9.5	
Lane LOS		B		D	C		B	B	A	A	A	
95% Queue, veh		2.9		6.1	3.0		3.3	4.3	0.9	1.9	2.3	
Approach Delay, s/veh	13.5			23.2			12.1			9.1		
Approach LOS	B			C			B			A		
Intersection Delay, s/veh | LOS	14.0						B					

HCS7 Roundabouts Report

General Information

Analyst	Luke James
Agency or Co.	SRF Consulting Group, Inc.
Date Performed	11/5/2018
Analysis Year	2018
Time Analyzed	P.M. Peak
Project Description	11876

Site Information

Intersection	Victory Drive at Hoffman Road
E/W Street Name	Hoffman Road
N/S Street Name	Victory Drive
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.96
Jurisdiction	MAPO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	1	0	0	2	0	0	0	2	0
Lane Assignment			LTR		LT		R		LT		T		LT		TR	
Volume (V), veh/h	0	80	140	40	0	130	140	110	0	30	645	85	0	155	760	90
Percent Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flow Rate (v_{PCE}), pc/h	0	84	147	42	0	137	147	116	0	32	679	89	0	163	800	95
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276		4.6453	4.3276		4.5436	4.5436	4.9763	4.5436	4.5436	
Follow-Up Headway (s)		2.5352		2.6667	2.5352		2.5352	2.5352	2.6087	2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		273.00		284.00	116.00		334.17	376.83	89.00	497.26	560.74	
Entry Volume veh/h		270.30		281.19	114.85		330.86	373.10	88.12	492.34	555.19	
Circulating Flow (v_c), pc/h	1100			795			394			316		
Exiting Flow (v_{ex}), pc/h	310			274			879			979		
Capacity (c_{pce}), pc/h		557.47		649.67	722.46		992.15	992.15	1005.90	1065.13	1065.13	
Capacity (c), veh/h		551.95		643.23	715.31		982.33	982.33	995.94	1054.59	1054.59	
v/c Ratio (x)		0.49		0.44	0.16		0.34	0.38	0.09	0.47	0.53	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		15.1		12.1	6.8		7.2	7.8	4.4	8.7	9.8	
Lane LOS		C		B	A		A	A	A	A	A	
95% Queue, veh		2.7		2.2	0.6		1.5	1.8	0.3	2.5	3.2	
Approach Delay, s/veh	15.1			10.5			7.2			9.3		
Approach LOS	C			B			A			A		
Intersection Delay, s/veh | LOS	9.4						A					

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	SB Victory Dr	350	0	24.00	2	28.00	2	110.00	75.00	35.00
2	EB Hoffman Rd	90	0	18.00	1	14.00	1	140.00	75.00	30.00
3	NB Victory Dr	190	0	24.00	2	24.00	2	145.00	85.00	30.00
4	WB Hoffman Rd	270	0	24.00	2	28.00	2	55.00	70.00	50.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	SB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
2	EB Hoffman Rd	170.00	28.00	2	15.00	1	20.00	1
3	NB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
4	WB Hoffman Rd	170.00	28.00	2	20.00	1	14.00	1

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	NB Victory Dr	Yield	145	24	2	14	1	38	3

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	NB Victory Dr	14	1	85	90	65.0000624	35	4	WB Hoffman Rd	1	2

Traffic Flow Data (veh/hr)

2018 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	SB Victory Dr	0	160	350	40	0	4.0	1.00	0.750
2	EB Hoffman Rd	0	50	190	10	0	4.0	1.00	0.750
3	NB Victory Dr	0	80	635	0	145	4.0	1.00	0.750
4	WB Hoffman Rd	0	110	160	215	0	4.0	1.00	0.750

Operational Results

2018 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	SB Victory Dr	None	733		466		1198	1867		0.3928	
2	EB Hoffman Rd	None	333		826		373	846		0.3942	
3	NB Victory Dr	Yield	953	193	532	532	626	1566	948	0.6087	0.2057
4	WB Hoffman Rd	None	647		1018		659	1484		0.4358	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	SB Victory Dr	None	3.63		3.63	2.19		A		A
2	EB Hoffman Rd	None	5.64		5.64	1.57		A		A
3	NB Victory Dr	Yield	4.96	4.21	4.84	3.96	0.67	A	A	A
4	WB Hoffman Rd	None	6.07		6.07	3.25		A		A

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	SB Victory Dr	350	0	24.00	2	28.00	2	110.00	75.00	35.00
2	EB Hoffman Rd	90	0	18.00	1	14.00	1	140.00	75.00	30.00
3	NB Victory Dr	190	0	24.00	2	24.00	2	145.00	85.00	30.00
4	WB Hoffman Rd	270	0	24.00	2	28.00	2	55.00	70.00	50.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	SB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
2	EB Hoffman Rd	170.00	28.00	2	15.00	1	20.00	1
3	NB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
4	WB Hoffman Rd	170.00	28.00	2	20.00	1	14.00	1

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	NB Victory Dr	Yield	85	24	2	14	1	38	3

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	NB Victory Dr	14	1	85	90	65.00006864	35	4	WB Hoffman Rd	1	2

Traffic Flow Data (veh/hr)

2018 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	SB Victory Dr	0	155	760	90	0	1.0	1.00	0.960
2	EB Hoffman Rd	0	80	140	40	0	1.0	1.00	0.960
3	NB Victory Dr	0	30	645	0	85	1.0	1.00	0.960
4	WB Hoffman Rd	0	130	140	110	0	1.0	1.00	0.960

Operational Results

2018 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	SB Victory Dr	None	1047		312		870	2150		0.4869	
2	EB Hoffman Rd	None	271		1088		271	809		0.3349	
3	NB Victory Dr	Yield	703	89	390	390	969	1815	1057	0.3873	0.0844
4	WB Hoffman Rd	None	396		786		396	1756		0.2255	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	SB Victory Dr	None	3.64		3.64	2.80		A		A
2	EB Hoffman Rd	None	6.32		6.32	1.28		A		A
3	NB Victory Dr	Yield	3.23	3.63	3.27	1.68	0.24	A	A	A
4	WB Hoffman Rd	None	3.86		3.86	1.14		A		A

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	SB Victory Dr	350	0	24.00	2	28.00	2	110.00	75.00	35.00
2	EB Hoffman Rd	90	0	18.00	1	14.00	1	140.00	75.00	30.00
3	NB Victory Dr	190	0	24.00	2	24.00	2	145.00	85.00	30.00
4	WB Hoffman Rd	270	0	24.00	2	28.00	2	55.00	70.00	50.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	SB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
2	EB Hoffman Rd	170.00	28.00	2	15.00	1	20.00	1
3	NB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
4	WB Hoffman Rd	170.00	28.00	2	20.00	1	14.00	1

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	NB Victory Dr	Yield	145	24	2	14	1	38	3

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	NB Victory Dr	14	1	85	90	65.00004992	35	4	WB Hoffman Rd	1	2

Traffic Flow Data (veh/hr)

2018 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	SB Victory Dr	0	160	350	40	0	4.0	1.00	0.750
2	EB Hoffman Rd	0	50	190	10	0	4.0	1.00	0.750
3	NB Victory Dr	0	80	635	0	145	4.0	1.00	0.750
4	WB Hoffman Rd	0	110	160	215	0	4.0	1.00	0.750

Operational Results

2018 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	SB Victory Dr	None	733		464		1193	1677		0.4372	
2	EB Hoffman Rd	None	333		824		371	655		0.5091	
3	NB Victory Dr	Yield	953	193	531	531	624	1377	750	0.6925	0.2607
4	WB Hoffman Rd	None	647		1014		657	1295		0.4992	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	SB Victory Dr	None	4.30		4.30	2.60		A		A
2	EB Hoffman Rd	None	8.55		8.55	2.42		A		A
3	NB Victory Dr	Yield	6.77	5.64	6.58	5.44	0.90	A	A	A
4	WB Hoffman Rd	None	7.61		7.61	4.11		A		A

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	SB Victory Dr	350	0	24.00	2	28.00	2	110.00	75.00	35.00
2	EB Hoffman Rd	90	0	18.00	1	14.00	1	140.00	75.00	30.00
3	NB Victory Dr	190	0	24.00	2	24.00	2	145.00	85.00	30.00
4	WB Hoffman Rd	270	0	24.00	2	28.00	2	55.00	70.00	50.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	SB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
2	EB Hoffman Rd	170.00	28.00	2	15.00	1	20.00	1
3	NB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
4	WB Hoffman Rd	170.00	28.00	2	20.00	1	14.00	1

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	NB Victory Dr	Yield	85	24	2	14	1	38	3

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	NB Victory Dr	14	1	85	90	65.00005408	35	4	WB Hoffman Rd	1	2

Traffic Flow Data (veh/hr)

2018 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	SB Victory Dr	0	155	760	90	0	1.0	1.00	0.960
2	EB Hoffman Rd	0	80	140	40	0	1.0	1.00	0.960
3	NB Victory Dr	0	30	645	0	85	1.0	1.00	0.960
4	WB Hoffman Rd	0	130	140	110	0	1.0	1.00	0.960

Operational Results

2018 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	SB Victory Dr	None	1047		312		870	1947		0.5377	
2	EB Hoffman Rd	None	271		1088		271	606		0.4471	
3	NB Victory Dr	Yield	703	89	390	390	968	1613	852	0.4360	0.1049
4	WB Hoffman Rd	None	396		786		396	1553		0.2549	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	SB Victory Dr	None	4.43		4.43	3.39		A		A
2	EB Hoffman Rd	None	9.93		9.93	2.02		A		A
3	NB Victory Dr	Yield	3.92	4.60	4.00	2.04	0.30	A	A	A
4	WB Hoffman Rd	None	4.52		4.52	1.33		A		A

Forecasted Year 2038 Detailed Operational Analysis

Traffic Signal Control with Existing Conditions

1: Victory Drive & Hoffman Road Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.1	0.1	0.1	0.2	0.5
Denied Del/Veh (s)	1.0	0.4	0.5	1.1	0.7
Total Delay (hr)	1.9	9.4	8.0	3.1	22.3
Total Del/Veh (s)	22.6	57.2	28.5	17.8	31.9
Stop Delay (hr)	1.6	8.3	5.7	2.4	17.9
Stop Del/Veh (s)	19.2	50.4	20.2	13.7	25.5
Total Stops	202	505	737	381	1825
Stop/Veh	0.68	0.86	0.73	0.61	0.72

Intersection: 1: Victory Drive & Hoffman Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	128	180	447	762	178	441	436	208	162	149
Average Queue (ft)	53	86	106	311	50	206	187	79	75	56
95th Queue (ft)	108	150	324	722	139	378	364	158	134	117
Link Distance (ft)		952	949	949		952	952		959	959
Upstream Blk Time (%)			0	1						
Queuing Penalty (veh)			0	0						
Storage Bay Dist (ft)	450				375			450		
Storage Blk Time (%)						2				
Queuing Penalty (veh)						3				

1: Victory Drive & Hoffman Road Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.1	0.0	0.1	0.2	0.4
Denied Del/Veh (s)	1.3	0.2	0.3	0.6	0.5
Total Delay (hr)	1.6	2.2	5.6	5.7	15.1
Total Del/Veh (s)	17.2	18.0	22.3	17.7	19.2
Stop Delay (hr)	1.3	1.8	3.8	3.7	10.7
Stop Del/Veh (s)	14.1	14.7	15.2	11.6	13.5
Total Stops	225	317	624	706	1872
Stop/Veh	0.68	0.71	0.69	0.61	0.66

Intersection: 1: Victory Drive & Hoffman Road

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	128	170	152	214	64	273	230	139	253	235
Average Queue (ft)	57	78	72	96	25	164	138	63	145	127
95th Queue (ft)	103	131	125	163	54	240	217	111	222	206
Link Distance (ft)		952	949	949		952	952		959	959
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	450				375			450		
Storage Blk Time (%)										
Queuing Penalty (veh)										

Forecasted Year 2038 Detailed Operational Analysis

Traffic Signal Control with Geometric Improvements

1: Victory Drive & Hoffman Road Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.1	0.2	0.2	0.2	0.7
Denied Del/Veh (s)	1.1	1.0	0.9	1.2	1.0
Total Delay (hr)	1.9	3.1	6.3	4.6	15.9
Total Del/Veh (s)	23.9	19.3	22.5	25.8	22.8
Stop Delay (hr)	1.6	2.7	4.5	3.8	12.5
Stop Del/Veh (s)	19.9	16.6	15.9	21.5	18.0
Total Stops	217	417	683	417	1734
Stop/Veh	0.74	0.72	0.68	0.65	0.69

Intersection: 1: Victory Drive & Hoffman Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	90	220	105	189	225	162	105	317	271	178	316	254
Average Queue (ft)	34	102	11	72	88	66	41	163	122	38	109	85
95th Queue (ft)	74	177	54	153	178	128	85	266	230	99	269	204
Link Distance (ft)		944			942	942		952	952			948
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	450		50	150			375			200	450	
Storage Blk Time (%)		37	0	4	1			0	2	0	1	
Queuing Penalty (veh)		28	0	10	2			0	4	0	3	

Intersection: 1: Victory Drive & Hoffman Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	239	48
Average Queue (ft)	58	11
95th Queue (ft)	156	36
Link Distance (ft)	948	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)		
Queuing Penalty (veh)		

1: Victory Drive & Hoffman Road Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.2	0.2	0.1	0.3	0.8
Denied Del/Veh (s)	2.0	1.3	0.6	0.8	1.0
Total Delay (hr)	1.9	2.6	5.1	5.2	14.8
Total Del/Veh (s)	21.7	20.7	20.2	15.9	18.7
Stop Delay (hr)	1.6	2.3	3.5	3.5	10.8
Stop Del/Veh (s)	18.5	17.8	13.9	10.6	13.7
Total Stops	253	357	582	655	1847
Stop/Veh	0.79	0.78	0.65	0.56	0.65

Intersection: 1: Victory Drive & Hoffman Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	105	152	116	162	183	74	58	236	204	74	165	236
Average Queue (ft)	49	76	30	76	81	36	22	152	114	23	72	137
95th Queue (ft)	85	132	80	132	143	61	46	216	189	52	125	210
Link Distance (ft)		944			942	942		952	952			948
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	450		50	150			375			200	450	
Storage Blk Time (%)		30	1	1	1				0			
Queuing Penalty (veh)		43	3	1	1				0			

Intersection: 1: Victory Drive & Hoffman Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	208	69
Average Queue (ft)	111	21
95th Queue (ft)	188	48
Link Distance (ft)	948	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Forecasted Year 2038 Detailed Operational Analysis

Roundabout Control

HCS7 Roundabouts Report

General Information

Analyst	Luke James
Agency or Co.	SRF Consulting Group, Inc.
Date Performed	11/5/2018
Analysis Year	2038
Time Analyzed	A.M. Peak
Project Description	11876

Site Information

Intersection	Victory Drive at Hoffman Road
E/W Street Name	Hoffman Road
N/S Street Name	Victory Drive
Analysis Time Period (hrs)	0.25
Peak Hour Factor	1.00
Jurisdiction	MAPO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	1	0	0	2	0	0	0	2	0
Lane Assignment			LTR		LT		R		LT		T		LT		TR	
Volume (V), veh/h	0	60	230	15	0	125	190	250	0	95	750	170	0	180	400	45
Percent Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Flow Rate (v_{PCE}), pc/h	0	62	239	16	0	130	198	260	0	99	780	177	0	187	416	47
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276		4.6453	4.3276		4.5436	4.5436	4.9763	4.5436	4.5436	
Follow-Up Headway (s)		2.5352		2.6667	2.5352		2.5352	2.5352	2.6087	2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		317.00		328.00	260.00		413.13	465.87	177.00	305.50	344.50	
Entry Volume veh/h		304.81		315.38	250.00		397.24	447.95	170.19	293.75	331.25	
Circulating Flow (v_c), pc/h	733			941			488			427		
Exiting Flow (v_{ex}), pc/h	426			344			1102			562		
Capacity (c_{pce}), pc/h		761.56		568.01	638.15		910.81	910.81	893.66	962.80	962.80	
Capacity (c), veh/h		732.27		546.16	613.60		875.78	875.78	859.29	925.77	925.77	
v/c Ratio (x)		0.42		0.58	0.41		0.45	0.51	0.20	0.32	0.36	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		10.5		18.1	11.9		9.7	10.9	6.2	7.3	7.8	
Lane LOS		B		C	B		A	B	A	A	A	
95% Queue, veh		2.1		3.6	2.0		2.4	3.0	0.7	1.4	1.6	
Approach Delay, s/veh	10.5			15.3			9.7			7.6		
Approach LOS	B			C			A			A		
Intersection Delay, s/veh | LOS	10.5						B					

HCS7 Roundabouts Report

General Information

Analyst	Luke James
Agency or Co.	SRF Consulting Group, Inc.
Date Performed	11/5/2018
Analysis Year	2038
Time Analyzed	P.M. Peak
Project Description	11876

Site Information

Intersection	Victory Drive at Hoffman Road
E/W Street Name	Hoffman Road
N/S Street Name	Victory Drive
Analysis Time Period (hrs)	0.25
Peak Hour Factor	1.00
Jurisdiction	MAPO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	1	0	0	2	0	0	0	2	0
Lane Assignment			LTR		LT		R		LT		T		LT		TR	
Volume (V), veh/h	0	95	170	50	0	150	165	130	0	40	760	100	0	175	870	105
Percent Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flow Rate (v_{PCE}), pc/h	0	96	172	50	0	152	167	131	0	40	768	101	0	177	879	106
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276		4.6453	4.3276		4.5436	4.5436	4.9763	4.5436	4.5436	
Follow-Up Headway (s)		2.5352		2.6667	2.5352		2.5352	2.5352	2.6087	2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		318.00		319.00	131.00		379.76	428.24	101.00	546.14	615.86	
Entry Volume veh/h		314.85		315.84	129.70		376.00	424.00	100.00	540.73	609.76	
Circulating Flow (v_c), pc/h	1208			904			445			359		
Exiting Flow (v_{ex}), pc/h	349			313			995			1081		
Capacity (c_{pce}), pc/h		508.58		587.68	658.53		947.16	947.16	966.67	1024.26	1024.26	
Capacity (c), veh/h		503.54		581.86	652.01		937.78	937.78	957.10	1014.12	1014.12	
v/c Ratio (x)		0.63		0.54	0.20		0.40	0.45	0.10	0.53	0.60	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		21.5		16.0	7.9		8.4	9.2	4.7	10.2	11.8	
Lane LOS		C		C	A		A	A	A	B	B	
95% Queue, veh		4.2		3.2	0.7		2.0	2.4	0.3	3.2	4.2	
Approach Delay, s/veh	21.5			13.6			8.4			11.0		
Approach LOS	C			B			A			B		
Intersection Delay, s/veh | LOS	11.8						B					

HCS7 Roundabouts Report

General Information

Analyst	Luke James
Agency or Co.	SRF Consulting Group, Inc.
Date Performed	11/5/2018
Analysis Year	2038
Time Analyzed	A.M. Peak
Project Description	11876

Site Information

Intersection	Victory Drive at Hoffman Road
E/W Street Name	Hoffman Road
N/S Street Name	Victory Drive
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.75
Jurisdiction	MAPO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	1	0	0	2	0	0	0	2	0
Lane Assignment			LTR		LT		R		LT		T		LT		TR	
Volume (V), veh/h	0	60	230	15	0	125	190	250	0	95	750	170	0	180	400	45
Percent Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Flow Rate (v_{PCE}), pc/h	0	83	319	21	0	173	263	347	0	132	1040	236	0	250	555	62
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276		4.6453	4.3276		4.5436	4.5436	4.9763	4.5436	4.5436	
Follow-Up Headway (s)		2.5352		2.6667	2.5352		2.5352	2.5352	2.6087	2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		423.00		436.00	347.00		550.84	621.16	236.00	407.49	459.51	
Entry Volume veh/h		406.73		419.23	333.65		529.65	597.27	226.92	391.82	441.84	
Circulating Flow (v_c), pc/h	978			1255			652			568		
Exiting Flow (v_{ex}), pc/h	569			457			1470			749		
Capacity (c_{pce}), pc/h		618.39		425.50	488.66		784.54	784.54	772.37	846.86	846.86	
Capacity (c), veh/h		594.60		409.13	469.87		754.36	754.36	742.66	814.29	814.29	
v/c Ratio (x)		0.68		1.02	0.71		0.70	0.79	0.31	0.48	0.54	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		21.6		83.3	27.9		18.7	24.3	8.5	10.9	12.3	
Lane LOS		C		F	D		C	C	A	B	B	
95% Queue, veh		5.3		13.2	5.5		5.9	8.1	1.3	2.6	3.3	
Approach Delay, s/veh	21.6			58.7			19.5			11.6		
Approach LOS	C			F			C			B		
Intersection Delay, s/veh | LOS	26.6						D					

HCS7 Roundabouts Report

General Information

Analyst	Luke James
Agency or Co.	SRF Consulting Group, Inc.
Date Performed	11/5/2018
Analysis Year	2038
Time Analyzed	P.M. Peak
Project Description	11876

Site Information

Intersection	Victory Drive at Hoffman Road
E/W Street Name	Hoffman Road
N/S Street Name	Victory Drive
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.96
Jurisdiction	MAPO

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	1	0	0	2	0	0	0	2	0
Lane Assignment			LTR		LT		R		LT		T		LT		TR	
Volume (V), veh/h	0	95	170	50	0	150	165	130	0	40	760	100	0	175	870	105
Percent Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flow Rate (v_{PCE}), pc/h	0	100	179	53	0	158	174	137	0	42	800	105	0	184	915	110
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	2				2				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.3276		4.6453	4.3276		4.5436	4.5436	4.9763	4.5436	4.5436	
Follow-Up Headway (s)		2.5352		2.6667	2.5352		2.5352	2.5352	2.6087	2.5352	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		332.00		332.00	137.00		395.74	446.26	105.00	568.23	640.77	
Entry Volume veh/h		328.71		328.71	135.64		391.82	441.84	103.96	562.60	634.43	
Circulating Flow (v_c), pc/h	1257			942			463			374		
Exiting Flow (v_{ex}), pc/h	363			326			1037			1126		
Capacity (c_{pce}), pc/h		487.83		567.49	637.60		931.77	931.77	952.97	1010.37	1010.37	
Capacity (c), veh/h		483.00		561.87	631.29		922.55	922.55	943.53	1000.37	1000.37	
v/c Ratio (x)		0.68		0.59	0.21		0.42	0.48	0.11	0.56	0.63	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		25.3		18.0	8.3		8.9	9.8	4.8	10.9	12.8	
Lane LOS		D		C	A		A	A	A	B	B	
95% Queue, veh		5.1		3.7	0.8		2.1	2.6	0.4	3.6	4.7	
Approach Delay, s/veh	25.3			15.2			8.9			11.9		
Approach LOS	D			C			A			B		
Intersection Delay, s/veh | LOS	13.0						B					

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	SB Victory Dr	350	0	24.00	2	28.00	2	110.00	75.00	35.00
2	EB Hoffman Rd	90	0	18.00	1	14.00	1	140.00	75.00	30.00
3	NB Victory Dr	190	0	24.00	2	24.00	2	145.00	85.00	30.00
4	WB Hoffman Rd	270	0	24.00	2	28.00	2	55.00	70.00	50.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	SB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
2	EB Hoffman Rd	170.00	28.00	2	15.00	1	20.00	1
3	NB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
4	WB Hoffman Rd	170.00	28.00	2	20.00	1	14.00	1

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	NB Victory Dr	Yield	170	24	2	14	1	38	3

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	NB Victory Dr	14	1	85	90	65.00002288	35	4	WB Hoffman Rd	1	2

Traffic Flow Data (veh/hr)

2038 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	SB Victory Dr	0	180	400	45	0	4.0	1.00	0.750
2	EB Hoffman Rd	0	60	230	15	0	4.0	1.00	0.750
3	NB Victory Dr	0	95	750	0	170	4.0	1.00	0.750
4	WB Hoffman Rd	0	125	190	250	0	4.0	1.00	0.750

Operational Results

2038 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	SB Victory Dr	None	833		543		1403	1791		0.4654	
2	EB Hoffman Rd	None	407		937		437	806		0.5047	
3	NB Victory Dr	Yield	1127	227	624	624	717	1479	900	0.7617	0.2540
4	WB Hoffman Rd	None	753		1198		770	1362		0.5530	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	SB Victory Dr	None	4.19		4.19	2.89		A		A
2	EB Hoffman Rd	None	6.95		6.95	2.39		A		A
3	NB Victory Dr	Yield	7.61	4.67	7.12	7.24	0.88	A	A	A
4	WB Hoffman Rd	None	7.90		7.90	4.99		A		A

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	SB Victory Dr	350	0	24.00	2	28.00	2	110.00	75.00	35.00
2	EB Hoffman Rd	90	0	18.00	1	14.00	1	140.00	75.00	30.00
3	NB Victory Dr	190	0	24.00	2	24.00	2	145.00	85.00	30.00
4	WB Hoffman Rd	270	0	24.00	2	28.00	2	55.00	70.00	50.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	SB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
2	EB Hoffman Rd	170.00	28.00	2	15.00	1	20.00	1
3	NB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
4	WB Hoffman Rd	170.00	28.00	2	20.00	1	14.00	1

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	NB Victory Dr	Yield	100	24	2	14	1	38	3

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	NB Victory Dr	14	1	85	90	65.00002704	35	4	WB Hoffman Rd	1	2

Traffic Flow Data (veh/hr)

2038 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	SB Victory Dr	0	175	870	105	0	1.0	1.00	0.960
2	EB Hoffman Rd	0	95	170	50	0	1.0	1.00	0.960
3	NB Victory Dr	0	40	760	0	100	1.0	1.00	0.960
4	WB Hoffman Rd	0	150	165	130	0	1.0	1.00	0.960

Operational Results

2038 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	SB Victory Dr	None	1198		370		1026	2092		0.5727	
2	EB Hoffman Rd	None	328		1244		323	751		0.4369	
3	NB Victory Dr	Yield	833	104	458	458	1114	1749	1022	0.4764	0.1028
4	WB Hoffman Rd	None	464		932		463	1654		0.2802	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	SB Victory Dr	None	4.42		4.42	3.86		A		A
2	EB Hoffman Rd	None	7.92		7.92	1.94		A		A
3	NB Victory Dr	Yield	3.90	3.83	3.89	2.40	0.30	A	A	A
4	WB Hoffman Rd	None	4.36		4.36	1.50		A		A

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	SB Victory Dr	350	0	24.00	2	28.00	2	110.00	75.00	35.00
2	EB Hoffman Rd	90	0	18.00	1	14.00	1	140.00	75.00	30.00
3	NB Victory Dr	190	0	24.00	2	24.00	2	145.00	85.00	30.00
4	WB Hoffman Rd	270	0	24.00	2	28.00	2	55.00	70.00	50.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	SB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
2	EB Hoffman Rd	170.00	28.00	2	15.00	1	20.00	1
3	NB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
4	WB Hoffman Rd	170.00	28.00	2	20.00	1	14.00	1

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	NB Victory Dr	Yield	170	24	2	14	1	38	3

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	NB Victory Dr	14	1	85	90	65.0000416	35	4	WB Hoffman Rd	1	2

Traffic Flow Data (veh/hr)

2038 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	SB Victory Dr	0	180	400	45	0	4.0	1.00	0.750
2	EB Hoffman Rd	0	60	230	15	0	4.0	1.00	0.750
3	NB Victory Dr	0	95	750	0	170	4.0	1.00	0.750
4	WB Hoffman Rd	0	125	190	250	0	4.0	1.00	0.750

Operational Results

2038 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	SB Victory Dr	None	833		540		1394	1602		0.5203	
2	EB Hoffman Rd	None	407		935		435	615		0.6614	
3	NB Victory Dr	Yield	1127	227	621	621	716	1290	703	0.8733	0.3265
4	WB Hoffman Rd	None	753		1189		768	1177		0.6399	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	SB Victory Dr	None	5.10		5.10	3.54		A		A
2	EB Hoffman Rd	None	12.01		12.01	4.22		B		B
3	NB Victory Dr	Yield	12.73	6.50	11.69	12.31	1.23	B	A	B
4	WB Hoffman Rd	None	10.66		10.66	6.82		B		B

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	SB Victory Dr	350	0	24.00	2	28.00	2	110.00	75.00	35.00
2	EB Hoffman Rd	90	0	18.00	1	14.00	1	140.00	75.00	30.00
3	NB Victory Dr	190	0	24.00	2	24.00	2	145.00	85.00	30.00
4	WB Hoffman Rd	270	0	24.00	2	28.00	2	55.00	70.00	50.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	SB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
2	EB Hoffman Rd	170.00	28.00	2	15.00	1	20.00	1
3	NB Victory Dr	170.00	16.00	1	25.00	2	24.00	2
4	WB Hoffman Rd	170.00	28.00	2	20.00	1	14.00	1

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
3	NB Victory Dr	Yield	100	24	2	14	1	38	3

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
3	NB Victory Dr	14	1	85	90	65.00004576	35	4	WB Hoffman Rd	1	2

Traffic Flow Data (veh/hr)

2038 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	SB Victory Dr	0	175	870	105	0	1.0	1.00	0.960
2	EB Hoffman Rd	0	95	170	50	0	1.0	1.00	0.960
3	NB Victory Dr	0	40	760	0	100	1.0	1.00	0.960
4	WB Hoffman Rd	0	150	165	130	0	1.0	1.00	0.960

Operational Results

2038 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	SB Victory Dr	None	1198		370		1026	1889		0.6343	
2	EB Hoffman Rd	None	328		1244		323	548		0.5986	
3	NB Victory Dr	Yield	833	104	458	458	1114	1547	817	0.5388	0.1288
4	WB Hoffman Rd	None	464		932		463	1451		0.3194	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	SB Victory Dr	None	5.63		5.63	4.89		A		A
2	EB Hoffman Rd	None	14.45		14.45	3.56		B		B
3	NB Victory Dr	Yield	4.95	4.91	4.94	3.04	0.38	A	A	A
4	WB Hoffman Rd	None	5.22		5.22	1.80		A		A

Detailed Cost Analysis

SRF Consulting Group, Inc. | Engineers Planners Designers

Concept Cost Estimate (based upon 2017 bid price information)

Prepared By: SRF Consulting Group, Inc., Date 11/2018

						South Victory Drive at Hoffman Road Signal Existing Conditions Alternative	
	ITEM DESCRIPTION		**UNIT**	**UNIT PRICE**	**EST. QUANTITY**	**EST. AMOUNT**
PAVING AND GRADING COSTS							
GrP 1	Excavation - common & subgrade		cu. yd.	$7.00		
GrP 2	Granular Subgrade (CV)		cu. yd.	$14.00		
GrP 3	County Road Pavement	(1)	sq. yd.	$30.00		
GrP 4	Concrete Median	(1)	sq. yd.	$40.00		
GrP 5	Walk / Trail	(1)	sq. yd.	$25.00		
GrP 6	ADA Pedestrian Curb Ramp		each	$600.00		
GrP 7	Concrete Curb and Gutter		lin. ft.	$12.00		
GrP 8	Removals - Pavement		sq. yd.	$2.50		
	SUBTOTAL PAVING AND GRADING COSTS:					
DRAINAGE, UTILITIES AND EROSION CONTROL						
Dr 1	Local Utilities - Sanitary Sewers		lin. ft.			
Dr 2	Local Utilities - Watermains		lin. ft.			
Dr 3	Water Quality Ponds		l.s.			
Dr 5	Drainage - urban (10-30%)		20%			
Dr 6	Turf Establishment & Erosion Control		10%			
Dr 7	Landscaping					
	SUBTOTAL DRAINAGE, UTILITIES AND EROSION CONTROL					
SIGNAL AND LIGHTING COSTS						
SGL 1	Signals (permanent)		each	$320,000	1	$320,000
SGL 2	At Grade Intersection Lighting (permanent - non sig		each	$10,000		
	SUBTOTAL SIGNAL AND LIGHTING COSTS:					**$320,000**
SIGNING & STRIPING COSTS						
SGN 1	Mainline Signing (C&D)		mile	$20,000		
SGN 2	Mainline Striping		mile	$10,000		
	SUBTOTAL SIGNING & STRIPING COSTS:					
	SUBTOTAL CONSTRUCTION COSTS:					**$320,000**
MISCELLANEOUS COSTS						
M 1	Mobilization		6%			$19,000
M 2	Non Quantified Minor Items (10% to 30%)		10%			$32,000
M 3	Temporary Pavement & Drainage					
M 4	Traffic Control		4%			$13,000
	SUBTOTAL MISCELLANEOUS COSTS:					**$64,000**
	ESTIMATED TOTAL CONSTRUCTION COSTS without Contingency:					**$384,000**
1	Contingency or "risk" (10% to 30%)		15%			$58,000
	ESTIMATED TOTAL CONSTRUCTION COSTS PLUS CONTINGENCY:					**$442,000**

OTHER PROJECT COSTS:					
R/W ACQUISITIONS	Lump Sum				
DESIGN ENG. & CONSTRUCTION ADMIN.	Lump Sum				
SUBTOTAL OTHER PROJECT COSTS					
TOTAL PROJECT COST (based upon 2016 bid price information)					**$442,000**

INFLATION COST (CURRENT YR. TO YR. OF OF	Years	3%			
TOTAL PROJECT COST (OPENING YEAR DOLLARS)					**$442,000**

NOTE: (1) Includes aggregate base class 5.

MAJOR ITEMS NOT INCLUDED:
- Local utilities (sanitary sewer or watermain)
- Water quality ponds or other BMPs
- R/W acquisitions
- Engineering design fees
- Inflation

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ITEM DESCRIPTION			UNIT	UNIT PRICE	South Victory Drive at Hoffman Road Signal Geometric Improvements Alternative EST. QUANTITY	EST. AMOUNT
PAVING AND GRADING COSTS						
GrP 1	Excavation - common & subgrade		cu. yd.	$7.00	1,660	$11,620
GrP 2	Granular Subgrade (CV)		cu. yd.	$14.00	890	$12,460
GrP 3	County Road Pavement	(1)	sq. yd.	$30.00	1,990	$59,700
GrP 4	Concrete Median	(1)	sq. yd.	$40.00		
GrP 5	Walk / Trail	(1)	sq. yd.	$25.00	400	$10,000
GrP 6	ADA Pedestrian Curb Ramp		each	$600.00	4	$2,400
GrP 7	Concrete Curb and Gutter		lin. ft.	$12.00	610	$7,320
GrP 8	Removals - Pavement		sq. yd.	$2.50	940	$2,350
	SUBTOTAL PAVING AND GRADING COSTS:					**$105,850**
DRAINAGE, UTILITIES AND EROSION CONTROL						
Dr 1	Local Utilities - Sanitary Sewers		lin. ft.			
Dr 2	Local Utilities - Watermains		lin. ft.			
Dr 3	Water Quality Ponds		l.s.			
Dr 5	Drainage - urban (10-30%)		20%			$21,000
Dr 6	Turf Establishment & Erosion Control		10%			$11,000
Dr 7	Landscaping					
	SUBTOTAL DRAINAGE, UTILITIES AND EROSION CONTROL					**$32,000**
SIGNAL AND LIGHTING COSTS						
SGL 1	Signals (permanent)		each	$300,000	1	$300,000
SGL 2	At Grade Intersection Lighting (permanent - non sig		each	$10,000		
	SUBTOTAL SIGNAL AND LIGHTING COSTS:					**$300,000**
SIGNING & STRIPING COSTS						
SGN 1	Mainline Signing (C&D)		mile	$20,000	0.3	$6,000
SGN 2	Mainline Striping		mile	$10,000	0.3	$3,000
	SUBTOTAL SIGNING & STRIPING COSTS:					**$9,000**
	SUBTOTAL CONSTRUCTION COSTS:					**$446,850**
MISCELLANEOUS COSTS						
M 1	Mobilization		6%			$27,000
M 2	Non Quantified Minor Items (10% to 30%)		10%			$45,000
M 3	Temporary Pavement & Drainage					
M 4	Traffic Control		4%			$18,000
	SUBTOTAL MISCELLANEOUS COSTS:					**$90,000**
	ESTIMATED TOTAL CONSTRUCTION COSTS without Contingency:					**$536,850**
1	Contingency or "risk" (10% to 30%)		15%			$81,000
	ESTIMATED TOTAL CONSTRUCTION COSTS PLUS CONTINGENCY:					**$617,850**

OTHER PROJECT COSTS:					
R/W ACQUISITIONS	Lump Sum				
DESIGN ENG. & CONSTRUCTION ADMIN.	Lump Sum				
SUBTOTAL OTHER PROJECT COSTS					
TOTAL PROJECT COST (based upon 2016 bid price information)					**$617,850**

INFLATION COST (CURRENT YR. TO YR. OF OF	Years	3%			
TOTAL PROJECT COST (OPENING YEAR DOLLARS)					**$617,850**

NOTE: (1) Includes aggregate base class 5.

MAJOR ITEMS NOT INCLUDED:
- Local utilities (sanitary sewer or watermain)
- Water quality ponds or other BMPs
- R/W acquisitions
- Engineering design fees
- Inflation

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Concept Cost Estimate (based upon 2017 bid price information)

Prepared By: SRF Consulting Group, Inc., Date 11/2018

						South Victory Drive at Hoffman Road Roundabout Alternative	
	ITEM DESCRIPTION		UNIT	UNIT PRICE		EST. QUANTITY	EST. AMOUNT
PAVING AND GRADING COSTS							
GrP 1	Excavation - common & subgrade		cu. yd.	$7.00		7,050	$49,350
GrP 2	Granular Subgrade (CV)		cu. yd.	$14.00		3,760	$52,640
GrP 3	County Road Pavement	(1)	sq. yd.	$30.00		8,450	$253,500
GrP 4	Concrete Median	(1)	sq. yd.	$40.00		1,680	$67,200
GrP 5	Walk / Trail	(1)	sq. yd.	$25.00		1,070	$26,750
GrP 6	ADA Pedestrian Curb Ramp		each	$600.00		20	$12,000
GrP 7	Concrete Curb and Gutter		lin. ft.	$12.00		5,260	$63,120
GrP 8	Removals - Pavement		sq. yd.	$2.50		10,740	$26,850
	SUBTOTAL PAVING AND GRADING COSTS:						**$551,410**
DRAINAGE, UTILITIES AND EROSION CONTROL							
Dr 1	Local Utilities - Sanitary Sewers		lin. ft.				
Dr 2	Local Utilities - Watermains		lin. ft.				
Dr 3	Water Quality Ponds		l.s.				
Dr 5	Drainage - urban (10-30%)		25%				$138,000
Dr 6	Turf Establishment & Erosion Control		10%				$55,000
Dr 7	Landscaping						
	SUBTOTAL DRAINAGE, UTILITIES AND EROSION CONTROL						**$193,000**
SIGNAL AND LIGHTING COSTS							
SGL 1	Signals (permanent)		each	$300,000			
SGL 2	At Grade Intersection Lighting (permanent - non signa		each	$10,000		12	$120,000
	SUBTOTAL SIGNAL AND LIGHTING COSTS:						**$120,000**
SIGNING & STRIPING COSTS							
SGN 1	Mainline Signing (C&D)		mile	$20,000		0.3	$6,000
SGN 2	Mainline Striping		mile	$10,000		0.3	$3,000
	SUBTOTAL SIGNING & STRIPING COSTS:						**$9,000**
	SUBTOTAL CONSTRUCTION COSTS:						**$873,410**
MISCELLANEOUS COSTS							
M 1	Mobilization		6%				$52,000
M 2	Non Quantified Minor Items (10% to 30%)		20%				$175,000
M 3	Temporary Pavement & Drainage						
M 4	Traffic Control		4%				$35,000
	SUBTOTAL MISCELLANEOUS COSTS:						**$262,000**
	ESTIMATED TOTAL CONSTRUCTION COSTS without Contingency:						**$1,135,410**
1	Contingency or "risk" (10% to 30%)		20%				$227,000
	ESTIMATED TOTAL CONSTRUCTION COSTS PLUS CONTINGENCY:						**$1,362,410**

	OTHER PROJECT COSTS:				
	R/W ACQUISITIONS	Lump Sum			
	DESIGN ENG. & CONSTRUCTION ADMIN.	Lump Sum			
	SUBTOTAL OTHER PROJECT COSTS				
	TOTAL PROJECT COST (based upon 2016 bid price information)				**$1,362,410**

	INFLATION COST (CURRENT YR. TO YR. OF OPE	Years	3%		
	TOTAL PROJECT COST (OPENING YEAR DOLLARS)				**$1,362,410**

NOTE: (1) Includes aggregate base class 5.

MAJOR ITEMS NOT INCLUDED:
- Local utilities (sanitary sewer or watermain)
- Water quality ponds or other BMPs
- R/W acquisitions
- Engineering design fees
- Inflation