TRAFFIC IMPACT STUDY

ADELMANN DEVELOPMENT
ELKO NEW MARKET, MINNESOTA

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Project No. 17-20548

ISG

Signature Sheet

I HEREBY CERTIFY THAT THESE CALCULATIONS WERE 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.

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Dated this 11th day of December, 2019.

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Executive Summary

Studied Intersection Description and Location

This Traffic Impact Study (TIS) studied current, projected, and future traffic conditions at six locations in the City of Elko New Market, Scott County, Minnesota. These locations included:

- Intersection 1 – The intersection of County State Aid Highway (CSAH) 2, also known as 260th Street E, and Xerxes Avenue.
- Intersection 2 – The intersection of CSAH 2 and Newton Circle's west access point.
- Intersection 3 – The intersection of CSAH 2 and Newton Circle's east access point.
- Intersection 4 – The intersection of CSAH 2 and Irving Avenue.
- Intersection 5 – The intersection of CSAH 2 and the southbound ramp of Interstate Highway 35 (I-35).
- Intersection 6 – The intersection of CSAH 2 and the northbound ramp of I-35.

This study focuses on the traffic impacts of a 160-acre residential, commercial, and industrial development north and south of CSAH 2 between Xerxes Avenue and I-35. The land, located on the outskirts of Elko New Market, is largely undeveloped. The properties are currently privately owned by Adelmann Farms New Market LLC, zoned by Scott County as Urban Business Reserve (UBR). At the time of this writing, an annexation agreement between the City of Elko New Market and Scott County is currently in place but has yet to be executed.

An existing asphalt paved trail runs along the north side of CSAH 2 from Intersection 1 to Intersection 5 within the county highway right-of-way. This trail is used by pedestrians and cyclists. Highway crossings are not provided. As the area develops, sidewalks will be constructed providing pedestrian access to the future businesses. There are no established transit routes or bus stops in the area.

Currently, Intersections 2 and 3 operate as 3-legged intersections, but they have been constructed, with radii and turn lanes on CSAH 2, to accommodate a side street to the north. When area development commences in 2019, users can expect to use Intersection 3 to access the proposed development, and this will be the only access available until property can be acquired to construct the side road north of Intersection 2. As the area continues to develop in the next 20 years, the development's road network will expand, reaching west to connect with Xerxes Avenue at two locations. Property has yet to be acquired to accommodate this expansion. An overview of the proposed development is provided in **Appendix A: Proposed Development Overview**.

Findings

Level of Service

The analysis shows that the proposed development impacts the studied intersections from a level of service (LOS) standpoint.

Existing (2018)

Overall
Currently, Intersections 1-6 are operating at an overall LOS A in all periods, with the exception of LOS B during the AM peak for Intersection 6.
CSAH 2
Along CSAH 2 at every intersection for both AM and PM, Eastbound (EB) and Westbound (WB) approaches operate at a LOS A.

Minor Streets
All minor street approaches operate at LOS A-D for both AM and PM peak periods, with the exception of the Intersection 6 NB approach (LOS F) during the AM peak.

Baseline (2031) – Without Development

There has been a historic increase in traffic growth within this corridor. The following summaries assume this trend will continue for the next 20 years.

Overall
Intersections 1-6 are expected to operate at an overall LOS A in all periods, with the exception of Intersection 6 during the AM peak (LOS F).
CSAH 2
EB and WB approaches operate at a LOS A-B during peak hours at all intersections.
Minor Streets
The minor street approaches operate at varying levels of service ranging from LOS A to LOS E at Intersections 1-4. At Intersections 5 and 6, the minor street approaches operate at LOS E-F.

Phase 1 (2031) – With Development

Overall
In the full build-out scenario, Intersections 1-6 see a general decrease in level of service, compared to the Baseline (2031) scenario, largely due to the failing of side street turning movements.
CSAH 2
Along CSAH 2 at most intersections for both AM and PM, EB and WB approaches operate at a LOS A. In the Phase 1 (2031) scenario, the exception is that the EB approach of Intersection 6 operates at LOS C during the AM peak.
Minor Streets
Most minor street approaches operate at LOS F. The exceptions include the NB approach of Intersection 2 in the PM peak and the NB approaches of Intersection 4 of both studied peak periods.

Baseline (2038) – Without Development

Overall
Intersections 1-4 are expected to operate at an overall LOS A in all periods. The LOS at Intersections 5 and 6 range from A-D.
CSAH 2
Along CSAH 2 at most intersections for both AM and PM, EB and WB approaches operate at a LOS A. In the Baseline (2038) scenario, the exception is that the EB approach of Intersection 6 operates at LOS C during the AM peak.
Minor Streets
The minor street approaches operate at varying levels of service ranging from LOS A to LOS F at the studied intersections. In particular, the interchange off-ramps perform the poorest.

Phase 2 (2038) – With Development

Phase 2 modeling was completed assuming that improvements for Phase 1 are implemented as recommended.
Overall
In the full build-out scenario, Intersections 1-6 see a general decrease in level of service, compared to the Baseline (2038) scenario, largely due to the failing of side street turning movements.
CSAH 2

Along CSAH 2 at Intersections 1-6, EB and WB approaches operate at LOS A-E, with the exception of the EB approach at Intersection 5 during the PM peak.

Minor Streets

At Intersections 1-3, the minor street approaches operate at LOS C-F, largely due to failing turning movements. At Intersections 5 and 6, the interchange off-ramps operate at LOS C during the AM peak and LOS B during the PM peak.

Connectivity

Study of the greater area road network shows that Elko New Market residents and visitors have few options to access I-35. Without CSAH 2's access to I-35, drivers must travel either north to Lakeville (5 miles) or south to Little Chicago (7 miles) in order to access I-35. Therefore drivers may accept long queues and low level of service before seeking alternate, more desirable routes. At the project level, Intersections 2 and 3 are connected by Newton Circle in addition to CSAH 2. While users exiting the south side of the proposed development looking to travel west may prefer Intersection 3 (because it's closer than Intersection 2), Intersection 2 is easily accessible in the proposed development plan, reducing congestion at Intersection 3.

Recommendations

By 2031, improvements to the interstate overpass bridge and Intersections 5 and 6 will be needed regardless of proposed development construction. Interim and long term options for I-35 interchange improvements have been detailed in the "CH 2 / I-35 Interchange Area Management Plan" (IAMP) developed in 2010.

To accommodate Phase 1 development, improvements to the studied intersections are needed. As the project moves into Phase 2, additional improvements will be needed. As businesses move into to the development, traffic impact studies should be conducted as needed in order to track interim improvement needs. Additionally, the study area should be re-evaluated if growth projections change.

Based on the modeled Phase 1 (2031) conditions described in this report, to accommodate both major and minor street traffic, improvements are recommended at Intersections 1-6 and some road links. The following are minimum recommendations:

- Implement roundabouts or traffic signal control at Intersections 1, 3, 5, and 6.
- Two travel lanes should be maintained both eastbound and westbound through the studied area.
- Close access to Intersection 4 and route to new access road to the west.
- At the I-35 overpass, widen the bridge to accommodate 4 travel lanes.
- Proposed business driveways should be placed in locations as to avoid impacts to future intersection turn lanes.

Based on the modeled Phase 2 (2038) conditions described in this report, to accommodate both major and minor street traffic, additional improvements are recommended at Intersections 1-6 and some road links. The following are minimum recommendations, assuming improvements to accommodate Phase 1 development are implemented as recommended:

- Implement roundabouts or traffic signal control at Intersection 2.
- Add turn lanes at Intersections 3 and 5.
- Proposed business driveways should be placed in locations as to avoid impacts to future intersection turn lanes.

Conclusions

Currently, the studied intersections are operating at LOS A-B. The area has seen in increase in traffic, and local and regional authorities expect that trend to continue. By 2031, improvements to the interstate overpass bridge and Intersections 5 and 6 will be needed regardless of proposed development construction. The proposed development is expected to impact the studied intersections in the future, and most minor street approaches are expected to operate at LOS F if the traffic control is to remain the same.

Improvements needed as a result of the proposed development, including the installation of traffic signals, may be needed to accommodate Phase 1 development. Additional improvements, including the installation of additional traffic signals, may be needed to accommodate Phase 2 development. As businesses move into the development, traffic studies should be conducted as needed to determine interim improvement needs. The types of business that move into the development, and the development rate, will largely determine when changes in intersection control are needed. Once traffic impact studies conclude that traffic signals are warranted in the near future, further study will be required to design the new traffic signals.

Once the recommended improvements are implemented, the area should be monitored as regular drivers adjust to the new traffic patterns. The study area corridors should be reevaluated on a regular basis as the area develops or as growth projections change.

Introduction

Purpose of Report

The purpose of this report is to document the methodologies, findings, recommendations, and conclusions of the subject study, including the basis for all assumptions, traffic parameters utilized, and conclusions. This report presents data in a logical format including tables and figures in order to accurately and clearly convey the data and its meaning.

Study Objectives

The objectives of this study include the following:

1. Identify the impacts to the transportation system and immediate area as a result of the proposed development.
2. Recommend necessary improvements to the adjacent transportation system to maintain a safe, efficient system.
3. Protect the safety and functionality of the transportation system while providing sufficient access for the proposed development.

Area Conditions

City Data, Land Use, and Zoning

This report studies the impacts of a proposed development near the City of Elko New Market in Scott County. An overview for the development in provided as **Appendix A: Proposed Development**, and a location map is provided as **Appendix B: Location Map**. More details regarding site traffic and trip generation are provided in a later section of this report.

The City of Elko New Market has an estimated population of 4,625 (year 2016), and the population has steadily grown since 2010. City and regional authorities expect the area's population to grow approximately 2.1% each year into the future. Community planning documents indicate that development will likely continue along the City's outer limits as Elko New Market continues to attract new businesses and residents. Land use in the study area vicinity includes commercial (south), light industrial (south), agricultural (west and east), and rural residences (west, north, and east). While the land uses vary, many of the properties are zoned Urban Reserve, Urban Expansion Reserve, and Urban Business Reserve. Those properties that are not reserved for further development are zoned Rural Residential or Rural Industrial. The City of Elko New Market's existing zoning map is provided as **Appendix C: Existing Zoning Map**. The City of Elko New Market Land Use Plan Map is provided as **Appendix D: Future Land Use Map** for reference.

Intersections 1 (CSAH 2 and Xerxes Avenue), 2 (CSAH 2 and Newton Circle), 3 (CSAH 2 and Newton Circle), 4 (CSAH 2 and Irving Avenue), 5 (CSAH 2 and SB I-35), 6 (CSAH 2 and NB I-35), the subject of this study, are located along CSAH 2 northeast of Elko New Market. The figure in **Appendix E: Intersection Diagram** identifies these six intersections on the development overview.

Area Roadway System

Through and adjacent to the study area:

- CSAH 2 (260th Street E) is an east-west Minor Arterial Collector.
- CSAH 2 (Deuce Rd) is an east-west Minor Arterial Reliever.
- I-35 is a north-south Principal Arterial.

CSAH 2 is a four lane divided (depressed grass center median) highway with a posted speed limit of 55 MPH that currently serves as a north border for the City of Elko New Market in the project vicinity. Intersections 1, 2, and 3 are stop controlled on the side streets, and both left and right turn lanes are provided on CSAH 2. At Intersection 4, Irving Avenue is stop controlled and no turn lanes are provided on CSAH 2. The median is painted through this intersection and while the pavement markings indicate that Intersection 4 has right-in, right-out type access, traffic count data show vehicles treating the intersection as fully accessible. Intersection 5 is stop controlled on the ramp and a channelized free right turn lane is provided to aid drivers turning onto CSAH 2. Intersection 6 is stop controlled on the ramp, and no turn lanes are provided.

At Intersections 1-4, the side streets are 2-lane undivided local roads. Xerxes Avenue, south of CSAH 2, serves as the primary access from CSAH 2 to existing residential neighborhoods. Newton Circle and Irving Avenue both serve as primary accesses from CSAH 2 to existing commercial and industrial properties. Between Intersections 3 and 4, there are two driveways. The first driveway is a full access driveway on the north side of the road. The second is a right-in, right-out on the south side of the road. There are no other driveways located in the study area.

The study area lies on a section of CSAH 2 that serves commuters traveling between their Elko New Market residences and their places of work to the North. Because of CSAH 2's classification and connection to I-35, there is some truck traffic on CSAH 2. According to the traffic count data collected for this study, approximately 2% of the vehicles traveling the corridor during peak time periods are classified as trucks.

An asphalt pedestrian path is provided along CSAH 2 on the north side of the road. The path was originally paved by the Metropolitan Council in conjunction with the construction of the Municipal Utility Service Area (MUSA) to Elko New Market and intended as a maintenance / access road. It has been used for pedestrian purposes and may need to be relocated further to the north, within the county road right-of-way, as development occurs. Currently, there are no bicycle accommodations provided along CSAH 2; however, cyclists are permitted on this roadway. There are no established transit routes or bus stops in the area.

Existing Traffic Volumes and Conditions

Existing traffic counts were collected for Intersections 1-6. A summary of the dates/times these counts were performed is provided below:

- AM peak hour counts were performed on Wednesday, January 10, 2017, from 7:00 AM to 11:00 AM.
- PM peak hour counts were performed on the previous day, Tuesday, January 9, 2017, from 3:00 PM to 6:00 PM.

Summary diagrams of the traffic counts are provided in **Appendix F: Existing Traffic Counts**. The Synchro (v9.2) Studio Suite was utilized to analyze the traffic conditions within the study area, which included modeling the six subject intersections along CSAH 2. The Synchro Analysis worksheets for the existing conditions are provided in **Appendix G: Synchro Reports – Existing (2018)**.

Tables 1-6 show the existing LOS and delay for Intersections 1-6 for both of the peak hour periods.

CSAH 2 has shown to have an AADT of 11,200 vehicles per day (vpd) through the study area (draft 2017 AADT) according to MnDOT traffic data as presented in **Exhibit 1** below.

Exhibit 1: Area Traffic

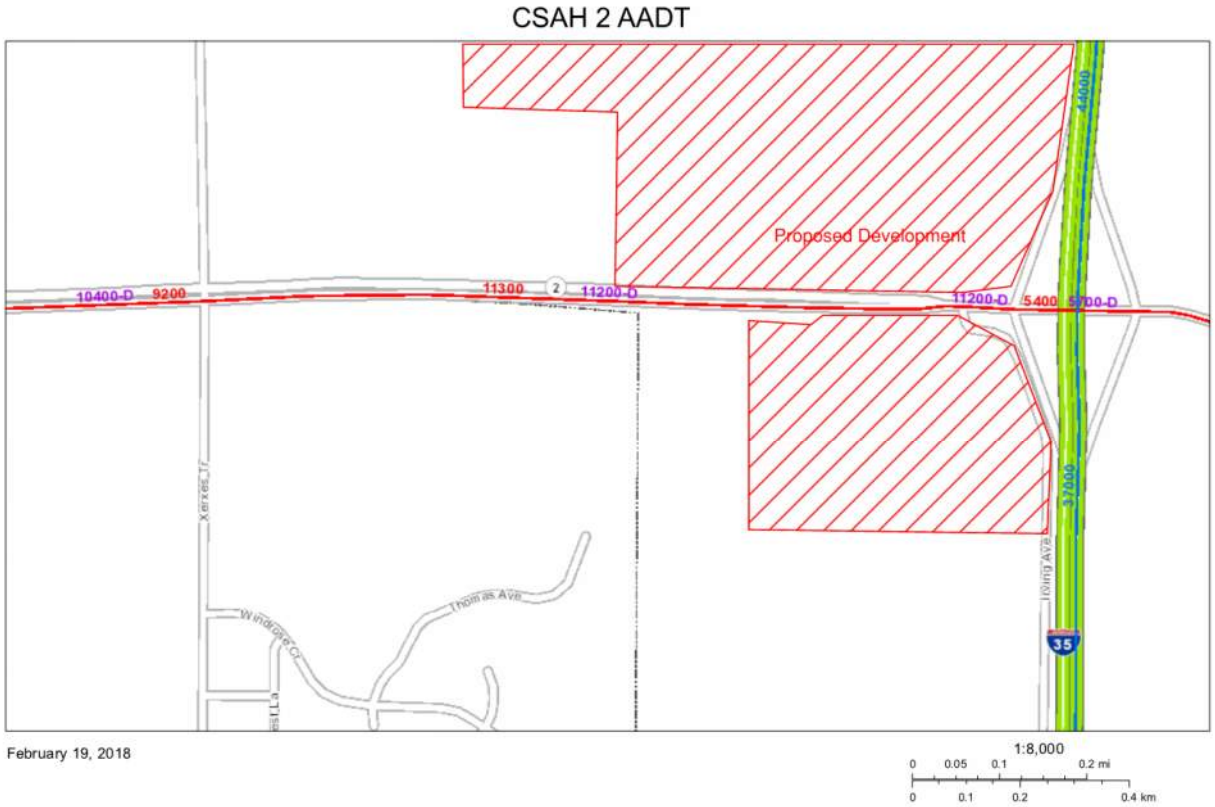


Table 1: Existing LOS – Intersection 1

INTERSECTION 1	AM PEAK												
	2018 EXISTING												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		5	566	4	19	140	0	25	2	210	0	2	3
Queue (ft)		0	0	0	26	0	0	37		88	19		
Mvmt Delay (sec)		7.6	0.0	0.0	9.0	0.0	0.0	16.1		13.3			
Mvmt LOS		A	A	A	A	A	A	C		B			
Delay (sec)	3.6	0.1			1.1			13.6			13.1		
LOS	A	A			A			B			B		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 1	PM PEAK												
	2018 EXISTING												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		2	315	20	185	709	3	16	1	59	1	0	0
Queue (ft)		8	0	0	66	0	0	30		0	38		
Mvmt Delay (sec)		9.3	0.0	0.0	8.6	0.0	0.0	22.2		9.6			
Mvmt LOS		A	A	A	A	A	A	C		A			
Delay (sec)	2.0	0.1			1.8			12.4			27.1		
LOS	A	A			A			B			D		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 2: Existing LOS – Intersection 2

INTERSECTION 2	AM PEAK												
	2018 EXISTING												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			867	8	0	173		2		0			
Queue (ft)			0	0	0	0		11					
Mvmt Delay (sec)					0.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.0	0.0			0.0			20.9					
LOS	A	A			A			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 2	PM PEAK												
	2018 EXISTING												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			338	14	1	830		11		2			
Queue (ft)			0	0	0	0		32					
Mvmt Delay (sec)					8.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.2	0.0			0.0			13.8					
LOS	A	A			A			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 3: Existing LOS – Intersection 3

INTERSECTION 3	AM PEAK												
	2018 EXISTING												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			853	0	10	170		0		6			
Queue (ft)			4	0	26	0		23					
Mvmt Delay (sec)					10.2	0.0							
Mvmt LOS					B	A							
Delay (sec)	0.2	0.0			0.6			12.0					
LOS	A	A			A			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 3	PM PEAK												
	2018 EXISTING												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			340	0	9	840		0		17			
Queue (ft)			0	0	18	0		28					
Mvmt Delay (sec)					8.1	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.2	0.0			0.1			9.5					
LOS	A	A			A			A					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 4: Existing LOS – Intersection 4

INTERSECTION 4	AM PEAK												
	2018 EXISTING												
CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			947	2	2	196		1		9			
Queue (ft)			0		6			29					
Mvmt Delay (sec)					10.6	0							
Mvmt LOS					B	A							
Delay (sec)	**0.2**	0.0			0.1			19.8					
LOS	**A**	A			A			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 4	PM PEAK												
	2018 EXISTING												
CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			360	3	11	879		4		5			
Queue (ft)			0		17			25					
Mvmt Delay (sec)					8.1	0.1							
Mvmt LOS					A	A							
Delay (sec)	**0.2**	0.0			0.2			13.8					
LOS	**A**	A			A			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 5: Existing LOS – Intersection 5

INTERSECTION 5	AM PEAK												
	2018 EXISTING												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			831	54	53	87					36	1	100
Queue (ft)			0	7	65						55		0
Mvmt Delay (sec)					10.4	0							
Mvmt LOS					B	A							
Delay (sec)	1.5	0.0			3.9						28.3		
LOS	A	A			A						D		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 5	PM PEAK												
	2018 EXISTING												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			286	39	67	251					112	0	571
Queue (ft)			0	0	57						74		169
Mvmt Delay (sec)					8.1	0.0							
Mvmt LOS					A	A							
Delay (sec)	3.7	0.0			1.7						19.8		
LOS	A	A			A						C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 6: Existing LOS – Intersection 6

INTERSECTION 6	AM PEAK												
	2018 EXISTING												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		662	227			98	114	15	0	48			
Queue (ft)		257				16		87					
Mvmt Delay (sec)		11.2	0										
Mvmt LOS		B	A										
Delay (sec)	12.9	8.3			0.0			122.0					
LOS	B	A			A			F					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 6	PM PEAK												
	2018 EXISTING												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		224	179			263	56	49	2	38			
Queue (ft)		74				4		54					
Mvmt Delay (sec)		8.7	0.0										
Mvmt LOS		A	A										
Delay (sec)	4.9	4.9			0.0			22.2					
LOS	A	A			A			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

See the Conclusions section for discussion on level of service and delay.

Anticipated Future Development

The 2030 Elko New Market Comprehensive Plan was adopted in 2010. The Comprehensive Plan outlines the City's goals for guiding:

- area growth and land use,
- housing development,
- transportation network improvements,
- natural resource management,
- park and trail system development,
- water facility expansion,
- sanitary sewer improvements,
- stormwater management, and
- intergovernmental cooperation.

The proposed development area is currently outside of the City of Elko New Market limit. However, the area has been identified within the City's Comprehensive Plan, and Scott County has reserved the land for future urban development. Areas to the east and west of the proposed development have also been reserved for proposed development. In the City's Water, Sanitary Sewer, and Stormwater Management plans, the City plans to extend water and sanitary sewer service to these development areas. The City has completed the sanitary sewer service extension but has yet to complete the water service extension. Parks and trails will be incorporated as a part of area development, and roads will need to be constructed in order to accommodate area connectivity. The Transportation Plan recognizes the growth potential of both Elko New Market and the surrounding area. As a result of this growth, I-35 north of CSAH 2 and sections along CSAH 2 are anticipated to be congested (Volume to Capacity Ratio > 1.00). To manage this congestion, the Plan discusses the need for improvements to the CSAH 2 / I-35 interchange.

The "CH 2 / I-35 Interchange Area Management Plan" (IAMP) completed in 2010 was developed to address this need for improvements to the subject interchange. While the guide does not identify specific improvements, the IAMP discusses the benefits and cost of a number of improvement types. The plan identifies a long-range vision and includes an implementation plan. After considering the multiple options discussed in the IAMP, Scott County has elected to proceed with a preliminary layout for a diverging diamond design. A preliminary layout was approved in 2016. The interchange project is not planned for construction within the next eight years, and funding has not been identified.

This preliminary layout shows that Intersection 4, Irving Ave's access to CSAH would close if the plan moves forward. Because the timing of the interchange reconstruction is uncertain and funding has not yet been identified, this report assumes access, access control, and the geometry of Intersections 1-6 will remain unchanged into 2038

Projected Traffic

Traffic was projected for 13-year (2031) Baseline and 20-year (2038) Baseline conditions for the weekday AM and PM peak hours. The method for determining these traffic projections included trip generation, internal capture, pass-by, and distribution analyses based on estimates from the ITE Trip Generation Manual 9th Edition and the ITE Trip Generation Handbook 2nd Edition.

Site Traffic

Trip Generation

The new development will generate both employee and customer trips. For this study, a trip is defined as a one-way movement between an origin and a destination. The expected numbers of trips the proposed development will generate was estimated using the ITE Trip Generation Manual 9th Edition and conceptual plans of the proposed development. The summarized results are provided in **Table 7**.

Table 7: Unadjusted Generated Traffic by Land Use

Phase	ITE Code	Use	AM	PM
1	110	General Light Industrial (A)	49	51
2	110	General Light Industrial (B)	30	31
2	110	General Light Industrial (B)	30	31
2	110	General Light Industrial (C)	65	69
2	110	General Light Industrial (D)	125	132
2	110	General Light Industrial (E)	147	155
1	140	Manufacturing	29	29
2	151	Mini-Warehouse	6	10
2	230	Residential Condominium/Townhouse	6	7
1	310	Hotel	72	81
1	715	Single Tenant Office Building (A)	63	61
2	720	Medical-Dental Office Building	74	111
1	810	Tractor Supply Store	0	28
1	890	Furniture Store	5	14
1	820	Shopping Center (A)	145	554
2	820	Shopping Center (B)	100	366
1	826	Specialty Retail Center	8	27
1	834	Automobile Parts Sales	22	63
1	841	Automobile Sales	188	257
2	842	Recreational Vehicle Sales	0	79
1	850	Supermarket	76	212
1	890	Furniture Store	5	14
1	932	High Turnover (Sit-Down) Restaurant (A)	119	108
1	932	High Turnover (Sit-Down) Restaurant (B)	43	39
2	932	High Turnover (Sit-Down) Restaurant (C)	43	39
1	934	Fast-Food Restaurants with Drive-Through Windows	818	588
1	937	Coffee/Donut Shop with Drive-Through Window	362	154
1	945	Gasoline/Service Station with Convenience Market (A)	163	216
1	945	Gasoline/Service Station with Convenience Market (B)	163	216

In **Table 8**, the detailed land uses were combined into categories – Industrial, Residential, Office/Business, Commercial-Products, and Commercial-Services – and the weighted averages of the entering and exiting percentages were calculated. These values were then applied in the next step: calculating an internal capture ratio.

Table 8: Unadjusted Generated Traffic Summary – Entering and Exiting

	AM					PM				
Phase 1: 2018-2031	#	Enter		Exit		#	Enter		Exit	
100 Industrial	78	86%	**67**	14%	**11**	80	14%	**11**	86%	**69**
200/300 Residential and Lodging	72	19%	**14**	81%	**58**	81	64%	**52**	36%	**29**
700 Office/Business	63	75%	**47**	25%	**16**	61	25%	**15**	75%	**46**
800 Commercial - Products	449	60%	**269**	40%	**180**	1169	45%	**526**	55%	**643**
900 Commercial - Services	1668	50%	**834**	50%	**834**	1322	50%	**661**	50%	**661**
			1231		**1099**			**1265**		**1448**

	AM					PM				
Phase 2: 2031-2038	#	Enter		Exit		#	Enter		Exit	
100 Industrial	403	86%	**347**	14%	**56**	428	14%	**60**	86%	**368**
200/300 Residential and Lodging	6	19%	**1**	81%	**5**	7	64%	**4**	36%	**3**
700 Office/Business	75	75%	**56**	25%	**19**	111	25%	**28**	75%	**83**
800 Commercial - Products	100	60%	**60**	40%	**40**	445	45%	**200**	55%	**245**
900 Commercial - Services	44	50%	**22**	50%	**22**	40	50%	**20**	50%	**20**
			486		**142**			**312**		**719**

Internal Capture

Because the proposed development will contain multiple land uses, an internal capture analysis was performed. The internal capture rate is the percentage reduction that can be applied to the trip generation estimates for individual land uses to account for trips internally absorbed. The ITE Trip Generation Handbook, 3rd Edition provides the method, and the internal capture rates for the AM and PM peak periods can be found in **Exhibit 2** and **Exhibit 3** respectively.

Exhibit 2: AM Internal Capture

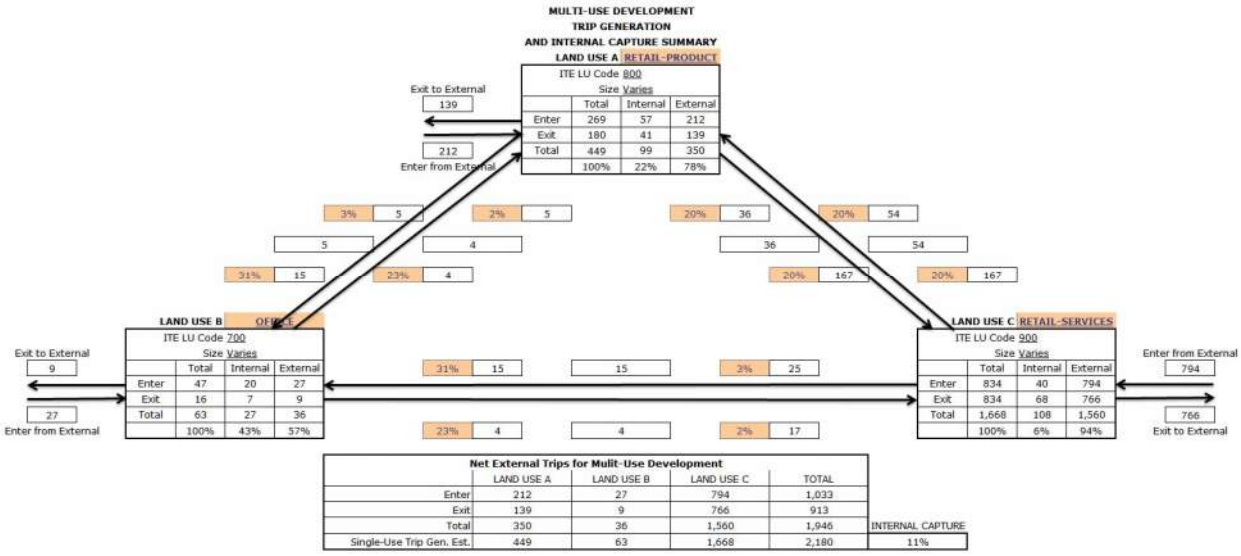
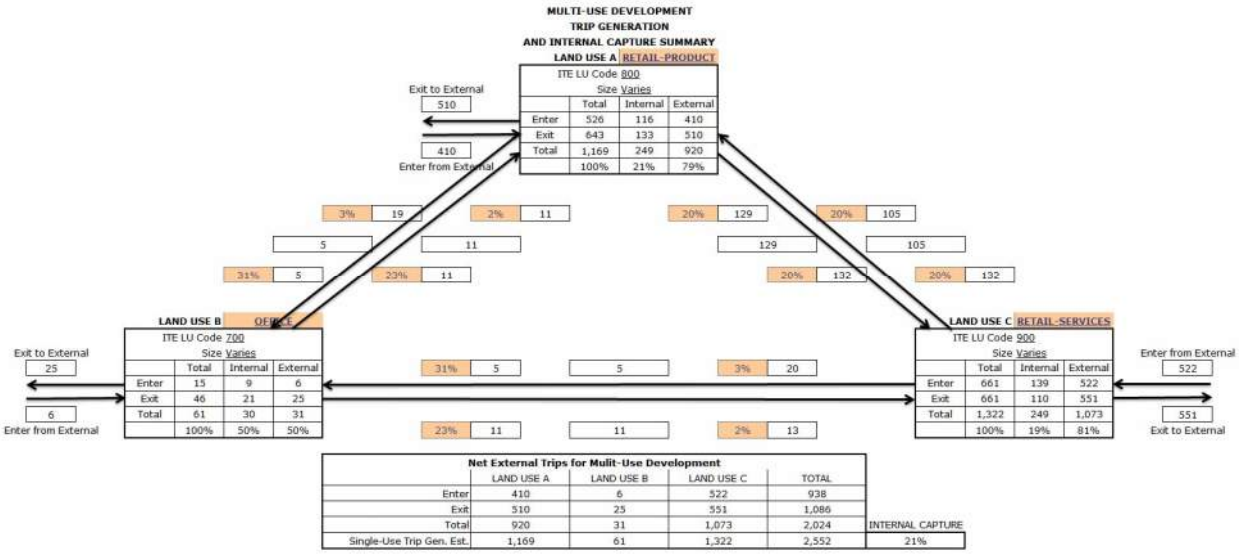


Exhibit 3: PM Internal Capture



Net External Trips for Mulit-Use Development	LAND USE A	LAND USE B	LAND USE C	TOTAL	
Enter	410	6	522	938	
Exit	510	25	551	1,086	
Total	920	31	1,073	2,024	INTERNAL CAPTURE
Single-Use Trip Gen. Est.	1,169	61	1,322	2,552	21%

The internal capture analysis was performed on the Office/Business, Commercial-Products, and Commercial-Services categories. Because the Residential trip generation is low and the ITE Trip Generation Handbook does not include internal capture rates for industrial sites, internal capture involving the proposed development's residential and industrial land uses is expected to be negligible. The internal capture ratios were applied to the values in **Table 8** in order to create **Table 9**. The values shown in **Table 9** were then applied to the 13-Year (2031) Baseline and 20-Year (2038) Baseline conditions traffic volumes to create the 13-Year (2031) Phase 1 and 20-Year (2038) Phase 2 conditions traffic volumes.

Table 9: Externally Generated Trips – Entering and Exiting

Adjusting for Internal Capture	2031			
	AM		PM	
	Enter	Exit	Enter	Exit
100 Industrial	67	11	11	69
200/300 Residential and Lodging	14	58	52	29
700 Office/Business	27	9	6	25
800 Commercial - Products	212	139	410	510
900 Commercial - Services	794	766	522	551
Total External Trips	**1114**	**983**	**1001**	**1184**
Internal Capture Ratio	*10%*	*11%*	*21%*	*18%*

Adjusting for Internal Capture	2038			
	AM		PM	
	Enter	Exit	Enter	Exit
100 Industrial	414	67	71	437
200/300 Residential and Lodging	15	63	56	32
700 Office/Business	83	28	34	108
800 Commercial - Products	272	179	610	755
900 Commercial - Services	816	788	542	571
Total External Trips	**1600**	**1125**	**1313**	**1903**

Pass-By Trip Analysis

Pass-by trips are made as intermediate stop on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or road. Therefore they are trips that may not add new traffic to the adjacent street system because they attract motorists already on the street. However, it is important to note that although pass-by trips do not add new traffic, they do affect traffic distribution and turning movements at entrances. They must be accounted for when distributing traffic. Because the proposed development is expected to divert traffic from I-35, provide goods and services to local residents, and provide jobs closer to home, the percentage of pass-by trips is expected to be dependent on the individual land uses within the proposed development. **Table 9** and the pass-by rates in the ITE Trip Generation Handbook were used to create **Table 10**. **Table 10** shows how many non-pass-by trips are added to the CSAH 2 road network as a result of the proposed development.

Table 10: Pass-By Trip Analysis

Adjusting for Pass-By	2031			
	AM		PM	
	Enter	Exit	Enter	Exit
100 Industrial	67	11	11	69
200/300 Residential and Lodging	14	58	52	29
700 Office/Business	27	9	6	25
800 Commercial - Products	212	139	324	404
900 Commercial - Services	400	386	250	264
Total Non-Pass-By Trips	**720**	**603**	**643**	**791**
Pass-By Trips	394	380	358	393
Average (Entering/Exiting)	*387*		*376*	
Total Pass-By Trips	774		751	
% of External Trips	36.9%		34.4%	

Adjusting for Pass-By	2038			
	AM		PM	
	Enter	Exit	Enter	Exit
100 Industrial	414	67	71	437
200/300 Residential and Lodging	15	63	56	32
700 Office/Business	83	28	34	108
800 Commercial - Products	272	179	483	597
900 Commercial - Services	400	386	259	273
Total Non-Pass-By Trips	**1184**	**723**	**903**	**1447**
Pass-By Trips	416	402	410	456
Average (Entering/Exiting)	*409*		*433*	
Total Pass-By Trips	818		866	
% of External Trips	30.0%		26.9%	

Trip Distribution and Assignment

Synchro Traffic Impact Analysis was used to distribute trips between the various inbound and outbound routes drivers are expected to take. It is assumed that drivers will generally choose the shortest distance when selecting a route and driveway. Eight origins, two driveways, and 16 routes were identified for Phase 1. An additionally driveway was identified for Phase 2, creating 24 possible routes. Trips were assigned to these routes, and routes were weighted based on the existing roadway network traffic distribution and the roadway functional classifications.

A diagram of the Synchro model, including labeled nodes are provided in **Appendix H: Trip Distribution**. Trips assigned using the Traffic Impact Analysis tool are assigned to the intersections within Synchro and can be seen in the analysis reports as "Future Vol". These trips are included in the LOS analysis.

Other Traffic

Roadway Historical Growth Rate

A historical annual growth of 2.1% was used to project the February 2018 traffic volumes to 2038. This value was back-calculated using the historical traffic counts along CSAH 2 in the study area using the following equation:

$$F = C(1+i)^n$$

$$where: C = the\ current\ AADT$$

$$F = the\ future\ AADT$$

$$i = percent\ growth\ in\ decimal\ form$$

$$n = number\ of\ years\ between\ C\ and\ F$$

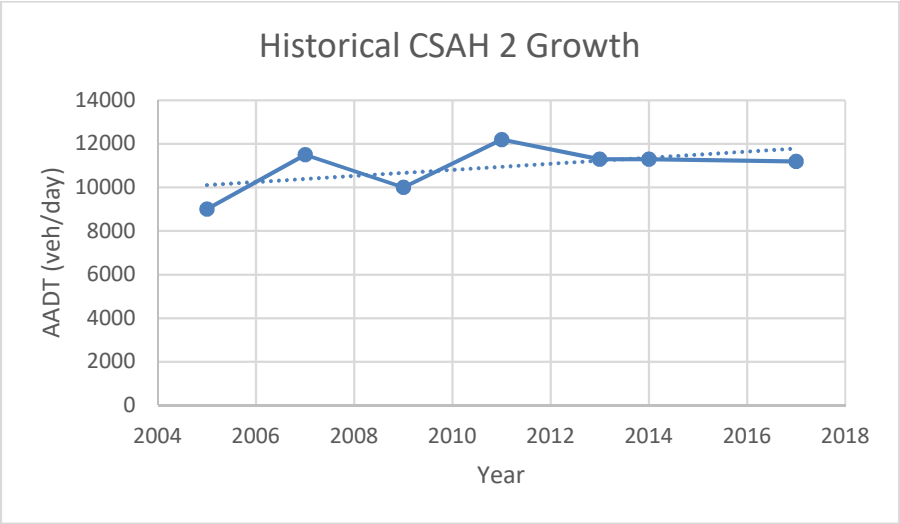
The results are shown in **Table 11** and **Exhibit 4**. In the past 10-15 years, growth has been inconsistent, but it should be noted that the traffic growth on CSAH 2 closely matches the projected future population growth. Additionally, the estimate was compared against multiple other resources, including other area traffic studies and the IAMP, and was determined to be reasonable. Therefore, this study assumes that the traffic within the study area will continue its current 2.1% average annual growth into the future.

Table 11: Historical CSAH 2 Growth

Historical CSAH 2 Growth

Year	AADT	Annualized Growth
2017	11200	-0.3%
2014	11300	0.0%
2013	11300	-3.8%
2011	12200	10.5%
2009	10000	-6.7%
2007	11500	13.0%
2005	9000	-
Average Growth		2.1%

Exhibit 4: Historical Area Traffic Growth



Expected Traffic Growth

For this traffic impact study, traffic projections were simply taken to be 2.1% annual growth. The Baseline 2031 and Baseline 2038 condition traffic volumes were projected to be the existing traffic volumes with an increase of 2.1% per year for 13 and 20 years, respectively. It is anticipated that business will move into the proposed development gradually over the next 20 years. The Phase 1 and Phase 2 traffic volumes were determined to be the computed Baseline 2031 and Baseline 2038 conditions in addition to the trips provided in **Table 9**. No growth factor was applied to the trips generated by the development.

Trip Distribution and Assignment

Phase 1 involves development on both the North and South sides of CSAH 2. Both halves of the development are expected to utilize Intersection 3 to access CSAH 2. Phase 2 development will occur on the north side of CSAH 2, west of the Phase 1 area. Once the project transitions into Phase 2, it is expected that Intersection 2 will be available to access CSAH 2. Both distribution diagrams are provided in **Appendix H: Trip Distribution**.

Modal Split

The traffic counters were instructed to note pedestrian and bicycle movements at the time of data collection. No pedestrians or cyclists were observed during the study times. Introducing the development may generate pedestrian and bicycle traffic. The proposed development plan shows sidewalks throughout the development. No bicycle accommodations are shown. If into the future, cyclists use the roadways more frequently, bicycle accommodations should be considered.

Total Future Traffic

The trip generation, trip distribution, and traffic assignment analysis and calculations result in peak hour volumes for each study period.

Appendix I: Baseline (2031) Traffic Counts – Diagram shows the 13-year (2031) Baseline peak volumes, and **Appendix J: Phase 1 (2031) Traffic Counts – Diagram** shows the 13-year (2031) Phase 1 peak volumes. Refer to **Appendices M and N** for the complete Synchro analysis worksheets.

Appendix K: Baseline (2038) Traffic Counts – Diagram shows the 20-year (2038) Baseline peak volumes, and **Appendix L: Phase 2 (2038) Traffic Counts – Diagram** shows the 20-year (2038) Phase 2 peak volumes. Refer to **Appendices P and R** for the complete Synchro analysis worksheets. Additionally, **Appendix Q: Synchro Reports – Baseline (2038) with Improvements from Phase 1** is provided which details the "Baseline (2038)" volumes with the geometrics implemented as recommended for Phase 1.

Site Access, Circulation, and Parking

The proposed development will be constructed north of CSAH 2, between Xerxes Avenue and I-35. At full build, the development will contain three major access points, a road intersecting with Xerxes Avenue and two roads intersecting CSAH 2. An overview of the development and road locations are shown within **Appendix A: Proposed Development**. The roads will be classified as Collectors with 40' roadway widths. The CSAH 2 access points have been paved-in within the CSAH 2 right-of-way. **Exhibits 5-8** show the proposed typical sections and aerials of the CSAH 2 access points. The typical sections shown below are consistent with the 2030 City Comprehensive Plan for Major and Minor Collector streets. Business driveways will access this internal road network. Off street parking will be provided as businesses move into the development. Site plans for these business will be developed and submitted to the City of Elko New Market for review and approval.

Exhibit 5: Typical Section – North-South Roads Accessing CSAH 2 – Major Collector

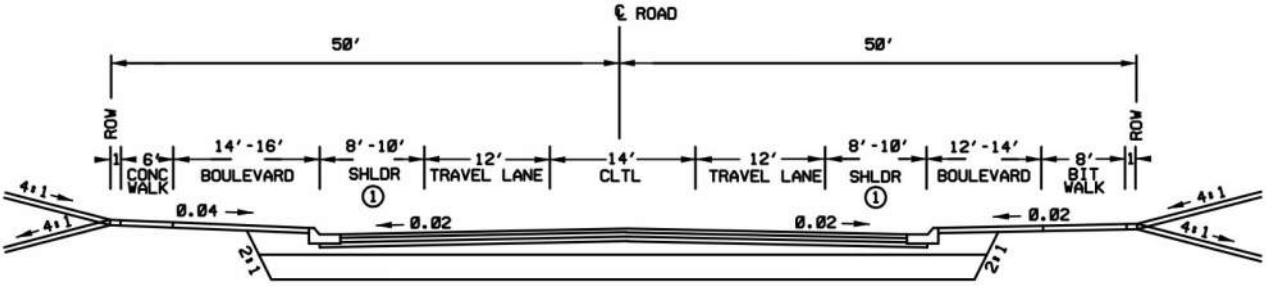


Exhibit 6: Typical Section – East-West Roads Accessing Xerxes Avenue – Minor Collector

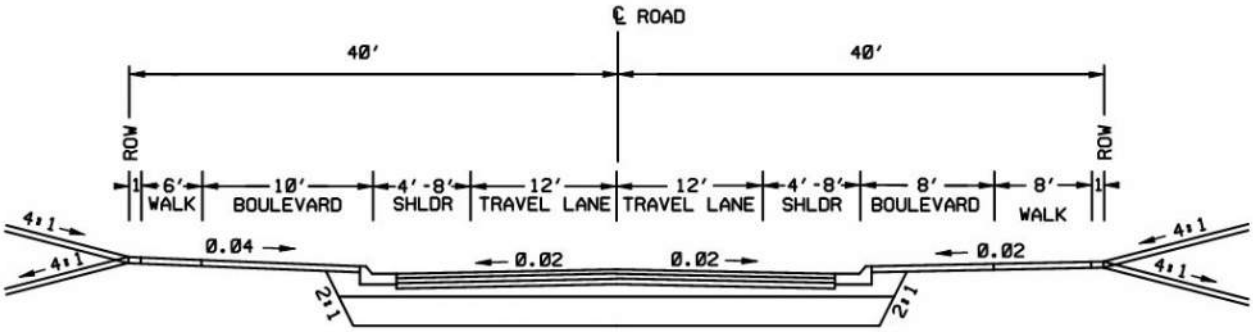


Exhibit 7: Intersection 2 - CSAH 2 and Future Access Road (W)

Exhibit 8: Intersection 3 - CSAH 2 and Future Access Road (E)

Capacity and Level of Service at Studied Intersections

The peak hour volumes for each study period were analyzed within Synchro for capacity and LOS at the study roadways and intersections. The Synchro analysis worksheets are provided within the Appendices.

Tables 12-17 show the 13-year (2031) Baseline LOS and delay and **Tables 18-23** show the 13-year (2031) Phase 1 LOS and delay.

Tables 24-29 show the 20-year (2038) Baseline LOS and delay. These tables do not include Phase 1 traffic or recommendations. **Tables 30-35** show the 20-year LOS and delay at the studied intersections as if Phase 1 was implemented. **Tables 36-41** show the 20-year (2038) Phase 2 LOS and delay.

Notes:

*: the delay is greater than 300 seconds.

**: the volume exceeds capacity, and LOS F is assigned to both the overcapacity movement and the respective approach. HCM 2010 LOS and delay values shown in Synchro reports for overcapacity movements and approaches may not reflect conditions.

13-Year (2031) Baseline Condition

Table 12: Baseline 2031 LOS – Intersection 1

INTERSECTION 1	AM PEAK												
	2031 BASELINE												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		6	742	4	26	183	0	33	3	275	3	2	3
Queue (ft)		6	0	0	32	0	0	49		90	21		
Mvmt Delay (sec)		7.7	0.0	0.0	9.7	0.0	0.0	20.5		17.8			
Mvmt LOS		A	A	A	A	A	A	C		C			
Delay (sec)	4.8	0.1			1.2			18.1			16.5		
LOS	A	A			A			C			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 1	PM PEAK												
	2031 BASELINE												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		2	413	27	242	928	4	20	1	77	1	0	0
Queue (ft)		12	0	9	76	0	0	42		46	0		
Mvmt Delay (sec)		10.2	0.0	0.0	9.2	0.0	0.0	33.0		10.1			
Mvmt LOS		B	A	A	A	A	A	D		B			
Delay (sec)	2.2	0.0			1.9			15.0			41.4		
LOS	A	A			A			C			E		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 13: Baseline 2031 LOS – Intersection 2

INTERSECTION 2	AM PEAK												
	2031 BASELINE												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1136	10	0	227		2		0			
Queue (ft)			0	0	0	0		13					
Mvmt Delay (sec)					0.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.0	0.0			0.0			28.7					
LOS	A	A			A			D					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 2	PM PEAK												
	2031 BASELINE												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			443	18	1	1088		14		3			
Queue (ft)			0	0	0	0		32					
Mvmt Delay (sec)					8.3	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.2	0.0			0.0			15.9					
LOS	A	A			A			A					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 14: Baseline 2031 LOS – Intersection 3

INTERSECTION 3	AM PEAK												
	2031 BASELINE												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1118	0	14	224		0		8			
Queue (ft)			5	0	33	0		26					
Mvmt Delay (sec)					11.7	0.0							
Mvmt LOS					B	A							
Delay (sec)	0.2	0.0			0.7			13.6					
LOS	A	A			A			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 3	PM PEAK												
	2031 BASELINE												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			446	0	12	1100		0		22			
Queue (ft)			0	0	20	0		32					
Mvmt Delay (sec)					8.4	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.2	0.0			0.1			9.9					
LOS	A	A			A			A					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 15: Baseline 2031 LOS – Intersection 4

INTERSECTION 4	AM PEAK												
	2031 BASELINE												
CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1240	2	2	257		1		12			
Queue (ft)			22		33			31					
Mvmt Delay (sec)					12.4	0.0							
Mvmt LOS					B	A							
Delay (sec)	**0.3**	0.0			0.1			28.6					
LOS	**A**	A			A			D					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 4	PM PEAK												
	2031 BASELINE												
CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			472	4	14	1152		6		6			
Queue (ft)			0		39			29					
Mvmt Delay (sec)					8.5	0.2							
Mvmt LOS					A	A							
Delay (sec)	**0.3**	0.0			0.3			18.1					
LOS	**A**	A			A			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 16: Baseline 2031 LOS – Intersection 5

INTERSECTION 5	AM PEAK												
	2031 BASELINE												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1088	70	69	114					47	1	130
Queue (ft)			156	0	132						145		21
Mvmt Delay (sec)					12.3	0.0							
Mvmt LOS					B	A							
Delay (sec)	2.8	0.0			4.6						63		
LOS	A	A			A						F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 5	PM PEAK												
	2031 BASELINE												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			375	51	88	328					146	0	747
Queue (ft)			0	0	80						89		278
Mvmt Delay (sec)					8.4	0.0							
Mvmt LOS					A	A							
Delay (sec)	6.1	0.0			1.8						36.2		
LOS	A	A			A						E		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 17: Baseline 2031 LOS – Intersection 6

INTERSECTION 6	AM PEAK												
	2031 BASELINE												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		867	297			128	148	20	0	62			
Queue (ft)		770				24		465					
Mvmt Delay (sec)		17.2	0.0										
Mvmt LOS		C	A										
Delay (sec)	**	12.8			0.0			**					
LOS	F	B			A			F					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 6	PM PEAK												
	2031 BASELINE												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		294	234			345	72	64	2	49			
Queue (ft)		126				10		109					
Mvmt Delay (sec)		9.6	0.0										
Mvmt LOS		A	A										
Delay (sec)	8.9	5.3			0.0			57.5					
LOS	A	A			A			F					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

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Table 18: Phase 1 LOS – Intersection 1

INTERSECTION 1	AM PEAK												
	2031 PHASE 1												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		6	1032	4	26	421	0	33	3	384	40	2	3
Queue (ft)		7	5	0	45	0	0	254		288	48		
Mvmt Delay (sec)		8.3	0.0	0.0	12.7	0.0	0.0	39.5		59			
Mvmt LOS		A	A	A	B	A	A	E		F			
Delay (sec)	12.3	0.0			2.6			57.3			**		
LOS	B	A			A			F			F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 1	PM PEAK												
	2031 PHASE 1												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		2	663	27	363	1251	44	20	1	171	33	0	0
Queue (ft)		9	0	7	86	0	0	69		77	151		
Mvmt Delay (sec)		12.1	0.0	0.0	12.3	0.0	0.0	**		12.9			
Mvmt LOS		B	A	A	B	A	A	F		B			
Delay (sec)	*	0.0			2.7			**			**		
LOS	F	A			A			F			F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 19: Phase 1 LOS – Intersection 2

INTERSECTION 2	AM PEAK												
	2031 PHASE 1												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1572	10	0	585		2		0			
Queue (ft)			0	0	0	0		10					
Mvmt Delay (sec)					0.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.1	0.0			0.0			54.5					
LOS	A	A			A			F					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 2	PM PEAK												
	2031 PHASE 1												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			819	18	1	1572		14		3			
Queue (ft)			0	0	4	0		35					
Mvmt Delay (sec)					9.7	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.2	0.0			0.0			25.1					
LOS	A	A			A			D					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 20: Phase 1 LOS – Intersection 3

INTERSECTION 3	AM PEAK												
	2031 PHASE 1												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		175	1118	261	188	224	117	215	0	152	96	0	143
Queue (ft)		49	0	26	415	264	6	24			123		
Mvmt Delay (sec)					15.6	0.0							
Mvmt LOS					C	A							
Delay (sec)	*	0.9			5.5			**			**		
LOS	F	A			A			F			F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 3	PM PEAK												
	2031 PHASE 1												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		151	446	225	162	1100	101	291	0	216	128	0	193
Queue (ft)		78	0	18	63	5	8	36			131		
Mvmt Delay (sec)					9.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	*	2.5			1.1			**			**		
LOS	F	A			A			F			F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 21: Phase 1 LOS – Intersection 4

INTERSECTION 4	AM PEAK												
	2031 PHASE 1												
CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1480	2	2	548		1		12			
Queue (ft)			108		19			29					
Mvmt Delay (sec)					14.4	0.1							
Mvmt LOS					B	A							
Delay (sec)	**0.3**	0.0			0.2			42.3					
LOS	**A**	A			A			E					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 4	PM PEAK												
	2031 PHASE 1												
CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			794	4	14	1403		6		6			
Queue (ft)			0		24			31					
Mvmt Delay (sec)					9.7	0.6							
Mvmt LOS					A	A							
Delay (sec)	**0.6**	0.0			0.7			33.1					
LOS	**A**	A			A			D					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 22: Phase 1 LOS – Intersection 5

INTERSECTION 5	AM PEAK												
	2031 PHASE 1												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1238	160	69	296					47	1	239
Queue (ft)			214	10	195						169		68
Mvmt Delay (sec)					13.7	0.0							
Mvmt LOS					B	A							
Delay (sec)	5.3	0.0			2.6						182		
LOS	A	A			A						F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 5	PM PEAK												
	2031 PHASE 1												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			576	172	88	485					146	0	841
Queue (ft)			0	4	78						549		1131
Mvmt Delay (sec)					9.1	0.0							
Mvmt LOS					A	A							
Delay (sec)	*	0.0			1.4						**		
LOS	F	A			A						F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 23: Phase 1 LOS – Intersection 6

INTERSECTION 6	AM PEAK												
	2031 PHASE 1												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		957	357			201	148	129	0	62			
Queue (ft)		809				25		880					
Mvmt Delay (sec)		30.3	0.0										
Mvmt LOS		D	A										
Delay (sec)	17.0	22.1			0.0			**					
LOS	C	C			A			F					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 6	PM PEAK												
	2031 PHASE 1												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		415	314			408	72	158	2	49			
Queue (ft)		114				7		367					
Mvmt Delay (sec)		11.0	0.0										
Mvmt LOS		B	A										
Delay (sec)	*	6.3			0.0			**					
LOS	F	A			A			F					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

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Table 24: Baseline 2038 LOS – Intersection 1

INTERSECTION 1	AM PEAK												
	2038 BASELINE												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		9	860	8	30	213	0	38	3	319	6	4	6
Queue (ft)		17	5	0	41	0	0	46		117	25		
Mvmt Delay (sec)		7.7	0	0	10.3	0	0	25.4		24.8			
Mvmt LOS		A	A	A	B	A	A	D		C			
Delay (sec)	6.5	0.1			1.3			24.9			23.5		
LOS	A	A			A			C			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 1	PM PEAK												
	2038 BASELINE												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		4	478	31	281	1078	5	24	2	90	2	0	0
Queue (ft)		15	0	14	94	0	0	36		49	14		
Mvmt Delay (sec)		11.1	0	0	9.8	0	0	49.6		10.6			
Mvmt LOS		B	A	A	A	A	A	E		B			
Delay (sec)	2.6	0.1			2.0			19.3			59.7		
LOS	A	A			A			C			F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 25: Baseline 2038 LOS – Intersection 2

INTERSECTION 2	AM PEAK												
	2038 BASELINE												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1319	13	0	264		4		0			
Queue (ft)			0	0	0	0		15					
Mvmt Delay (sec)					0.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.1	0.0			0.0			37.6					
LOS	A	A			A			E					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 2	PM PEAK												
	2038 BASELINE												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			513	22	2	1261		18		3			
Queue (ft)			0	13	12	0		36					
Mvmt Delay (sec)					8.5	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.2	0.0			0.0			18.4					
LOS	A	A			A			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 26: Baseline 2038 LOS – Intersection 3

INTERSECTION 3	AM PEAK												
	2038 BASELINE												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1297	0	15	258		0		10			
Queue (ft)			566	0	33	0		28					
Mvmt Delay (sec)					13.1	0.0							
Mvmt LOS					B	A							
Delay (sec)	**0.2**	0.0			0.7			15.2					
LOS	**A**	A			A			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 3	PM PEAK												
	2038 BASELINE												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			517	0	15	1277		0		27			
Queue (ft)			0	0	23	0		33					
Mvmt Delay (sec)					8.6	0.0							
Mvmt LOS					A	A							
Delay (sec)	**0.2**	0.0			0.1			10.2					
LOS	**A**	A			A			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 27: Baseline 2038 LOS – Intersection 4

INTERSECTION 4	AM PEAK												
	2038 BASELINE												
CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1439	4	4	298		2		14			
Queue (ft)			683		26			68					
Mvmt Delay (sec)					14.1	0.1							
Mvmt LOS					B	A							
Delay (sec)	**0.4**	0.0			0.3			40.9					
LOS	**A**	A			A			E					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 4	PM PEAK												
	2038 BASELINE												
CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			547	5	18	1336		6		9			
Queue (ft)			0		38			31					
Mvmt Delay (sec)					8.7	0.4							
Mvmt LOS					A	A							
Delay (sec)	**0.5**	0.0			0.5			20.7					
LOS	**A**	A			A			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 28: Baseline 2038 LOS – Intersection 5

INTERSECTION 5	AM PEAK												
	2038 BASELINE												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1263	81	81	132					55	2	152
Queue (ft)			373	7	142						254		113
Mvmt Delay (sec)					14.2	0							
Mvmt LOS					B	A							
Delay (sec)	6.4	0.0			5.4						160		
LOS	A	A			A						F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 5	PM PEAK												
	2038 BASELINE												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			435	60	102	381					170	0	868
Queue (ft)			0		100						614		1290
Mvmt Delay (sec)					8.6	0							
Mvmt LOS					A	A							
Delay (sec)	12.5	0.0			1.8						79.2		
LOS	B	A			A						F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 29: Baseline 2038 LOS – Intersection 6

INTERSECTION 6	AM PEAK												
	2038 BASELINE												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		1006	345			149	173	24	0	72			
Queue (ft)		862				21		643					
Mvmt Delay (sec)		33.4	0										
Mvmt LOS		D	A										
Delay (sec)	19.6	24.8			0.0			11.5					
LOS	C	C			A			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 6	PM PEAK												
	2038 BASELINE												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		341	271			400	85	74	4	58			
Queue (ft)		177				10		117					
Mvmt Delay (sec)		10.4	0										
Mvmt LOS		B	A										
Delay (sec)	26.0	5.8			0.0			209					
LOS	D	A			A			F					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

20-Year (2038) with Phase 1 Recommendations

Table 30: 2038 with Phase 1 Recommendations LOS – Intersection 1

INTERSECTION 1	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		9	1150	8	120	451	30	38	3	428	43	4	6
Queue (ft)		30	322	14	112	98	20	41		228	61		9
Mvmt Delay (sec)		15.2	31.4	15.7	23.3	15.4	13.4	69.3		36.1			
Mvmt LOS		B	C	B	C	B	B	E		D			
Delay (sec)	29.9	31.2			16.9			39.0			69.6		
LOS	C	C			B			D			E		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 1	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		4	728	31	402	1401	45	24	2	184	34	0	0
Queue (ft)		19	242	29	260	281	22	41		81	41		0
Mvmt Delay (sec)		20.8	26.2	19.9	24.0	20.9	10.9	20.8		25.4			
Mvmt LOS		C	C	B	C	C	B	C		C			
Delay (sec)	22.8	25.9			21.4			24.8			22.0		
LOS	C	C			C			C			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 31: 2038 with Phase 1 Recommendations LOS – Intersection 2

INTERSECTION 2	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1755	13	0	622		4		0			
Queue (ft)			0	0	0	0		10					
Mvmt Delay (sec)					0.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.1	0.0			0.0			74.8					
LOS	A	A			A			F					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 2	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			889	22	2	1745		18		3			
Queue (ft)			0	0	0	0		35					
Mvmt Delay (sec)					0.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.2	0.0			0.0			30.0					
LOS	A	A			A			D					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 32: 2038 with Phase 1 Recommendations LOS – Intersection 3

INTERSECTION 3	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		175	1297	261	189	258	117	215	0	154	96	0	143
Queue (ft)		222	494	195	422	316	53	18	45		56	99	
Mvmt Delay (sec)		12.6	40.5	18.6	50.0	15.9	16.0	35.8	0.0	34.4	25.6	0.0	34.2
Mvmt LOS		B	D	B	D	B	B	D	A	C	C	A	C
Delay (sec)	32.8	34.3			27.4			35.2			30.7		
LOS	C	C			C			D			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 3	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		151	517	225	165	1277	101	291	0	221	128	0	193
Queue (ft)		169	180	95	164	372	42	16	53		68	144	
Mvmt Delay (sec)		42.4	20	20	15.4	39.7	16.9	42.0	0.0	37.3	25.3	0.0	39.1
Mvmt LOS		D	B	C	B	D	B	D	A	D	C	A	D
Delay (sec)	32.8	23.7			35.6			40.0			33.6		
LOS	C	C			D			D			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Recommendations for Phase 1 improvements include closing Intersection 4. Table for Intersection 4 is omitted.

Table 33: 2038 with Phase 1 Recommendations LOS – Intersection 5

INTERSECTION 5	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1413	171	81	314					55	2	261
Queue (ft)			314	341	111	145					69		57
Mvmt Delay (sec)					20.3	0.1							
Mvmt LOS					C	A							
Delay (sec)	24	28.7			4.2						29.6		
LOS	C	C			A						C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 5	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			636	181	102	538					170	0	962
Queue (ft)			334		224	573					581		1196
Mvmt Delay (sec)					29.9	48.3							
Mvmt LOS					C	D							
Delay (sec)	65.5	92.8			45.3						10.3		
LOS	E	F			D						B		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 34: 2038 with Phase 1 Recommendations LOS – Intersection 6

INTERSECTION 6	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		1096	405			222	173	133	0	72			
Queue (ft)		312	167			200		132		44			
Mvmt Delay (sec)		27.9	23.8										
Mvmt LOS		C	C										
Delay (sec)	29.5	26.8			43.1			22.5					
LOS	C	C			D			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 6	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		462	351			463	85	168	4	58			
Queue (ft)		157	92			264		138		46			
Mvmt Delay (sec)		24.4	30.1										
Mvmt LOS		C	C										
Delay (sec)	27.9	26.9			35.3			13.6					
LOS	C	C			D			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

20-Year (2038) Phase 2 Condition

Table 35: Phase 2 LOS – Intersection 1

INTERSECTION 1	AM PEAK												
	2038 PHASE 2												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		9	1337	8	137	499	36	38	3	498	66	4	6
Queue (ft)		20	332	17	106	112	27	389		342	77		10
Mvmt Delay (sec)		11.5	31	12	27.3	12	10.1	57.3		108.6			
Mvmt LOS		B	C	B	C	B	B	E		F			
Delay (sec)	43.5	30.5			14.8			104.7			95.1		
LOS	D	C			B			F			F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 1	PM PEAK												
	2038 PHASE 2												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		4	830	31	501	1666	78	24	2	222	46	0	0
Queue (ft)		10	219	29	272	237	27	47		124	61		0
Mvmt Delay (sec)		20.8	29.5	19.5	39.3	23.4	8.5	21.7		29.9			
Mvmt LOS		C	C	B	D	C	A	C		C			
Delay (sec)	27.3	29.1			26.4			29.1			23.5		
LOS	C	C			C			C			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 36: Phase 2 LOS – Intersection 2

INTERSECTION 2	AM PEAK												
	2038 PHASE 2												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		36	1999	13	0	638	58	4	0	0	14	0	55
Queue (ft)		69	0	0	0	369	0	20			732		
Mvmt Delay (sec)		9.3	0.0	0.0	0.0	0.0	0.0						
Mvmt LOS		A	A	A	A	A	A						
Delay (sec)	0.8	0.2			0.0			135.1			18.0		
LOS	A	A			A			F			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 2	PM PEAK												
	2038 PHASE 2												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		132	909	22	2	1769	241	18	0	3	147	0	373
Queue (ft)		161	0	0	0	0	26	62			650		
Mvmt Delay (sec)		25.3	0.0	0.0	10.1	0.0	0.0						
Mvmt LOS		D	A	A	B	A	A						
Delay (sec)	*	3.1			0.0			**			**		
LOS	F	A			A			F			F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 37: Phase 2 LOS – Intersection 3

INTERSECTION 3	AM PEAK												
	2038 PHASE 2												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		429	1311	251	183	282	285	151	0	111	171	0	257
Queue (ft)		209	396	85	398	339	83	18	45		56	106	
Mvmt Delay (sec)		17.1	39	17.9	47.8	23	29.2	40.2	0	32.2	29.7	0	54.1
Mvmt LOS		B	D	B	D	C	C	D	A	C	C	A	D
Delay (sec)	33.5	31.4			31.5			36.8			44.4		
LOS	C	C			C			D			D		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 3	PM PEAK												
	2038 PHASE 2												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		184	664	212	156	1365	123	352	0	262	205	0	309
Queue (ft)		216	308	71	397	539	392	17	40		61	143	
Mvmt Delay (sec)		91.3	29.9	27.9	25.0	63.3	28.7	93.3	0	66.2	50.1	0	199.6
Mvmt LOS		F	C	C	C	E	C	F	A	E	D	A	F
Delay (sec)	67.5	40.2			57.1			81.7			140.0		
LOS	E	D			E			F			F		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Recommendations for Phase 1 improvements include closing Intersection 4. Table for Intersection 4 is omitted.

Table 38: Phase 2 LOS – Intersection 5

INTERSECTION 5	AM PEAK												
	2038 PHASE 2												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1442	188	81	430					55	2	331
Queue (ft)			319	336	92	172					75		123
Mvmt Delay (sec)					20.8	0.1							
Mvmt LOS					C	A							
Delay (sec)	23.8	29.9			3.4						29.5		
LOS	C	C			A						C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 5	PM PEAK												
	2038 PHASE 2												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			802	280	102	601					170	0	1000
Queue (ft)			316	310	253	796					585		1267
Mvmt Delay (sec)					124.7	34.5							
Mvmt LOS					F	C							
Delay (sec)	86.4	123			47.6						16.2		
LOS	F	F			D						B		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 39: Phase 2 LOS – Intersection 6

INTERSECTION 6	AM PEAK												
	2038 PHASE 2												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		1113	417			268	173	203	0	72			
Queue (ft)		244	310			191	231	178		89			
Mvmt Delay (sec)		28.6	23.2										
Mvmt LOS		C	C										
Delay (sec)	30.6	27.1			45.8			25.5					
LOS	C	C			D			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 6	PM PEAK												
	2038 PHASE 2												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		561	418			488	85	206	4	58			
Queue (ft)		288	281			260	275	209		87			
Mvmt Delay (sec)		15.9	6.1										
Mvmt LOS		B	A										
Delay (sec)	19.0	11.7			33.1			15.4					
LOS	B	B			C			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Level of Service and Delay Comparison

The following tables provide a side-by-side comparison in the change in delay and level of service for the studied intersections' approaches. Values within the 2031 Phase 1 and 2038 Phase 2 rows show conditions using existing geometry and without any recommended improvements.

In the existing condition, Intersections 1-6 operate at an overall LOS A-B. Background traffic is expected to increase into the future, causing LOS F conditions at Intersections 5 and 6. Introducing the proposed development's trips, multiple turn movements on the minor approaches are expected to operate at LOS F, causing the overall level of service at the intersections to decrease. Because business are expected to move into the development gradually, the area will need to be closely monitored as the area develops and traffic conditions change over the next 20 years.

Table 40: LOS and Delay Comparison – Intersection 1

	INTERSECTION 1	AM PEAK												
	CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	3.6	0.1			1.1			13.6			13.1		
	LOS	A	A			A			B			B		
2031 Baseline	Delay (sec)	4.8	0.1			1.2			18.1			16.5		
	LOS	A	A			A			C			C		
2031 Phase 1	Delay (sec)	12.3	0.0			2.6			57.3			**		
	LOS	B	A			A			F			F		
2038 Baseline	Delay (sec)	6.5	0.1			1.3			24.9			23.5		
	LOS	A	A			A			C			C		
2038 Phase 2	Delay (sec)	43.5	30.5			14.8			104.7			95.1		
	LOS	D	C			B			F			F		

	INTERSECTION 1	PM PEAK												
	CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	2.0	0.1			1.8			12.4			27.1		
	LOS	A	A			A			B			D		
2031 Baseline	Delay (sec)	2.2	0.0			1.9			15.0			41.4		
	LOS	A	A			A			C			E		
2031 Phase 1	Delay (sec)	*	0.0			2.7			**			**		
	LOS	F	A			A			F			F		
2038 Baseline	Delay (sec)	2.6	0.1			2.0			19.3			59.7		
	LOS	A	A			A			C			F		
2038 Phase 2	Delay (sec)	27.3	29.1			26.4			29.1			23.5		
	LOS	C	C			C			C			C		

Table 41: LOS and Delay Comparison – Intersection 2

	INTERSECTION 2	AM PEAK												
	CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	0.0		0.0			0.0			20.9				
	LOS	A		A			A			C				
2031 Baseline	Delay (sec)	0.0		0.0			0.0			28.7				
	LOS	A		A			A			D				
2031 Phase 1	Delay (sec)	0.1		0.0			0.0			54.5				
	LOS	A		A			A			F				
2038 Baseline	Delay (sec)	0.1		0.0			0.0			37.6				
	LOS	A		A			A			E				
2038 Phase 2	Delay (sec)	0.8		0.2			0.0			135.1			18.0	
	LOS	A		A			A			F			C	

	INTERSECTION 2	PM PEAK												
	CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	0.2		0.0			0.0			13.8				
	LOS	A		A			A			B				
2031 Baseline	Delay (sec)	0.2		0.0			0.0			15.9				
	LOS	A		A			A			A				
2031 Phase 1	Delay (sec)	0.2		0.0			0.0			25.1				
	LOS	A		A			A			D				
2038 Baseline	Delay (sec)	0.2		0.0			0.0			18.4				
	LOS	A		A			A			C				
2038 Phase 2	Delay (sec)	*		3.1			0.0			**			**	
	LOS	F		A			A			F			F	

Table 42: LOS and Delay Comparison – Intersection 3

	CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	0.2		0.0			0.6			12.0				
	LOS	A		A			A			B				
2031 Baseline	Delay (sec)	0.2		0.0			0.7			13.6				
	LOS	A		A			A			B				
2031 Phase 1	Delay (sec)	*		0.9			5.5			**				
	LOS	F		A			A			F				
2038 Baseline	Delay (sec)	0.2		0.0			0.7			15.2				
	LOS	A		A			A			C				
2038 Phase 2	Delay (sec)	33.5		31.4			31.5			36.8			44.4	
	LOS	C		C			C			D			D	

	INTERSECTION 3	PM PEAK												
	CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	0.2		0.0			0.1			9.5				
	LOS	A		A			A			A				
2031 Baseline	Delay (sec)	0.2		0.0			0.1			9.9				
	LOS	A		A			A			A				
2031 Phase 1	Delay (sec)	*		2.5			1.1			**				
	LOS	F		A			A			F				
2038 Baseline	Delay (sec)	0.2		0.0			0.1			10.2				
	LOS	A		A			A			B				
2038 Phase 2	Delay (sec)	67.5		40.2			57.1			81.7			140.0	
	LOS	E		D			E			F			F	

Table 43: LOS and Delay Comparison – Intersection 4

	INTERSECTION 4	AM PEAK												
	CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	0.2		0.0			0.1			19.8				
	LOS	A		A			A			C				
2031 Baseline	Delay (sec)	0.3		0.0			0.1			28.6				
	LOS	A		A			A			D				
2031 Phase 1	Delay (sec)	0.3		0.0			0.2			42.3				
	LOS	A		A			A			E				
2038 Baseline	Delay (sec)	0.4		0.0			0.3			40.9				
	LOS	A		A			A			E				
2038 Phase 2	Delay (sec)													
	LOS													

	INTERSECTION 4	PM PEAK												
	CSAH 2 & Irving Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	0.2		0.0			0.2			13.8				
	LOS	A		A			A			B				
2031 Baseline	Delay (sec)	0.3		0.0			0.3			18.1				
	LOS	A		A			A			C				
2031 Phase 1	Delay (sec)	0.6		0.0			0.7			33.1				
	LOS	A		A			A			D				
2038 Baseline	Delay (sec)	0.5		0.0			0.5			20.7				
	LOS	A		A			A			C				
2038 Phase 2	Delay (sec)													
	LOS													

Table 44: LOS and Delay Comparison – Intersection 5

	INTERSECTION 5	AM PEAK												
	CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	1.5	0.0			3.9						28.3		
	LOS	A	A			A						D		
2031 Baseline	Delay (sec)	2.8	0.0			4.6						0.0		
	LOS	A	A			A						F		
2031 Phase 1	Delay (sec)	5.3	0.0			2.6						181.6		
	LOS	A	A			A						F		
2038 Baseline	Delay (sec)	6.4	0.0			5.4						159.9		
	LOS	A	A			A						F		
2038 Phase 2	Delay (sec)	23.8	29.9			3.4						29.5		
	LOS	C	C			A						C		

	INTERSECTION 5	PM PEAK												
	CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	3.7	0.0			1.7						19.8		
	LOS	A	A			A						C		
2031 Baseline	Delay (sec)	6.1	0.0			1.8						36.2		
	LOS	A	A			A						E		
2031 Phase 1	Delay (sec)	*	0.0			1.4						**		
	LOS	F	A			A						F		
2038 Baseline	Delay (sec)	12.5	0.0			1.8						79.2		
	LOS	B	A			A						F		
2038 Phase 2	Delay (sec)	86.4	122.7			47.6						16.2		
	LOS	F	F			D						B		

Table 45: LOS and Delay Comparison – Intersection 6

	INTERSECTION 6	AM PEAK												
	CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	12.9	8.3			0.0			122.0					
	LOS	B	A			A			F					
2031 Baseline	Delay (sec)	**	12.8			0.0			**					
	LOS	F	B			A			F					
2031 Phase 1	Delay (sec)	17.0	22.1			0.0			**					
	LOS	C	C			A			F					
2038 Baseline	Delay (sec)	19.6	24.8			0.0			11.5					
	LOS	C	C			A			B					
2038 Phase 2	Delay (sec)	30.6	27.1			45.8			25.5					
	LOS	C	C			D			C					

	INTERSECTION 6	PM PEAK												
	CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
			L	T	R	L	T	R	L	T	R	L	T	R
Existing	Delay (sec)	4.9	4.9			0.0			22.2					
	LOS	A	A			A			C					
2031 Baseline	Delay (sec)	8.9	5.3			0.0			57.5					
	LOS	A	A			A			F					
2031 Phase 1	Delay (sec)	*	6.3			0.0			**					
	LOS	F	A			A			F					
2038 Baseline	Delay (sec)	26.0	5.8			0.0			209.3					
	LOS	D	A			A			F					
2038 Phase 2	Delay (sec)	19.0	11.7			33.1			15.4					
	LOS	B	B			C			B					

Crash Analysis

Crash data for the study area was gathered using the Minnesota Crash Mapping Tool (MnCMAT). A diagram of crashes reported between 2011 and 2015 is provided as **Exhibit 9**. 26 crashes occurred between 2006 and 2015. **Table 46** and **Table 47** summarizes these crashes. There are no apparent patterns in the crash data warranting safety improvements to the existing roadway.

Exhibit 9: Crash Locations

Table 46: Recorded Crashes and Severity Summary

Crash Severity	Number of Crashes
K – Fatal Injury	1
A – Incapacitating Injury	0
B – Non-Incapacitating Injury	7
C – Possible Injury	17
Property Damage	28

Table 47: KAB Crash Details

Severity Type	Date	Time	Junction	Road Condition	Weather	Diagram	Notes
B	8/26/2006	11:20 PM	Xerxes Ave	Dry	Clear (Dark)	Sideswipe Passing	Wrong Way
B	8/9/2010	1:15 PM	Xerxes Ave	Dry	Clear	Head On	Failed to Yield to ROW, Distraction
K	1/17/11	7:49 AM	Xerxes Ave	Ice/Packed Snow	Cloudy	Right Angle	Fatal; Failed to Yield to ROW, Avoid Unit/Object in Road
B	3/3/11	7:29 PM	I-35	Dry	Clear	Right Angle	Failed to Yield to ROW; Vision Obscured
B	11/13/11	8:54 AM	Xerxes Ave	Wet	Rain	Sideswipe Passing	Both driving East
B	4/18/12	3:57 PM	Non-Junction	Dry	Clear	Other; 1 Vehicle	Motorcycle; Under the Influence
B	6/10/13	4:39 PM	I-35	Dry	Clear	Right Angle	Failed to Yield to ROW
B	12/5/14	3:39 PM	I-35	Dry	Cloudy	Rear End	Both driving South

Traffic Signal Warrant Analysis

The following table is a summary of the various traffic signal warrants as described in the Manual of Uniform Traffic Devices (MUTCD), and whether or not each warrant is satisfied for Intersections 1-3. Where Warrants 1 and 2 are satisfied, traffic signals are warranted.

Table 48: Traffic Signal Warrant Analysis Summary

Warrant #	Warrant Name	INT 1 Baseline (2031)	INT 1 Phase 1 (2031)	INT 2 Baseline (2038)	INT 2 Phase 2 (2038)	INT 3 Baseline (2031)	INT 3 Phase 1 (2031)
1	Eight-Hour Vehicular Volume	Yes	Yes	No	Yes	No	Yes
2	Four-Hour Vehicular Volume	Yes	Yes	No	Yes	No	Yes
3	Peak Hour	N/A	N/A	N/A	N/A	N/A	N/A
4	Pedestrian Four-Hour Volume	N/A	N/A	N/A	N/A	N/A	N/A
5	School Crossing	N/A	N/A	N/A	N/A	N/A	N/A
6	Coordinate Signal System	N/A	N/A	N/A	N/A	N/A	N/A
7	Crash Experience	N/A	N/A	N/A	N/A	N/A	N/A
8	Roadway Network	N/A	N/A	N/A	N/A	N/A	N/A
9	Intersection Near a Grade Crossing	N/A	N/A	N/A	N/A	N/A	N/A

Warrant #1

To estimate the average vehicular flow rates during the peak 8-hour period of an average day, a factor of 0.0625 was applied to the average daily traffic (ADT) values shown in **Appendix H: Trip Distribution**. This number was then divided by 2 to get the approach volume. Where an ADT value is not shown, the peak hour volume for the approach was divided by a K factor of 0.12 to get an estimated average daily traffic, and then a factor of 0.0625 was applied to get an average flow rate.

Once traffic impact studies conclude that traffic signals are warranted in the near future, a 12-hour traffic count should be conducted to confirm these conclusions and further study will be required to design the new traffic signals.

Warrant #2

The vehicular flow rates used in Warrant #1 were used in Warrant #2 to determine whether or not Warrant #2 is fulfilled.

All-Way-Stop Control Warrant Analysis

Per MUTCD guidance, all-way-stop control is warranted for Intersection 1 during the Baseline (2031) and Phase 1 conditions, for Intersection 2 during the Phase 2 condition, and Intersection 3 during the Phase 1 condition. The MUTCD describes when all-way-stop control may be appropriate for a particular intersection. The below text is taken from the MUTCD:

A. *Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.*

B. *Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.*

C. *Minimum volumes:*

   1. *The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and*

   2. *The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but*

   3. *If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.*

D. *Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.*

When traffic signals are warranted to accommodate traffic at Intersections 1-3, all-way-stop control may also be appropriate. All-way-stop control is an appropriate interim measure that can be installed immediately while arrangements can be made to install a traffic signal or other traffic control. Criteria A described above is satisfied. Because Criteria A is satisfied, all-way-stop control is warranted.

Improvements to Accommodate Development Traffic

Based on the modeled Phase 1 (2031) conditions described in this report, to accommodate both major and minor street traffic, improvements are recommended at Intersections 1-6. At the studied intersections the following are minimum recommendations:

- At Intersection 1,
    - Signalize intersection with permitted-protected EB and WB left turns and permitted NB and SB left turns;
    - Pave SB leg to accommodate a left-thru shared lane and a right turn lane; and
- At Intersection 2,
    - None.
- At Intersection 3,
    - Signalize intersection with permitted-protected EB and WB left turns; and
    - Include NB and 150’ SB left turn lanes (permitted-protected phasing) in the proposed development’s intersection reconfiguration plans.
- At Intersection 4,
    - Close access and route traffic to new access road to the west; and

    - Restripe CSAH 2 for two travel lanes in both EB and WB directions.
- At Intersection 5,
    - Signalize intersection with split phasing;
    - Add a 200’ WB left turn lane;
    - Maintain one dedicated EB thru lane and one shared EB thru/right lane.
- At the I-35 overpass, widen the bridge to accommodate four travel lanes.
- At Intersection 6,
    - Signalize intersection with split phasing;
    - Add two dedicated 300’ EB left turn lanes;
    - Add one dedicated 200’ WB right turn lane;
    - Add a 150’ NB right turn lane.

As the project moves into Phase 2, additional improvements are needed to accommodate both major and minor street traffic. At the studied intersections the following are minimum recommendations:

- At Intersection 1,
    - Ensure that traffic signal timing is current and update if necessary; and
    - Lengthen existing 200’ NB right turn lane to 300’.
- At Intersection 2,
    - Signalize intersection with permitted-protected EB and WB left turns and permitted NB and SB left turns;
    - Add a 150’ NB left turn lane; and
    - Add a 150’ SB right turn lane.
- At Intersection 3,
    - Ensure that traffic signal timing is current and update if necessary; and
    - Add a second NB left turn lane.
- At Intersection 4,
    - Closed per Phase 1 recommendations.
- At Intersection 5,
    - Ensure that traffic signal timing is current and update if necessary; and
    - Add a second 250’ SB right turn lane;
    - Add a 300’ EB right turn lane in order to maintain two EB thru lanes onto the I-35 overpass.
- At Intersection 6,
    - Ensure that traffic signal timing is current and update if necessary.

All turn lane tapers should be designed to appropriate lengths. Additionally, the above signal timing recommendations and described turn lane layouts are suggestions among many acceptable options. As the area develops, further study will be needed into order to appropriately design traffic signal timings for the area’s unique traffic patterns. Although the intersections seem to be planned for traffic signals, roundabouts were considered at Intersections 1-6. Into the future, turning movement volumes are expected to be low compared to CSAH 2’s thru

movements. Additionally, the intersections are closely spaced. Due to the high thru movement volumes and the close proximity of the intersections, roundabouts were not studied further.

Phasing of Improvements

Because businesses are expected to move into the development gradually, improvements to the subject intersection are not needed when the development is available for construction operations in 2019. Assuming linear development growth, Phase 1 development will be complete by 2031. If development occurs according to conceptual plans, the recommended improvements to accommodate Phase 1 traffic as described in this report may need to be implemented prior to 2031. The following recommendations should be used to determine when improvements are needed:

- As businesses move into the development, traffic impact studies should be conducted as the City's and County's thresholds require, to determine when improvements are warranted.
- This study should be updated if growth projections change.

Driveway Locations

Thoughtful placement of driveways is needed moving forward, and proposed business driveways should be placed in locations as to avoid impacts to future intersection turn lanes and tapers. No driveways should be allowed on CSAH 2. Two-way left turn lanes could also be considered to prevent future congestion along the development's access roadway links.

I-35 Interchange Improvements

Improvements will be needed to Intersection 5, Intersection 6, and the I-35 overpass regardless of proposed development construction. Interim and long term options for I-35 interchange improvements have been detailed in the "CH 2 / I-35 Interchange Area Management Plan" (IAMP) developed in 2010. If Scott County moves forward with the diverging diamond interchange plan, the recommended traffic signals and Intersections 1-4 should be actuated-coordinated, designed to complement the interchange signals. In the meantime, a LOS F condition was observed during traffic data collection for this report.

Modeling the Improvements

Modeling shows that the above recommendations improve the level of service at Intersections 1-6. **Tables 49-53** summarize the studied intersections' Phase 1 (2031) conditions with the recommended improvements. **Tables 54-58** summarize the studied intersections' Phase 2 (2038) conditions with the recommended improvements. Note that this report recommends closing Intersection 4 as a part of Phase 1. Therefore, the Intersection 4 table is purposely omitted. The Synchro analysis worksheets are provided in **Appendix O: Synchro Reports – Phase 1 (2031) Recommendations** and **Appendix S: Synchro Reports – Phase 2 (2038) Recommendations**.

This study anticipates other area development to match the recent rate of traffic growth, and these recommendations apply to the traffic conditions used in this study. However, re-analyzing the studied intersections is recommended during the design of major nearby developments, highway improvement projects, or interchange improvement projects.

Table 49: Phase 1 Recommendations – Intersection 1

INTERSECTION 1	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		9	1150	8	120	451	30	38	3	428	43	4	6
Queue (ft)		30	322	14	112	98	20	41		228	61		9
Mvmt Delay (sec)		15.2	31.4	15.7	23.3	15.4	13.4	69.3		36.1			
Mvmt LOS		B	C	B	C	B	B	E		D			
Delay (sec)	29.9	31.2			16.9			39.0			69.6		
LOS	C	C			B			D			E		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 1	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		4	728	31	402	1401	45	24	2	184	34	0	0
Queue (ft)		19	242	29	260	281	22	41		81	41		0
Mvmt Delay (sec)		20.8	26.2	19.9	24.0	20.9	10.9	20.8		25.4			
Mvmt LOS		C	C	B	C	C	B	C		C			
Delay (sec)	22.8	25.9			21.4			24.8			22.0		
LOS	C	C			C			C			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 50: Phase 1 Recommendations – Intersection 2

INTERSECTION 2	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1755	13	0	622		4		0			
Queue (ft)			0	0	0	0		10					
Mvmt Delay (sec)					0.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.1	0.0			0.0			74.8					
LOS	A	A			A			F					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 2	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			889	22	2	1745		18		3			
Queue (ft)			0	0	0	0		35					
Mvmt Delay (sec)					0.0	0.0							
Mvmt LOS					A	A							
Delay (sec)	0.2	0.0			0.0			30.0					
LOS	A	A			A			D					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 51: Phase 1 Recommendations – Intersection 3

INTERSECTION 3	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		175	1297	261	189	258	117	215	0	154	96	0	143
Queue (ft)		222	494	195	422	316	53	18	45		56	99	
Mvmt Delay (sec)		12.6	40.5	18.6	50.0	15.9	16.0	35.8	0.0	34.4	25.6	0.0	34.2
Mvmt LOS		B	D	B	D	B	B	D	A	C	C	A	C
Delay (sec)	32.8	34.3			27.4			35.2			30.7		
LOS	C	C			C			D			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 3	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		151	517	225	165	1277	101	291	0	221	128	0	193
Queue (ft)		169	180	95	164	372	42	16	53		68	144	
Mvmt Delay (sec)		42.4	20	20	15.4	39.7	16.9	42.0	0.0	37.3	25.3	0.0	39.1
Mvmt LOS		D	B	C	B	D	B	D	A	D	C	A	D
Delay (sec)	32.8	23.7			35.6			40.0			33.6		
LOS	C	C			D			D			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 52: Phase 1 Recommendations – Intersection 5

INTERSECTION 5	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1413	171	81	314					55	2	261
Queue (ft)			314	341	111	145					69		57
Mvmt Delay (sec)					20.3	0.1							
Mvmt LOS					C	A							
Delay (sec)	24	28.7			4.2						29.6		
LOS	C	C			A						C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 5	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			636	181	102	538					170	0	962
Queue (ft)			334		224	573					581		1196
Mvmt Delay (sec)					29.9	48.3							
Mvmt LOS					C	D							
Delay (sec)	65.5	92.8			45.3						10.3		
LOS	E	F			D						B		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 53: Phase 1 Recommendations – Intersection 6

INTERSECTION 6	AM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		1096	405			222	173	133	0	72			
Queue (ft)		312	167			200		132		44			
Mvmt Delay (sec)		27.9	23.8										
Mvmt LOS		C	C										
Delay (sec)	29.5	26.8			43.1			22.5					
LOS	C	C			D			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 6	PM PEAK												
	2038 WITH PHASE 1 IMPROVEMENTS												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		462	351			463	85	168	4	58			
Queue (ft)		157	92			264		138		46			
Mvmt Delay (sec)		24.4	30.1										
Mvmt LOS		C	C										
Delay (sec)	27.9	26.9			35.3			13.6					
LOS	C	C			D			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 54: Phase 2 Recommendations – Intersection 1

INTERSECTION 1	AM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		9	1337	8	138	500	36	38	3	498	66	4	6
Queue (ft)		26	421	18	148	130	34	191		310	80		15
Mvmt Delay (sec)		13.6	39	14.2	33.2	0	0.3	20.4		75.5			
Mvmt LOS		B	D	B	C	A	A	C		F			
Delay (sec)	**37.1**	39.1			7.1			71.3			23.6		
LOS	**D**	D			A			E			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 1	PM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & Xerxes Ave	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		4	830	31	501	1666	78	24	2	222	46	0	0
Queue (ft)		18	292	41	299	160	27	41		120	78		0
Mvmt Delay (sec)		22.4	34	22.1	27.5	13	5.4	23.5		31.1			
Mvmt LOS		C	C	C	C	B	A	C		C			
Delay (sec)	**21.6**	33.4			16.0			30.3			25.4		
LOS	**C**	C			B			C			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 55: Phase 2 Recommendations – Intersection 2

INTERSECTION 2	AM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		179	1856	13	0	587	120	4	0	0	72	0	108
Queue (ft)		173	337	6	0	111	45	13	0		71		52
Mvmt Delay (sec)					17	0							
Mvmt LOS					C	A							
Delay (sec)	22.3	30.0			0.1			23.7			21.9		
LOS	C	C			A			C			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 2	PM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & Newton Circle W	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		132	909	22	2	1922	88	18	0	3	147	0	220
Queue (ft)		546	1569	2	9	243	35	34	9		135		164
Mvmt Delay (sec)		22.0	6.3	4.6	0.9	0.6	0	36.5	27.7				
Mvmt LOS		C	A	A	A	A	A	D	C				
Delay (sec)	7.2	8.2			0.5			35.5			39.5		
LOS	A	A			A			D			D		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 56: Phase 2 Recommendations – Intersection 3

INTERSECTION 3	AM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		251	1369	286	205	378	168	172	0	125	101	0	151
Queue (ft)		452	565	398	276	142	58	48	43		55	110	
Mvmt Delay (sec)		10.7	17	3.5	49.3	17	17.5	26.6		34.9	26.9	0	37.2
Mvmt LOS		B	B	A	D	B	B	C		C	C	A	D
Delay (sec)	20	14.3			26.2			30.1			33.1		
LOS	C	B			C			C			C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 3	PM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & Newton Circle E	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		184	664	212	156	1365	123	352	0	262	205	0	309
Queue (ft)		182	191	67	284	429	164	50	54		56	157	
Mvmt Delay (sec)		45.3	3.7	3.6	12.8	42.6	16.1	51.8		55.2	56.3	0	84.5
Mvmt LOS		D	A	A	B	D	B	D		E	E	A	F
Delay (sec)	37.6	10.9			37.8			53.3			73.3		
LOS	D	B			D			D			E		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 57: Phase 2 Recommendations – Intersection 5

INTERSECTION 5	AM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			1443	189	81	431					55	2	331
Queue (ft)			346	100	125	179					79		131
Mvmt Delay (sec)					19.2	0							
Mvmt LOS					B	A							
Delay (sec)	17.8	22.1			3.1						27.8		
LOS	B	C			A						C		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 5	PM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & SB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)			802	280	102	601					170	0	1000
Queue (ft)			270	68	129	283					127		259
Mvmt Delay (sec)					22.2	38							
Mvmt LOS					C	D							
Delay (sec)	30.3	28.9			35.5						17.2		
LOS	C	C			D						B		

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Table 58: Phase 2 Recommendations – Intersection 6

INTERSECTION 6	AM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		1114	417			269	173	203	0	72			
Queue (ft)		292	112			184	229	178		89			
Mvmt Delay (sec)		29.6	23.3										
Mvmt LOS		C	C										
Delay (sec)	31.2	27.9			46.4			25.3					
LOS	C	C			D			C					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

INTERSECTION 6	PM PEAK												
	2038 PHASE 2 WITH IMPROVEMENTS												
CSAH 2 & NB I-35 Ramp	Overall	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Volume (veh)		561	418			488	85	206	4	58			
Queue (ft)		179	153			399	416	175		78			
Mvmt Delay (sec)		24.8	30.3										
Mvmt LOS		C	C										
Delay (sec)	28.4	27.1			36.3			15.8					
LOS	C	C			D			B					

Source: Data collected by ISG January 2018. Data was analyzed using the 2010 Highway Capacity Manual and SimTraffic.

Conclusions

Summary of Roadway Link Analysis

The analysis shows that the existing roadway link network is sufficient for the existing traffic. In the design year between Intersections 1 and 4, the existing roadway link network is sufficient for the grown background traffic and the new traffic anticipated to be generated from the proposed development. Between Intersections 4 and 6, the existing roadway link network is not sufficient for both the grown background traffic and the new traffic anticipated to be generated from the proposed development. Between intersections 4 and 5, the roadway should be restriped and the I-35 overpass between intersections 5 and 6 should be widened to accommodate the increase in AADT. As area traffic grows and redistributes, the studied area should be reviewed periodically for alternate routes to achieve the City's goals for development as outlined in applicable comprehensive plans.

Summary of Intersection Analysis

Intersections 1-6 are expected to operate with an overall acceptable LOS (LOS A-D) and delay at opening and into the future based on current growth projections. However, several failing left turn movements create overall poor levels of service at studied intersections. Closing Intersection 4, changing the intersection control to traffic signal at the other studied intersections, and implementing the other recommended improvements would improve conditions at all intersections. The performance of the interchange ramp intersections will be dependent on interchange improvements that may occur between 2018 and 2038. While traffic signals would manage traffic appropriately in the interim, options discussed in other interchange management plans may serve as better long term solutions.

Summary of Needed Improvements

Based on the modeled Phase 1 (2031) and Phase 2 (2038) conditions described in this report, to accommodate both major and minor street traffic, improvements are recommended at Intersections 1-6 and some road links. The following are minimum recommendations:

- Implement roundabouts or traffic signal control at Intersections 1-3, 5, and 6.
- Two travel lanes should be maintained both eastbound and westbound through the studied area.
- Close access to Intersection 4 and route to new access road to the west.
- At the I-35 overpass, widen the bridge to accommodate four travel lanes.
- Proposed business driveways should be placed in locations as to avoid impacts to future intersection turn lanes.

Improvements will be needed to Intersection 5, Intersection 6 and the I-35 overpass in the future regardless of proposed development construction. Interim and long term options for I-35 interchange improvements have been detailed in a separate report. Because businesses are expected to move into the development gradually over the next 20 years, the development is broken into Phases 1 and 2. Based on current concepts, Phase 1 development is expected to last through 2031. Recommended improvements to the studied intersections should be applied by this time. Additional improvements to the studied intersection will be needed for Phase 2 development; however, as businesses move into to the development, traffic impact studies should be conducted as needed in order to track interim improvement needs. Additionally, the study area should be re-evaluated if growth projections change.

Appendices

Appendix A: Proposed Development Overview

AREAS INCLUDED IN PHASE 1

PHASE 2 INCLUDES ENTIRE CONCEPTUAL AREA

OVERALL SITE PLAN

0 300 600 900
SCALE IN FEET

N

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Elko New Market, MN
April 5, 2018
ISG Project No. 17-20548

ISG

CAD FILE NAME 20548 CONCEPT 1 PHASE 2

NORTHERN SITE PLAN

0 200 400 600
SCALE IN FEET

N

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ADELMANN PROPERTY

Elko New Market, MN
April 5, 2018
ISG Project No. 17-20548

ISG

CAD FILE NAME 20548 CONCEPT 1 PHASE 2

SOUTHERN SITE PLAN

0 100 200 400
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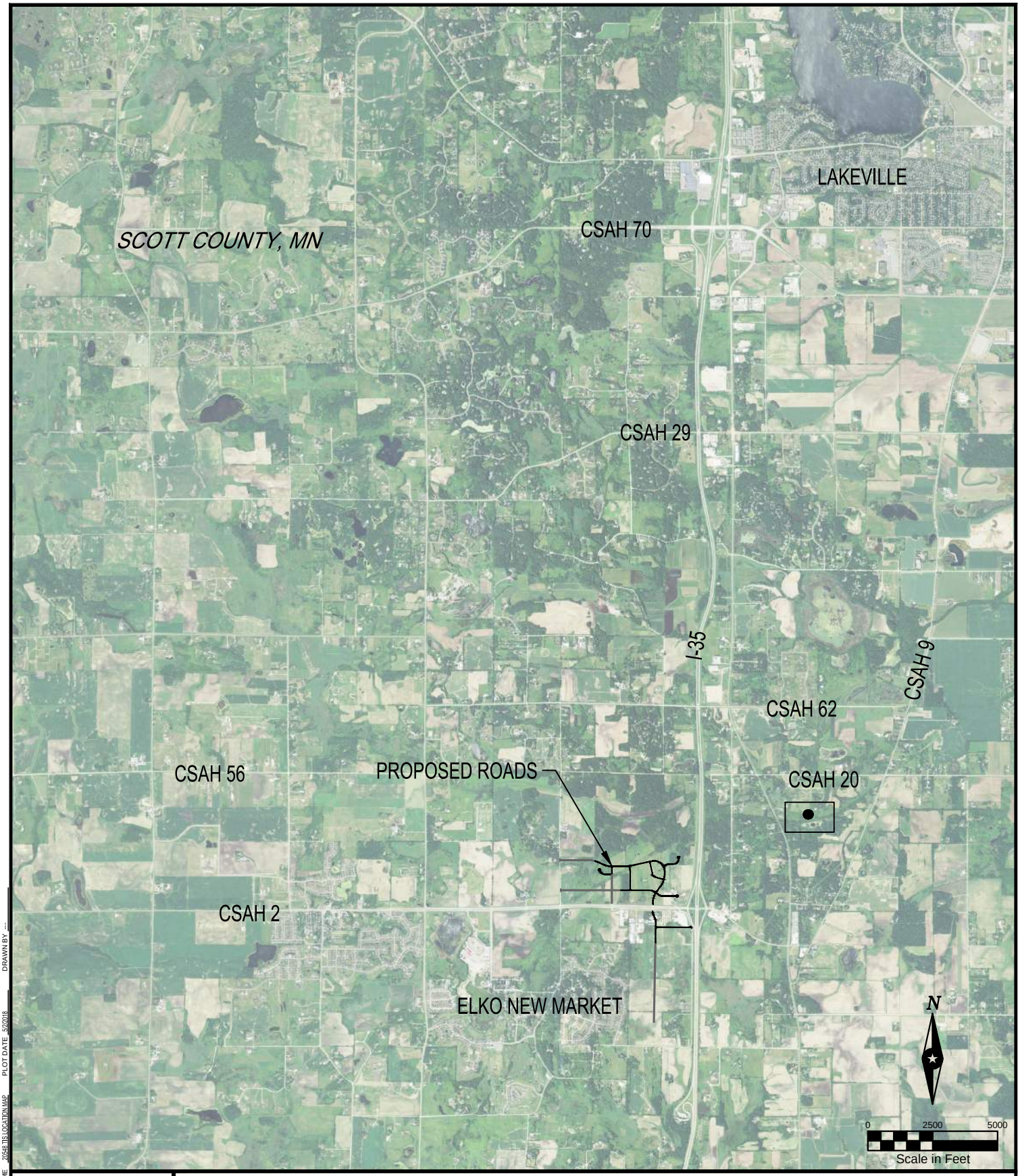
ADELMANN PROPERTY

Elko New Market, MN
April 5, 2018
ISG Project No. 17-20548

ISG

CAD FILE NAME 20548 CONCEPT 1 PHASE 2

Appendix B: Location Map



LOCATION MAP

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ELKO NEW MARKET MINNESOTA

SHEET B

PROJECT NO. 20456 CAD FILE NAME 20548 TIS LOCATION MAP PLOT DATE 5/2/2018 DRAWN BY ---

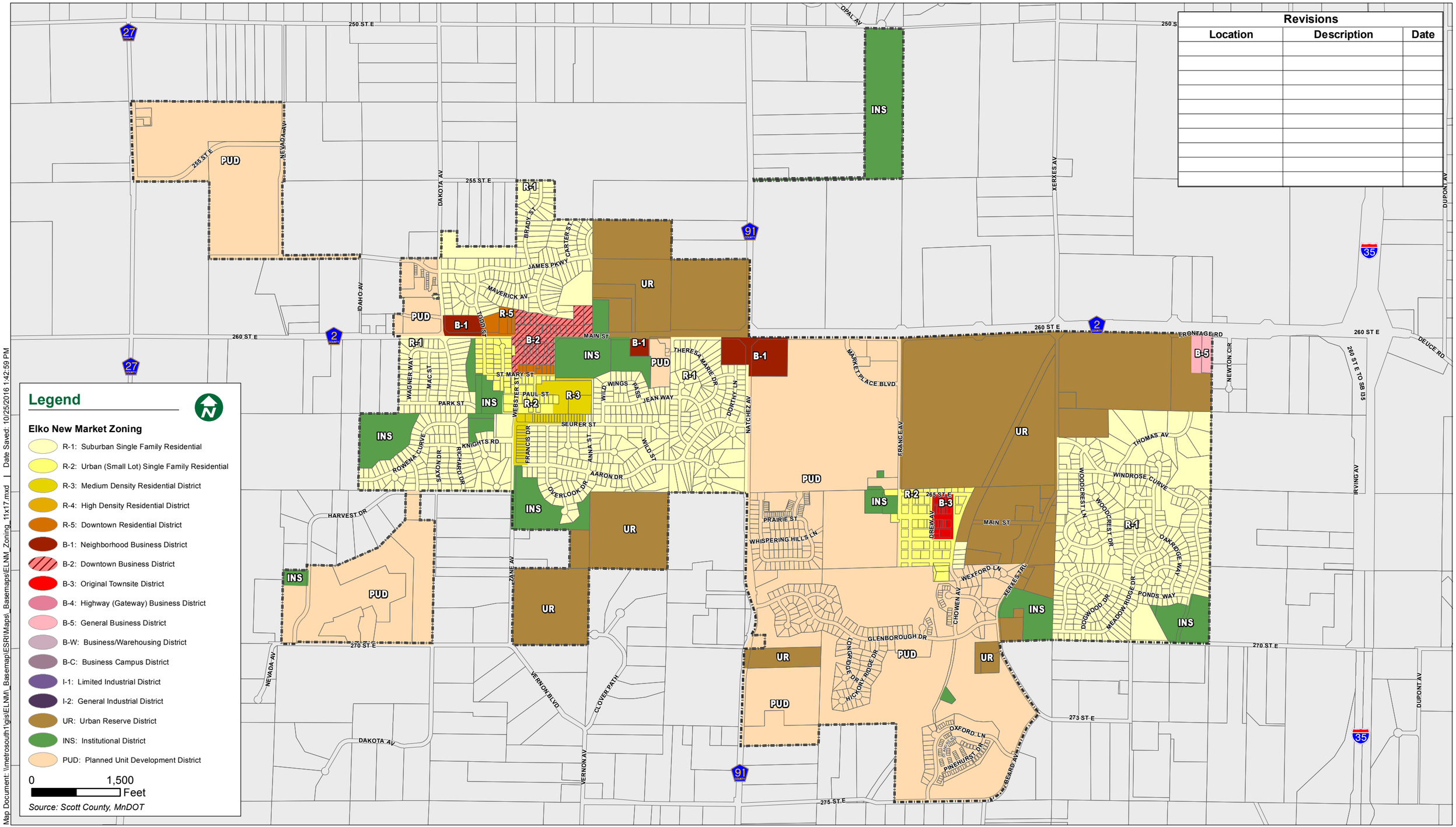
Appendix C: Existing Zoning Map

CITY OF ELKO NEW MARKET

Zoning Map

October 2016

BOLTON & MENK
Real People. Real Solutions.

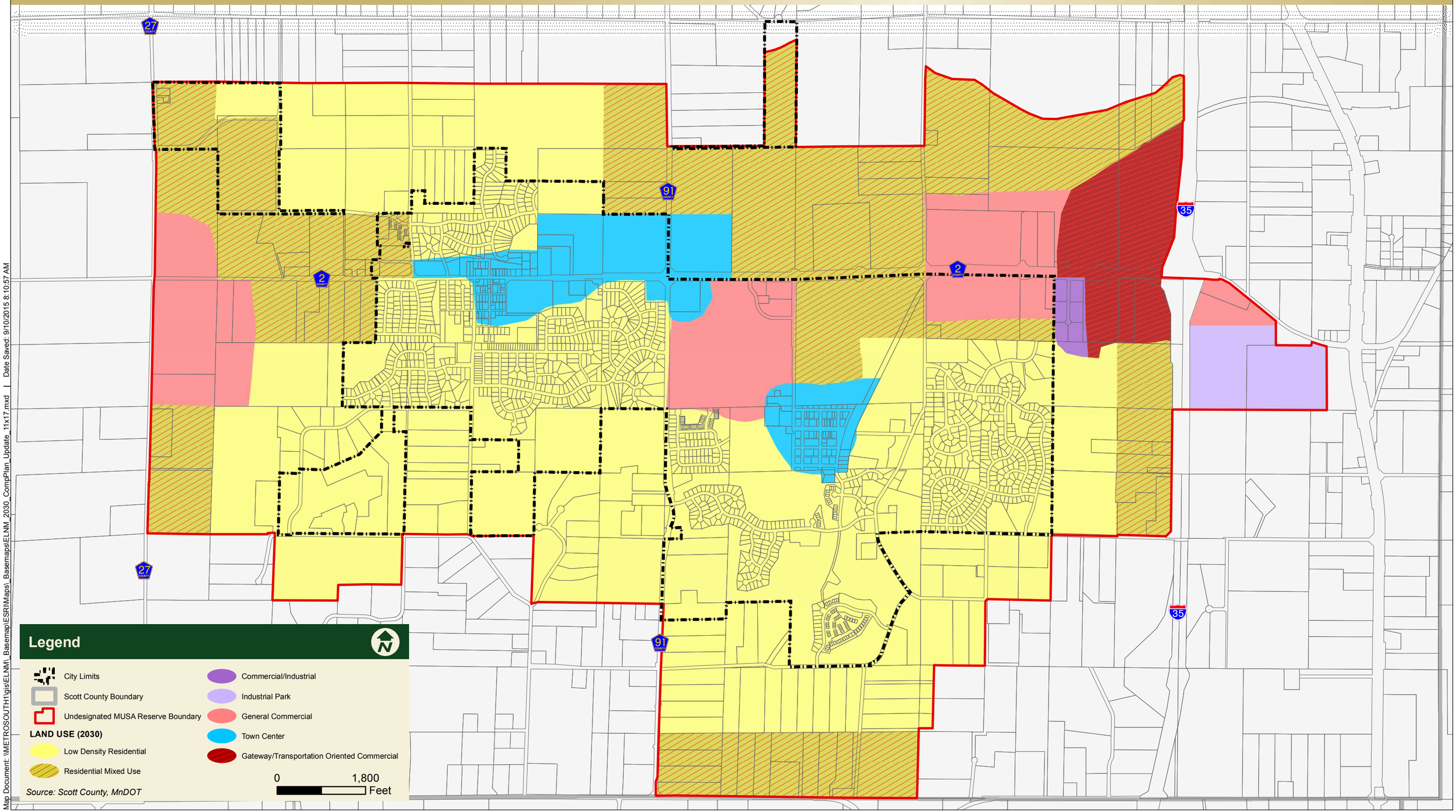


Map Document: \\metrosouth1\gis\ELNM_Basemap\ESRI\Maps_Basemaps\ELNM_Zoning_11x17.mxd | Date Saved: 10/25/2016 1:42:59 PM

Appendix D: Future Land Use Map

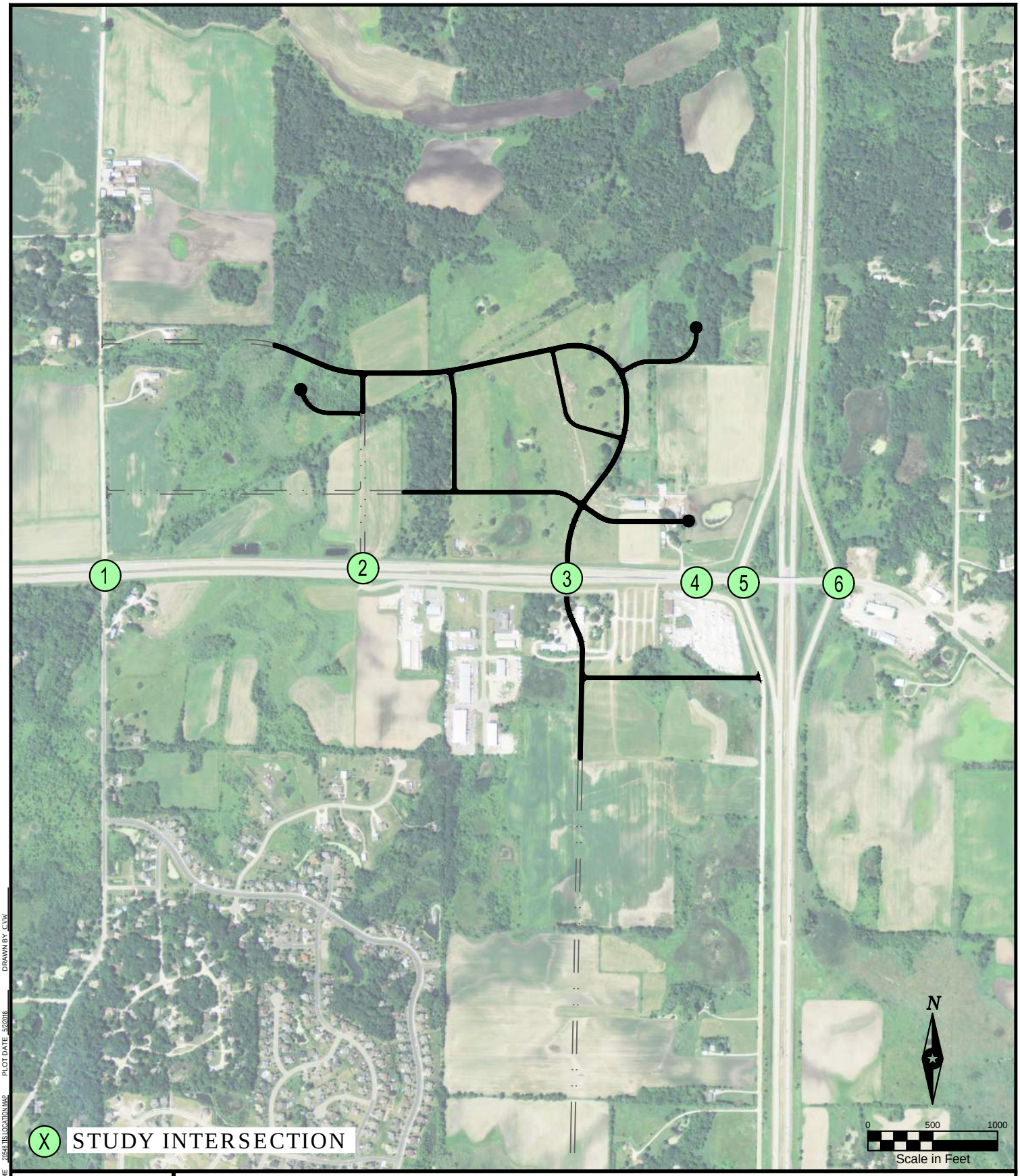
2030 Land Use Plan

August 2015



Map Document: \\METROSOUTH1\gis\ELNM_Basemap\ESRIMaps_Basemaps\ELNM_2030_CompPlan_Update_11x17.mxd | Date Saved: 9/10/2015 8:10:57 AM

Appendix E: Intersection Diagram



INTERSECTION DIAGRAM

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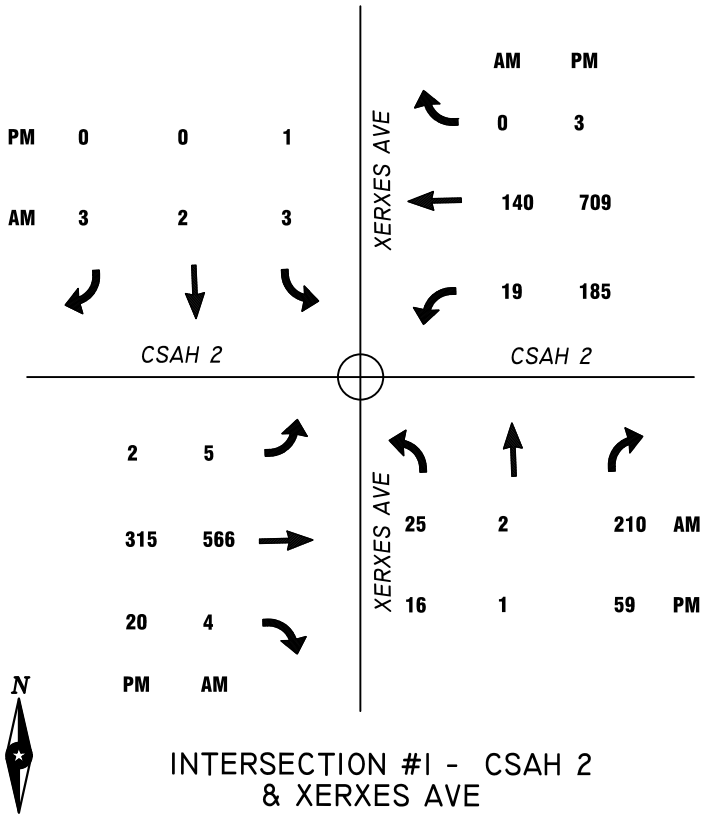
ELKO NEW MARKET MINNESOTA

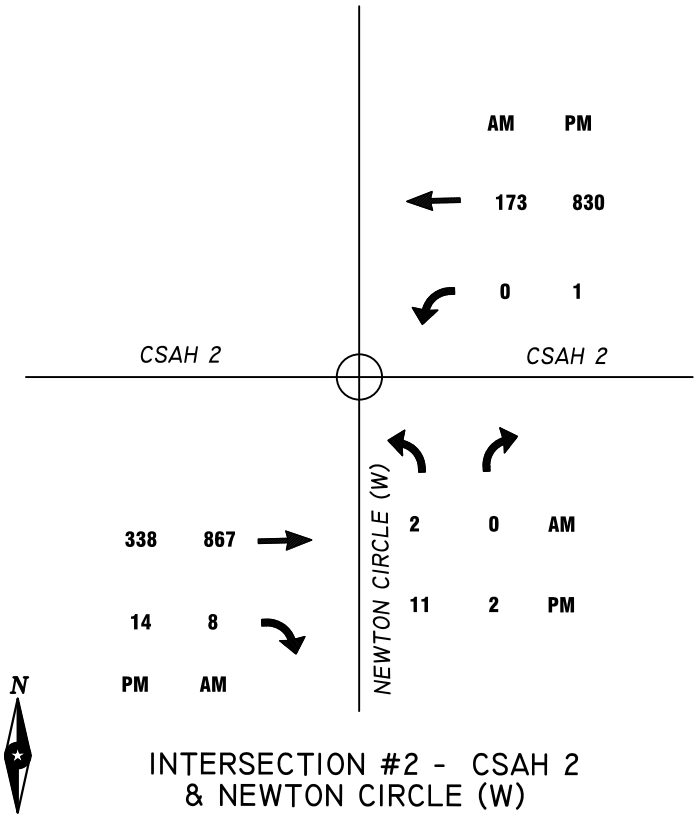
SHEET E

PROJECT NO. 20456 CAD FILE NAME 20548-TIS-LOCATION-MAP PLOT DATE 5/2/2018 DRAWN BY CVW

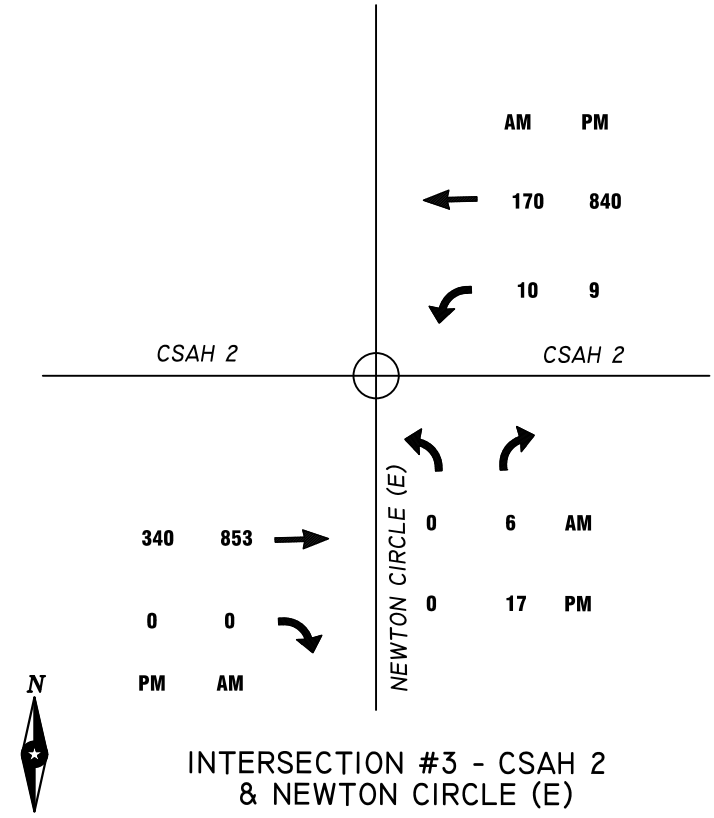
Appendix F: Existing Traffic Counts



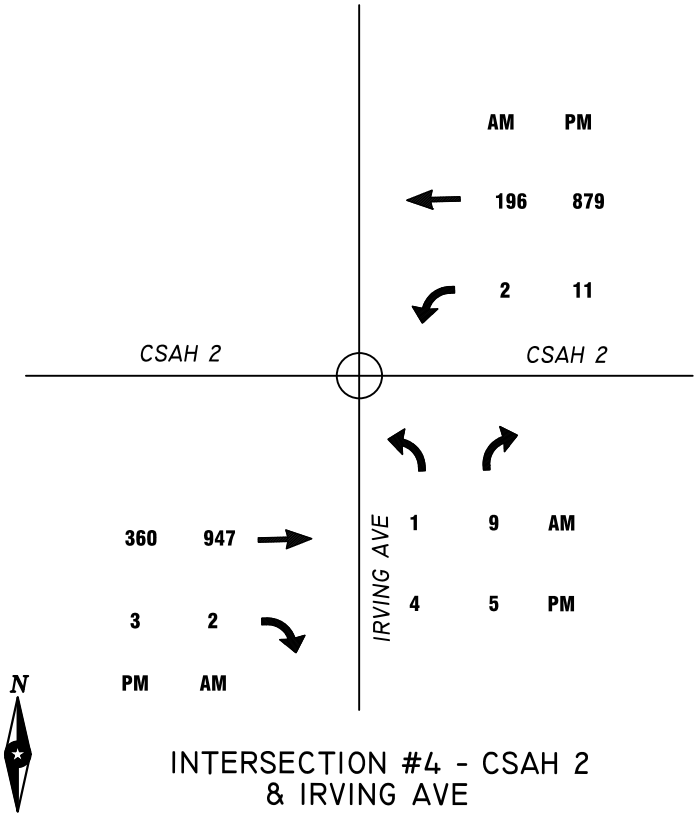
INTERSECTION #1 - CSAH 2
& XERXES AVE



INTERSECTION #2 - CSAH 2
& NEWTON CIRCLE (W)

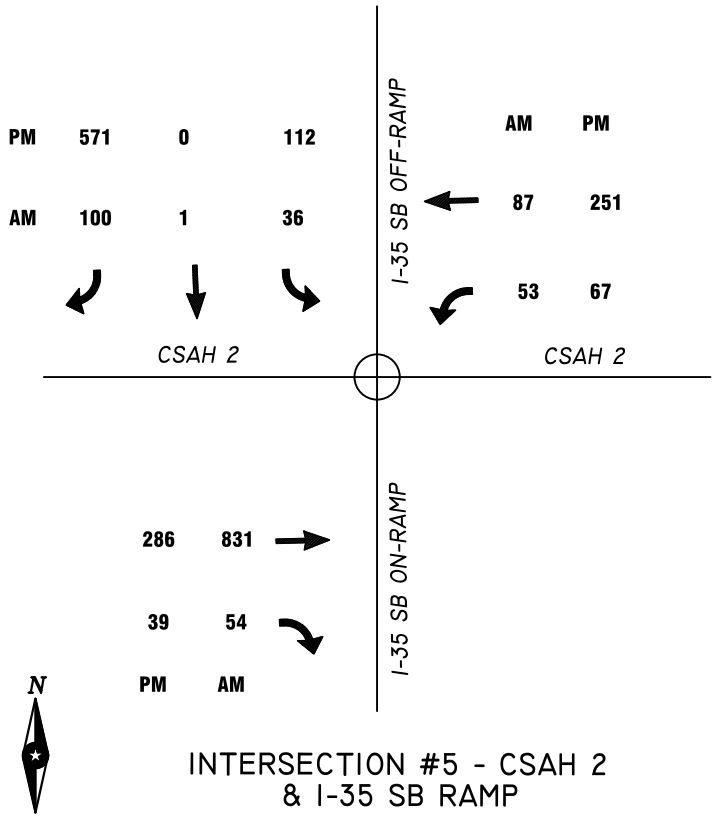


INTERSECTION #3 - CSAH 2
& NEWTON CIRCLE (E)

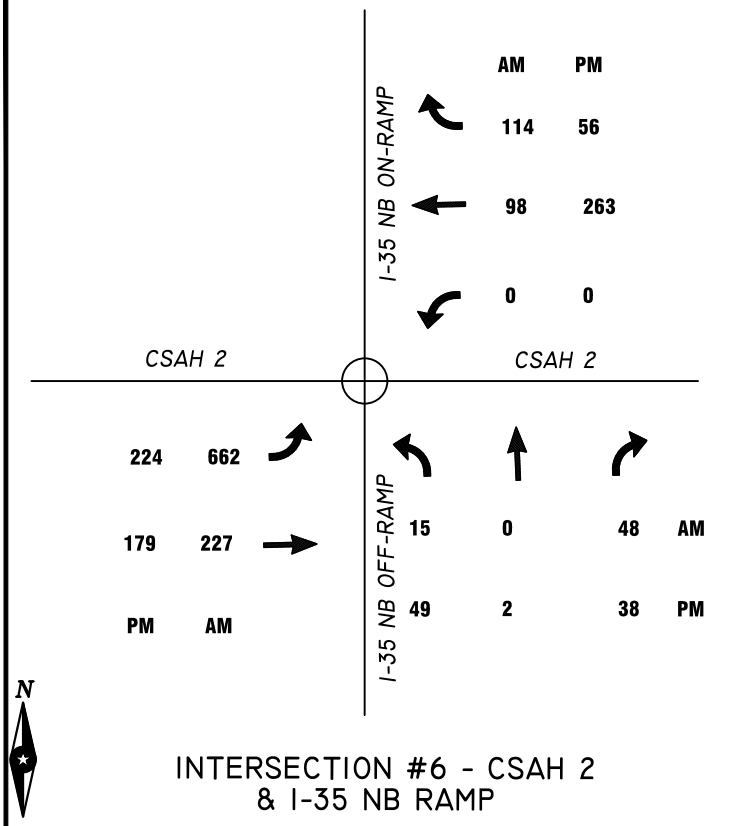


INTERSECTION #4 - CSAH 2
& IRVING AVE

EXISTING (2018) 1-4



INTERSECTION #5 - CSAH 2
& I-35 SB RAMP



INTERSECTION #6 - CSAH 2
& I-35 NB RAMP

EXISTING (2018) 5 AND 6

Appendix G: Synchro Reports – Existing (2018)

Intersection: 1: Xerxes Ave & CSAH 2

Movement	WB	NB	NB	SB
Directions Served	L	LT	R	LTR
Maximum Queue (ft)	31	36	105	21
Average Queue (ft)	6	15	49	5
95th Queue (ft)	26	37	88	19
Link Distance (ft)		1864		700
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	300		200	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	16
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	WB	NB
Directions Served	T	L	LTR
Maximum Queue (ft)	3	29	24
Average Queue (ft)	0	7	6
95th Queue (ft)	4	26	23
Link Distance (ft)	1519		12
Upstream Blk Time (%)			1
Queuing Penalty (veh)			0
Storage Bay Dist (ft)		300	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: CSAH 2

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	5	28
Average Queue (ft)	0	9
95th Queue (ft)	6	29
Link Distance (ft)	267	450
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	WB	SB
Directions Served	R	LT	LT
Maximum Queue (ft)	7	68	55
Average Queue (ft)	1	30	23
95th Queue (ft)	7	65	55
Link Distance (ft)	267	710	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	306	27	97
Average Queue (ft)	124	3	38
95th Queue (ft)	257	16	87
Link Distance (ft)	710	3512	744
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Newton Cir & Frontage Rd

Movement	NB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	12
95th Queue (ft)	36
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: Driveway & Frontage Rd

Movement	EB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	8
95th Queue (ft)	29
Link Distance (ft)	572
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: Xerxes Ave & Future Entrance 2

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 10: Xerxes Ave & Future Entrance 3

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	566	4	19	140	0	25	2	210	3	2	3
Future Vol, veh/h	5	566	4	19	140	0	25	2	210	3	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	651	5	22	161	0	29	2	241	3	2	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	161	0	0	651	0	0	787	867	325	543	867	80
Stage 1	-	-	-	-	-	-	662	662	-	205	205	-
Stage 2	-	-	-	-	-	-	125	205	-	338	662	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1416	-	-	931	-	-	282	289	671	423	289	964
Stage 1	-	-	-	-	-	-	417	457	-	778	731	-
Stage 2	-	-	-	-	-	-	866	731	-	650	457	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1416	-	-	931	-	-	274	281	671	264	281	964
Mov Cap-2 Maneuver	-	-	-	-	-	-	353	369	-	333	359	-
Stage 1	-	-	-	-	-	-	415	455	-	775	714	-
Stage 2	-	-	-	-	-	-	840	714	-	412	455	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	13.6	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	354	671	1416	-	-	931	-	-	452
HCM Lane V/C Ratio	0.088	0.36	0.004	-	-	0.023	-	-	0.02
HCM Control Delay (s)	16.1	13.3	7.6	-	-	9	-	-	13.1
HCM Lane LOS	C	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	1.6	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	867	8	0	173	0	2	0	0	0	0	0
Future Vol, veh/h	0	867	8	0	173	0	2	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	997	9	0	199	0	2	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	199	0	0	997	0	0	1096	1196	498	697	1196	99
Stage 1	-	-	-	-	-	-	997	997	-	199	199	-
Stage 2	-	-	-	-	-	-	99	199	-	498	997	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1371	-	-	690	-	-	168	185	518	328	185	937
Stage 1	-	-	-	-	-	-	262	320	-	784	735	-
Stage 2	-	-	-	-	-	-	896	735	-	523	320	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1371	-	-	690	-	-	168	185	518	328	185	937
Mov Cap-2 Maneuver	-	-	-	-	-	-	229	268	-	424	268	-
Stage 1	-	-	-	-	-	-	262	320	-	784	735	-
Stage 2	-	-	-	-	-	-	896	735	-	523	320	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	20.9	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	229	1371	-	-	690	-	-	-
HCM Lane V/C Ratio	0.01	-	-	-	-	-	-	-
HCM Control Delay (s)	20.9	0	-	-	0	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	853	0	10	170	0	0	0	6	0	0	0
Future Vol, veh/h	0	853	0	10	170	0	0	0	6	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	980	0	11	195	0	0	0	7	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	195	0	0	980	0	0	1101	1198	490	708	1198	98
Stage 1	-	-	-	-	-	-	980	980	-	218	218	-
Stage 2	-	-	-	-	-	-	121	218	-	490	980	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1375	-	-	700	-	-	166	184	524	322	184	939
Stage 1	-	-	-	-	-	-	268	326	-	764	721	-
Stage 2	-	-	-	-	-	-	870	721	-	529	326	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1375	-	-	700	-	-	164	181	524	314	181	939
Mov Cap-2 Maneuver	-	-	-	-	-	-	232	269	-	412	263	-
Stage 1	-	-	-	-	-	-	268	326	-	764	710	-
Stage 2	-	-	-	-	-	-	856	710	-	522	326	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.6	12	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	524	1375	-	-	700	-	-	-
HCM Lane V/C Ratio	0.013	-	-	-	0.016	-	-	-
HCM Control Delay (s)	12	0	-	-	10.2	-	-	0
HCM Lane LOS	B	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	947	2	2	196	1	9
Future Vol, veh/h	947	2	2	196	1	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1076	2	2	223	1	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1078	0	1193	1077
Stage 1	-	-	-	-	1077	-
Stage 2	-	-	-	-	116	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	645	-	193	265
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	897	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	645	-	192	265
Mov Cap-2 Maneuver	-	-	-	-	192	-
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	255	-	-	645	-
HCM Lane V/C Ratio	0.045	-	-	0.004	-
HCM Control Delay (s)	19.8	-	-	10.6	0
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↰						↰	↱
Traffic Vol, veh/h	0	831	54	53	87	0	0	0	0	36	1	100
Future Vol, veh/h	0	831	54	53	87	0	0	0	0	36	1	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	0	-	-	-	-	-	-	300	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	944	61	60	99	0	0	0	0	41	1	114

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	944	0	0	1163	1163	-
Stage 1	-	-	-	-	-	-	219	219	-
Stage 2	-	-	-	-	-	-	944	944	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	-
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	-
Pot Cap-1 Maneuver	0	-	-	727	-	0	215	195	0
Stage 1	0	-	-	-	-	0	817	722	0
Stage 2	0	-	-	-	-	0	378	341	0
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	727	-	-	196	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	196	0	-
Stage 1	-	-	-	-	-	-	746	0	-
Stage 2	-	-	-	-	-	-	378	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	3.9	28.3
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	727	-	196	-
HCM Lane V/C Ratio	-	-	0.083	-	0.215	-
HCM Control Delay (s)	-	-	10.4	0	28.3	0
HCM Lane LOS	-	-	B	A	D	A
HCM 95th %tile Q(veh)	-	-	0.3	-	0.8	-

Intersection	
Int Delay, s/veh	12.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	662	227	0	0	98	114	15	0	48	0	0	0
Future Vol, veh/h	662	227	0	0	98	114	15	0	48	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	752	258	0	0	111	130	17	0	55	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	241	0	-	-	-	0	1939	2004	258
Stage 1	-	-	-	-	-	-	1763	1763	-
Stage 2	-	-	-	-	-	-	176	241	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1326	-	0	0	-	-	72	60	781
Stage 1	-	-	0	0	-	-	151	137	-
Stage 2	-	-	0	0	-	-	855	706	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1326	-	-	-	-	-	24	0	781
Mov Cap-2 Maneuver	-	-	-	-	-	-	24	0	-
Stage 1	-	-	-	-	-	-	51	0	-
Stage 2	-	-	-	-	-	-	855	0	-

Approach	EB	WB	NB
HCM Control Delay, s	8.3	0	121.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	92	1326	-	-	-
HCM Lane V/C Ratio	0.778	0.567	-	-	-
HCM Control Delay (s)	121.5	11.2	0	-	-
HCM Lane LOS	F	B	A	-	-
HCM 95th %tile Q(veh)	4.1	3.7	-	-	-

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	WB	NB	NB
Directions Served	L	L	LT	R
Maximum Queue (ft)	10	74	28	46
Average Queue (ft)	1	32	10	19
95th Queue (ft)	8	66	30	38
Link Distance (ft)			1864	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	300	300		200
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	29
Average Queue (ft)	12
95th Queue (ft)	32
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	WB	NB
Directions Served	L	LTR
Maximum Queue (ft)	28	24
Average Queue (ft)	3	9
95th Queue (ft)	18	28
Link Distance (ft)		12
Upstream Blk Time (%)		1
Queuing Penalty (veh)		0
Storage Bay Dist (ft)	300	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: CSAH 2

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	30	28
Average Queue (ft)	3	6
95th Queue (ft)	17	25
Link Distance (ft)	267	450
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	WB	SB	SB
Directions Served	LT	LT	R
Maximum Queue (ft)	67	86	192
Average Queue (ft)	19	41	76
95th Queue (ft)	57	74	169
Link Distance (ft)	710		1051
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		300	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	72	3	59
Average Queue (ft)	41	0	32
95th Queue (ft)	74	4	54
Link Distance (ft)	710	3512	744
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	315	20	185	709	3	16	1	59	1	0	0
Future Vol, veh/h	2	315	20	185	709	3	16	1	59	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	342	22	201	771	3	17	1	64	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	771	0	0	342	0	0	1135	1520	171	1349	1520	385
Stage 1	-	-	-	-	-	-	347	347	-	1173	1173	-
Stage 2	-	-	-	-	-	-	788	1173	-	176	347	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	840	-	-	1214	-	-	157	118	843	109	118	613
Stage 1	-	-	-	-	-	-	642	633	-	204	264	-
Stage 2	-	-	-	-	-	-	350	264	-	809	633	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	840	-	-	1214	-	-	137	98	843	87	98	613
Mov Cap-2 Maneuver	-	-	-	-	-	-	232	179	-	164	171	-
Stage 1	-	-	-	-	-	-	640	631	-	204	220	-
Stage 2	-	-	-	-	-	-	292	220	-	744	631	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.8	12.4	27.1
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	228	843	840	-	-	1214	-	-	164
HCM Lane V/C Ratio	0.081	0.076	0.003	-	-	0.166	-	-	0.007
HCM Control Delay (s)	22.2	9.6	9.3	-	-	8.6	-	-	27.1
HCM Lane LOS	C	A	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.3	0.2	0	-	-	0.6	-	-	0

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	338	14	1	830	0	11	0	2	0	0	0
Future Vol, veh/h	0	338	14	1	830	0	11	0	2	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	367	15	1	902	0	12	0	2	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	902	0	0	367	0	0	820	1271	184	1088	1271	451
Stage 1	-	-	-	-	-	-	367	367	-	904	904	-
Stage 2	-	-	-	-	-	-	453	904	-	184	367	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	749	-	-	1188	-	-	267	167	827	170	167	556
Stage 1	-	-	-	-	-	-	625	621	-	298	354	-
Stage 2	-	-	-	-	-	-	556	354	-	800	621	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	749	-	-	1188	-	-	267	167	827	169	167	556
Mov Cap-2 Maneuver	-	-	-	-	-	-	390	273	-	252	273	-
Stage 1	-	-	-	-	-	-	625	621	-	298	354	-
Stage 2	-	-	-	-	-	-	556	354	-	798	621	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13.8	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	425	749	-	-	1188	-	-	-
HCM Lane V/C Ratio	0.033	-	-	-	0.001	-	-	-
HCM Control Delay (s)	13.8	0	-	-	8	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	340	0	9	840	0	0	0	17	0	0	0
Future Vol, veh/h	0	340	0	9	840	0	0	0	17	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	370	0	10	913	0	0	0	18	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	913	0	0	370	0	0	846	1303	185	1118	1303	457
Stage 1	-	-	-	-	-	-	370	370	-	933	933	-
Stage 2	-	-	-	-	-	-	476	933	-	185	370	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	742	-	-	1185	-	-	256	159	826	162	159	551
Stage 1	-	-	-	-	-	-	622	619	-	286	343	-
Stage 2	-	-	-	-	-	-	539	343	-	799	619	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	742	-	-	1185	-	-	254	158	826	157	158	551
Mov Cap-2 Maneuver	-	-	-	-	-	-	377	263	-	241	263	-
Stage 1	-	-	-	-	-	-	622	619	-	286	340	-
Stage 2	-	-	-	-	-	-	534	340	-	781	619	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	9.5	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	826	742	-	-	1185	-	-	-
HCM Lane V/C Ratio	0.022	-	-	-	0.008	-	-	-
HCM Control Delay (s)	9.5	0	-	-	8.1	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	360	3	11	879	4	5
Future Vol, veh/h	360	3	11	879	4	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	391	3	12	955	4	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	395	0	895	393
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	502	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1162	-	295	655
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	574	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1162	-	289	655
Mov Cap-2 Maneuver	-	-	-	-	289	-
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	561	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	419	-	-	1162	-
HCM Lane V/C Ratio	0.023	-	-	0.01	-
HCM Control Delay (s)	13.8	-	-	8.1	0.1
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↰						↰	↱
Traffic Vol, veh/h	0	286	39	67	251	0	0	0	0	112	0	571
Future Vol, veh/h	0	286	39	67	251	0	0	0	0	112	0	571
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	0	-	-	-	-	-	-	300	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	311	42	73	273	0	0	0	0	122	0	621

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	311	0	0	729	729	-
Stage 1	-	-	-	-	-	-	418	418	-
Stage 2	-	-	-	-	-	-	311	311	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	-
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	-
Pot Cap-1 Maneuver	0	-	-	1249	-	0	390	350	0
Stage 1	0	-	-	-	-	0	664	591	0
Stage 2	0	-	-	-	-	0	743	658	0
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1249	-	-	363	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	363	0	-
Stage 1	-	-	-	-	-	-	618	0	-
Stage 2	-	-	-	-	-	-	743	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.7	19.8
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1249	-	363	-
HCM Lane V/C Ratio	-	-	0.058	-	0.335	-
HCM Control Delay (s)	-	-	8.1	0	19.8	0
HCM Lane LOS	-	-	A	A	C	A
HCM 95th %tile Q(veh)	-	-	0.2	-	1.4	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	224	179	0	0	263	56	49	2	38	0	0	0
Future Vol, veh/h	224	179	0	0	263	56	49	2	38	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	246	197	0	0	289	62	54	2	42	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	351	0	-	-	-	0	1009	1040	197
Stage 1	-	-	-	-	-	-	689	689	-
Stage 2	-	-	-	-	-	-	320	351	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1208	-	0	0	-	-	266	230	844
Stage 1	-	-	0	0	-	-	498	446	-
Stage 2	-	-	0	0	-	-	736	632	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1208	-	-	-	-	-	205	0	844
Mov Cap-2 Maneuver	-	-	-	-	-	-	205	0	-
Stage 1	-	-	-	-	-	-	384	0	-
Stage 2	-	-	-	-	-	-	736	0	-

Approach	EB	WB	NB
HCM Control Delay, s	4.9	0	22.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	306	1208	-	-	-
HCM Lane V/C Ratio	0.32	0.204	-	-	-
HCM Control Delay (s)	22.2	8.7	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	1.3	0.8	-	-	-

Appendix H: Trip Distribution

Map - Adelmann Development TIS
ISG

Node Numbers
03/20/2018

Map - Adelmann Development TIS
ISG

Node Numbers
03/20/2018

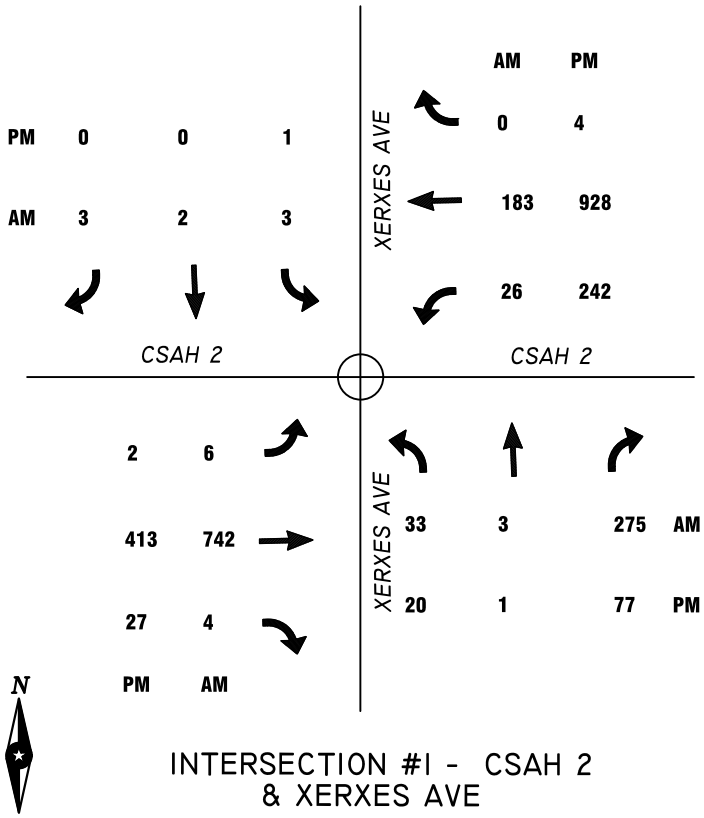
Map - Adelmann Development TIS
ISG

Node Numbers
03/20/2018

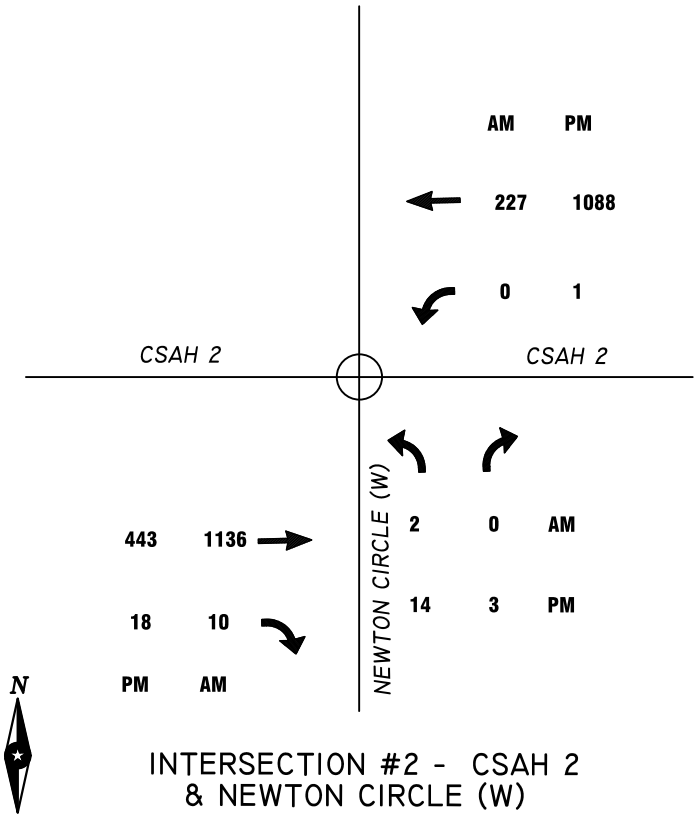
Map - Adelmann Development TIS
ISG

Node Numbers
03/20/2018

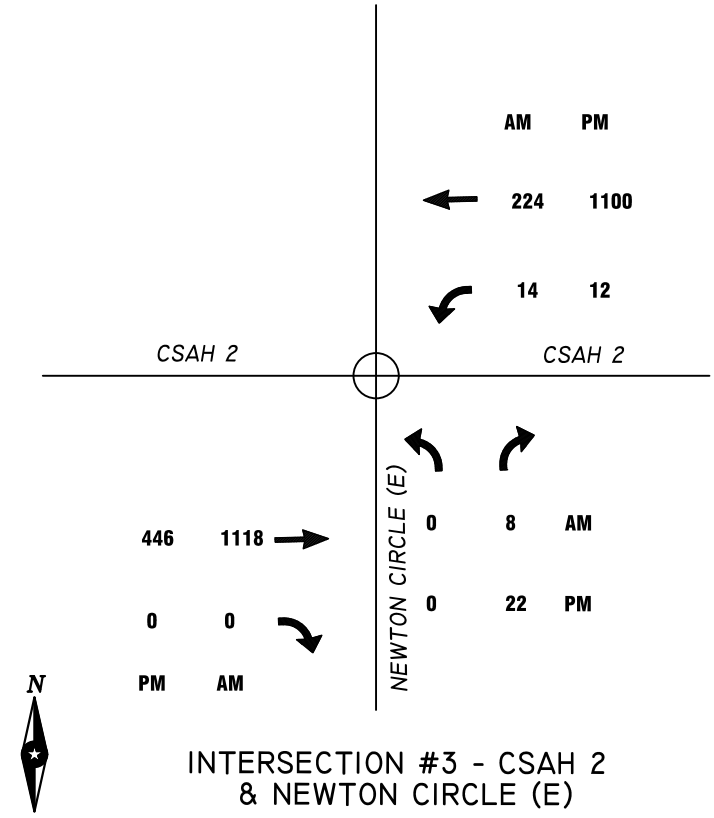
Appendix I: Baseline (2031) Traffic Counts – Diagram



INTERSECTION #1 - CSAH 2
& XERXES AVE

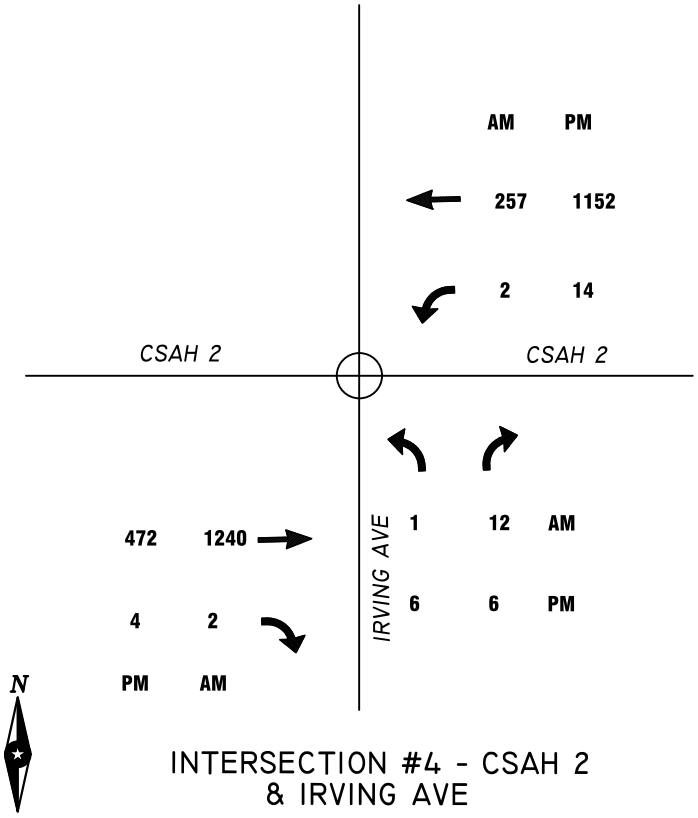


INTERSECTION #2 - CSAH 2
& NEWTON CIRCLE (W)



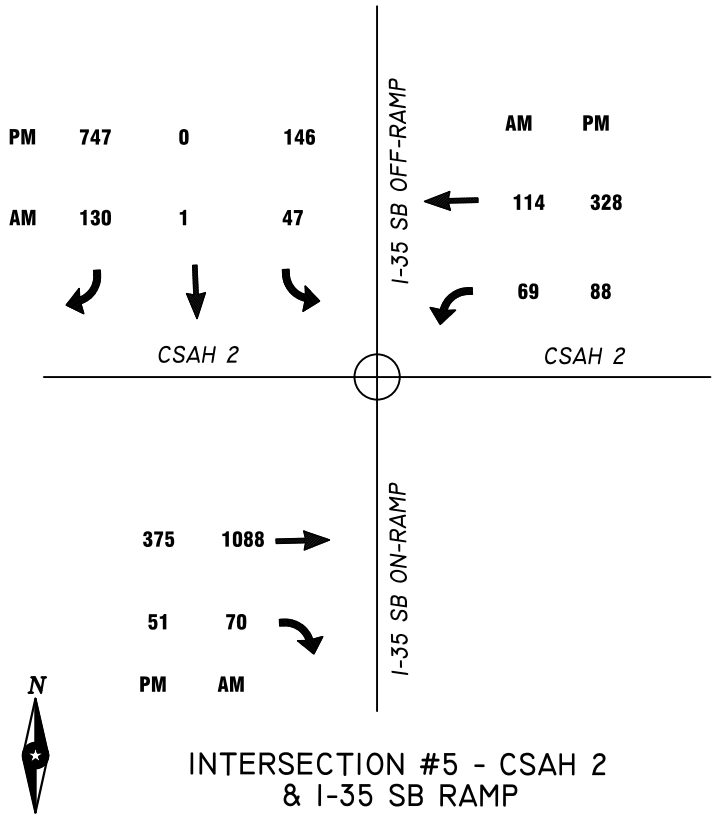
INTERSECTION #3 - CSAH 2
& NEWTON CIRCLE (E)

BASELINE (2031) 1-4

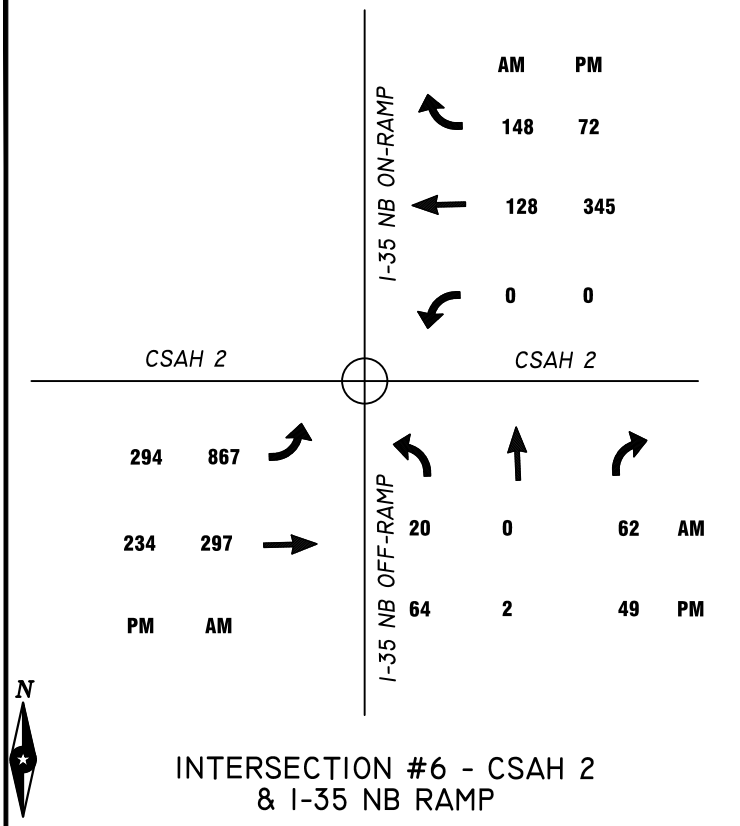


INTERSECTION #4 - CSAH 2
& IRVING AVE

ADELMANN DEVELOPMENT
ELKO NEW MARKET, MINNESOTA
5/2/18
ISG Project No. 20456



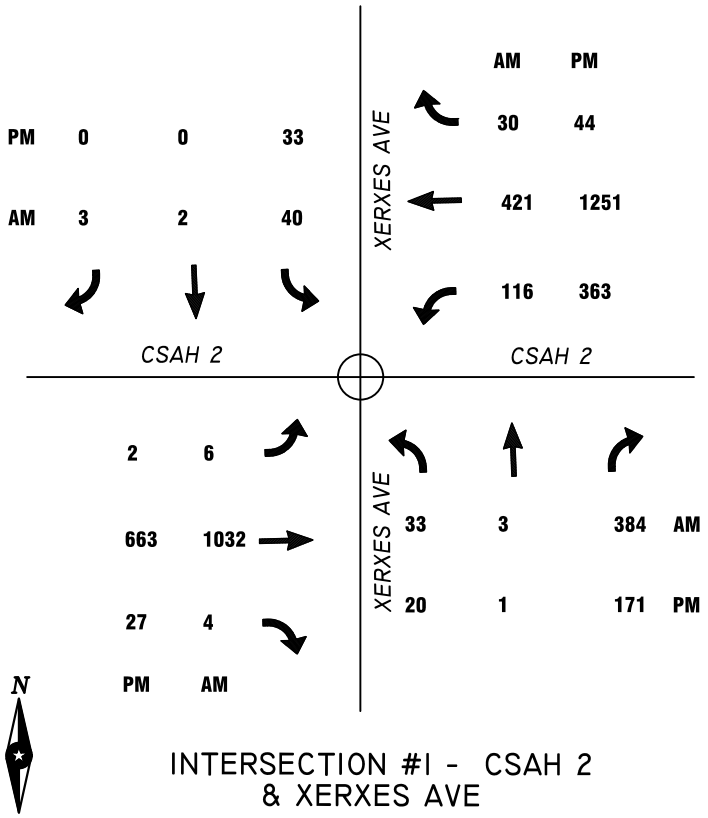
INTERSECTION #5 - CSAH 2
& I-35 SB RAMP



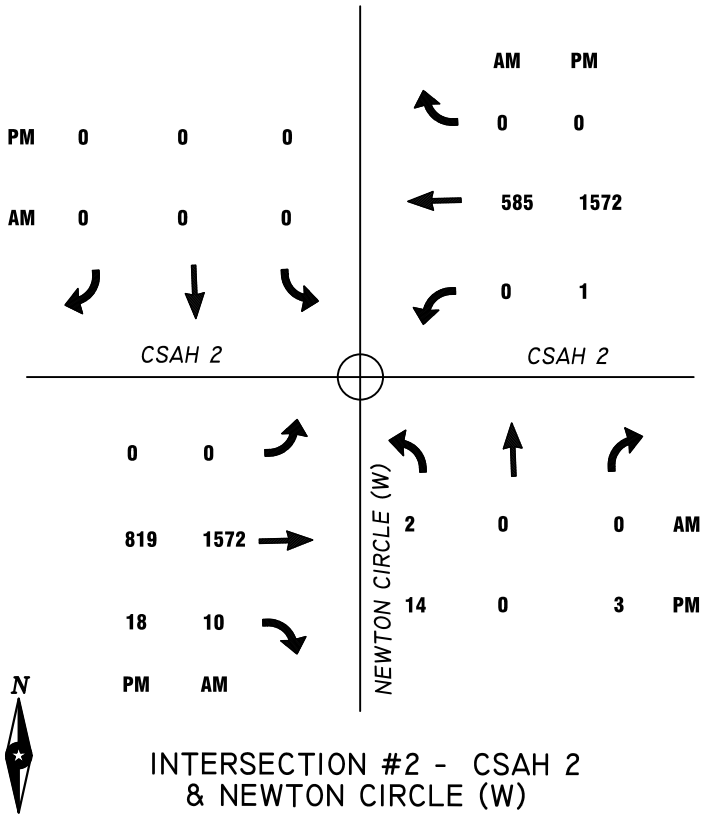
INTERSECTION #6 - CSAH 2
& I-35 NB RAMP

BASELINE (2031) 5 AND 6

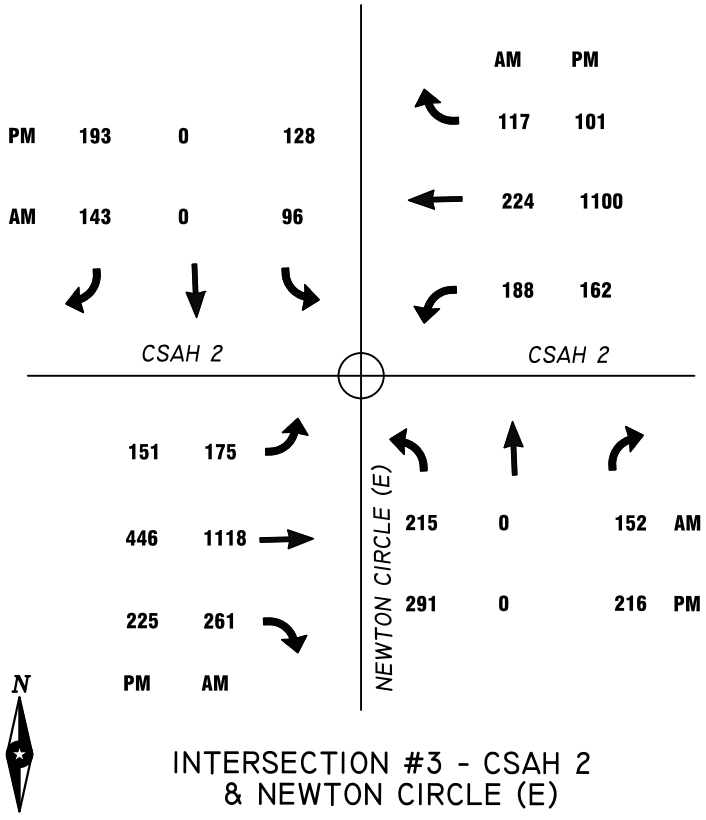
Appendix J: Phase 1 (2031) Traffic Counts – Diagram



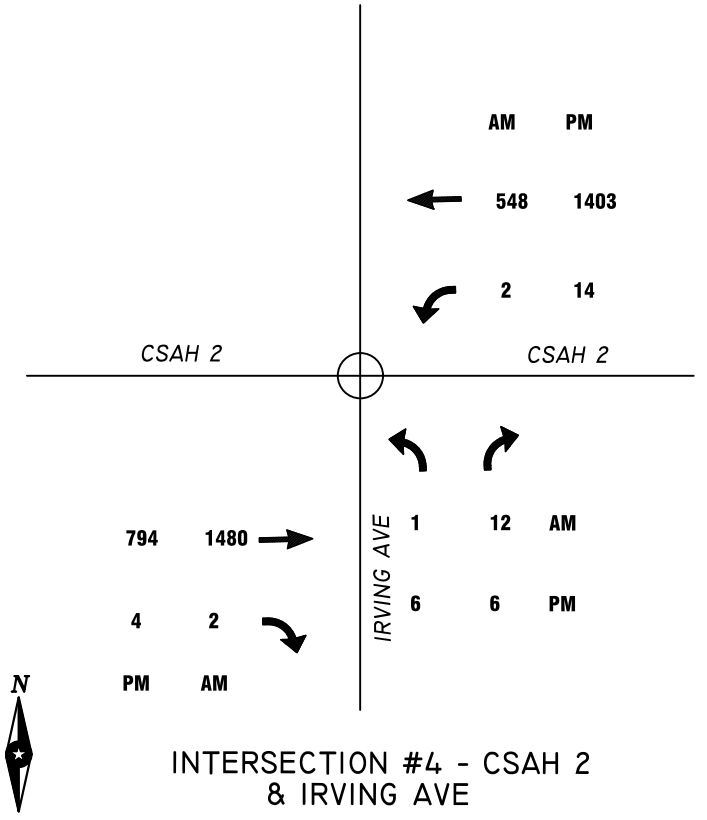
INTERSECTION #1 - CSAH 2
& XERXES AVE



INTERSECTION #2 - CSAH 2
& NEWTON CIRCLE (W)



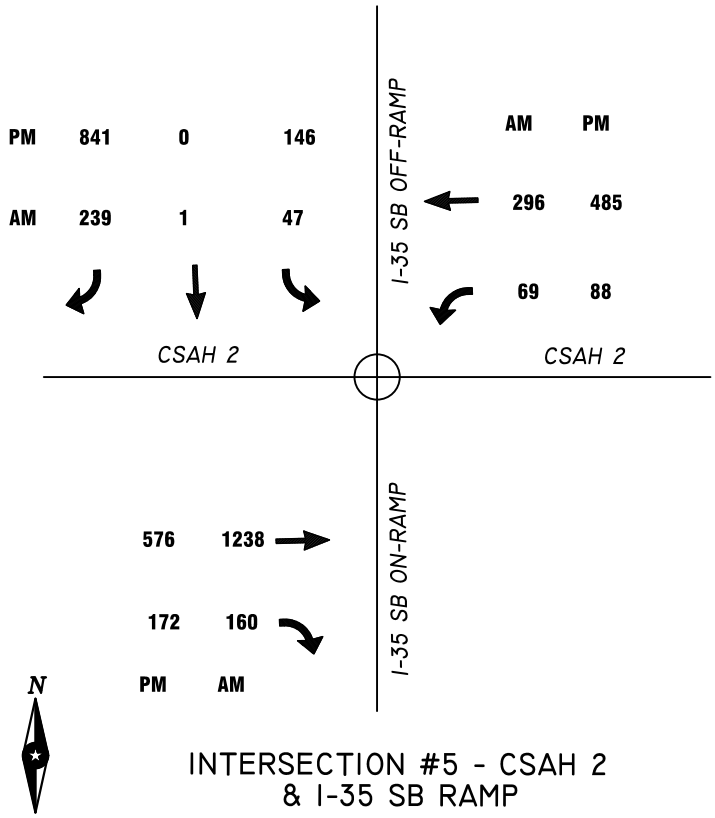
INTERSECTION #3 - CSAH 2
& NEWTON CIRCLE (E)



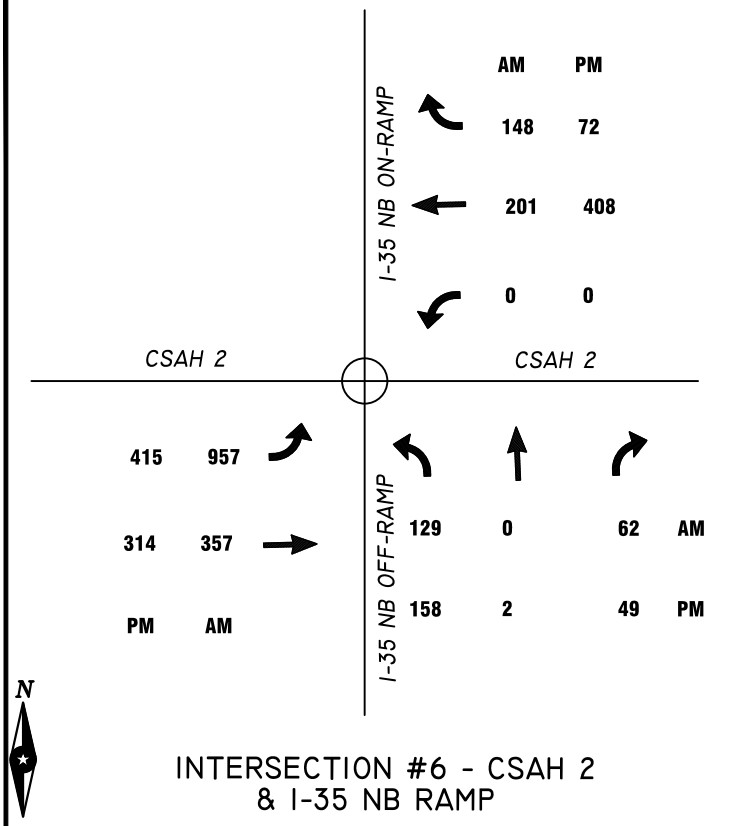
INTERSECTION #4 - CSAH 2
& IRVING AVE

PHASE 1 (2031) 1-4

ADELMANN DEVELOPMENT
ELKO NEW MARKET, MINNESOTA
5/2/18
ISG Project No. 20456



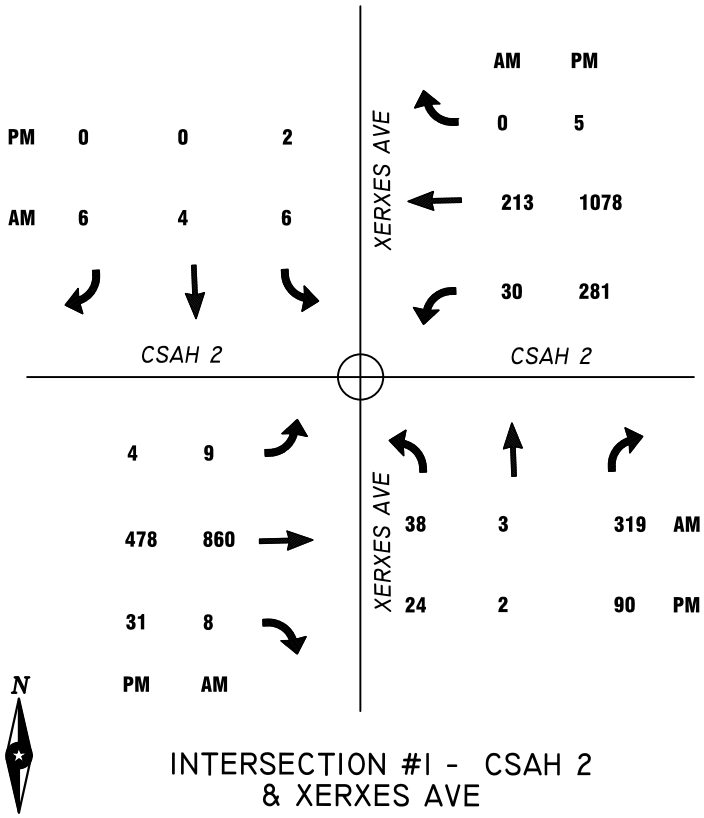
INTERSECTION #5 - CSAH 2
& I-35 SB RAMP



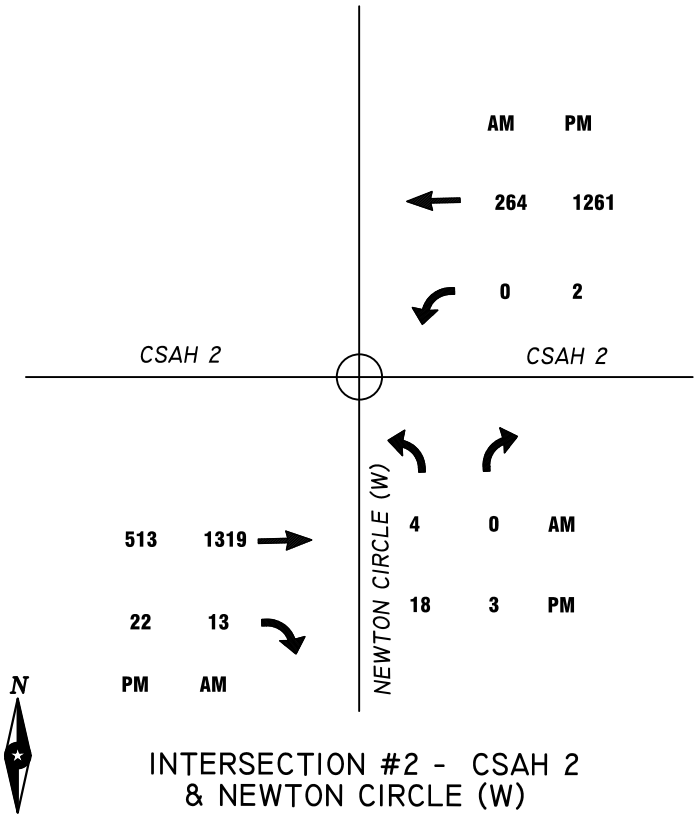
INTERSECTION #6 - CSAH 2
& I-35 NB RAMP

PHASE 1 (2031) 5 AND 6

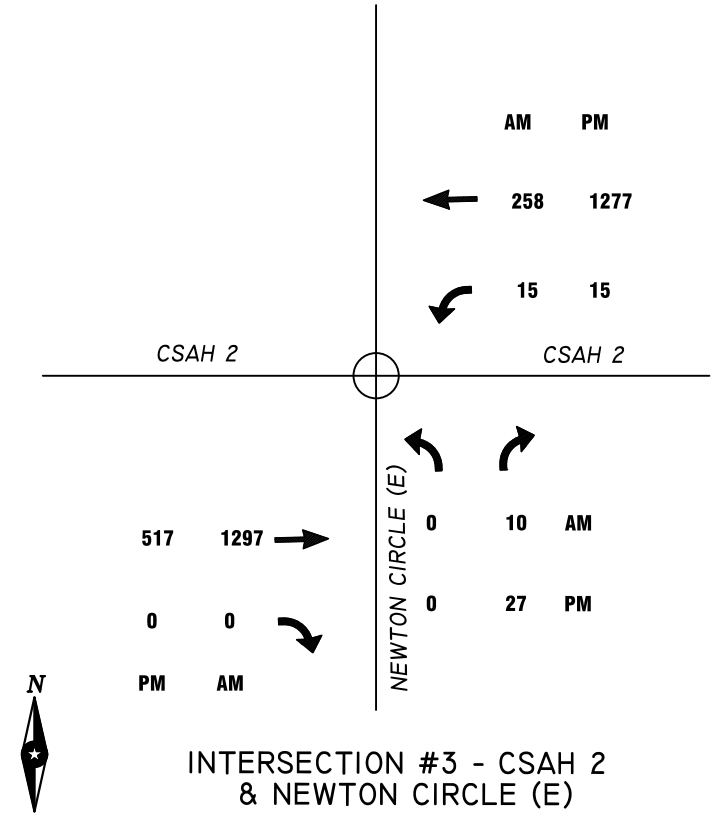
Appendix K: Baseline (2038) Traffic Counts – Diagram



INTERSECTION #1 - CSAH 2
& XERXES AVE

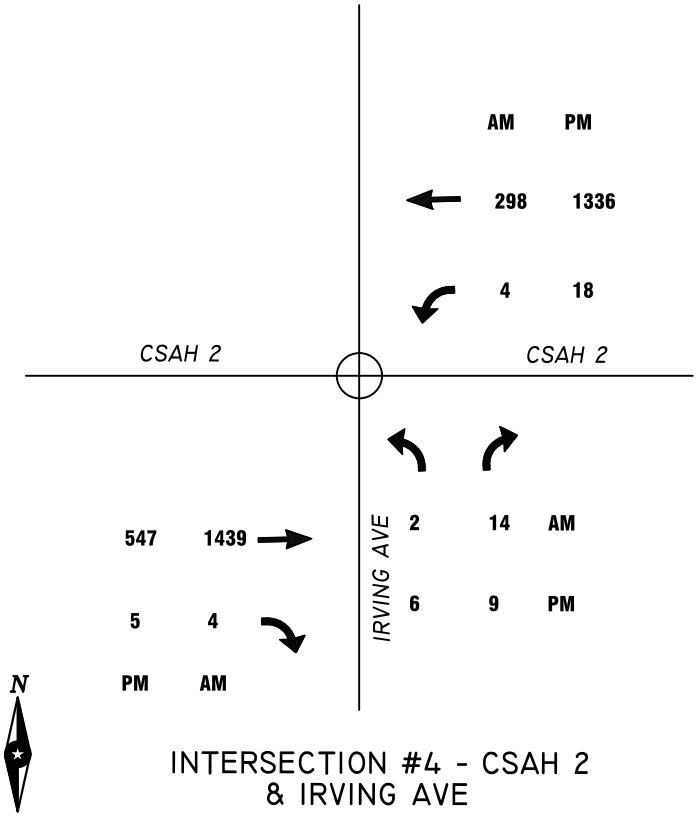


INTERSECTION #2 - CSAH 2
& NEWTON CIRCLE (W)

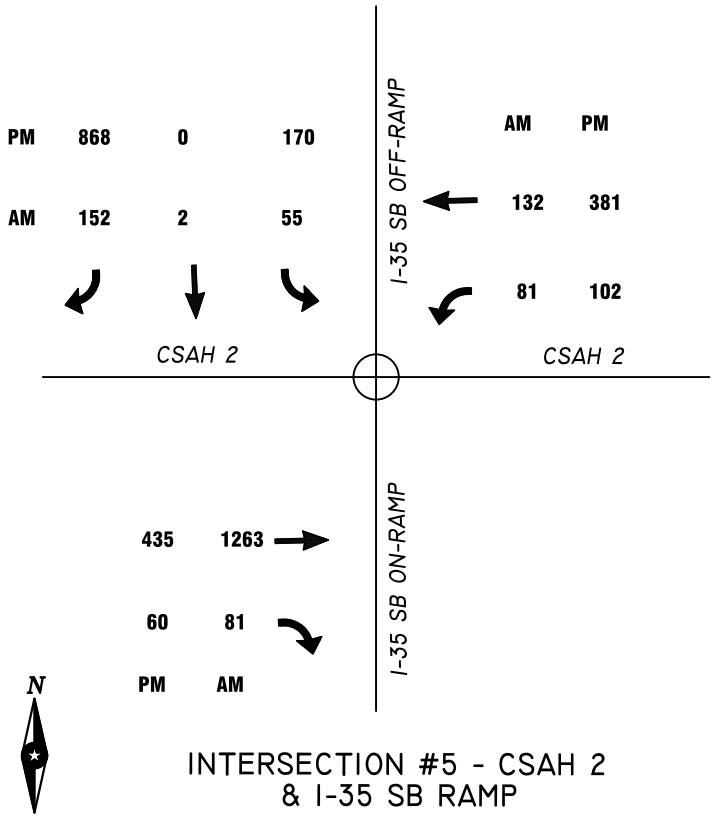


INTERSECTION #3 - CSAH 2
& NEWTON CIRCLE (E)

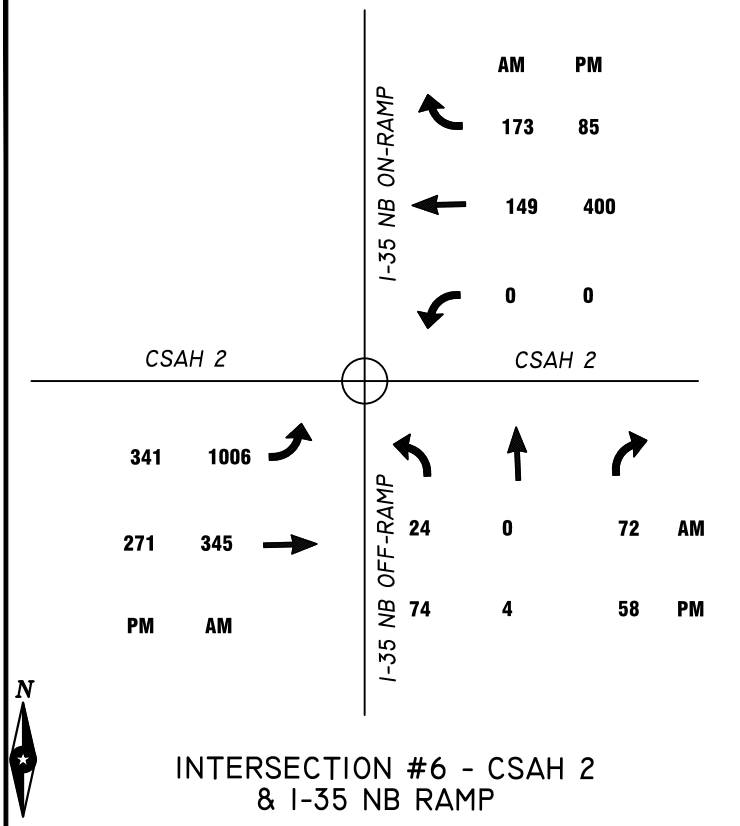
BASELINE (2038) 1-4



INTERSECTION #4 - CSAH 2
& IRVING AVE



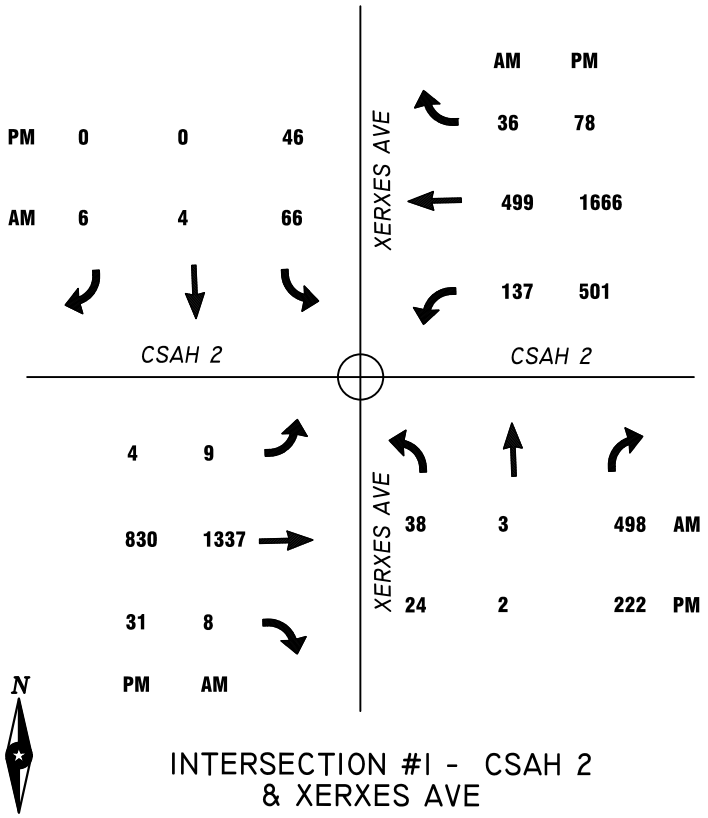
INTERSECTION #5 - CSAH 2
& I-35 SB RAMP



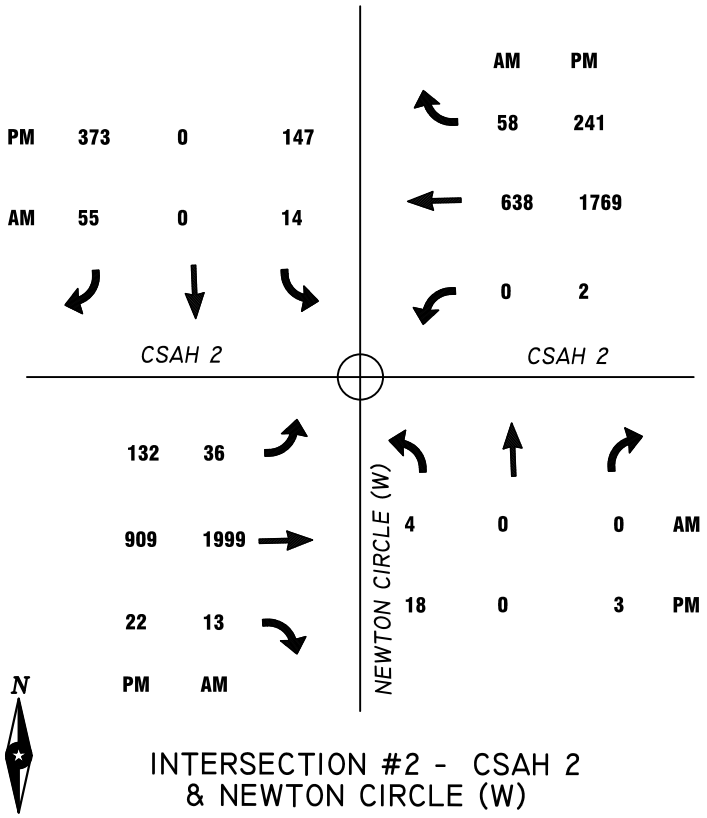
INTERSECTION #6 - CSAH 2
& I-35 NB RAMP

BASELINE (2038) 5 AND 6

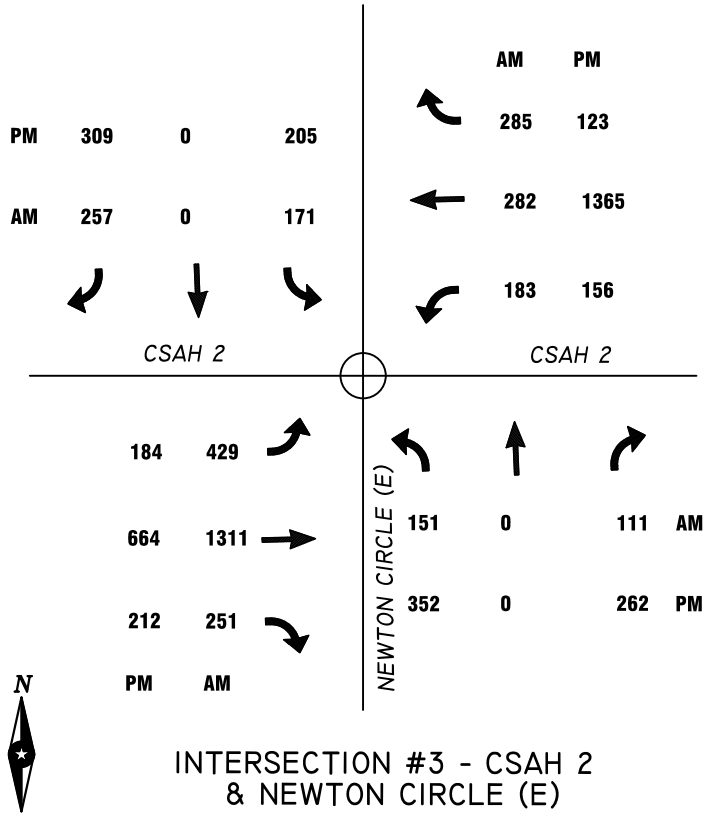
Appendix L: Phase 2 (2038) Traffic Counts – Diagram



INTERSECTION #1 - CSAH 2
& XERXES AVE

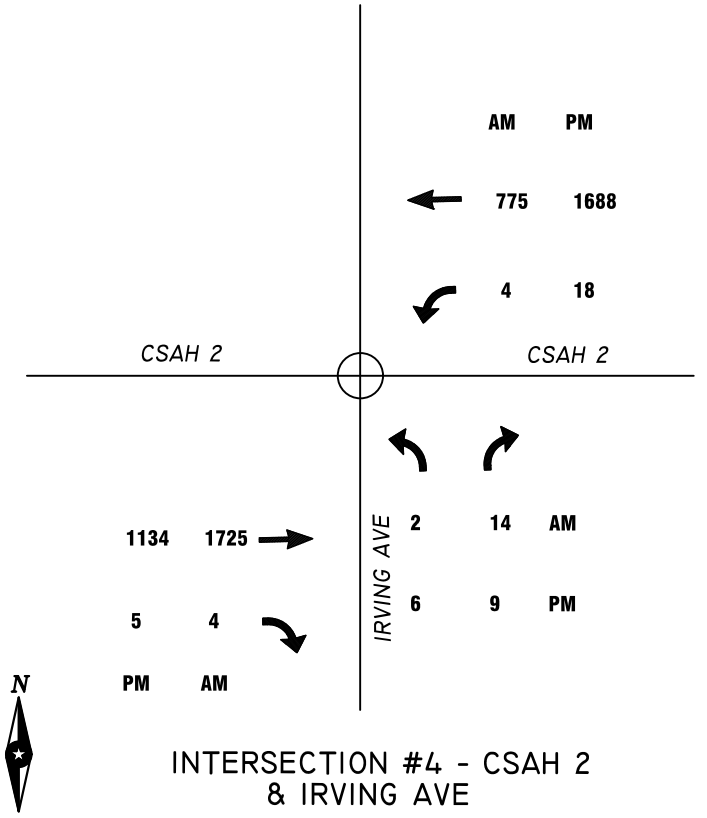


INTERSECTION #2 - CSAH 2
& NEWTON CIRCLE (W)

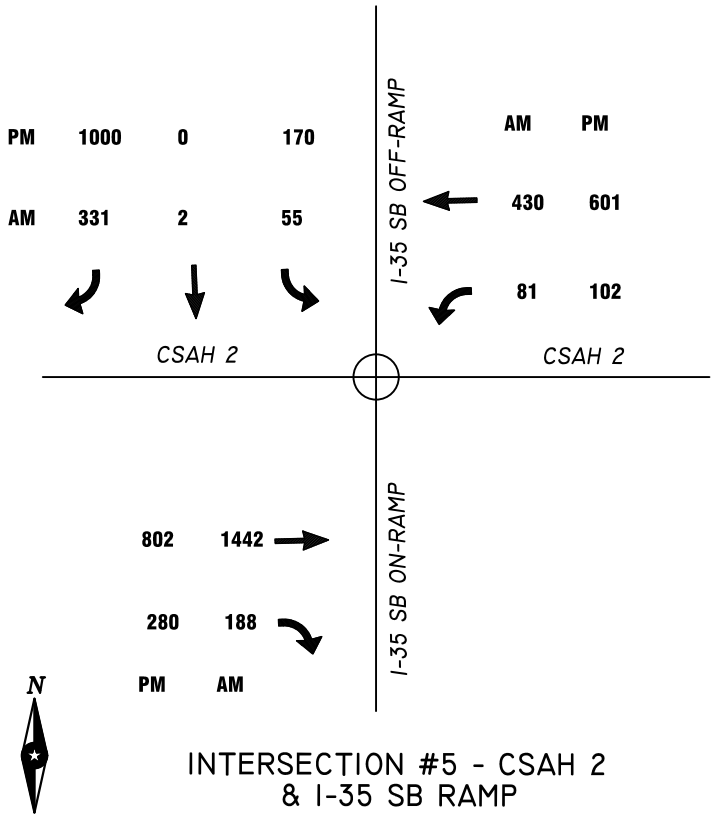


INTERSECTION #3 - CSAH 2
& NEWTON CIRCLE (E)

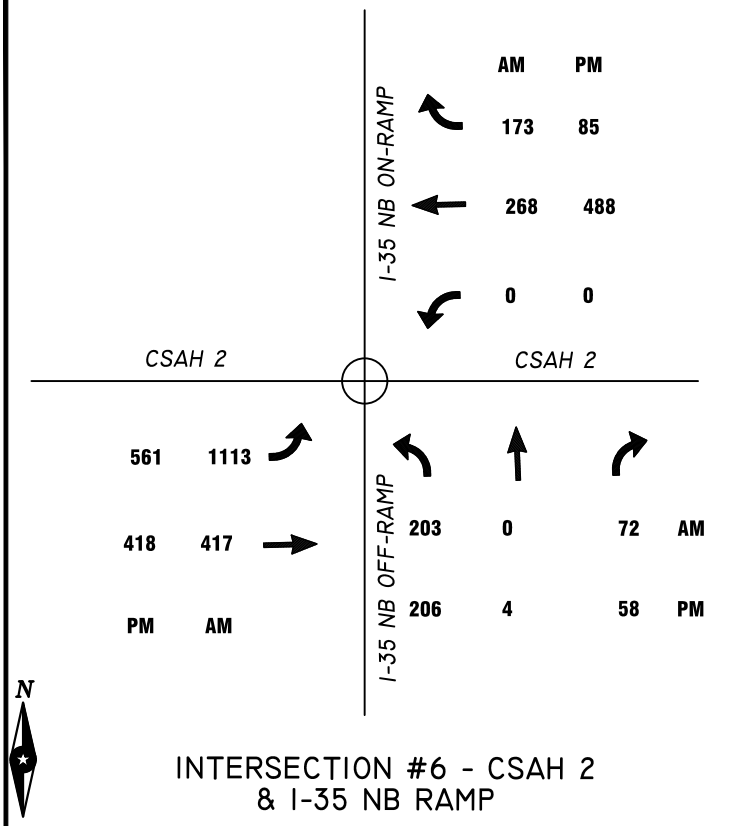
PHASE 2 (2038) 1-4



INTERSECTION #4 - CSAH 2
& IRVING AVE



INTERSECTION #5 - CSAH 2
& I-35 SB RAMP



INTERSECTION #6 - CSAH 2
& I-35 NB RAMP

PHASE 2 (2038) 5 AND 6

Appendix M: Synchro Reports – Baseline (2031)

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	WB	NB	NB	SB
Directions Served	L	L	LT	R	LTR
Maximum Queue (ft)	5	28	57	99	21
Average Queue (ft)	0	11	23	54	5
95th Queue (ft)	6	32	49	90	21
Link Distance (ft)			1864		700
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	300	300		200	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	10
Average Queue (ft)	2
95th Queue (ft)	13
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	WB	NB
Directions Served	T	L	LTR
Maximum Queue (ft)	3	33	24
Average Queue (ft)	0	9	8
95th Queue (ft)	5	33	26
Link Distance (ft)	1519		12
Upstream Blk Time (%)			1
Queuing Penalty (veh)			0
Storage Bay Dist (ft)		300	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: CSAH 2

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	18	21	28
Average Queue (ft)	3	5	10
95th Queue (ft)	22	33	31
Link Distance (ft)	428	267	450
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	WB	SB	SB
Directions Served	T	LT	LT	R
Maximum Queue (ft)	119	133	109	26
Average Queue (ft)	33	55	63	3
95th Queue (ft)	156	132	145	21
Link Distance (ft)	267	710		1051
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	1			
Storage Bay Dist (ft)			300	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	650	24	406
Average Queue (ft)	430	6	197
95th Queue (ft)	770	24	465
Link Distance (ft)	710	3512	744
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	4		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	742	4	26	183	0	33	3	275	3	2	3
Future Vol, veh/h	6	742	4	26	183	0	33	3	275	3	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	834	4	29	206	0	37	3	309	3	2	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	206	0	0	834	0	0	1009	1111	417	696	1111	103
Stage 1	-	-	-	-	-	-	847	847	-	264	264	-
Stage 2	-	-	-	-	-	-	162	264	-	432	847	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1363	-	-	795	-	-	194	208	585	328	208	932
Stage 1	-	-	-	-	-	-	323	376	-	718	689	-
Stage 2	-	-	-	-	-	-	824	689	-	572	376	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1363	-	-	795	-	-	186	199	585	149	199	932
Mov Cap-2 Maneuver	-	-	-	-	-	-	270	297	-	206	283	-
Stage 1	-	-	-	-	-	-	321	374	-	714	664	-
Stage 2	-	-	-	-	-	-	788	664	-	266	374	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.2	18.1	16.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	272	585	1363	-	-	795	-	-	322
HCM Lane V/C Ratio	0.149	0.528	0.005	-	-	0.037	-	-	0.028
HCM Control Delay (s)	20.5	17.8	7.7	-	-	9.7	-	-	16.5
HCM Lane LOS	C	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.5	3.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1136	10	0	227	0	2	0	0	0	0	0
Future Vol, veh/h	0	1136	10	0	227	0	2	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1276	11	0	255	0	2	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	255	0	0	1276	0	0	1404	1531	638	893	1531	128
Stage 1	-	-	-	-	-	-	1276	1276	-	255	255	-
Stage 2	-	-	-	-	-	-	128	255	-	638	1276	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1307	-	-	540	-	-	99	116	419	236	116	898
Stage 1	-	-	-	-	-	-	176	236	-	727	695	-
Stage 2	-	-	-	-	-	-	862	695	-	431	236	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1307	-	-	540	-	-	99	116	419	236	116	898
Mov Cap-2 Maneuver	-	-	-	-	-	-	154	197	-	343	197	-
Stage 1	-	-	-	-	-	-	176	236	-	727	695	-
Stage 2	-	-	-	-	-	-	862	695	-	431	236	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	28.7	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	154	1307	-	-	540	-	-	-
HCM Lane V/C Ratio	0.015	-	-	-	-	-	-	-
HCM Control Delay (s)	28.7	0	-	-	0	-	-	0
HCM Lane LOS	D	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1118	0	14	224	0	0	0	8	0	0	0
Future Vol, veh/h	0	1118	0	14	224	0	0	0	8	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1256	0	16	252	0	0	0	9	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	252	0	0	1256	0	0	1413	1539	628	911	1539	126
Stage 1	-	-	-	-	-	-	1256	1256	-	283	283	-
Stage 2	-	-	-	-	-	-	157	283	-	628	1256	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1310	-	-	550	-	-	98	115	426	229	115	901
Stage 1	-	-	-	-	-	-	181	241	-	700	676	-
Stage 2	-	-	-	-	-	-	829	676	-	437	241	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1310	-	-	550	-	-	96	112	426	219	112	901
Mov Cap-2 Maneuver	-	-	-	-	-	-	157	197	-	326	188	-
Stage 1	-	-	-	-	-	-	181	241	-	700	656	-
Stage 2	-	-	-	-	-	-	805	656	-	428	241	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	13.6	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	426	1310	-	-	550	-	-	-
HCM Lane V/C Ratio	0.021	-	-	-	0.029	-	-	-
HCM Control Delay (s)	13.6	0	-	-	11.7	-	-	0
HCM Lane LOS	B	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1240	2	2	257	1	12
Future Vol, veh/h	1240	2	2	257	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1393	2	2	289	1	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1396	0	1543	1394
Stage 1	-	-	-	-	1394	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	488	-	116	173
Stage 1	-	-	-	-	229	-
Stage 2	-	-	-	-	864	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	488	-	115	173
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	229	-
Stage 2	-	-	-	-	860	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	28.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	167	-	-	488	-
HCM Lane V/C Ratio	0.087	-	-	0.005	-
HCM Control Delay (s)	28.6	-	-	12.4	0
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↰						↰	↱
Traffic Vol, veh/h	0	1088	70	69	114	0	0	0	0	47	1	130
Future Vol, veh/h	0	1088	70	69	114	0	0	0	0	47	1	130
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	0	-	-	-	-	-	-	300	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1222	79	78	128	0	0	0	0	53	1	146

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1222	0	0	1505	1505	-
Stage 1	-	-	-	-	-	-	283	283	-
Stage 2	-	-	-	-	-	-	1222	1222	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	-
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	-
Pot Cap-1 Maneuver	0	-	-	570	-	0	133	121	0
Stage 1	0	-	-	-	-	0	765	677	0
Stage 2	0	-	-	-	-	0	278	252	0
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	570	-	-	113	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	113	0	-
Stage 1	-	-	-	-	-	-	653	0	-
Stage 2	-	-	-	-	-	-	278	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	4.6	63
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	570	-	113	-
HCM Lane V/C Ratio	-	-	0.136	-	0.477	-
HCM Control Delay (s)	-	-	12.3	0	63	0
HCM Lane LOS	-	-	B	A	F	A
HCM 95th %tile Q(veh)	-	-	0.5	-	2.1	-

Intersection	
Int Delay, s/veh	639.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	867	297	0	0	128	148	20	0	62	0	0	0
Future Vol, veh/h	867	297	0	0	128	148	20	0	62	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	974	334	0	0	144	166	22	0	70	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	310	0	-	-	-	0	2509	2592	334
Stage 1	-	-	-	-	-	-	2282	2282	-
Stage 2	-	-	-	-	-	-	227	310	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1250	-	0	0	-	-	31	25	708
Stage 1	-	-	0	0	-	-	82	75	-
Stage 2	-	-	0	0	-	-	811	659	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1250	-	-	-	-	-	~ 1	0	708
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 1	0	-
Stage 1	-	-	-	-	-	-	~ 4	0	-
Stage 2	-	-	-	-	-	-	811	0	-

Approach	EB	WB	NB
HCM Control Delay, s	12.8	0	$ 11685.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	4	1250	-	-	-
HCM Lane V/C Ratio	23.034	0.779	-	-	-
HCM Control Delay (s)	$ 11685.5	17.2	0	-	-
HCM Lane LOS	F	C	A	-	-
HCM 95th %tile Q(veh)	13.6	8.5	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	WB	NB	NB
Directions Served	L	R	L	LT	R
Maximum Queue (ft)	14	7	72	39	48
Average Queue (ft)	1	1	41	16	23
95th Queue (ft)	12	9	76	42	46
Link Distance (ft)				1864	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	300	300	300		200
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	29
Average Queue (ft)	12
95th Queue (ft)	32
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	WB	NB
Directions Served	L	LTR
Maximum Queue (ft)	24	24
Average Queue (ft)	4	12
95th Queue (ft)	20	32
Link Distance (ft)		12
Upstream Blk Time (%)		1
Queuing Penalty (veh)		0
Storage Bay Dist (ft)	300	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: CSAH 2

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	49	23
Average Queue (ft)	8	8
95th Queue (ft)	39	29
Link Distance (ft)	267	450
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	WB	SB	SB
Directions Served	LT	LT	R
Maximum Queue (ft)	86	94	261
Average Queue (ft)	34	52	147
95th Queue (ft)	80	89	278
Link Distance (ft)	710		1051
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		300	
Storage Blk Time (%)			2
Queuing Penalty (veh)			2

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	127	14	111
Average Queue (ft)	71	1	52
95th Queue (ft)	126	10	109
Link Distance (ft)	710	3512	744
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	413	27	242	928	4	20	1	77	1	0	0
Future Vol, veh/h	2	413	27	242	928	4	20	1	77	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	444	29	260	998	4	22	1	83	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	998	0	0	444	0	0	1467	1966	222	1745	1966	499
Stage 1	-	-	-	-	-	-	448	448	-	1518	1518	-
Stage 2	-	-	-	-	-	-	1019	1518	-	227	448	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	689	-	-	1112	-	-	89	62	782	55	62	517
Stage 1	-	-	-	-	-	-	560	571	-	125	180	-
Stage 2	-	-	-	-	-	-	254	180	-	755	571	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	689	-	-	1112	-	-	73	47	782	40	47	517
Mov Cap-2 Maneuver	-	-	-	-	-	-	154	112	-	100	105	-
Stage 1	-	-	-	-	-	-	558	569	-	125	138	-
Stage 2	-	-	-	-	-	-	195	138	-	672	569	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.9	15	41.4
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	151	782	689	-	-	1112	-	-	100
HCM Lane V/C Ratio	0.15	0.106	0.003	-	-	0.234	-	-	0.011
HCM Control Delay (s)	33	10.1	10.2	-	-	9.2	-	-	41.4
HCM Lane LOS	D	B	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.5	0.4	0	-	-	0.9	-	-	0

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	443	18	1	1088	0	14	0	3	0	0	0
Future Vol, veh/h	0	443	18	1	1088	0	14	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	471	19	1	1157	0	15	0	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1157	0	0	471	0	0	1052	1631	236	1396	1631	579
Stage 1	-	-	-	-	-	-	471	471	-	1160	1160	-
Stage 2	-	-	-	-	-	-	581	1160	-	236	471	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	600	-	-	1087	-	-	181	101	766	101	101	458
Stage 1	-	-	-	-	-	-	542	558	-	208	268	-
Stage 2	-	-	-	-	-	-	467	268	-	746	558	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	600	-	-	1087	-	-	181	101	766	101	101	458
Mov Cap-2 Maneuver	-	-	-	-	-	-	311	204	-	176	204	-
Stage 1	-	-	-	-	-	-	542	558	-	208	268	-
Stage 2	-	-	-	-	-	-	467	268	-	743	558	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	15.9	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	347	600	-	-	1087	-	-	-
HCM Lane V/C Ratio	0.052	-	-	-	0.001	-	-	-
HCM Control Delay (s)	15.9	0	-	-	8.3	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	446	0	12	1100	0	0	0	22	0	0	0
Future Vol, veh/h	0	446	0	12	1100	0	0	0	22	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	480	0	13	1183	0	0	0	24	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1183	0	0	480	0	0	1097	1689	240	1449	1689	591
Stage 1	-	-	-	-	-	-	480	480	-	1209	1209	-
Stage 2	-	-	-	-	-	-	617	1209	-	240	480	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	586	-	-	1079	-	-	168	93	761	92	93	450
Stage 1	-	-	-	-	-	-	536	553	-	194	254	-
Stage 2	-	-	-	-	-	-	444	254	-	742	553	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	586	-	-	1079	-	-	166	92	761	88	92	450
Mov Cap-2 Maneuver	-	-	-	-	-	-	295	192	-	163	191	-
Stage 1	-	-	-	-	-	-	536	553	-	194	251	-
Stage 2	-	-	-	-	-	-	439	251	-	719	553	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	9.9	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	761	586	-	-	1079	-	-	-
HCM Lane V/C Ratio	0.031	-	-	-	0.012	-	-	-
HCM Control Delay (s)	9.9	0	-	-	8.4	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	472	4	14	1152	6	6
Future Vol, veh/h	472	4	14	1152	6	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	508	4	15	1239	6	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	512	0	1159	510
Stage 1	-	-	-	-	510	-
Stage 2	-	-	-	-	649	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1051	-	202	562
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	483	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1051	-	193	562
Mov Cap-2 Maneuver	-	-	-	-	193	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	461	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	18.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	287	-	-	1051	-
HCM Lane V/C Ratio	0.045	-	-	0.014	-
HCM Control Delay (s)	18.1	-	-	8.5	0.2
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↰						↰	↱
Traffic Vol, veh/h	0	375	51	88	328	0	0	0	0	146	0	747
Future Vol, veh/h	0	375	51	88	328	0	0	0	0	146	0	747
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	0	-	-	-	-	-	-	300	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	399	54	94	349	0	0	0	0	155	0	795

Major/Minor	Major1			Major2				Minor2		
Conflicting Flow All	-	0	0	399	0	0		935	935	-
Stage 1	-	-	-	-	-	-		536	536	-
Stage 2	-	-	-	-	-	-		399	399	-
Critical Hdwy	-	-	-	4.12	-	-		6.42	6.52	-
Critical Hdwy Stg 1	-	-	-	-	-	-		5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-		5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-		3.518	4.018	-
Pot Cap-1 Maneuver	0	-	-	1160	-	0		295	265	0
Stage 1	0	-	-	-	-	0		587	523	0
Stage 2	0	-	-	-	-	0		678	602	0
Platoon blocked, %		-	-		-					
Mov Cap-1 Maneuver	-	-	-	1160	-	-		265	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-		265	0	-
Stage 1	-	-	-	-	-	-		528	0	-
Stage 2	-	-	-	-	-	-		678	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.8	36.2
HCM LOS			E

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1160	-	265	-
HCM Lane V/C Ratio	-	-	0.081	-	0.586	-
HCM Control Delay (s)	-	-	8.4	0	36.2	0
HCM Lane LOS	-	-	A	A	E	A
HCM 95th %tile Q(veh)	-	-	0.3	-	3.4	-

Intersection	
Int Delay, s/veh	8.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	294	234	0	0	345	72	64	2	49	0	0	0
Future Vol, veh/h	294	234	0	0	345	72	64	2	49	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	320	254	0	0	375	78	70	2	53	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	453	0	-	-	-	0	1307	1346	254
Stage 1	-	-	-	-	-	-	893	893	-
Stage 2	-	-	-	-	-	-	414	453	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1108	-	0	0	-	-	176	151	785
Stage 1	-	-	0	0	-	-	400	360	-
Stage 2	-	-	0	0	-	-	667	570	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1108	-	-	-	-	-	117	0	785
Mov Cap-2 Maneuver	-	-	-	-	-	-	117	0	-
Stage 1	-	-	-	-	-	-	266	0	-
Stage 2	-	-	-	-	-	-	667	0	-

Approach	EB	WB	NB
HCM Control Delay, s	5.3	0	57.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	185	1108	-	-	-
HCM Lane V/C Ratio	0.676	0.288	-	-	-
HCM Control Delay (s)	57.5	9.6	0	-	-
HCM Lane LOS	F	A	A	-	-
HCM 95th %tile Q(veh)	4.1	1.2	-	-	-

Appendix N: Synchro Reports – Phase 1 (2031)

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	WB	NB	NB	SB
Directions Served	L	T	L	LT	R	LTR
Maximum Queue (ft)	7	3	44	122	238	50
Average Queue (ft)	1	0	19	60	151	23
95th Queue (ft)	7	5	45	254	288	48
Link Distance (ft)		2640		1864		700
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	300		300		200	
Storage Blk Time (%)					14	
Queuing Penalty (veh)					5	

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	8
Average Queue (ft)	2
95th Queue (ft)	10
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	WB	WB	WB	WB	B26	NB	SB	B27
Directions Served	L	R	L	T	T	R	T	LTR	LTR	T
Maximum Queue (ft)	47	25	317	182	80	6	30	25	123	619
Average Queue (ft)	24	8	224	43	8	1	3	15	118	567
95th Queue (ft)	49	26	415	264	109	6	41	24	123	732
Link Distance (ft)				480	480		428	12	52	604
Upstream Blk Time (%)				2	0			98	100	74
Queuing Penalty (veh)				7	0			362	0	0
Storage Bay Dist (ft)	300	300	300			300				
Storage Blk Time (%)			20	0						
Queuing Penalty (veh)			23	0						

Intersection: 4: CSAH 2

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	101	12	26
Average Queue (ft)	18	2	10
95th Queue (ft)	108	19	29
Link Distance (ft)	428	267	450
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	WB	SB	SB
Directions Served	T	R	LT	LT	R
Maximum Queue (ft)	156	11	190	147	68
Average Queue (ft)	55	1	81	81	21
95th Queue (ft)	214	10	195	169	68
Link Distance (ft)	267	267	710		1051
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	4				
Storage Bay Dist (ft)				300	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	705	25	748
Average Queue (ft)	543	7	680
95th Queue (ft)	809	25	880
Link Distance (ft)	710	3512	744
Upstream Blk Time (%)	1		59
Queuing Penalty (veh)	9		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	12.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	742	4	26	183	0	33	3	275	3	2	3
Future Vol, veh/h	6	1032	4	116	421	30	33	3	384	40	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	1160	4	130	473	34	37	3	431	45	2	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	473	0	0	1160	0	0	1671	1907	580	1329	1907	237
Stage 1	-	-	-	-	-	-	1173	1173	-	734	734	-
Stage 2	-	-	-	-	-	-	498	734	-	595	1173	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1085	-	-	598	-	-	63	68	458	113	68	764
Stage 1	-	-	-	-	-	-	204	264	-	378	424	-
Stage 2	-	-	-	-	-	-	523	424	-	458	264	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1085	-	-	598	-	-	51	53	458	~ 5	53	764
Mov Cap-2 Maneuver	-	-	-	-	-	-	143	156	-	~ -136	105	-
Stage 1	-	-	-	-	-	-	203	262	-	376	332	-
Stage 2	-	-	-	-	-	-	405	332	-	~ 26	262	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.6	57.3	
HCM LOS			F	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	144	458	1085	-	-	598	-	-	+
HCM Lane V/C Ratio	0.281	0.942	0.006	-	-	0.218	-	-	-
HCM Control Delay (s)	39.5	59	8.3	-	-	12.7	-	-	-
HCM Lane LOS	E	F	A	-	-	B	-	-	-
HCM 95th %tile Q(veh)	1.1	11.2	0	-	-	0.8	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1136	10	0	227	0	2	0	0	0	0	0
Future Vol, veh/h	0	1572	10	0	585	0	2	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1766	11	0	657	0	2	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	657	0	0	1766	0	0	2095	2423	883	1540	2423	329
Stage 1	-	-	-	-	-	-	1766	1766	-	657	657	-
Stage 2	-	-	-	-	-	-	329	657	-	883	1766	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	926	-	-	349	-	-	30	32	289	79	32	667
Stage 1	-	-	-	-	-	-	87	135	-	420	460	-
Stage 2	-	-	-	-	-	-	658	460	-	307	135	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	926	-	-	349	-	-	30	32	289	79	32	667
Mov Cap-2 Maneuver	-	-	-	-	-	-	75	105	-	197	105	-
Stage 1	-	-	-	-	-	-	87	135	-	420	460	-
Stage 2	-	-	-	-	-	-	658	460	-	307	135	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	54.5	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	75	926	-	-	349	-	-	-
HCM Lane V/C Ratio	0.03	-	-	-	-	-	-	-
HCM Control Delay (s)	54.5	0	-	-	0	-	-	0
HCM Lane LOS	F	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	420.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1118	0	14	224	0	0	0	8	0	0	0
Future Vol, veh/h	175	1118	261	188	224	117	215	0	152	96	0	143
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	197	1256	293	211	252	131	242	0	171	108	0	161

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	252	0	0	1256	0	0	2197	2323	628	1695	2323	126
Stage 1	-	-	-	-	-	-	1649	1649	-	674	674	-
Stage 2	-	-	-	-	-	-	548	674	-	1021	1649	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1310	-	-	550	-	-	~ 25	37	426	~ 60	37	901
Stage 1	-	-	-	-	-	-	~ 103	155	-	410	452	-
Stage 2	-	-	-	-	-	-	488	452	-	253	155	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1310	-	-	550	-	-	~ 13	19	426	~ 23	19	901
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 34	54	-	~ -121	~ -126	-
Stage 1	-	-	-	-	-	-	~ 88	132	-	348	279	-
Stage 2	-	-	-	-	-	-	247	279	-	129	132	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	5.5	$ 3068	
HCM LOS			F	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	55	1310	-	-	550	-	-	+
HCM Lane V/C Ratio	7.497	0.15	-	-	0.384	-	-	-
HCM Control Delay (s)	$ 3068	8.2	-	-	15.6	-	-	-
HCM Lane LOS	F	A	-	-	C	-	-	-
HCM 95th %tile Q(veh)	47.9	0.5	-	-	1.8	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1240	2	2	257	1	12
Future Vol, veh/h	1480	2	2	548	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1663	2	2	616	1	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1665	0	1976	1664
Stage 1	-	-	-	-	1664	-
Stage 2	-	-	-	-	312	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	384	-	61	119
Stage 1	-	-	-	-	168	-
Stage 2	-	-	-	-	716	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	384	-	61	119
Mov Cap-2 Maneuver	-	-	-	-	61	-
Stage 1	-	-	-	-	168	-
Stage 2	-	-	-	-	710	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	42.3
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	111	-	-	384	-
HCM Lane V/C Ratio	0.132	-	-	0.006	-
HCM Control Delay (s)	42.3	-	-	14.4	0.1
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↰						↰	↱
Traffic Vol, veh/h	0	1088	70	69	114	0	0	0	0	47	1	130
Future Vol, veh/h	0	1238	160	69	296	0	0	0	0	47	1	239
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	0	-	-	-	-	-	-	300	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1391	180	78	333	0	0	0	0	53	1	269

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1391	0	0	1879	1879	-
Stage 1	-	-	-	-	-	-	488	488	-
Stage 2	-	-	-	-	-	-	1391	1391	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	-
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	-
Pot Cap-1 Maneuver	0	-	-	492	-	0	78	71	0
Stage 1	0	-	-	-	-	0	617	550	0
Stage 2	0	-	-	-	-	0	231	209	0
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	492	-	-	63	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	0	-
Stage 1	-	-	-	-	-	-	497	0	-
Stage 2	-	-	-	-	-	-	231	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	2.6	181.6
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	492	-	63	-
HCM Lane V/C Ratio	-	-	0.158	-	0.856	-
HCM Control Delay (s)	-	-	13.7	0	181.6	0
HCM Lane LOS	-	-	B	A	F	A
HCM 95th %tile Q(veh)	-	-	0.6	-	4	-

Intersection	
Int Delay, s/veh	17

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	867	297	0	0	128	148	20	0	62	0	0	0
Future Vol, veh/h	957	357	0	0	201	148	129	0	62	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1075	401	0	0	226	166	145	0	70	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	392	0	-	-	-	0	2861	2944	401
Stage 1	-	-	-	-	-	-	2552	2552	-
Stage 2	-	-	-	-	-	-	309	392	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1167	-	0	0	-	-	~ 19	15	649
Stage 1	-	-	0	0	-	-	~ 60	54	-
Stage 2	-	-	0	0	-	-	745	606	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1167	-	-	-	-	-	0	0	649
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	0	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	745	0	-

Approach	EB	WB	NB
HCM Control Delay, s	22.1	0	13.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	649	1167	-	-	-
HCM Lane V/C Ratio	0.331	0.921	-	-	-
HCM Control Delay (s)	13.3	30.3	0	-	-
HCM Lane LOS	B	D	A	-	-
HCM 95th %tile Q(veh)	1.4	15.2	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	WB	NB	NB	SB
Directions Served	L	R	L	LT	R	LTR
Maximum Queue (ft)	12	11	89	71	89	146
Average Queue (ft)	1	1	53	28	43	61
95th Queue (ft)	9	7	86	69	77	151
Link Distance (ft)				1864		700
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	300	300	300		200	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	WB	NB
Directions Served	L	LTR
Maximum Queue (ft)	4	36
Average Queue (ft)	0	12
95th Queue (ft)	4	35
Link Distance (ft)		650
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	300	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	WB	WB	WB	NB	SB	B27
Directions Served	L	R	L	T	R	LTR	LTR	T
Maximum Queue (ft)	89	20	62	6	14	40	132	627
Average Queue (ft)	45	4	36	0	1	24	121	612
95th Queue (ft)	78	18	63	5	8	36	131	656
Link Distance (ft)				480		12	52	604
Upstream Blk Time (%)						85	100	94
Queuing Penalty (veh)						430	0	0
Storage Bay Dist (ft)	300	300	300		300			
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 4: CSAH 2

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	39	28
Average Queue (ft)	4	10
95th Queue (ft)	24	31
Link Distance (ft)	267	450
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	WB	SB	SB
Directions Served	R	LT	LT	R
Maximum Queue (ft)	4	96	450	1098
Average Queue (ft)	0	32	439	1070
95th Queue (ft)	4	78	549	1131
Link Distance (ft)	267	710		1051
Upstream Blk Time (%)				91
Queuing Penalty (veh)				0
Storage Bay Dist (ft)			300	
Storage Blk Time (%)				95
Queuing Penalty (veh)				138

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	149	4	363
Average Queue (ft)	61	1	171
95th Queue (ft)	114	7	367
Link Distance (ft)	710	3512	744
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	413	27	242	928	4	20	1	77	1	0	0
Future Vol, veh/h	2	663	27	363	1251	44	20	1	171	33	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	713	29	390	1345	47	22	1	184	35	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1345	0	0	713	0	0	2170	2843	356	2487	2843	673
Stage 1	-	-	-	-	-	-	717	717	-	2126	2126	-
Stage 2	-	-	-	-	-	-	1453	2126	-	361	717	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	508	-	-	883	-	-	26	17	640	~ 15	17	398
Stage 1	-	-	-	-	-	-	387	432	-	51	89	-
Stage 2	-	-	-	-	-	-	137	89	-	630	432	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	508	-	-	883	-	-	~ 17	9	640	~ 7	9	398
Mov Cap-2 Maneuver	-	-	-	-	-	-	61	41	-	~ 28	24	-
Stage 1	-	-	-	-	-	-	385	430	-	51	50	-
Stage 2	-	-	-	-	-	-	76	50	-	446	430	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.7	22.2	$ 471.1
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	60	640	508	-	-	883	-	-	28
HCM Lane V/C Ratio	0.376	0.287	0.004	-	-	0.442	-	-	1.267
HCM Control Delay (s)	97.5	12.9	12.1	-	-	12.3	-	-	$ 471.1
HCM Lane LOS	F	B	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	1.4	1.2	0	-	-	2.3	-	-	4.1

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	443	18	1	1088	0	14	0	3	0	0	0
Future Vol, veh/h	0	819	18	1	1572	0	14	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	871	19	1	1672	0	15	0	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1672	0	0	871	0	0	1709	2545	436	2110	2545	836
Stage 1	-	-	-	-	-	-	871	871	-	1674	1674	-
Stage 2	-	-	-	-	-	-	838	1674	-	436	871	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	380	-	-	770	-	-	59	27	568	29	27	310
Stage 1	-	-	-	-	-	-	312	367	-	99	151	-
Stage 2	-	-	-	-	-	-	327	151	-	569	367	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	380	-	-	770	-	-	59	27	568	29	27	310
Mov Cap-2 Maneuver	-	-	-	-	-	-	173	108	-	83	108	-
Stage 1	-	-	-	-	-	-	312	367	-	99	151	-
Stage 2	-	-	-	-	-	-	327	151	-	566	367	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	25.1	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	197	380	-	-	770	-	-	-
HCM Lane V/C Ratio	0.092	-	-	-	0.001	-	-	-
HCM Control Delay (s)	25.1	0	-	-	9.7	-	-	0
HCM Lane LOS	D	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	147.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	446	0	12	1100	0	0	0	22	0	0	0
Future Vol, veh/h	151	446	225	162	1100	101	291	0	216	128	0	193
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	162	480	242	174	1183	109	313	0	232	138	0	208

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1183	0	0	480	0	0	1744	2335	240	2096	2335	591
Stage 1	-	-	-	-	-	-	804	804	-	1531	1531	-
Stage 2	-	-	-	-	-	-	940	1531	-	565	804	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	586	-	-	1079	-	-	~ 55	36	761	~ 30	36	450
Stage 1	-	-	-	-	-	-	343	394	-	~ 122	177	-
Stage 2	-	-	-	-	-	-	~ 283	177	-	477	394	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	586	-	-	1079	-	-	~ 21	22	761	~ 14	22	450
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ -47	~ -18	-	~ 41	68	-
Stage 1	-	-	-	-	-	-	~ 248	285	-	~ 88	148	-
Stage 2	-	-	-	-	-	-	~ 128	148	-	240	285	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	1.1		$ 1372.8
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	+	586	-	-	1079	-	-	90
HCM Lane V/C Ratio	-	0.277	-	-	0.161	-	-	3.835
HCM Control Delay (s)	-	13.5	-	-	9	-		$ 1372.8
HCM Lane LOS	-	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	-	1.1	-	-	0.6	-	-	35.5

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	472	4	14	1152	6	6
Future Vol, veh/h	794	4	14	1403	6	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	854	4	15	1509	6	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	858	0	1640	856
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	784	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	781	-	100	357
Stage 1	-	-	-	-	415	-
Stage 2	-	-	-	-	411	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	781	-	88	357
Mov Cap-2 Maneuver	-	-	-	-	88	-
Stage 1	-	-	-	-	415	-
Stage 2	-	-	-	-	362	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	33.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	141	-	-	781	-
HCM Lane V/C Ratio	0.092	-	-	0.019	-
HCM Control Delay (s)	33.1	-	-	9.7	0.6
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	14.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	375	51	88	328	0	0	0	0	146	0	747
Future Vol, veh/h	0	576	172	88	485	0	0	0	0	146	0	841
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	0	-	-	-	-	-	-	300	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	613	183	94	516	0	0	0	0	155	0	895

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	613	0	0	1316	1316	-
Stage 1	-	-	-	-	-	-	703	703	-
Stage 2	-	-	-	-	-	-	613	613	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	-
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	-
Pot Cap-1 Maneuver	0	-	-	966	-	0	174	158	0
Stage 1	0	-	-	-	-	0	491	440	0
Stage 2	0	-	-	-	-	0	541	483	0
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	966	-	-	~ 150	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 150	0	-
Stage 1	-	-	-	-	-	-	424	0	-
Stage 2	-	-	-	-	-	-	541	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.4	143
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	966	-	150	-
HCM Lane V/C Ratio	-	-	0.097	-	1.035	-
HCM Control Delay (s)	-	-	9.1	0	143	0
HCM Lane LOS	-	-	A	A	F	A
HCM 95th %tile Q(veh)	-	-	0.3	-	8	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	213.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	294	234	0	0	345	72	64	2	49	0	0	0
Future Vol, veh/h	415	314	0	0	408	72	158	2	49	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	451	341	0	0	443	78	172	2	53	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	522	0	-	-	-	0	1726	1765	341
Stage 1	-	-	-	-	-	-	1243	1243	-
Stage 2	-	-	-	-	-	-	483	522	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1044	-	0	0	-	-	~ 98	84	701
Stage 1	-	-	0	0	-	-	272	246	-
Stage 2	-	-	0	0	-	-	620	531	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1044	-	-	-	-	-	~ 46	0	701
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 46	0	-
Stage 1	-	-	-	-	-	-	~ 127	0	-
Stage 2	-	-	-	-	-	-	620	0	-

Approach	EB	WB	NB
HCM Control Delay, s	6.3	0	$ 1426.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	59	1044	-	-	-
HCM Lane V/C Ratio	3.85	0.432	-	-	-
HCM Control Delay (s)	$ 1426.4	11	0	-	-
HCM Lane LOS	F	B	A	-	-
HCM 95th %tile Q(veh)	24.5	2.2	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Appendix O: Synchro Reports – Phase 1 (2031) Recommendations

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	25	271	273	9	91	72	85	19	49	217	45	6
Average Queue (ft)	4	174	168	1	50	41	52	5	16	126	15	1
95th Queue (ft)	20	261	264	7	89	76	89	18	46	215	46	6
Link Distance (ft)		2632	2632			1905	1905		1864		701	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			300	300			300		200		150
Storage Blk Time (%)		0	0							2		
Queuing Penalty (veh)		0	0							1		

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	WB	NB
Directions Served	T	LTR
Maximum Queue (ft)	268	11
Average Queue (ft)	27	1
95th Queue (ft)	366	9
Link Distance (ft)	1513	650
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	199	405	374	161	313	82	94	59	12	49	49	93
Average Queue (ft)	99	305	286	65	207	47	60	33	12	28	34	47
95th Queue (ft)	244	448	414	155	397	80	101	58	16	43	52	85
Link Distance (ft)		1513	1513			474	474			13		53
Upstream Blk Time (%)									11	35	5	5
Queuing Penalty (veh)									0	130	0	0
Storage Bay Dist (ft)	300			300	300			300	150		150	
Storage Blk Time (%)		16	10		14				11	35	5	5
Queuing Penalty (veh)		29	26		16				16	76	7	5

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	B27
Directions Served	T
Maximum Queue (ft)	4
Average Queue (ft)	0
95th Queue (ft)	6
Link Distance (ft)	604
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: CSAH 2

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	199	203	47	17	33
Average Queue (ft)	51	41	7	2	9
95th Queue (ft)	212	199	49	23	32
Link Distance (ft)	429	429	268	268	451
Upstream Blk Time (%)	0	0			
Queuing Penalty (veh)	2	1			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	TR	L	T	LT	R
Maximum Queue (ft)	289	290	72	120	66	74
Average Queue (ft)	229	207	43	33	26	24
95th Queue (ft)	329	309	75	109	63	71
Link Distance (ft)	268	268		711		1042
Upstream Blk Time (%)	10	5				
Queuing Penalty (veh)	75	40				
Storage Bay Dist (ft)			200		300	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	LT	R
Maximum Queue (ft)	199	189	99	114	148	130	50
Average Queue (ft)	114	119	47	75	91	56	21
95th Queue (ft)	187	192	94	121	152	114	48
Link Distance (ft)		711	711	3503	3503	741	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	350						150
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 7: Newton Cir & Frontage Rd

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	13
95th Queue (ft)	37
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	742	4	26	183	0	33	3	275	3	2	3
Future Volume (veh/h)	6	1032	4	116	421	30	33	3	384	40	2	3
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	7	1160	4	130	473	34	37	3	431	45	2	3
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	423	1348	603	249	1545	691	92	4	593	94	2	593
Arrive On Green	0.01	0.38	0.38	0.06	0.44	0.44	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	0	11	1583	0	6	1583
Grp Volume(v), veh/h	7	1160	4	130	473	34	40	0	431	47	0	3
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	11	0	1583	6	0	1583
Q Serve(g_s), s	0.2	22.6	0.1	3.2	6.5	0.9	0.0	0.0	17.5	0.0	0.0	0.1
Cycle Q Clear(g_c), s	0.2	22.6	0.1	3.2	6.5	0.9	28.1	0.0	17.5	28.1	0.0	0.1
Prop In Lane	1.00		1.00	1.00		1.00	0.92		1.00	0.96		1.00
Lane Grp Cap(c), veh/h	423	1348	603	249	1545	691	96	0	593	96	0	593
V/C Ratio(X)	0.02	0.86	0.01	0.52	0.31	0.05	0.41	0.00	0.73	0.49	0.00	0.01
Avail Cap(c_a), veh/h	525	1439	644	288	1545	691	96	0	593	96	0	593
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.0	21.4	14.4	16.7	13.7	12.2	34.7	0.0	20.2	36.2	0.0	14.7
Incr Delay (d2), s/veh	0.0	5.3	0.0	1.7	0.1	0.0	12.6	0.0	7.6	16.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	11.9	0.1	1.6	3.2	0.4	1.2	0.0	8.9	1.4	0.0	0.0
LnGrp Delay(d),s/veh	14.1	26.7	14.4	18.4	13.9	12.2	47.3	0.0	27.8	52.9	0.0	14.7
LnGrp LOS	B	C	B	B	B	B	D		C	D		B
Approach Vol, veh/h		1171			637			471			50	
Approach Delay, s/veh		26.5			14.7			29.4			50.6	
Approach LOS		C			B			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		32.6	9.3	33.1		32.6	5.2	37.2
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		24.5	6.5	30.5		24.5	5.0	32.0
Max Q Clear Time (g_c+I1), s		30.1	5.2	24.6		30.1	2.2	8.5
Green Ext Time (p_c), s		0.0	0.0	3.9		0.0	0.0	11.3

Intersection Summary	
HCM 2010 Ctrl Delay	24.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1118	0	14	224	0	0	0	8	0	0	0
Future Volume (veh/h)	175	1118	261	188	224	117	215	0	152	96	0	143
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	197	1256	293	211	252	131	242	0	171	108	0	161
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	567	1298	581	246	1249	559	410	0	393	399	0	386
Arrive On Green	0.10	0.37	0.37	0.08	0.35	0.35	0.07	0.00	0.25	0.06	0.00	0.24
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	0	1583	1774	0	1583
Grp Volume(v), veh/h	197	1256	293	211	252	131	242	0	171	108	0	161
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1583	1774	0	1583
Q Serve(g_s), s	5.2	26.1	10.8	5.7	3.7	4.4	5.1	0.0	6.8	3.4	0.0	6.4
Cycle Q Clear(g_c), s	5.2	26.1	10.8	5.7	3.7	4.4	5.1	0.0	6.8	3.4	0.0	6.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	567	1298	581	246	1249	559	410	0	393	399	0	386
V/C Ratio(X)	0.35	0.97	0.50	0.86	0.20	0.23	0.59	0.00	0.44	0.27	0.00	0.42
Avail Cap(c_a), veh/h	604	1298	581	246	1249	559	410	0	393	404	0	386
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.0	23.3	18.5	18.3	16.9	17.1	23.2	0.0	23.8	19.4	0.0	23.9
Incr Delay (d2), s/veh	0.4	17.8	0.7	24.5	0.1	0.2	2.2	0.0	3.5	0.4	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	15.9	4.8	4.4	1.8	1.9	2.4	0.0	3.4	1.7	0.0	3.2
LnGrp Delay(d),s/veh	13.3	41.1	19.2	42.8	17.0	17.3	25.4	0.0	27.3	19.8	0.0	27.1
LnGrp LOS	B	D	B	D	B	B	C		C	B		C
Approach Vol, veh/h		1746			594			413			269	
Approach Delay, s/veh		34.3			26.2			26.2			24.2	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	23.1	10.6	32.0	9.6	22.8	11.6	31.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	18.4	6.1	27.5	5.1	18.3	8.7	24.9
Max Q Clear Time (g_c+I1), s	5.4	8.8	7.7	28.1	7.1	8.4	7.2	6.4
Green Ext Time (p_c), s	0.0	1.4	0.0	0.0	0.0	1.4	0.1	10.6

Intersection Summary	
HCM 2010 Ctrl Delay	30.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1088	70	69	114	0	0	0	0	47	1	130
Future Volume (veh/h)	0	1238	160	69	296	0	0	0	0	47	1	239
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1863	0				1900	1863	1863
Adj Flow Rate, veh/h	0	1391	180	78	333	0				53	1	0
Adj No. of Lanes	0	2	0	1	1	0				0	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89				0.89	0.89	0.89
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	1540	198	217	1121	0				437	8	397
Arrive On Green	0.00	0.49	0.49	0.11	1.00	0.00				0.25	0.25	0.00
Sat Flow, veh/h	0	3249	405	1774	1863	0				1743	33	1583
Grp Volume(v), veh/h	0	775	796	78	333	0				54	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1791	1774	1863	0				1776	0	1583
Q Serve(g_s), s	0.0	29.9	30.7	1.5	0.0	0.0				1.8	0.0	0.0
Cycle Q Clear(g_c), s	0.0	29.9	30.7	1.5	0.0	0.0				1.8	0.0	0.0
Prop In Lane	0.00		0.23	1.00		0.00				0.98		1.00
Lane Grp Cap(c), veh/h	0	864	874	217	1121	0				445	0	397
V/C Ratio(X)	0.00	0.90	0.91	0.36	0.30	0.00				0.12	0.00	0.00
Avail Cap(c_a), veh/h	0	887	898	242	1172	0				445	0	397
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.73	0.73	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	17.5	17.7	15.3	0.0	0.0				21.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	11.7	13.0	0.7	0.1	0.0				0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	17.2	18.2	0.8	0.0	0.0				0.9	0.0	0.0
LnGrp Delay(d),s/veh	0.0	29.2	30.7	16.0	0.1	0.0				22.3	0.0	0.0
LnGrp LOS		C	C	B	A					C		
Approach Vol, veh/h		1571			411						54	
Approach Delay, s/veh		29.9			3.1						22.3	
Approach LOS		C			A						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.5	41.1		23.3		49.6
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s			5.1	37.6		18.8		47.2
Max Q Clear Time (g_c+I1), s			3.5	32.7		3.8		2.0
Green Ext Time (p_c), s			0.0	3.9		0.1		17.4

Intersection Summary	
HCM 2010 Ctrl Delay	24.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	867	297	0	0	128	148	20	0	62	0	0	0
Future Volume (veh/h)	957	357	0	0	201	148	129	0	62	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1900	1863	1863			
Adj Flow Rate, veh/h	1075	401	0	0	226	166	145	0	70			
Adj No. of Lanes	2	1	0	0	2	0	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	1288	963	0	0	343	241	644	0	575			
Arrive On Green	0.09	0.17	0.00	0.00	0.17	0.17	0.36	0.00	0.36			
Sat Flow, veh/h	3442	1863	0	0	2080	1398	1774	0	1583			
Grp Volume(v), veh/h	1075	401	0	0	200	192	145	0	70			
Grp Sat Flow(s),veh/h/ln	1721	1863	0	0	1770	1616	1774	0	1583			
Q Serve(g_s), s	17.1	14.4	0.0	0.0	7.9	8.4	4.3	0.0	2.2			
Cycle Q Clear(g_c), s	17.1	14.4	0.0	0.0	7.9	8.4	4.3	0.0	2.2			
Prop In Lane	1.00		0.00	0.00		0.87	1.00		1.00			
Lane Grp Cap(c), veh/h	1288	963	0	0	305	279	644	0	575			
V/C Ratio(X)	0.83	0.42	0.00	0.00	0.66	0.69	0.23	0.00	0.12			
Avail Cap(c_a), veh/h	1451	1180	0	0	427	390	644	0	575			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.30	0.30	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	19.9	21.0	0.0	0.0	29.0	29.1	16.6	0.0	15.9			
Incr Delay (d2), s/veh	1.2	0.1	0.0	0.0	2.4	3.0	0.8	0.0	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.2	7.5	0.0	0.0	4.0	4.0	2.2	0.0	1.0			
LnGrp Delay(d),s/veh	21.1	21.1	0.0	0.0	31.4	32.2	17.4	0.0	16.3			
LnGrp LOS	C	C			C	C	B		B			
Approach Vol, veh/h		1476			392			215				
Approach Delay, s/veh		21.1			31.8			17.0				
Approach LOS		C			C			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		31.7		43.3			25.8	17.4
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		18.5		47.5			24.9	18.1
Max Q Clear Time (g_c+I1), s		6.3		16.4			19.1	10.4
Green Ext Time (p_c), s		0.7		4.4			2.3	2.6

Intersection Summary	
HCM 2010 Ctrl Delay	22.7
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1136	10	0	227	0	2	0	0	0	0	0
Future Vol, veh/h	0	1572	10	0	585	0	2	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1766	11	0	657	0	2	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	657	0	0	1766	0	0	2095	2423	883	1540	2423	329
Stage 1	-	-	-	-	-	-	1766	1766	-	657	657	-
Stage 2	-	-	-	-	-	-	329	657	-	883	1766	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	926	-	-	349	-	-	30	32	289	79	32	667
Stage 1	-	-	-	-	-	-	87	135	-	420	460	-
Stage 2	-	-	-	-	-	-	658	460	-	307	135	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	926	-	-	349	-	-	30	32	289	79	32	667
Mov Cap-2 Maneuver	-	-	-	-	-	-	75	105	-	197	105	-
Stage 1	-	-	-	-	-	-	87	135	-	420	460	-
Stage 2	-	-	-	-	-	-	658	460	-	307	135	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	54.5	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	75	926	-	-	349	-	-	-
HCM Lane V/C Ratio	0.03	-	-	-	-	-	-	-
HCM Control Delay (s)	54.5	0	-	-	0	-	-	0
HCM Lane LOS	F	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1240	2	2	257	1	12
Future Vol, veh/h	1480	2	2	548	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1663	2	2	616	1	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1665	0	1976	833
Stage 1	-	-	-	-	1664	-
Stage 2	-	-	-	-	312	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	382	-	54	312
Stage 1	-	-	-	-	139	-
Stage 2	-	-	-	-	715	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	382	-	54	312
Mov Cap-2 Maneuver	-	-	-	-	54	-
Stage 1	-	-	-	-	139	-
Stage 2	-	-	-	-	709	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	21.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	228	-	-	382	-
HCM Lane V/C Ratio	0.064	-	-	0.006	-
HCM Control Delay (s)	21.9	-	-	14.5	0.1
HCM Lane LOS	C	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	R	LT
Maximum Queue (ft)	15	201	195	31	207	225	250	30	38	97	45
Average Queue (ft)	2	138	128	10	140	147	166	11	14	49	15
95th Queue (ft)	13	197	202	29	206	216	241	31	39	90	45
Link Distance (ft)		2632	2632			1905	1905		1864		701
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	300			300	300			300		200	
Storage Blk Time (%)						0	0				
Queuing Penalty (veh)						0	0				

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	WB	NB
Directions Served	L	LTR
Maximum Queue (ft)	3	28
Average Queue (ft)	0	13
95th Queue (ft)	5	33
Link Distance (ft)		650
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	300	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	B26	B26	NB	NB
Directions Served	L	T	T	R	L	T	T	R	T	T	L	TR
Maximum Queue (ft)	173	157	153	84	181	362	365	181	29	25	14	56
Average Queue (ft)	108	104	108	50	107	260	268	48	5	5	12	32
95th Queue (ft)	183	163	160	81	286	449	451	201	51	46	15	53
Link Distance (ft)		1513	1513			474	474		429	429		13
Upstream Blk Time (%)						3	3				18	38
Queuing Penalty (veh)						19	22				0	190
Storage Bay Dist (ft)	300			300	300			300			150	
Storage Blk Time (%)						11	11				18	38
Queuing Penalty (veh)						17	11				38	110

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	SB	SB	B27
Directions Served	L	TR	T
Maximum Queue (ft)	52	128	59
Average Queue (ft)	39	79	9
95th Queue (ft)	67	132	48
Link Distance (ft)		53	604
Upstream Blk Time (%)	8	14	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)	150		
Storage Blk Time (%)	8	14	
Queuing Penalty (veh)	15	18	

Intersection: 4: CSAH 2

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	12	29	93	68	41
Average Queue (ft)	1	5	20	8	12
95th Queue (ft)	16	36	86	70	41
Link Distance (ft)	429	429	268	268	451
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	TR	L	T	LT	R
Maximum Queue (ft)	243	268	159	269	149	456
Average Queue (ft)	135	173	56	153	58	238
95th Queue (ft)	238	281	133	254	186	481
Link Distance (ft)	268	268		711		1042
Upstream Blk Time (%)	0	2				
Queuing Penalty (veh)	1	7				
Storage Bay Dist (ft)			200		300	
Storage Blk Time (%)				2		5
Queuing Penalty (veh)				2		8

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	LT	R
Maximum Queue (ft)	99	110	98	161	176	126	36
Average Queue (ft)	58	71	44	105	112	66	14
95th Queue (ft)	99	112	96	160	174	121	37
Link Distance (ft)		711	711	3503	3503	741	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	350						150
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 7: Newton Cir & Frontage Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	10	38
Average Queue (ft)	1	22
95th Queue (ft)	11	47
Link Distance (ft)	566	650
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	413	27	242	928	4	20	1	77	1	0	0
Future Volume (veh/h)	2	663	27	363	1251	44	20	1	171	33	0	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	2	713	29	390	1345	47	22	1	184	35	0	0
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	154	1027	459	491	1647	737	582	24	557	506	0	557
Arrive On Green	0.00	0.29	0.29	0.18	0.47	0.47	0.35	0.35	0.35	0.35	0.00	0.00
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1386	69	1583	1165	0	1583
Grp Volume(v), veh/h	2	713	29	390	1345	47	23	0	184	35	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1455	0	1583	1165	0	1583
Q Serve(g_s), s	0.1	13.4	1.0	10.7	24.6	1.2	0.0	0.0	6.4	1.5	0.0	0.0
Cycle Q Clear(g_c), s	0.1	13.4	1.0	10.7	24.6	1.2	0.6	0.0	6.4	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.96		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	154	1027	459	491	1647	737	606	0	557	506	0	557
V/C Ratio(X)	0.01	0.69	0.06	0.79	0.82	0.06	0.04	0.00	0.33	0.07	0.00	0.00
Avail Cap(c_a), veh/h	267	1085	486	637	1770	792	606	0	557	506	0	557
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	19.7	23.7	19.3	15.2	17.3	11.0	16.0	0.0	17.8	16.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.8	0.1	5.3	2.9	0.0	0.1	0.0	1.6	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.8	0.4	5.9	12.6	0.5	0.3	0.0	3.0	0.5	0.0	0.0
LnGrp Delay(d),s/veh	19.7	25.5	19.3	20.4	20.2	11.1	16.1	0.0	19.4	16.9	0.0	0.0
LnGrp LOS	B	C	B	C	C	B	B		B	B		
Approach Vol, veh/h		744			1782			207			35	
Approach Delay, s/veh		25.2			20.0			19.0			16.9	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		30.9	17.8	26.3		30.9	4.7	39.4
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		19.0	19.5	23.0		19.0	5.0	37.5
Max Q Clear Time (g_c+I1), s		8.4	12.7	15.4		4.1	2.1	26.6
Green Ext Time (p_c), s		0.6	0.7	6.1		0.8	0.0	8.3

Intersection Summary	
HCM 2010 Ctrl Delay	21.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	446	0	12	1100	0	0	0	22	0	0	0
Future Volume (veh/h)	151	446	225	162	1100	101	291	0	216	128	0	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	164	485	245	176	1196	110	316	0	235	139	0	210
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	224	1170	523	417	1251	559	412	0	413	387	0	401
Arrive On Green	0.07	0.33	0.33	0.09	0.35	0.35	0.09	0.00	0.26	0.08	0.00	0.25
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	0	1583	1774	0	1583
Grp Volume(v), veh/h	164	485	245	176	1196	110	316	0	235	139	0	210
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1583	1774	0	1583
Q Serve(g_s), s	4.6	8.0	9.2	4.8	24.8	3.6	6.5	0.0	9.7	4.3	0.0	8.6
Cycle Q Clear(g_c), s	4.6	8.0	9.2	4.8	24.8	3.6	6.5	0.0	9.7	4.3	0.0	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	224	1170	523	417	1251	559	412	0	413	387	0	401
V/C Ratio(X)	0.73	0.41	0.47	0.42	0.96	0.20	0.77	0.00	0.57	0.36	0.00	0.52
Avail Cap(c_a), veh/h	224	1170	523	478	1251	559	412	0	413	396	0	401
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.1	19.5	19.9	14.6	23.7	16.9	24.0	0.0	24.0	18.8	0.0	24.1
Incr Delay (d2), s/veh	11.6	0.2	0.7	0.7	16.1	0.2	8.4	0.0	5.6	0.6	0.0	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	3.9	4.1	2.4	14.8	1.6	4.3	0.0	4.8	2.1	0.0	4.3
LnGrp Delay(d),s/veh	30.7	19.7	20.5	15.2	39.8	17.0	32.4	0.0	29.6	19.3	0.0	28.9
LnGrp LOS	C	B	C	B	D	B	C		C	B		C
Approach Vol, veh/h		894			1482			551			349	
Approach Delay, s/veh		22.0			35.2			31.2			25.1	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.4	24.1	11.2	29.3	11.0	23.5	9.5	31.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.3	19.2	9.3	22.2	6.5	19.0	5.0	26.5
Max Q Clear Time (g_c+I1), s	6.3	11.7	6.8	11.2	8.5	10.6	6.6	26.8
Green Ext Time (p_c), s	0.0	1.6	0.1	7.8	0.0	1.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	375	51	88	328	0	0	0	0	146	0	747
Future Volume (veh/h)	0	576	172	88	485	0	0	0	0	146	0	841
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1863	0				1900	1863	1863
Adj Flow Rate, veh/h	0	613	183	94	516	0				155	0	0
Adj No. of Lanes	0	2	0	1	1	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	653	195	210	670	0				904	0	806
Arrive On Green	0.00	0.24	0.24	0.02	0.12	0.00				0.51	0.00	0.00
Sat Flow, veh/h	0	2783	802	1774	1863	0				1774	0	1583
Grp Volume(v), veh/h	0	403	393	94	516	0				155	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1721	1774	1863	0				1774	0	1583
Q Serve(g_s), s	0.0	16.8	16.8	2.8	20.2	0.0				3.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	16.8	16.8	2.8	20.2	0.0				3.5	0.0	0.0
Prop In Lane	0.00		0.47	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	429	418	210	670	0				904	0	806
V/C Ratio(X)	0.00	0.94	0.94	0.45	0.77	0.00				0.17	0.00	0.00
Avail Cap(c_a), veh/h	0	429	418	229	690	0				904	0	806
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.68	0.68	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	27.9	27.9	21.4	30.0	0.0				9.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	28.5	29.5	1.0	3.6	0.0				0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	11.6	11.4	1.4	11.1	0.0				1.8	0.0	0.0
LnGrp Delay(d),s/veh	0.0	56.3	57.4	22.4	33.6	0.0				10.3	0.0	0.0
LnGrp LOS		E	E	C	C					B		
Approach Vol, veh/h		796			610						155	
Approach Delay, s/veh		56.8			31.9						10.3	
Approach LOS		E			C						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			8.8	22.7		42.7		31.5
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s			5.1	18.2		38.2		27.8
Max Q Clear Time (g_c+I1), s			4.8	18.8		5.5		22.2
Green Ext Time (p_c), s			0.0	0.0		0.9		3.3

Intersection Summary	
HCM 2010 Ctrl Delay	42.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	294	234	0	0	345	72	64	2	49	0	0	0
Future Volume (veh/h)	415	314	0	0	408	72	158	2	49	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1900	1863	1863			
Adj Flow Rate, veh/h	451	341	0	0	443	78	172	2	53			
Adj No. of Lanes	2	1	0	0	2	0	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	767	745	0	0	625	109	842	10	760			
Arrive On Green	0.04	0.13	0.00	0.00	0.21	0.21	0.48	0.48	0.48			
Sat Flow, veh/h	3442	1863	0	0	3105	527	1755	20	1583			
Grp Volume(v), veh/h	451	341	0	0	259	262	174	0	53			
Grp Sat Flow(s),veh/h/ln	1721	1863	0	0	1770	1770	1775	0	1583			
Q Serve(g_s), s	7.2	12.7	0.0	0.0	10.2	10.3	4.2	0.0	1.4			
Cycle Q Clear(g_c), s	7.2	12.7	0.0	0.0	10.2	10.3	4.2	0.0	1.4			
Prop In Lane	1.00		0.00	0.00		0.30	0.99		1.00			
Lane Grp Cap(c), veh/h	767	745	0	0	367	367	852	0	760			
V/C Ratio(X)	0.59	0.46	0.00	0.00	0.71	0.71	0.20	0.00	0.07			
Avail Cap(c_a), veh/h	976	1031	0	0	531	531	852	0	760			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.27	0.27	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	20.7	25.0	0.0	0.0	27.6	27.6	11.2	0.0	10.5			
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	2.5	2.6	0.5	0.0	0.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.4	6.6	0.0	0.0	5.2	5.3	2.2	0.0	0.6			
LnGrp Delay(d),s/veh	20.8	25.1	0.0	0.0	30.1	30.2	11.8	0.0	10.7			
LnGrp LOS	C	C			C	C	B		B			
Approach Vol, veh/h		792			521			227				
Approach Delay, s/veh		22.7			30.2			11.5				
Approach LOS		C			C			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		40.5		34.5			14.4	20.1
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		24.5		41.5			14.5	22.5
Max Q Clear Time (g_c+I1), s		6.2		14.7			9.2	12.3
Green Ext Time (p_c), s		1.0		4.7			0.8	3.2

Intersection Summary	
HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	443	18	1	1088	0	14	0	3	0	0	0
Future Vol, veh/h	0	819	18	1	1572	0	14	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	871	19	1	1672	0	15	0	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1672	0	0	871	0	0	1709	2545	436	2110	2545	836
Stage 1	-	-	-	-	-	-	871	871	-	1674	1674	-
Stage 2	-	-	-	-	-	-	838	1674	-	436	871	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	380	-	-	770	-	-	59	27	568	29	27	310
Stage 1	-	-	-	-	-	-	312	367	-	99	151	-
Stage 2	-	-	-	-	-	-	327	151	-	569	367	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	380	-	-	770	-	-	59	27	568	29	27	310
Mov Cap-2 Maneuver	-	-	-	-	-	-	173	108	-	83	108	-
Stage 1	-	-	-	-	-	-	312	367	-	99	151	-
Stage 2	-	-	-	-	-	-	327	151	-	566	367	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	25.1	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	197	380	-	-	770	-	-	-
HCM Lane V/C Ratio	0.092	-	-	-	0.001	-	-	-
HCM Control Delay (s)	25.1	0	-	-	9.7	-	-	0
HCM Lane LOS	D	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	472	4	14	1152	6	6
Future Vol, veh/h	794	4	14	1403	6	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	854	4	15	1509	6	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	858	0	1640	429
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	784	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	779	-	91	574
Stage 1	-	-	-	-	377	-
Stage 2	-	-	-	-	410	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	779	-	80	574
Mov Cap-2 Maneuver	-	-	-	-	80	-
Stage 1	-	-	-	-	377	-
Stage 2	-	-	-	-	361	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	33.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	140	-	-	779	-
HCM Lane V/C Ratio	0.092	-	-	0.019	-
HCM Control Delay (s)	33.3	-	-	9.7	0.6
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Appendix P: Synchro Reports – Baseline (2038)

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	WB	NB	NB	SB
Directions Served	L	T	L	LT	R	LTR
Maximum Queue (ft)	19	3	39	46	126	25
Average Queue (ft)	3	0	15	20	67	8
95th Queue (ft)	17	5	41	46	117	25
Link Distance (ft)		2640		1864		700
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	300		300		200	
Storage Blk Time (%)					0	
Queuing Penalty (veh)					0	

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	16
Average Queue (ft)	3
95th Queue (ft)	15
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	WB	NB
Directions Served	T	T	L	LTR
Maximum Queue (ft)	452	431	33	24
Average Queue (ft)	159	145	10	9
95th Queue (ft)	566	535	33	28
Link Distance (ft)	1519	1519		12
Upstream Blk Time (%)				2
Queuing Penalty (veh)				0
Storage Bay Dist (ft)			300	
Storage Blk Time (%)	17	6		
Queuing Penalty (veh)	0	0		

Intersection: 4: CSAH 2

Movement	EB	B26	B26	WB	NB
Directions Served	TR	T		LT	LR
Maximum Queue (ft)	516	491	438	28	53
Average Queue (ft)	296	221	171	5	20
95th Queue (ft)	683	611	572	26	68
Link Distance (ft)	428	480	480	267	450
Upstream Blk Time (%)	26	15	6		
Queuing Penalty (veh)	344	98	36		
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	WB	SB	SB
Directions Served	T	R	LT	LT	R
Maximum Queue (ft)	281	7	156	214	82
Average Queue (ft)	191	1	66	128	18
95th Queue (ft)	373	7	142	254	113
Link Distance (ft)	267	267	710		1051
Upstream Blk Time (%)	5				
Queuing Penalty (veh)	35				
Storage Bay Dist (ft)				300	
Storage Blk Time (%)				4	0
Queuing Penalty (veh)				6	0

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	719	21	552
Average Queue (ft)	648	6	309
95th Queue (ft)	862	21	643
Link Distance (ft)	710	3512	744
Upstream Blk Time (%)	4		1
Queuing Penalty (veh)	47		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	860	8	30	213	0	38	3	319	6	4	6
Future Vol, veh/h	9	860	8	30	213	0	38	3	319	6	4	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	966	9	34	239	0	43	3	358	7	4	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	239	0	0	966	0	0	1176	1294	483	812	1294	120
Stage 1	-	-	-	-	-	-	987	987	-	307	307	-
Stage 2	-	-	-	-	-	-	189	307	-	505	987	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1325	-	-	709	-	-	147	161	530	271	161	909
Stage 1	-	-	-	-	-	-	265	324	-	678	660	-
Stage 2	-	-	-	-	-	-	795	660	-	518	324	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1325	-	-	709	-	-	138	152	530	83	152	909
Mov Cap-2 Maneuver	-	-	-	-	-	-	220	252	-	116	235	-
Stage 1	-	-	-	-	-	-	263	322	-	673	628	-
Stage 2	-	-	-	-	-	-	746	628	-	165	322	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.3	24.9	23.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	222	530	1325	-	-	709	-	-	212
HCM Lane V/C Ratio	0.208	0.676	0.008	-	-	0.048	-	-	0.085
HCM Control Delay (s)	25.4	24.8	7.7	-	-	10.3	-	-	23.5
HCM Lane LOS	D	C	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.8	5.1	0	-	-	0.1	-	-	0.3

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1319	13	0	264	0	4	0	0	0	0	0
Future Vol, veh/h	0	1319	13	0	264	0	4	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1482	15	0	297	0	4	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	297	0	0	1482	0	0	1630	1779	741	1038	1779	148
Stage 1	-	-	-	-	-	-	1482	1482	-	297	297	-
Stage 2	-	-	-	-	-	-	148	297	-	741	1482	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1261	-	-	450	-	-	67	81	359	185	81	872
Stage 1	-	-	-	-	-	-	131	187	-	687	666	-
Stage 2	-	-	-	-	-	-	840	666	-	374	187	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1261	-	-	450	-	-	67	81	359	185	81	872
Mov Cap-2 Maneuver	-	-	-	-	-	-	115	156	-	294	156	-
Stage 1	-	-	-	-	-	-	131	187	-	687	666	-
Stage 2	-	-	-	-	-	-	840	666	-	374	187	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	37.6	0
HCM LOS			E	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	115	1261	-	-	450	-	-	-
HCM Lane V/C Ratio	0.039	-	-	-	-	-	-	-
HCM Control Delay (s)	37.6	0	-	-	0	-	-	0
HCM Lane LOS	E	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1297	0	15	258	0	0	0	10	0	0	0
Future Vol, veh/h	0	1297	0	15	258	0	0	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1457	0	17	290	0	0	0	11	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	290	0	0	1457	0	0	1636	1781	729	1053	1781	145
Stage 1	-	-	-	-	-	-	1457	1457	-	324	324	-
Stage 2	-	-	-	-	-	-	179	324	-	729	1457	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1269	-	-	460	-	-	67	81	365	181	81	876
Stage 1	-	-	-	-	-	-	136	193	-	662	648	-
Stage 2	-	-	-	-	-	-	805	648	-	380	193	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1269	-	-	460	-	-	65	78	365	170	78	876
Mov Cap-2 Maneuver	-	-	-	-	-	-	118	158	-	276	147	-
Stage 1	-	-	-	-	-	-	136	193	-	662	624	-
Stage 2	-	-	-	-	-	-	775	624	-	368	193	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	15.2	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	365	1269	-	-	460	-	-	-
HCM Lane V/C Ratio	0.031	-	-	-	0.037	-	-	-
HCM Control Delay (s)	15.2	0	-	-	13.1	-	-	0
HCM Lane LOS	C	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1439	4	4	298	2	14
Future Vol, veh/h	1439	4	4	298	2	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1617	4	4	335	2	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1621	0	1795	1619
Stage 1	-	-	-	-	1619	-
Stage 2	-	-	-	-	176	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	400	-	80	127
Stage 1	-	-	-	-	177	-
Stage 2	-	-	-	-	837	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	400	-	79	127
Mov Cap-2 Maneuver	-	-	-	-	79	-
Stage 1	-	-	-	-	177	-
Stage 2	-	-	-	-	827	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	40.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	118	-	-	400	-
HCM Lane V/C Ratio	0.152	-	-	0.011	-
HCM Control Delay (s)	40.9	-	-	14.1	0.1
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↰						↰	↱
Traffic Vol, veh/h	0	1263	81	81	132	0	0	0	0	55	2	152
Future Vol, veh/h	0	1263	81	81	132	0	0	0	0	55	2	152
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	0	-	-	-	-	-	-	300	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1419	91	91	148	0	0	0	0	62	2	171

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1419	0	0	1749	1749	-
Stage 1	-	-	-	-	-	-	330	330	-
Stage 2	-	-	-	-	-	-	1419	1419	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	-
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	-
Pot Cap-1 Maneuver	0	-	-	480	-	0	94	86	0
Stage 1	0	-	-	-	-	0	728	646	0
Stage 2	0	-	-	-	-	0	223	203	0
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	480	-	-	75	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	75	0	-
Stage 1	-	-	-	-	-	-	577	0	-
Stage 2	-	-	-	-	-	-	223	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	5.4	159.9
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	480	-	75	-
HCM Lane V/C Ratio	-	-	0.19	-	0.854	-
HCM Control Delay (s)	-	-	14.2	0	159.9	0
HCM Lane LOS	-	-	B	A	F	A
HCM 95th %tile Q(veh)	-	-	0.7	-	4.3	-

Intersection	
Int Delay, s/veh	19.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1006	345	0	0	149	173	24	0	72	0	0	0
Future Vol, veh/h	1006	345	0	0	149	173	24	0	72	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1130	388	0	0	167	194	27	0	81	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	362	0	-	-	-	0	2913	3010	388
Stage 1	-	-	-	-	-	-	2648	2648	-
Stage 2	-	-	-	-	-	-	265	362	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1197	-	0	0	-	-	~ 17	13	660
Stage 1	-	-	0	0	-	-	53	48	-
Stage 2	-	-	0	0	-	-	779	625	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1197	-	-	-	-	-	0	0	660
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	0	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	779	0	-

Approach	EB	WB	NB
HCM Control Delay, s	24.8	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	660	1197	-	-	-
HCM Lane V/C Ratio	0.163	0.944	-	-	-
HCM Control Delay (s)	11.5	33.4	0	-	-
HCM Lane LOS	B	D	A	-	-
HCM 95th %tile Q(veh)	0.6	16.8	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	WB	NB	NB	SB
Directions Served	L	R	L	LT	R	LTR
Maximum Queue (ft)	19	17	93	35	52	14
Average Queue (ft)	2	2	54	13	27	3
95th Queue (ft)	15	14	94	36	49	14
Link Distance (ft)				1864		700
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	300	300	300		200	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	EB	WB	NB
Directions Served	R	L	LTR
Maximum Queue (ft)	9	14	28
Average Queue (ft)	1	1	14
95th Queue (ft)	13	12	36
Link Distance (ft)			650
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300	300	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	WB	NB
Directions Served	L	LTR
Maximum Queue (ft)	29	28
Average Queue (ft)	5	13
95th Queue (ft)	23	33
Link Distance (ft)		12
Upstream Blk Time (%)		2
Queuing Penalty (veh)		0
Storage Bay Dist (ft)	300	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: CSAH 2

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	46	27
Average Queue (ft)	9	9
95th Queue (ft)	38	31
Link Distance (ft)	267	450
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	WB	SB	SB
Directions Served	LT	LT	R
Maximum Queue (ft)	97	450	1054
Average Queue (ft)	47	308	747
95th Queue (ft)	100	614	1290
Link Distance (ft)	710		1051
Upstream Blk Time (%)			21
Queuing Penalty (veh)			0
Storage Bay Dist (ft)		300	
Storage Blk Time (%)			65
Queuing Penalty (veh)			111

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	192	14	130
Average Queue (ft)	97	1	58
95th Queue (ft)	177	10	117
Link Distance (ft)	710	3512	744
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	478	31	281	1078	5	24	2	90	2	0	0
Future Vol, veh/h	4	478	31	281	1078	5	24	2	90	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	514	33	302	1159	5	26	2	97	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1159	0	0	514	0	0	1707	2286	257	2030	2286	580
Stage 1	-	-	-	-	-	-	523	523	-	1763	1763	-
Stage 2	-	-	-	-	-	-	1184	1763	-	267	523	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	599	-	-	1048	-	-	59	39	742	34	39	458
Stage 1	-	-	-	-	-	-	505	529	-	87	136	-
Stage 2	-	-	-	-	-	-	201	136	-	715	529	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	599	-	-	1048	-	-	46	28	742	22	28	458
Mov Cap-2 Maneuver	-	-	-	-	-	-	112	78	-	68	72	-
Stage 1	-	-	-	-	-	-	502	525	-	86	97	-
Stage 2	-	-	-	-	-	-	143	97	-	615	525	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	2	19.3	59.7
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	108	742	599	-	-	1048	-	-	68
HCM Lane V/C Ratio	0.259	0.13	0.007	-	-	0.288	-	-	0.032
HCM Control Delay (s)	49.6	10.6	11.1	-	-	9.8	-	-	59.7
HCM Lane LOS	E	B	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	1	0.4	0	-	-	1.2	-	-	0.1

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	513	22	2	1261	0	18	0	3	0	0	0
Future Vol, veh/h	0	513	22	2	1261	0	18	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	546	23	2	1341	0	19	0	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1341	0	0	546	0	0	1221	1892	273	1619	1892	671
Stage 1	-	-	-	-	-	-	546	546	-	1346	1346	-
Stage 2	-	-	-	-	-	-	675	1346	-	273	546	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	510	-	-	1019	-	-	136	69	725	69	69	399
Stage 1	-	-	-	-	-	-	490	516	-	159	218	-
Stage 2	-	-	-	-	-	-	410	218	-	710	516	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	510	-	-	1019	-	-	136	69	725	69	69	399
Mov Cap-2 Maneuver	-	-	-	-	-	-	265	165	-	135	165	-
Stage 1	-	-	-	-	-	-	490	516	-	159	218	-
Stage 2	-	-	-	-	-	-	409	218	-	707	516	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	18.4	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	291	510	-	-	1019	-	-	-
HCM Lane V/C Ratio	0.077	-	-	-	0.002	-	-	-
HCM Control Delay (s)	18.4	0	-	-	8.5	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	517	0	15	1277	0	0	0	27	0	0	0
Future Vol, veh/h	0	517	0	15	1277	0	0	0	27	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	556	0	16	1373	0	0	0	29	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1373	0	0	556	0	0	1275	1961	278	1683	1961	687
Stage 1	-	-	-	-	-	-	556	556	-	1405	1405	-
Stage 2	-	-	-	-	-	-	719	1405	-	278	556	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	496	-	-	1011	-	-	124	63	719	61	63	389
Stage 1	-	-	-	-	-	-	483	511	-	147	204	-
Stage 2	-	-	-	-	-	-	386	204	-	705	511	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	496	-	-	1011	-	-	123	62	719	58	62	389
Mov Cap-2 Maneuver	-	-	-	-	-	-	249	153	-	124	153	-
Stage 1	-	-	-	-	-	-	483	511	-	147	201	-
Stage 2	-	-	-	-	-	-	380	201	-	677	511	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	10.2	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	719	496	-	-	1011	-	-	-
HCM Lane V/C Ratio	0.04	-	-	-	0.016	-	-	-
HCM Control Delay (s)	10.2	0	-	-	8.6	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	547	5	18	1336	6	9
Future Vol, veh/h	547	5	18	1336	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	588	5	19	1437	6	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	594	0	1348	591
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	757	-
Critical Hdwy	-	-	4.13	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	980	-	154	506
Stage 1	-	-	-	-	552	-
Stage 2	-	-	-	-	425	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	980	-	139	506
Mov Cap-2 Maneuver	-	-	-	-	139	-
Stage 1	-	-	-	-	552	-
Stage 2	-	-	-	-	384	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	20.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	246	-	-	980	-
HCM Lane V/C Ratio	0.066	-	-	0.02	-
HCM Control Delay (s)	20.7	-	-	8.7	0.4
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	12.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		↰						↰	↱
Traffic Vol, veh/h	0	435	60	102	381	0	0	0	0	170	0	868
Future Vol, veh/h	0	435	60	102	381	0	0	0	0	170	0	868
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	-	-	0	-	-	-	-	-	-	300	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	463	64	109	405	0	0	0	0	181	0	923

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	463	0	0	1085	1085	-
Stage 1	-	-	-	-	-	-	622	622	-
Stage 2	-	-	-	-	-	-	463	463	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	-
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	-
Pot Cap-1 Maneuver	0	-	-	1098	-	0	240	217	0
Stage 1	0	-	-	-	-	0	535	479	0
Stage 2	0	-	-	-	-	0	634	564	0
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1098	-	-	209	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	209	0	-
Stage 1	-	-	-	-	-	-	467	0	-
Stage 2	-	-	-	-	-	-	634	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.8	79.2
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1098	-	209	-
HCM Lane V/C Ratio	-	-	0.099	-	0.865	-
HCM Control Delay (s)	-	-	8.6	0	79.2	0
HCM Lane LOS	-	-	A	A	F	A
HCM 95th %tile Q(veh)	-	-	0.3	-	6.7	-

Intersection	
Int Delay, s/veh	26

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	341	271	0	0	400	85	74	4	58	0	0	0
Future Vol, veh/h	341	271	0	0	400	85	74	4	58	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	371	295	0	0	435	92	80	4	63	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	527	0	-	-	-	0	1517	1563	295
Stage 1	-	-	-	-	-	-	1036	1036	-
Stage 2	-	-	-	-	-	-	481	527	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1040	-	0	0	-	-	131	112	744
Stage 1	-	-	0	0	-	-	342	309	-
Stage 2	-	-	0	0	-	-	622	528	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1040	-	-	-	-	-	~ 75	0	744
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 75	0	-
Stage 1	-	-	-	-	-	-	196	0	-
Stage 2	-	-	-	-	-	-	622	0	-

Approach	EB	WB	NB
HCM Control Delay, s	5.8	0	209.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	124	1040	-	-	-
HCM Lane V/C Ratio	1.192	0.356	-	-	-
HCM Control Delay (s)	209.3	10.4	0	-	-
HCM Lane LOS	F	B	A	-	-
HCM 95th %tile Q(veh)	9.1	1.6	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Appendix Q: Synchro Reports – Baseline (2038) with Improvements from Phase 1

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	37	328	294	14	109	79	96	23	45	221	64	11
Average Queue (ft)	7	219	208	3	60	38	57	6	15	147	27	1
95th Queue (ft)	30	322	299	14	112	79	98	20	41	228	61	9
Link Distance (ft)		2632	2632			1905	1905		1864		701	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			300	300			300		200		150
Storage Blk Time (%)		2	1							2		
Queuing Penalty (veh)		0	0							1		

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	WB	NB
Directions Served	T	LTR
Maximum Queue (ft)	268	12
Average Queue (ft)	27	1
95th Queue (ft)	366	10
Link Distance (ft)	1513	650
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	245	469	469	157	350	296	178	50	18	51	51	103
Average Queue (ft)	97	341	324	73	222	99	74	31	12	29	35	50
95th Queue (ft)	222	494	494	195	422	316	174	53	18	45	56	99
Link Distance (ft)		1513	1513			474	474			13		53
Upstream Blk Time (%)						1	0		18	42	7	5
Queuing Penalty (veh)						4	0		0	155	0	0
Storage Bay Dist (ft)	300			300	300			300	150		150	
Storage Blk Time (%)	0	21	14		24				18	42	7	5
Queuing Penalty (veh)	0	36	38		31				27	91	10	5

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	B27
Directions Served	T
Maximum Queue (ft)	14
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	604
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: CSAH 2

Movement	EB	EB	B26	B26	WB	NB
Directions Served	T	TR	T	T	LT	LR
Maximum Queue (ft)	481	448	35	28	14	37
Average Queue (ft)	209	182	5	3	2	15
95th Queue (ft)	468	452	35	32	19	41
Link Distance (ft)	429	429	474	474	268	451
Upstream Blk Time (%)	2	1				
Queuing Penalty (veh)	15	6				
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	TR	L	T	LT	R
Maximum Queue (ft)	300	296	111	153	66	70
Average Queue (ft)	276	251	57	40	31	17
95th Queue (ft)	314	341	111	145	69	57
Link Distance (ft)	268	268		711		1042
Upstream Blk Time (%)	25	16				
Queuing Penalty (veh)	213	133				
Storage Bay Dist (ft)			200		300	
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	LT	R
Maximum Queue (ft)	272	303	172	164	203	124	46
Average Queue (ft)	151	158	61	93	120	71	20
95th Queue (ft)	281	312	160	167	200	132	44
Link Distance (ft)		711	711	3503	3503	741	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	350						150
Storage Blk Time (%)	0	1				0	
Queuing Penalty (veh)	0	7				0	

Intersection: 7: Newton Cir & Frontage Rd

Movement	NB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	13
95th Queue (ft)	37
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	860	8	30	213	0	38	3	319	6	4	6
Future Volume (veh/h)	9	1150	8	120	451	30	38	3	428	43	4	6
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	10	1292	9	135	507	34	43	3	481	48	4	7
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	421	1453	650	220	1629	729	77	3	598	77	3	598
Arrive On Green	0.01	0.41	0.41	0.06	0.46	0.46	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	0	8	1583	0	9	1583
Grp Volume(v), veh/h	10	1292	9	135	507	34	46	0	481	52	0	7
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	8	0	1583	9	0	1583
Q Serve(g_s), s	0.3	30.5	0.3	3.7	8.1	1.1	0.0	0.0	24.5	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.3	30.5	0.3	3.7	8.1	1.1	34.0	0.0	24.5	34.0	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	0.93		1.00	0.92		1.00
Lane Grp Cap(c), veh/h	421	1453	650	220	1629	729	80	0	598	80	0	598
V/C Ratio(X)	0.02	0.89	0.01	0.61	0.31	0.05	0.57	0.00	0.81	0.65	0.00	0.01
Avail Cap(c_a), veh/h	497	1514	677	258	1629	729	80	0	598	80	0	598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.2	24.6	15.7	20.1	15.3	13.4	42.9	0.0	25.1	42.8	0.0	17.5
Incr Delay (d2), s/veh	0.0	6.8	0.0	3.2	0.1	0.0	26.4	0.0	11.0	33.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	16.3	0.1	2.0	4.0	0.5	1.7	0.0	12.5	2.0	0.0	0.1
LnGrp Delay(d),s/veh	15.2	31.4	15.7	23.3	15.4	13.4	69.3	0.0	36.1	76.6	0.0	17.6
LnGrp LOS	B	C	B	C	B	B	E		D	E		B
Approach Vol, veh/h		1311			676			527			59	
Approach Delay, s/veh		31.2			16.9			39.0			69.6	
Approach LOS		C			B			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		38.5	10.1	41.4		38.5	5.6	45.9
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		30.5	7.5	38.5		30.5	5.0	41.0
Max Q Clear Time (g_c+I1), s		36.0	5.7	32.5		36.0	2.3	10.1
Green Ext Time (p_c), s		0.0	0.0	4.4		0.0	0.0	14.6

Intersection Summary	
HCM 2010 Ctrl Delay	29.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1297	0	15	258	0	0	0	10	0	0	0
Future Volume (veh/h)	175	1297	261	189	258	117	215	0	154	96	0	143
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	197	1457	293	212	290	131	242	0	173	108	0	161
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	593	1512	676	241	1525	682	356	0	363	344	0	356
Arrive On Green	0.08	0.43	0.43	0.09	0.43	0.43	0.06	0.00	0.23	0.06	0.00	0.23
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	0	1583	1774	0	1583
Grp Volume(v), veh/h	197	1457	293	212	290	131	242	0	173	108	0	161
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1583	1774	0	1583
Q Serve(g_s), s	5.5	36.1	11.7	6.1	4.6	4.6	5.5	0.0	8.5	4.2	0.0	7.9
Cycle Q Clear(g_c), s	5.5	36.1	11.7	6.1	4.6	4.6	5.5	0.0	8.5	4.2	0.0	7.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	593	1512	676	241	1525	682	356	0	363	344	0	356
V/C Ratio(X)	0.33	0.96	0.43	0.88	0.19	0.19	0.68	0.00	0.48	0.31	0.00	0.45
Avail Cap(c_a), veh/h	595	1514	677	241	1525	682	356	0	363	344	0	356
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.3	25.1	18.1	21.0	15.9	15.9	30.6	0.0	30.0	25.1	0.0	30.1
Incr Delay (d2), s/veh	0.3	15.4	0.4	28.9	0.1	0.1	5.2	0.0	4.4	0.5	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	20.8	5.2	7.1	2.2	2.0	3.6	0.0	4.1	2.1	0.0	3.8
LnGrp Delay(d),s/veh	12.6	40.5	18.6	50.0	15.9	16.0	35.8	0.0	34.4	25.6	0.0	34.2
LnGrp LOS	B	D	B	D	B	B	D		C	C		C
Approach Vol, veh/h		1947			633			415			269	
Approach Delay, s/veh		34.3			27.4			35.2			30.7	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	25.2	12.3	42.9	10.0	24.8	12.0	43.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	20.6	7.8	38.5	5.5	20.2	7.6	38.7
Max Q Clear Time (g_c+I1), s	6.2	10.5	8.1	38.1	7.5	9.9	7.5	6.6
Green Ext Time (p_c), s	0.0	1.4	0.0	0.4	0.0	1.4	0.0	17.0

Intersection Summary	
HCM 2010 Ctrl Delay	32.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1263	81	81	132	0	0	0	0	55	2	152
Future Volume (veh/h)	0	1413	171	81	314	0	0	0	0	55	2	261
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1863	0				1900	1863	1863
Adj Flow Rate, veh/h	0	1588	192	91	353	0				62	2	0
Adj No. of Lanes	0	2	0	1	1	0				0	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89				0.89	0.89	0.89
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	1764	210	194	1218	0				373	12	343
Arrive On Green	0.00	0.55	0.55	0.10	1.00	0.00				0.22	0.22	0.00
Sat Flow, veh/h	0	3279	380	1774	1863	0				1721	56	1583
Grp Volume(v), veh/h	0	872	908	91	353	0				64	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1796	1774	1863	0				1777	0	1583
Q Serve(g_s), s	0.0	39.0	41.0	1.8	0.0	0.0				2.6	0.0	0.0
Cycle Q Clear(g_c), s	0.0	39.0	41.0	1.8	0.0	0.0				2.6	0.0	0.0
Prop In Lane	0.00		0.21	1.00		0.00				0.97		1.00
Lane Grp Cap(c), veh/h	0	980	995	194	1218	0				385	0	343
V/C Ratio(X)	0.00	0.89	0.91	0.47	0.29	0.00				0.17	0.00	0.00
Avail Cap(c_a), veh/h	0	1013	1028	214	1273	0				385	0	343
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.65	0.65	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	17.7	18.1	19.2	0.0	0.0				28.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	9.7	11.9	1.1	0.1	0.0				0.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	21.5	23.4	1.3	0.0	0.0				1.4	0.0	0.0
LnGrp Delay(d),s/veh	0.0	27.4	30.0	20.3	0.1	0.0				29.6	0.0	0.0
LnGrp LOS		C	C	C	A					C		
Approach Vol, veh/h		1780			444						64	
Approach Delay, s/veh		28.7			4.2						29.6	
Approach LOS		C			A						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			9.0	54.3		24.0		63.3
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s			5.5	51.5		19.5		61.5
Max Q Clear Time (g_c+I1), s			3.8	43.0		4.6		2.0
Green Ext Time (p_c), s			0.0	6.8		0.2		24.2

Intersection Summary	
HCM 2010 Ctrl Delay	24.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1006	345	0	0	149	173	24	0	72	0	0	0
Future Volume (veh/h)	1096	405	0	0	222	173	133	0	72	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1900	1863	1863			
Adj Flow Rate, veh/h	1231	455	0	0	249	194	149	0	81			
Adj No. of Lanes	2	1	0	0	2	0	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	1425	1056	0	0	335	252	591	0	527			
Arrive On Green	0.11	0.19	0.00	0.00	0.17	0.17	0.33	0.00	0.33			
Sat Flow, veh/h	3442	1863	0	0	2023	1447	1774	0	1583			
Grp Volume(v), veh/h	1231	455	0	0	228	215	149	0	81			
Grp Sat Flow(s),veh/h/ln	1721	1863	0	0	1770	1607	1774	0	1583			
Q Serve(g_s), s	25.1	19.4	0.0	0.0	11.0	11.5	5.5	0.0	3.2			
Cycle Q Clear(g_c), s	25.1	19.4	0.0	0.0	11.0	11.5	5.5	0.0	3.2			
Prop In Lane	1.00		0.00	0.00		0.90	1.00		1.00			
Lane Grp Cap(c), veh/h	1425	1056	0	0	308	279	591	0	527			
V/C Ratio(X)	0.86	0.43	0.00	0.00	0.74	0.77	0.25	0.00	0.15			
Avail Cap(c_a), veh/h	1678	1252	0	0	364	330	591	0	527			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.31	0.31	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	26.5	23.7	0.0	0.0	35.2	35.5	21.8	0.0	21.1			
Incr Delay (d2), s/veh	1.4	0.1	0.0	0.0	6.5	9.1	1.0	0.0	0.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	15.3	10.1	0.0	0.0	5.9	5.8	2.9	0.0	1.5			
LnGrp Delay(d),s/veh	27.9	23.8	0.0	0.0	41.8	44.5	22.9	0.0	21.7			
LnGrp LOS	C	C			D	D	C		C			
Approach Vol, veh/h		1686			443			230				
Approach Delay, s/veh		26.8			43.1			22.5				
Approach LOS		C			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		34.5		55.5			35.4	20.1
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		20.5		60.5			37.5	18.5
Max Q Clear Time (g_c+I1), s		7.5		21.4			27.1	13.5
Green Ext Time (p_c), s		0.8		5.3			3.7	2.1

Intersection Summary	
HCM 2010 Ctrl Delay	29.5
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1319	13	0	264	0	4	0	0	0	0	0
Future Vol, veh/h	0	1755	13	0	622	0	4	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1972	15	0	699	0	4	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	699	0	0	1972	0	0	2321	2671	986	1685	2671	349
Stage 1	-	-	-	-	-	-	1972	1972	-	699	699	-
Stage 2	-	-	-	-	-	-	349	699	-	986	1972	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	893	-	-	290	-	-	20	22	247	61	22	647
Stage 1	-	-	-	-	-	-	64	107	-	397	440	-
Stage 2	-	-	-	-	-	-	640	440	-	266	107	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	893	-	-	290	-	-	20	22	247	61	22	647
Mov Cap-2 Maneuver	-	-	-	-	-	-	56	85	-	172	85	-
Stage 1	-	-	-	-	-	-	64	107	-	397	440	-
Stage 2	-	-	-	-	-	-	640	440	-	266	107	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	74.8	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	56	893	-	-	290	-	-	-
HCM Lane V/C Ratio	0.08	-	-	-	-	-	-	-
HCM Control Delay (s)	74.8	0	-	-	0	-	-	0
HCM Lane LOS	F	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1439	4	4	298	2	14
Future Vol, veh/h	1679	4	4	589	2	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1887	4	4	662	2	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1891	0	2229	946
Stage 1	-	-	-	-	1889	-
Stage 2	-	-	-	-	340	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	312	-	36	262
Stage 1	-	-	-	-	105	-
Stage 2	-	-	-	-	692	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	312	-	35	262
Mov Cap-2 Maneuver	-	-	-	-	35	-
Stage 1	-	-	-	-	105	-
Stage 2	-	-	-	-	678	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	33.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	145	-	-	312	-
HCM Lane V/C Ratio	0.124	-	-	0.014	-
HCM Control Delay (s)	33.3	-	-	16.7	0.2
HCM Lane LOS	D	-	-	C	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	R	LT
Maximum Queue (ft)	24	228	238	31	243	263	288	20	48	82	41
Average Queue (ft)	4	147	142	10	165	151	175	7	13	44	15
95th Queue (ft)	19	236	242	29	260	249	281	22	41	81	41
Link Distance (ft)		2632	2632			1905	1905		1864		701
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	300			300	300			300		200	
Storage Blk Time (%)			0		0	0	1				
Queuing Penalty (veh)			0		0	1	0				

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	WB	NB
Directions Served	T	LTR
Maximum Queue (ft)	268	37
Average Queue (ft)	27	12
95th Queue (ft)	366	35
Link Distance (ft)	1513	650
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	162	164	178	91	171	342	350	44	16	57	53	131
Average Queue (ft)	100	91	98	48	89	252	263	22	13	32	41	95
95th Queue (ft)	169	165	180	95	164	355	372	42	16	53	68	144
Link Distance (ft)		1513	1513			474	474			13		53
Upstream Blk Time (%)							0		24	41	8	21
Queuing Penalty (veh)							1		0	210	0	0
Storage Bay Dist (ft)	300			300	300			300	150		150	
Storage Blk Time (%)						3	5		24	41	8	21
Queuing Penalty (veh)						5	5		53	120	16	27

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	B27
Directions Served	T
Maximum Queue (ft)	66
Average Queue (ft)	14
95th Queue (ft)	56
Link Distance (ft)	604
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: CSAH 2

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	201	184	140	30	28
Average Queue (ft)	53	74	30	3	11
95th Queue (ft)	219	237	118	32	35
Link Distance (ft)	429	429	268	268	451
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	TR	L	T	LT	R
Maximum Queue (ft)	288	295	224	598	449	961
Average Queue (ft)	203	231	98	320	248	676
95th Queue (ft)	320	334	224	573	581	1196
Link Distance (ft)	268	268		711		1042
Upstream Blk Time (%)	7	20		0		14
Queuing Penalty (veh)	32	87		0		0
Storage Bay Dist (ft)			200		300	
Storage Blk Time (%)				19		34
Queuing Penalty (veh)				20		58

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	LT	R
Maximum Queue (ft)	134	172	97	245	251	143	49
Average Queue (ft)	66	87	40	156	165	78	17
95th Queue (ft)	122	157	92	255	264	138	46
Link Distance (ft)		711	711	3503	3503	741	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	350						150
Storage Blk Time (%)						1	
Queuing Penalty (veh)						1	

Intersection: 7: Newton Cir & Frontage Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	16	38
Average Queue (ft)	2	24
95th Queue (ft)	13	47
Link Distance (ft)	566	650
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	478	31	281	1078	5	24	2	90	2	0	0
Future Volume (veh/h)	4	728	31	402	1401	45	24	2	184	34	0	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	4	783	33	432	1506	48	26	2	198	37	0	0
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	142	1211	542	503	1830	819	522	37	519	453	0	519
Arrive On Green	0.01	0.34	0.34	0.18	0.52	0.52	0.33	0.33	0.33	0.33	0.00	0.00
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1357	114	1583	1139	0	1583
Grp Volume(v), veh/h	4	783	33	432	1506	48	28	0	198	37	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1471	0	1583	1139	0	1583
Q Serve(g_s), s	0.1	16.8	1.3	13.2	32.2	1.4	0.0	0.0	8.6	2.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	16.8	1.3	13.2	32.2	1.4	1.0	0.0	8.6	3.0	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.93		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	142	1211	542	503	1830	819	559	0	519	453	0	519
V/C Ratio(X)	0.03	0.65	0.06	0.86	0.82	0.06	0.05	0.00	0.38	0.08	0.00	0.00
Avail Cap(c_a), veh/h	231	1211	542	714	2021	904	559	0	519	453	0	519
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.7	25.0	19.9	16.6	18.3	10.8	20.7	0.0	23.3	21.7	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.2	0.0	7.4	2.7	0.0	0.2	0.0	2.1	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	8.4	0.6	7.4	16.2	0.6	0.5	0.0	4.1	0.7	0.0	0.0
LnGrp Delay(d),s/veh	20.8	26.2	19.9	24.0	20.9	10.9	20.8	0.0	25.4	22.0	0.0	0.0
LnGrp LOS	C	C	B	C	C	B	C		C	C		
Approach Vol, veh/h		820			1986			226			37	
Approach Delay, s/veh		25.9			21.4			24.8			22.0	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		34.0	20.7	35.3		34.0	5.0	51.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		20.1	26.9	29.5		20.1	5.0	51.4
Max Q Clear Time (g_c+I1), s		10.6	15.2	18.8		5.0	2.1	34.2
Green Ext Time (p_c), s		0.7	1.0	8.7		0.9	0.0	12.3

Intersection Summary	
HCM 2010 Ctrl Delay	22.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	517	0	15	1277	0	0	0	27	0	0	0
Future Volume (veh/h)	151	517	225	165	1277	101	291	0	221	128	0	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	164	562	245	179	1388	110	316	0	240	139	0	210
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	203	1391	622	411	1454	651	385	0	389	348	0	349
Arrive On Green	0.06	0.39	0.39	0.08	0.41	0.41	0.11	0.00	0.25	0.08	0.00	0.22
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	0	1583	1774	0	1583
Grp Volume(v), veh/h	164	562	245	179	1388	110	316	0	240	139	0	210
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1583	1774	0	1583
Q Serve(g_s), s	5.0	10.3	10.0	5.3	34.2	4.0	9.5	0.0	12.1	5.4	0.0	10.7
Cycle Q Clear(g_c), s	5.0	10.3	10.0	5.3	34.2	4.0	9.5	0.0	12.1	5.4	0.0	10.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	203	1391	622	411	1454	651	385	0	389	348	0	349
V/C Ratio(X)	0.81	0.40	0.39	0.44	0.95	0.17	0.82	0.00	0.62	0.40	0.00	0.60
Avail Cap(c_a), veh/h	203	1391	622	454	1475	660	385	0	389	386	0	349
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	19.7	19.6	14.6	25.7	16.8	28.8	0.0	30.2	24.5	0.0	31.6
Incr Delay (d2), s/veh	20.9	0.2	0.4	0.7	14.0	0.1	13.2	0.0	7.1	0.7	0.0	7.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	5.0	4.4	2.6	19.4	1.7	4.6	0.0	6.0	2.7	0.0	5.4
LnGrp Delay(d),s/veh	42.4	19.9	20.0	15.4	39.7	16.9	42.0	0.0	37.3	25.3	0.0	39.1
LnGrp LOS	D	B	C	B	D	B	D		D	C		D
Approach Vol, veh/h		971			1677			556			349	
Approach Delay, s/veh		23.7			35.6			40.0			33.6	
Approach LOS		C			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	26.6	11.8	39.9	14.0	24.3	10.2	41.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.1	19.7	9.5	33.7	9.5	19.3	5.7	37.5
Max Q Clear Time (g_c+I1), s	7.4	14.1	7.3	12.3	11.5	12.7	7.0	36.2
Green Ext Time (p_c), s	0.1	1.3	0.1	14.2	0.0	1.5	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	32.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	435	60	102	381	0	0	0	0	170	0	868
Future Volume (veh/h)	0	636	181	102	538	0	0	0	0	170	0	962
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1863	0				1900	1863	1863
Adj Flow Rate, veh/h	0	677	193	109	572	0				181	0	0
Adj No. of Lanes	0	2	0	1	1	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	644	183	181	640	0				988	0	881
Arrive On Green	0.00	0.24	0.24	0.02	0.11	0.00				0.56	0.00	0.00
Sat Flow, veh/h	0	2814	775	1774	1863	0				1774	0	1583
Grp Volume(v), veh/h	0	440	430	109	572	0				181	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1726	1774	1863	0				1774	0	1583
Q Serve(g_s), s	0.0	21.3	21.3	4.0	27.3	0.0				4.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	21.3	21.3	4.0	27.3	0.0				4.5	0.0	0.0
Prop In Lane	0.00		0.45	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	419	408	181	640	0				988	0	881
V/C Ratio(X)	0.00	1.05	1.05	0.60	0.89	0.00				0.18	0.00	0.00
Avail Cap(c_a), veh/h	0	419	408	181	640	0				988	0	881
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.61	0.61	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	34.3	34.4	26.5	38.3	0.0				9.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	58.1	58.9	3.4	10.0	0.0				0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	17.1	16.8	2.1	15.9	0.0				2.3	0.0	0.0
LnGrp Delay(d),s/veh	0.0	92.4	93.2	29.9	48.3	0.0				10.3	0.0	0.0
LnGrp LOS		F	F	C	D					B		
Approach Vol, veh/h		870			681						181	
Approach Delay, s/veh		92.8			45.3						10.3	
Approach LOS		F			D						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			9.6	25.8		54.6		35.4
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s			5.1	21.3		50.1		30.9
Max Q Clear Time (g_c+I1), s			6.0	23.3		6.5		29.3
Green Ext Time (p_c), s			0.0	0.0		1.1		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	65.5
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	341	271	0	0	400	85	74	4	58	0	0	0
Future Volume (veh/h)	462	351	0	0	463	85	168	4	58	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1900	1863	1863			
Adj Flow Rate, veh/h	502	382	0	0	503	92	183	4	63			
Adj No. of Lanes	2	1	0	0	2	0	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	749	775	0	0	679	124	841	18	766			
Arrive On Green	0.05	0.14	0.00	0.00	0.23	0.23	0.48	0.48	0.48			
Sat Flow, veh/h	3442	1863	0	0	3085	545	1738	38	1583			
Grp Volume(v), veh/h	502	382	0	0	297	298	187	0	63			
Grp Sat Flow(s),veh/h/ln	1721	1863	0	0	1770	1767	1776	0	1583			
Q Serve(g_s), s	9.4	17.1	0.0	0.0	14.0	14.1	5.5	0.0	1.9			
Cycle Q Clear(g_c), s	9.4	17.1	0.0	0.0	14.0	14.1	5.5	0.0	1.9			
Prop In Lane	1.00		0.00	0.00		0.31	0.98		1.00			
Lane Grp Cap(c), veh/h	749	775	0	0	402	401	860	0	766			
V/C Ratio(X)	0.67	0.49	0.00	0.00	0.74	0.74	0.22	0.00	0.08			
Avail Cap(c_a), veh/h	1017	1107	0	0	580	579	860	0	766			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.19	0.19	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	24.2	30.0	0.0	0.0	32.3	32.4	13.4	0.0	12.5			
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	2.9	3.1	0.6	0.0	0.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.4	8.8	0.0	0.0	7.2	7.2	2.8	0.0	0.9			
LnGrp Delay(d),s/veh	24.4	30.1	0.0	0.0	35.2	35.4	14.0	0.0	12.7			
LnGrp LOS	C	C			D	D	B		B			
Approach Vol, veh/h		884			595			250				
Approach Delay, s/veh		26.9			35.3			13.6				
Approach LOS		C			D			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		48.1		41.9			17.0	24.9
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		27.5		53.5			19.5	29.5
Max Q Clear Time (g_c+I1), s		7.5		19.1			11.4	16.1
Green Ext Time (p_c), s		1.1		5.7			1.2	4.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.9
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	513	22	2	1261	0	18	0	3	0	0	0
Future Vol, veh/h	0	889	22	2	1745	0	18	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	946	23	2	1856	0	19	0	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1856	0	0	946	0	0	1878	2807	473	2334	2807	928
Stage 1	-	-	-	-	-	-	946	946	-	1861	1861	-
Stage 2	-	-	-	-	-	-	932	1861	-	473	946	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	322	-	-	721	-	-	44	18	538	20	18	270
Stage 1	-	-	-	-	-	-	281	338	-	76	121	-
Stage 2	-	-	-	-	-	-	287	121	-	541	338	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	322	-	-	721	-	-	44	18	538	20	18	270
Mov Cap-2 Maneuver	-	-	-	-	-	-	149	88	-	64	87	-
Stage 1	-	-	-	-	-	-	281	338	-	76	121	-
Stage 2	-	-	-	-	-	-	286	121	-	538	338	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	30	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	166	322	-	-	721	-	-	-
HCM Lane V/C Ratio	0.135	-	-	-	0.003	-	-	-
HCM Control Delay (s)	30	0	-	-	10	-	-	0
HCM Lane LOS	D	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	547	5	18	1336	6	9
Future Vol, veh/h	869	5	18	1587	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	934	5	19	1706	6	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	940	0	1829	470
Stage 1	-	-	-	-	937	-
Stage 2	-	-	-	-	892	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	725	-	68	540
Stage 1	-	-	-	-	342	-
Stage 2	-	-	-	-	361	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	725	-	34	540
Mov Cap-2 Maneuver	-	-	-	-	34	-
Stage 1	-	-	-	-	342	-
Stage 2	-	-	-	-	179	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	62.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	78	-	-	725	-
HCM Lane V/C Ratio	0.207	-	-	0.027	-
HCM Control Delay (s)	62.8	-	-	10.1	2.5
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

Appendix R: Synchro Reports – Phase 2 (2038)

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	18	336	337	16	108	95	109	29	366	309	84	12
Average Queue (ft)	4	218	209	3	57	41	54	8	114	233	34	2
95th Queue (ft)	20	328	332	14	106	94	112	27	389	342	77	10
Link Distance (ft)		2632	2632			1905	1905		1864		701	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			300	300			300		200		150
Storage Blk Time (%)		2	1						0	23	0	
Queuing Penalty (veh)		0	0						0	9	0	

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	EB	WB	WB	NB	SB
Directions Served	L	T	R	LTR	LTR
Maximum Queue (ft)	64	270	8	15	630
Average Queue (ft)	41	27	2	3	561
95th Queue (ft)	69	369	9	20	732
Link Distance (ft)		1513		650	602
Upstream Blk Time (%)					67
Queuing Penalty (veh)					0
Storage Bay Dist (ft)	300		300		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	B26	B26	NB	NB
Directions Served	L	T	T	R	L	T	T	R	T	T	L	TR
Maximum Queue (ft)	224	392	350	83	316	223	176	90	21	14	18	50
Average Queue (ft)	102	281	255	52	223	123	104	45	4	1	12	29
95th Queue (ft)	209	396	363	85	398	339	169	83	38	20	18	45
Link Distance (ft)		1513	1513			474	474		429	429		13
Upstream Blk Time (%)						5					15	39
Queuing Penalty (veh)						18					0	117
Storage Bay Dist (ft)	300			300	300			300			150	
Storage Blk Time (%)		7	3		14	0					15	39
Queuing Penalty (veh)		18	10		27	0					19	68

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	SB	SB	B27
Directions Served	L	TR	T
Maximum Queue (ft)	49	110	45
Average Queue (ft)	34	56	6
95th Queue (ft)	56	106	59
Link Distance (ft)		53	604
Upstream Blk Time (%)	10	9	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)	150		
Storage Blk Time (%)	10	9	
Queuing Penalty (veh)	15	9	

Intersection: 4: CSAH 2

Movement	EB	EB	B26	WB	NB
Directions Served	T	TR	T	LT	LR
Maximum Queue (ft)	332	319	7	39	44
Average Queue (ft)	130	103	1	5	17
95th Queue (ft)	343	311	11	43	44
Link Distance (ft)	429	429	474	268	451
Upstream Blk Time (%)	0	0			
Queuing Penalty (veh)	2	3			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	TR	L	T	LT	R
Maximum Queue (ft)	289	288	89	191	77	115
Average Queue (ft)	250	223	51	44	31	50
95th Queue (ft)	319	336	92	172	75	123
Link Distance (ft)	268	268		711		1042
Upstream Blk Time (%)	17	12				
Queuing Penalty (veh)	150	101				
Storage Bay Dist (ft)			200		300	
Storage Blk Time (%)				1		
Queuing Penalty (veh)				1		

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	LT	R
Maximum Queue (ft)	274	341	173	184	225	182	94
Average Queue (ft)	140	150	60	115	142	106	35
95th Queue (ft)	244	310	177	191	231	178	89
Link Distance (ft)		711	711	3503	3503	741	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	350						150
Storage Blk Time (%)	0	1				2	
Queuing Penalty (veh)	1	4				2	

Intersection: 7: Newton Cir & Frontage Rd

Movement	NB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	12
95th Queue (ft)	35
Link Distance (ft)	650
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	860	8	30	213	0	38	3	319	6	4	6
Future Volume (veh/h)	9	1337	8	137	499	36	38	3	498	66	4	6
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	10	1502	9	154	561	40	43	3	560	74	4	7
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	448	1608	719	221	1790	801	87	3	496	88	3	496
Arrive On Green	0.01	0.45	0.45	0.06	0.51	0.51	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	0	10	1583	0	8	1583
Grp Volume(v), veh/h	10	1502	9	154	561	40	46	0	560	78	0	7
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	10	0	1583	8	0	1583
Q Serve(g_s), s	0.2	32.2	0.2	3.5	7.4	1.0	0.0	0.0	25.0	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.2	32.2	0.2	3.5	7.4	1.0	25.0	0.0	25.0	25.0	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	0.93		1.00	0.95		1.00
Lane Grp Cap(c), veh/h	448	1608	719	221	1790	801	90	0	496	90	0	496
V/C Ratio(X)	0.02	0.93	0.01	0.70	0.31	0.05	0.51	0.00	1.13	0.86	0.00	0.01
Avail Cap(c_a), veh/h	537	1663	744	221	1790	801	90	0	496	90	0	496
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.5	20.7	12.0	18.1	11.6	10.0	38.2	0.0	27.5	39.2	0.0	19.0
Incr Delay (d2), s/veh	0.0	10.0	0.0	9.2	0.1	0.0	19.0	0.0	81.1	62.8	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	17.9	0.1	2.2	3.6	0.5	1.5	0.0	22.0	3.3	0.0	0.1
LnGrp Delay(d),s/veh	11.5	30.7	12.0	27.3	11.7	10.1	57.3	0.0	108.6	102.0	0.0	19.0
LnGrp LOS	B	C	B	C	B	B	E		F	F		B
Approach Vol, veh/h		1521			755			606			85	
Approach Delay, s/veh		30.5			14.8			104.7			95.1	
Approach LOS		C			B			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		29.5	9.6	40.9		29.5	5.5	45.0
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		24.3	5.1	37.6		24.3	5.0	37.7
Max Q Clear Time (g_c+I1), s		27.0	5.5	34.2		27.0	2.2	9.4
Green Ext Time (p_c), s		0.0	0.0	2.2		0.0	0.0	16.7

Intersection Summary	
HCM 2010 Ctrl Delay	43.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1297	0	15	258	0	0	0	10	0	0	0
Future Volume (veh/h)	429	1311	251	183	282	285	151	0	111	171	0	257
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	482	1473	282	206	317	320	170	0	125	192	0	289
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	638	1538	688	240	1117	500	237	0	353	378	0	346
Arrive On Green	0.20	0.43	0.43	0.09	0.32	0.32	0.06	0.00	0.22	0.06	0.00	0.22
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	0	1583	1774	0	1583
Grp Volume(v), veh/h	482	1473	282	206	317	320	170	0	125	192	0	289
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1583	1774	0	1583
Q Serve(g_s), s	15.4	36.3	11.0	7.1	6.1	15.6	5.5	0.0	6.0	5.1	0.0	15.7
Cycle Q Clear(g_c), s	15.4	36.3	11.0	7.1	6.1	15.6	5.5	0.0	6.0	5.1	0.0	15.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	638	1538	688	240	1117	500	237	0	353	378	0	346
V/C Ratio(X)	0.76	0.96	0.41	0.86	0.28	0.64	0.72	0.00	0.35	0.51	0.00	0.83
Avail Cap(c_a), veh/h	792	1553	695	240	1117	500	237	0	353	378	0	346
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.9	24.6	17.5	22.7	23.1	26.4	30.1	0.0	29.5	28.6	0.0	33.6
Incr Delay (d2), s/veh	3.3	14.0	0.4	25.1	0.1	2.7	10.1	0.0	2.8	1.1	0.0	20.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	20.6	4.8	5.1	3.0	7.2	2.2	0.0	2.9	1.9	0.0	8.8
LnGrp Delay(d),s/veh	17.1	38.7	17.9	47.8	23.3	29.2	40.2	0.0	32.2	29.7	0.0	54.1
LnGrp LOS	B	D	B	D	C	C	D		C	C		D
Approach Vol, veh/h		2237			843			295			481	
Approach Delay, s/veh		31.4			31.5			36.8			44.4	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	24.6	12.2	43.6	10.0	24.2	22.9	32.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	19.7	7.7	39.5	5.5	19.3	26.2	21.0
Max Q Clear Time (g_c+I1), s	7.1	8.0	9.1	38.3	7.5	17.7	17.4	17.6
Green Ext Time (p_c), s	0.0	2.0	0.0	0.8	0.0	0.4	1.0	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	33.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1263	81	81	132	0	0	0	0	55	2	152
Future Volume (veh/h)	0	1442	188	81	430	0	0	0	0	55	2	331
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1863	0				1900	1863	1863
Adj Flow Rate, veh/h	0	1620	211	91	483	0				62	2	0
Adj No. of Lanes	0	2	0	1	1	0				0	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89				0.89	0.89	0.89
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	1777	228	190	1235	0				375	12	345
Arrive On Green	0.00	0.56	0.56	0.10	1.00	0.00				0.22	0.22	0.00
Sat Flow, veh/h	0	3250	404	1774	1863	0				1721	56	1583
Grp Volume(v), veh/h	0	896	935	91	483	0				64	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1791	1774	1863	0				1777	0	1583
Q Serve(g_s), s	0.0	40.3	42.9	1.8	0.0	0.0				2.6	0.0	0.0
Cycle Q Clear(g_c), s	0.0	40.3	42.9	1.8	0.0	0.0				2.6	0.0	0.0
Prop In Lane	0.00		0.23	1.00		0.00				0.97		1.00
Lane Grp Cap(c), veh/h	0	996	1009	190	1235	0				387	0	345
V/C Ratio(X)	0.00	0.90	0.93	0.48	0.39	0.00				0.17	0.00	0.00
Avail Cap(c_a), veh/h	0	1015	1027	206	1271	0				387	0	345
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.59	0.59	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	17.4	18.0	19.7	0.0	0.0				28.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	10.7	13.7	1.1	0.1	0.0				0.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	22.4	24.9	1.3	0.0	0.0				1.4	0.0	0.0
LnGrp Delay(d),s/veh	0.0	28.1	31.7	20.8	0.1	0.0				29.5	0.0	0.0
LnGrp LOS		C	C	C	A					C		
Approach Vol, veh/h		1831			574						64	
Approach Delay, s/veh		29.9			3.4						29.5	
Approach LOS		C			A						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			9.0	55.2		24.1		64.2
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s			5.3	51.6		19.6		61.4
Max Q Clear Time (g_c+I1), s			3.8	44.9		4.6		2.0
Green Ext Time (p_c), s			0.0	5.7		0.2		27.9

Intersection Summary	
HCM 2010 Ctrl Delay	23.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1006	345	0	0	149	173	24	0	72	0	0	0
Future Volume (veh/h)	1113	417	0	0	268	173	203	0	72	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1900	1863	1863			
Adj Flow Rate, veh/h	1251	469	0	0	301	194	228	0	81			
Adj No. of Lanes	2	1	0	0	2	0	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	1441	1089	0	0	384	241	559	0	499			
Arrive On Green	0.12	0.19	0.00	0.00	0.18	0.18	0.32	0.00	0.32			
Sat Flow, veh/h	3442	1863	0	0	2182	1312	1774	0	1583			
Grp Volume(v), veh/h	1251	469	0	0	254	241	228	0	81			
Grp Sat Flow(s),veh/h/ln	1721	1863	0	0	1770	1631	1774	0	1583			
Q Serve(g_s), s	25.9	19.9	0.0	0.0	12.3	12.7	9.1	0.0	3.3			
Cycle Q Clear(g_c), s	25.9	19.9	0.0	0.0	12.3	12.7	9.1	0.0	3.3			
Prop In Lane	1.00		0.00	0.00		0.80	1.00		1.00			
Lane Grp Cap(c), veh/h	1441	1089	0	0	326	300	559	0	499			
V/C Ratio(X)	0.87	0.43	0.00	0.00	0.78	0.80	0.41	0.00	0.16			
Avail Cap(c_a), veh/h	1668	1252	0	0	364	335	559	0	499			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.27	0.27	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	27.3	23.1	0.0	0.0	35.0	35.2	24.2	0.0	22.2			
Incr Delay (d2), s/veh	1.3	0.1	0.0	0.0	9.4	12.1	2.2	0.0	0.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	15.6	10.3	0.0	0.0	6.8	6.8	4.8	0.0	1.5			
LnGrp Delay(d),s/veh	28.6	23.2	0.0	0.0	44.4	47.2	26.4	0.0	22.9			
LnGrp LOS	C	C			D	D	C		C			
Approach Vol, veh/h		1720			495			309				
Approach Delay, s/veh		27.1			45.8			25.5				
Approach LOS		C			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		32.9		57.1			36.1	21.1
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		20.5		60.5			37.5	18.5
Max Q Clear Time (g_c+I1), s		11.1		21.9			27.9	14.7
Green Ext Time (p_c), s		1.0		5.8			3.6	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	30.6
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1319	13	0	264	0	4	0	0	0	0	0
Future Vol, veh/h	36	1999	13	0	638	58	4	0	0	14	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	2246	15	0	717	65	4	0	0	16	0	62

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	717	0	0	2246	0	0	2685	3044	1123	1921	3044	358
Stage 1	-	-	-	-	-	-	2327	2327	-	717	717	-
Stage 2	-	-	-	-	-	-	358	717	-	1204	2327	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	880	-	-	226	-	-	10	12	200	41	12	638
Stage 1	-	-	-	-	-	-	38	70	-	387	432	-
Stage 2	-	-	-	-	-	-	633	432	-	195	70	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	880	-	-	226	-	-	9	11	200	40	11	638
Mov Cap-2 Maneuver	-	-	-	-	-	-	32	55	-	129	55	-
Stage 1	-	-	-	-	-	-	36	67	-	369	432	-
Stage 2	-	-	-	-	-	-	572	432	-	186	67	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	135.1	18
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	32	880	-	-	226	-	-	354
HCM Lane V/C Ratio	0.14	0.046	-	-	-	-	-	0.219
HCM Control Delay (s)	135.1	9.3	-	-	0	-	-	18
HCM Lane LOS	F	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.8

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1439	4	4	298	2	14
Future Vol, veh/h	1725	4	4	775	2	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1938	4	4	871	2	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1943	0	2384	971
Stage 1	-	-	-	-	1940	-
Stage 2	-	-	-	-	444	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	298	-	28	252
Stage 1	-	-	-	-	98	-
Stage 2	-	-	-	-	614	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	298	-	27	252
Mov Cap-2 Maneuver	-	-	-	-	27	-
Stage 1	-	-	-	-	98	-
Stage 2	-	-	-	-	598	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	39.2
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	123	-	-	298	-
HCM Lane V/C Ratio	0.146	-	-	0.015	-
HCM Control Delay (s)	39.2	-	-	17.3	0.2
HCM Lane LOS	E	-	-	C	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	R	LT
Maximum Queue (ft)	4	227	211	29	272	209	239	27	54	134	61
Average Queue (ft)	1	145	132	9	162	118	143	9	17	61	23
95th Queue (ft)	10	219	208	29	272	201	237	27	47	124	61
Link Distance (ft)		2632	2632			1905	1905		1864		701
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	300			300	300			300		200	
Storage Blk Time (%)		0			1					0	
Queuing Penalty (veh)		0			4					0	

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	EB	WB	NB	SB
Directions Served	L	R	LTR	LTR
Maximum Queue (ft)	162	32	52	636
Average Queue (ft)	87	7	23	614
95th Queue (ft)	161	26	62	650
Link Distance (ft)			650	602
Upstream Blk Time (%)				92
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	300	300		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	B26	B26	NB	NB
Directions Served	L	T	T	R	L	T	T	R	T	T	L	TR
Maximum Queue (ft)	208	333	340	74	430	510	515	384	50	52	15	46
Average Queue (ft)	118	183	188	39	169	383	400	120	5	6	12	27
95th Queue (ft)	216	303	308	71	397	514	539	392	44	46	17	40
Link Distance (ft)		1513	1513			474	474		429	429		13
Upstream Blk Time (%)						3	4				26	50
Queuing Penalty (veh)						27	38				0	303
Storage Bay Dist (ft)	300			300	300			300			150	
Storage Blk Time (%)	0	1	1		1	20	22				26	50
Queuing Penalty (veh)	0	1	2		7	31	27				68	175

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	SB	SB	B27
Directions Served	L	TR	T
Maximum Queue (ft)	52	137	355
Average Queue (ft)	48	122	175
95th Queue (ft)	61	143	374
Link Distance (ft)		53	604
Upstream Blk Time (%)	26	49	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)	150		
Storage Blk Time (%)	26	49	
Queuing Penalty (veh)	79	100	

Intersection: 4: CSAH 2

Movement	EB	EB	B26	B26	WB	WB	NB
Directions Served	T	TR	T	T	LT	T	LR
Maximum Queue (ft)	506	506	226	235	118	41	48
Average Queue (ft)	350	387	62	74	22	4	15
95th Queue (ft)	619	638	253	275	106	41	45
Link Distance (ft)	429	429	474	474	268	268	451
Upstream Blk Time (%)	14	24	0	0			
Queuing Penalty (veh)	79	136	1	1			
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	TR	L	T	LT	R
Maximum Queue (ft)	299	295	224	684	450	1073
Average Queue (ft)	267	269	136	566	259	887
95th Queue (ft)	316	310	253	796	585	1267
Link Distance (ft)	268	268		711		1042
Upstream Blk Time (%)	42	56		4		23
Queuing Penalty (veh)	240	321		28		0
Storage Bay Dist (ft)			200		300	
Storage Blk Time (%)				46		40
Queuing Penalty (veh)				47		68

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	LT	R
Maximum Queue (ft)	253	281	259	255	267	179	107
Average Queue (ft)	156	185	134	155	167	112	29
95th Queue (ft)	258	288	281	260	275	209	87
Link Distance (ft)		711	711	3503	3503	741	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	350						150
Storage Blk Time (%)						4	
Queuing Penalty (veh)						3	

Intersection: 7: Newton Cir & Frontage Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	15	38
Average Queue (ft)	2	24
95th Queue (ft)	13	47
Link Distance (ft)	566	650
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	478	31	281	1078	5	24	2	90	2	0	0
Future Volume (veh/h)	4	830	31	501	1666	78	24	2	222	46	0	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	4	892	33	539	1791	84	26	2	239	49	0	0
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	0	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	122	1100	492	577	1957	876	462	32	432	387	0	432
Arrive On Green	0.01	0.31	0.31	0.25	0.55	0.55	0.27	0.27	0.27	0.27	0.00	0.00
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1375	119	1583	1086	0	1583
Grp Volume(v), veh/h	4	892	33	539	1791	84	28	0	239	49	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1494	0	1583	1086	0	1583
Q Serve(g_s), s	0.1	18.6	1.2	17.4	36.6	2.0	0.0	0.0	10.3	2.7	0.0	0.0
Cycle Q Clear(g_c), s	0.1	18.6	1.2	17.4	36.6	2.0	0.9	0.0	10.3	3.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.93		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	122	1100	492	577	1957	876	494	0	432	387	0	432
V/C Ratio(X)	0.03	0.81	0.07	0.93	0.92	0.10	0.06	0.00	0.55	0.13	0.00	0.00
Avail Cap(c_a), veh/h	224	1194	534	614	1957	876	494	0	432	387	0	432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.6	25.4	19.4	18.2	16.2	8.4	21.5	0.0	24.9	22.8	0.0	0.0
Incr Delay (d2), s/veh	0.1	4.0	0.1	21.1	7.2	0.0	0.2	0.0	5.0	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	9.7	0.5	14.9	19.6	0.9	0.5	0.0	5.1	0.9	0.0	0.0
LnGrp Delay(d),s/veh	20.8	29.5	19.5	39.3	23.4	8.5	21.7	0.0	29.9	23.5	0.0	0.0
LnGrp LOS	C	C	B	D	C	A	C		C	C		
Approach Vol, veh/h		929			2414			267			49	
Approach Delay, s/veh		29.1			26.4			29.1			23.5	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		26.3	24.3	29.4		26.3	4.9	48.7
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		18.0	21.5	27.0		18.0	5.0	43.5
Max Q Clear Time (g_c+I1), s		12.3	19.4	20.6		5.6	2.1	38.6
Green Ext Time (p_c), s		0.6	0.4	4.3		1.0	0.0	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	27.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	517	0	15	1277	0	0	0	27	0	0	0
Future Volume (veh/h)	184	664	212	156	1365	123	352	0	262	205	0	309
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	200	722	230	170	1484	134	383	0	285	223	0	336
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	217	1614	722	349	1515	678	388	0	393	343	0	272
Arrive On Green	0.09	0.46	0.46	0.07	0.43	0.43	0.19	0.00	0.25	0.12	0.00	0.17
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	0	1583	1774	0	1583
Grp Volume(v), veh/h	200	722	230	170	1484	134	383	0	285	223	0	336
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	0	1583	1774	0	1583
Q Serve(g_s), s	13.4	22.3	14.8	8.6	66.1	8.5	30.4	0.0	26.4	16.4	0.0	27.5
Cycle Q Clear(g_c), s	13.4	22.3	14.8	8.6	66.1	8.5	30.4	0.0	26.4	16.4	0.0	27.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	217	1614	722	349	1515	678	388	0	393	343	0	272
V/C Ratio(X)	0.92	0.45	0.32	0.49	0.98	0.20	0.99	0.00	0.72	0.65	0.00	1.24
Avail Cap(c_a), veh/h	217	1614	722	369	1522	681	388	0	393	396	0	272
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.5	29.7	27.7	24.0	45.0	28.6	50.8	0.0	55.1	47.1	0.0	66.3
Incr Delay (d2), s/veh	39.9	0.2	0.3	1.1	18.2	0.1	42.4	0.0	11.1	3.0	0.0	133.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.2	11.0	6.5	4.3	36.0	3.7	21.5	0.0	12.8	8.3	0.0	22.1
LnGrp Delay(d),s/veh	91.3	29.9	27.9	25.0	63.3	28.7	93.3	0.0	66.2	50.1	0.0	199.6
LnGrp LOS	F	C	C	C	E	C	F		E	D		F
Approach Vol, veh/h		1152			1788			668			559	
Approach Delay, s/veh		40.2			57.1			81.7			140.0	
Approach LOS		D			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.1	44.2	15.1	77.5	35.4	32.0	19.6	73.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	23.5	34.6	12.5	71.4	30.9	27.2	15.1	68.8
Max Q Clear Time (g_c+I1), s	18.4	28.4	10.6	24.3	32.4	29.5	15.4	68.1
Green Ext Time (p_c), s	0.3	2.1	0.1	26.3	0.0	0.0	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	67.5
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	435	60	102	381	0	0	0	0	170	0	868
Future Volume (veh/h)	0	802	280	102	601	0	0	0	0	170	0	1000
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1900	1863	1863	0				1900	1863	1863
Adj Flow Rate, veh/h	0	853	298	109	639	0				181	0	0
Adj No. of Lanes	0	2	0	1	1	0				0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	781	272	106	681	0				1026	0	915
Arrive On Green	0.00	0.30	0.30	0.07	0.73	0.00				0.58	0.00	0.00
Sat Flow, veh/h	0	2669	898	1774	1863	0				1774	0	1583
Grp Volume(v), veh/h	0	586	565	109	639	0				181	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1704	1774	1863	0				1774	0	1583
Q Serve(g_s), s	0.0	48.5	48.5	5.5	47.0	0.0				7.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	48.5	48.5	5.5	47.0	0.0				7.7	0.0	0.0
Prop In Lane	0.00		0.53	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	536	517	106	681	0				1026	0	915
V/C Ratio(X)	0.00	1.09	1.09	1.03	0.94	0.00				0.18	0.00	0.00
Avail Cap(c_a), veh/h	0	536	517	106	681	0				1026	0	915
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.61	0.61	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	55.7	55.8	48.4	20.0	0.0				15.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	66.1	67.9	75.9	14.5	0.0				0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.4	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	33.5	32.6	4.2	26.2	0.0				3.9	0.0	0.0
LnGrp Delay(d),s/veh	0.0	121.9	123.6	124.7	34.5	0.0				16.2	0.0	0.0
LnGrp LOS		F	F	F	C					B		
Approach Vol, veh/h		1151			748						181	
Approach Delay, s/veh		122.7			47.6						16.2	
Approach LOS		F			D						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			10.0	53.0		97.0		63.0
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s			5.5	48.5		92.5		58.5
Max Q Clear Time (g_c+I1), s			7.5	50.5		9.7		49.0
Green Ext Time (p_c), s			0.0	0.0		1.1		6.4

Intersection Summary	
HCM 2010 Ctrl Delay	86.4
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	341	271	0	0	400	85	74	4	58	0	0	0
Future Volume (veh/h)	561	418	0	0	488	85	206	4	58	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1900	1863	1863			
Adj Flow Rate, veh/h	610	454	0	0	530	92	224	4	63			
Adj No. of Lanes	2	1	0	0	2	0	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	861	851	0	0	707	122	751	13	682			
Arrive On Green	0.28	0.76	0.00	0.00	0.23	0.23	0.43	0.43	0.43			
Sat Flow, veh/h	3442	1863	0	0	3111	522	1744	31	1583			
Grp Volume(v), veh/h	610	454	0	0	310	312	228	0	63			
Grp Sat Flow(s),veh/h/ln	1721	1863	0	0	1770	1771	1776	0	1583			
Q Serve(g_s), s	10.0	7.8	0.0	0.0	13.0	13.1	6.7	0.0	1.9			
Cycle Q Clear(g_c), s	10.0	7.8	0.0	0.0	13.0	13.1	6.7	0.0	1.9			
Prop In Lane	1.00		0.00	0.00		0.29	0.98		1.00			
Lane Grp Cap(c), veh/h	861	851	0	0	415	415	765	0	682			
V/C Ratio(X)	0.71	0.53	0.00	0.00	0.75	0.75	0.30	0.00	0.09			
Avail Cap(c_a), veh/h	1085	1083	0	0	520	520	765	0	682			
HCM Platoon Ratio	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.8	6.1	0.0	0.0	28.4	28.5	14.9	0.0	13.5			
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	4.5	4.7	1.0	0.0	0.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.7	3.8	0.0	0.0	6.9	7.0	3.5	0.0	0.9			
LnGrp Delay(d),s/veh	15.9	6.1	0.0	0.0	33.0	33.2	15.9	0.0	13.8			
LnGrp LOS	B	A			C	C	B		B			
Approach Vol, veh/h		1064			622			291				
Approach Delay, s/veh		11.7			33.1			15.4				
Approach LOS		B			C			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		39.0		41.0			17.8	23.2
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		24.5		46.5			18.5	23.5
Max Q Clear Time (g_c+I1), s		8.7		9.8			12.0	15.1
Green Ext Time (p_c), s		1.3		6.5			1.3	3.6

Intersection Summary	
HCM 2010 Ctrl Delay	19.0
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	351.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	513	22	2	1261	0	18	0	3	0	0	0
Future Vol, veh/h	132	909	22	2	1769	241	18	0	3	147	0	373
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	300	-	300	300	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	140	967	23	2	1882	256	19	0	3	156	0	397

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1882	0	0	967	0	0	2193	3134	484	2650	3134	941
Stage 1	-	-	-	-	-	-	1248	1248	-	1886	1886	-
Stage 2	-	-	-	-	-	-	945	1886	-	764	1248	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	315	-	-	708	-	-	25	11	529	~ 11	11	~ 264
Stage 1	-	-	-	-	-	-	183	243	-	~ 73	118	-
Stage 2	-	-	-	-	-	-	282	118	-	362	243	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	315	-	-	708	-	-	-	6	529	~ 7	6	~ 264
Mov Cap-2 Maneuver	-	-	-	-	-	-	355	~ -27	-	~ 33	60	-
Stage 1	-	-	-	-	-	-	102	135	-	~ 41	118	-
Stage 2	-	-	-	-	-	-	-	118	-	200	135	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.1	0		$ 2439.7
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	315	-	-	708	-	-	89
HCM Lane V/C Ratio	-	0.446	-	-	0.003	-	-	6.216
HCM Control Delay (s)	-	25.3	-	-	10.1	-		$ 2439.7
HCM Lane LOS	-	D	-	-	B	-	-	F
HCM 95th %tile Q(veh)	-	2.2	-	-	0	-	-	61.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	547	5	18	1336	6	9
Future Vol, veh/h	1134	5	18	1688	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1219	5	19	1815	6	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1225	0	2168	612
Stage 1	-	-	-	-	1222	-
Stage 2	-	-	-	-	946	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	565	-	40	436
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	338	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	565	-	40	436
Mov Cap-2 Maneuver	-	-	-	-	40	-
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	338	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	54.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	88	-	-	565	-
HCM Lane V/C Ratio	0.183	-	-	0.034	-
HCM Control Delay (s)	54.9	-	-	11.6	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Appendix S: Synchro Reports – Phase 2 (2038) Recommendations

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	R	L	TR
Maximum Queue (ft)	27	412	391	18	154	104	124	35	215	296	84	18
Average Queue (ft)	7	280	275	4	86	65	82	12	45	194	37	4
95th Queue (ft)	26	421	401	18	148	114	130	34	191	310	80	15
Link Distance (ft)		2634	2634			1881	1881		1865		702	702
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			300	300			300		200		
Storage Blk Time (%)		8	7						0	10		
Queuing Penalty (veh)		1	1						0	4		

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	T	R	T	T	R	L	LT	R
Maximum Queue (ft)	177	326	312	7	118	120	48	13	74	52
Average Queue (ft)	71	172	165	1	42	44	17	2	34	27
95th Queue (ft)	173	337	318	6	103	111	45	13	71	52
Link Distance (ft)		1881	1881		1502	1502			603	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	300			300			300	150		150
Storage Blk Time (%)		3	3							
Queuing Penalty (veh)		5	0							

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	L	TR	L
Maximum Queue (ft)	448	538	530	330	245	148	150	61	31	40	37	50
Average Queue (ft)	198	393	376	139	140	74	85	31	28	24	28	37
95th Queue (ft)	452	565	550	398	276	136	142	58	41	48	43	55
Link Distance (ft)		1502	1502			463	463		12	12	12	
Upstream Blk Time (%)									48	22	28	3
Queuing Penalty (veh)									48	22	28	0
Storage Bay Dist (ft)	300			300	300			300				150
Storage Blk Time (%)		29	21		2							3
Queuing Penalty (veh)		73	61		4							4

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	SB	B27
Directions Served	TR	T
Maximum Queue (ft)	115	59
Average Queue (ft)	58	9
95th Queue (ft)	110	49
Link Distance (ft)	54	604
Upstream Blk Time (%)	8	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)	8	
Queuing Penalty (veh)	8	

Intersection: 4: CSAH 2

Movement	EB	EB	B26	B26	WB	WB	NB
Directions Served	T	TR	T	T	LT	T	LR
Maximum Queue (ft)	392	393	57	50	126	112	41
Average Queue (ft)	220	195	14	9	24	16	12
95th Queue (ft)	461	465	101	87	107	125	36
Link Distance (ft)	429	429	463	463	268	268	437
Upstream Blk Time (%)	3	2				1	
Queuing Penalty (veh)	23	14				3	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	L	T	LT	R
Maximum Queue (ft)	297	302	104	132	233	79	132
Average Queue (ft)	278	253	41	59	48	31	56
95th Queue (ft)	312	346	100	125	179	79	131
Link Distance (ft)	268	268	268		711		1042
Upstream Blk Time (%)	27	12	0				
Queuing Penalty (veh)	158	72	0				
Storage Bay Dist (ft)				200		300	
Storage Blk Time (%)					1		
Queuing Penalty (veh)					1		

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	LT	R
Maximum Queue (ft)	187	300	105	175	222	179	89
Average Queue (ft)	130	149	48	109	133	105	29
95th Queue (ft)	189	292	112	184	229	178	89
Link Distance (ft)		711	711	3503	3503	741	
Upstream Blk Time (%)		0					
Queuing Penalty (veh)		1					
Storage Bay Dist (ft)	350						150
Storage Blk Time (%)						3	
Queuing Penalty (veh)						2	

Intersection: 7: Newton Cir & Frontage Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	5	31
Average Queue (ft)	1	13
95th Queue (ft)	7	37
Link Distance (ft)	567	650
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	860	8	30	213	0	38	3	319	6	4	6
Future Volume (veh/h)	9	1337	8	138	500	36	38	3	498	66	4	6
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	10	1502	9	155	562	40	43	3	560	74	4	7
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	460	1559	697	206	1747	782	529	34	545	350	209	367
Arrive On Green	0.01	0.44	0.44	0.13	0.99	0.99	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1312	100	1583	844	609	1066
Grp Volume(v), veh/h	10	1502	9	155	562	40	46	0	560	74	0	11
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1411	0	1583	844	0	1675
Q Serve(g_s), s	0.3	37.1	0.3	4.2	0.3	0.0	1.8	0.0	31.0	5.9	0.0	0.4
Cycle Q Clear(g_c), s	0.3	37.1	0.3	4.2	0.3	0.0	2.2	0.0	31.0	8.1	0.0	0.4
Prop In Lane	1.00		1.00	1.00		1.00	0.93		1.00	1.00		0.64
Lane Grp Cap(c), veh/h	460	1559	697	206	1747	782	563	0	545	350	0	576
V/C Ratio(X)	0.02	0.96	0.01	0.75	0.32	0.05	0.08	0.00	1.03	0.21	0.00	0.02
Avail Cap(c_a), veh/h	537	1569	702	206	1747	782	563	0	545	350	0	576
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.6	24.5	14.2	19.1	0.3	0.3	20.1	0.0	29.5	22.8	0.0	19.5
Incr Delay (d2), s/veh	0.0	14.9	0.0	14.1	0.1	0.0	0.3	0.0	46.0	1.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	21.2	0.1	2.8	0.1	0.0	0.8	0.0	20.4	1.5	0.0	0.2
LnGrp Delay(d),s/veh	13.6	39.4	14.2	33.2	0.4	0.3	20.4	0.0	75.5	24.2	0.0	19.6
LnGrp LOS	B	D	B	C	A	A	C		F	C		B
Approach Vol, veh/h		1521			757			606			85	
Approach Delay, s/veh		39.1			7.1			71.3			23.6	
Approach LOS		D			A			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		35.5	10.4	44.1		35.5	5.6	48.9
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		30.7	5.9	39.9		30.7	5.0	40.8
Max Q Clear Time (g_c+I1), s		33.0	6.2	39.1		10.1	2.3	2.3
Green Ext Time (p_c), s		0.0	0.0	0.5		2.9	0.0	19.8

Intersection Summary	
HCM 2010 Ctrl Delay	37.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1319	13	0	264	0	4	0	0	0	0	0
Future Volume (veh/h)	179	1856	13	0	587	120	4	0	0	72	0	108
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1900	1863	1863
Adj Flow Rate, veh/h	201	2085	15	0	660	135	4	0	0	81	0	121
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	0	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	455	1954	874	80	1954	874	429	648	0	539	0	551
Arrive On Green	1.00	1.00	1.00	0.00	1.00	1.00	0.35	0.00	0.00	0.35	0.00	0.35
Sat Flow, veh/h	680	3539	1583	194	3539	1583	1265	1863	0	1319	0	1583
Grp Volume(v), veh/h	201	2085	15	0	660	135	4	0	0	81	0	121
Grp Sat Flow(s),veh/h/ln	680	1770	1583	194	1770	1583	1265	1863	0	1319	0	1583
Q Serve(g_s), s	0.0	49.7	0.0	0.0	0.0	0.0	0.2	0.0	0.0	3.7	0.0	4.9
Cycle Q Clear(g_c), s	0.0	49.7	0.0	0.0	0.0	0.0	6.7	0.0	0.0	5.7	0.0	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	455	1954	874	80	1954	874	429	648	0	539	0	551
V/C Ratio(X)	0.44	1.07	0.02	0.00	0.34	0.15	0.01	0.00	0.00	0.15	0.00	0.22
Avail Cap(c_a), veh/h	552	2458	1100	108	2458	1100	429	648	0	539	0	551
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.29	0.29	0.29	0.00	0.96	0.96	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	23.7	0.0	0.0	21.7	0.0	20.7
Incr Delay (d2), s/veh	0.2	33.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.6	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	9.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.5	0.0	2.3
LnGrp Delay(d),s/veh	0.2	33.1	0.0	0.0	0.1	0.1	23.7	0.0	0.0	22.3	0.0	21.6
LnGrp LOS	A	F	A		A	A	C			C		C
Approach Vol, veh/h		2301			795			4			202	
Approach Delay, s/veh		30.0			0.1			23.7			21.9	
Approach LOS		C			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		29.8		60.2		29.8		60.2
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green Setting (Gmax), s		18.5		62.5		18.5		62.5
Max Q Clear Time (g_c+I1), s		8.7		51.7		7.7		2.0
Green Ext Time (p_c), s		0.5		10.1		0.5		44.6

Intersection Summary	
HCM 2010 Ctrl Delay	22.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1297	0	15	258	0	0	0	10	0	0	0
Future Volume (veh/h)	251	1369	286	205	378	168	172	0	125	101	0	151
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	282	1538	321	230	425	189	193	0	140	113	0	170
Adj No. of Lanes	1	2	1	1	2	1	2	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	562	1555	696	261	1479	662	617	0	330	342	0	330
Arrive On Green	0.24	0.88	0.88	0.10	0.42	0.42	0.06	0.00	0.21	0.06	0.00	0.21
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	3442	0	1583	1774	0	1583
Grp Volume(v), veh/h	282	1538	321	230	425	189	193	0	140	113	0	170
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1721	0	1583	1774	0	1583
Q Serve(g_s), s	8.4	36.2	3.7	6.9	7.1	7.1	3.9	0.0	6.9	4.5	0.0	8.6
Cycle Q Clear(g_c), s	8.4	36.2	3.7	6.9	7.1	7.1	3.9	0.0	6.9	4.5	0.0	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	562	1555	696	261	1479	662	617	0	330	342	0	330
V/C Ratio(X)	0.50	0.99	0.46	0.88	0.29	0.29	0.31	0.00	0.42	0.33	0.00	0.52
Avail Cap(c_a), veh/h	611	1577	705	261	1479	662	617	0	330	342	0	330
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.41	0.41	0.41	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.4	5.3	3.3	21.5	17.3	17.3	26.3	0.0	30.9	26.3	0.0	31.6
Incr Delay (d2), s/veh	0.3	12.0	0.2	27.8	0.1	0.2	0.3	0.0	4.0	0.6	0.0	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	17.5	1.5	7.6	3.5	3.1	1.9	0.0	3.4	2.3	0.0	4.2
LnGrp Delay(d),s/veh	10.7	17.2	3.5	49.3	17.4	17.5	26.6	0.0	34.9	26.9	0.0	37.2
LnGrp LOS	B	B	A	D	B	B	C		C	C		D
Approach Vol, veh/h		2141			844			333			283	
Approach Delay, s/veh		14.3			26.2			30.1			33.1	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	23.3	13.2	44.0	9.5	23.3	15.1	42.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	18.2	8.7	40.1	5.0	18.2	13.1	35.7
Max Q Clear Time (g_c+I1), s	6.5	8.9	8.9	38.2	5.9	10.6	10.4	9.1
Green Ext Time (p_c), s	0.0	1.2	0.0	1.3	0.0	1.1	0.2	17.5

Intersection Summary	
HCM 2010 Ctrl Delay	20.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1263	81	81	132	0	0	0	0	55	2	152
Future Volume (veh/h)	0	1443	189	81	431	0	0	0	0	55	2	331
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	0				1900	1863	1863
Adj Flow Rate, veh/h	0	1621	212	91	484	0				62	2	0
Adj No. of Lanes	0	2	1	1	1	0				0	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89				0.89	0.89	0.89
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	1855	830	199	1162	0				411	13	378
Arrive On Green	0.00	0.52	0.52	0.10	1.00	0.00				0.24	0.24	0.00
Sat Flow, veh/h	0	3632	1583	1774	1863	0				1721	56	1583
Grp Volume(v), veh/h	0	1621	212	91	484	0				64	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1583	1774	1863	0				1777	0	1583
Q Serve(g_s), s	0.0	36.2	6.6	2.0	0.0	0.0				2.6	0.0	0.0
Cycle Q Clear(g_c), s	0.0	36.2	6.6	2.0	0.0	0.0				2.6	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				0.97		1.00
Lane Grp Cap(c), veh/h	0	1855	830	199	1162	0				424	0	378
V/C Ratio(X)	0.00	0.87	0.26	0.46	0.42	0.00				0.15	0.00	0.00
Avail Cap(c_a), veh/h	0	1947	871	219	1231	0				424	0	378
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.59	0.59	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	18.8	11.8	18.2	0.0	0.0				27.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	4.6	0.2	1.0	0.1	0.0				0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	18.7	2.9	1.2	0.0	0.0				1.4	0.0	0.0
LnGrp Delay(d),s/veh	0.0	23.4	11.9	19.2	0.1	0.0				27.8	0.0	0.0
LnGrp LOS		C	B	B	A					C		
Approach Vol, veh/h		1833			575						64	
Approach Delay, s/veh		22.1			3.1						27.8	
Approach LOS		C			A						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			9.0	51.7		26.0		60.7
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s			5.5	49.5		21.5		59.5
Max Q Clear Time (g_c+I1), s			4.0	38.2		4.6		2.0
Green Ext Time (p_c), s			0.0	9.0		0.2		25.9

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1006	345	0	0	149	173	24	0	72	0	0	0
Future Volume (veh/h)	1114	417	0	0	269	173	203	0	72	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1900	1863	1863			
Adj Flow Rate, veh/h	1252	469	0	0	302	194	228	0	81			
Adj No. of Lanes	2	1	0	0	2	0	0	1	1			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	1434	1085	0	0	384	240	563	0	503			
Arrive On Green	0.12	0.19	0.00	0.00	0.18	0.18	0.32	0.00	0.32			
Sat Flow, veh/h	3442	1863	0	0	2185	1310	1774	0	1583			
Grp Volume(v), veh/h	1252	469	0	0	254	242	228	0	81			
Grp Sat Flow(s),veh/h/ln	1721	1863	0	0	1770	1632	1774	0	1583			
Q Serve(g_s), s	26.0	20.0	0.0	0.0	12.3	12.8	9.1	0.0	3.3			
Cycle Q Clear(g_c), s	26.0	20.0	0.0	0.0	12.3	12.8	9.1	0.0	3.3			
Prop In Lane	1.00		0.00	0.00		0.80	1.00		1.00			
Lane Grp Cap(c), veh/h	1434	1085	0	0	324	299	563	0	503			
V/C Ratio(X)	0.87	0.43	0.00	0.00	0.78	0.81	0.40	0.00	0.16			
Avail Cap(c_a), veh/h	1628	1227	0	0	360	332	563	0	503			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.40	0.40	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	27.5	23.2	0.0	0.0	35.0	35.2	24.1	0.0	22.1			
Incr Delay (d2), s/veh	2.1	0.1	0.0	0.0	9.9	12.7	2.2	0.0	0.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	15.7	10.3	0.0	0.0	6.9	6.8	4.8	0.0	1.5			
LnGrp Delay(d),s/veh	29.6	23.3	0.0	0.0	44.9	47.9	26.2	0.0	22.8			
LnGrp LOS	C	C			D	D	C		C			
Approach Vol, veh/h		1721			496			309				
Approach Delay, s/veh		27.9			46.4			25.3				
Approach LOS		C			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		33.1		56.9			35.9	21.0
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		21.7		59.3			36.5	18.3
Max Q Clear Time (g_c+I1), s		11.1		22.0			28.0	14.8
Green Ext Time (p_c), s		1.1		5.8			3.4	1.7

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1439	4	4	298	2	14
Future Vol, veh/h	1727	4	4	776	2	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1940	4	4	872	2	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1945	0	2388	972
Stage 1	-	-	-	-	1943	-
Stage 2	-	-	-	-	445	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	297	-	28	252
Stage 1	-	-	-	-	98	-
Stage 2	-	-	-	-	613	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	297	-	27	252
Mov Cap-2 Maneuver	-	-	-	-	27	-
Stage 1	-	-	-	-	98	-
Stage 2	-	-	-	-	597	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	39.2
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	123	-	-	297	-
HCM Lane V/C Ratio	0.146	-	-	0.015	-
HCM Control Delay (s)	39.2	-	-	17.3	0.2
HCM Lane LOS	E	-	-	C	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection: 1: Xerxes Ave & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	LT	R	L
Maximum Queue (ft)	21	266	267	42	310	143	161	28	36	121	76
Average Queue (ft)	3	188	183	14	210	87	100	9	13	62	35
95th Queue (ft)	18	293	292	41	299	154	160	27	41	120	78
Link Distance (ft)		2634	2634			1881	1881		1865		702
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	300			300	300			300		200	
Storage Blk Time (%)		2	2		1						
Queuing Penalty (veh)		0	1		8						

Intersection: 2: Frontage Rd/Future Entrance 1 & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	LT	R
Maximum Queue (ft)	437	1349	1303	1	9	226	248	29	34	10	146	159
Average Queue (ft)	355	618	444	0	1	146	151	16	11	1	73	99
95th Queue (ft)	546	1569	1445	2	9	226	243	35	34	9	135	164
Link Distance (ft)		1881	1881			1502	1502			651	603	
Upstream Blk Time (%)		1	0									
Queuing Penalty (veh)		3	3									
Storage Bay Dist (ft)	300			300	300			300	150			150
Storage Blk Time (%)	64	0				0	0				0	2
Queuing Penalty (veh)	288	0				0	0				1	3

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	B26	B26	NB	NB
Directions Served	L	T	T	R	L	T	T	R	T	T	L	L
Maximum Queue (ft)	180	167	174	66	258	372	377	110	21	16	57	40
Average Queue (ft)	87	111	121	37	112	275	276	35	5	4	35	26
95th Queue (ft)	182	177	191	67	284	428	429	164	38	30	50	47
Link Distance (ft)		1502	1502			463	463		429	429	12	12
Upstream Blk Time (%)					0	2	2	0			59	35
Queuing Penalty (veh)					0	17	17	0			120	71
Storage Bay Dist (ft)	300			300	300			300				
Storage Blk Time (%)					0	6	7					
Queuing Penalty (veh)					0	10	9					

Intersection: 3: Frontage Rd/Proposed Entrance & CSAH 2

Movement	NB	SB	SB	B27
Directions Served	TR	L	TR	T
Maximum Queue (ft)	56	54	148	537
Average Queue (ft)	36	52	123	327
95th Queue (ft)	54	56	157	694
Link Distance (ft)	12		54	604
Upstream Blk Time (%)	37	9	64	16
Queuing Penalty (veh)	75	0	0	0
Storage Bay Dist (ft)		150		
Storage Blk Time (%)		9	64	
Queuing Penalty (veh)		27	132	

Intersection: 4: CSAH 2

Movement	EB	WB	WB	NB
Directions Served	T	LT	T	LR
Maximum Queue (ft)	5	127	86	52
Average Queue (ft)	1	32	10	20
95th Queue (ft)	7	111	69	61
Link Distance (ft)	429	268	268	437
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: SB IH 35 On Ramp/SB IH 35 Off Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	SB	SB	SB
Directions Served	T	T	R	L	T	LT	R	R
Maximum Queue (ft)	252	238	70	144	336	120	237	204
Average Queue (ft)	170	135	42	64	139	66	159	124
95th Queue (ft)	270	237	68	129	283	127	259	225
Link Distance (ft)	268	268	268		711		1041	1041
Upstream Blk Time (%)	0	0						
Queuing Penalty (veh)	1	0						
Storage Bay Dist (ft)				200		300		
Storage Blk Time (%)					2		0	
Queuing Penalty (veh)					2		0	

Intersection: 6: NB IH 35 Off Ramp/NB IH 35 On Ramp & CSAH 2

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	L	L	T	T	TR	LT	R
Maximum Queue (ft)	160	192	153	282	304	170	92
Average Queue (ft)	77	102	64	234	246	103	26
95th Queue (ft)	155	179	153	399	416	175	78
Link Distance (ft)		711	711	3503	3503	741	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	350						150
Storage Blk Time (%)						2	
Queuing Penalty (veh)						1	

Intersection: 7: Newton Cir & Frontage Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	5	31
Average Queue (ft)	1	19
95th Queue (ft)	7	43
Link Distance (ft)	567	650
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	478	31	281	1078	5	24	2	90	2	0	0
Future Volume (veh/h)	4	830	31	501	1666	78	24	2	222	46	0	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	4	892	33	539	1791	84	26	2	239	49	0	0
Adj No. of Lanes	1	2	1	1	2	1	0	1	1	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	127	1090	488	576	1970	881	459	33	456	391	537	0
Arrive On Green	0.01	0.31	0.31	0.34	0.74	0.74	0.29	0.29	0.29	0.29	0.00	0.00
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1326	113	1583	1134	1863	0
Grp Volume(v), veh/h	4	892	33	539	1791	84	28	0	239	49	0	0
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1439	0	1583	1134	1863	0
Q Serve(g_s), s	0.1	21.0	1.3	19.7	36.2	1.3	1.1	0.0	11.4	2.9	0.0	0.0
Cycle Q Clear(g_c), s	0.1	21.0	1.3	19.7	36.2	1.3	1.2	0.0	11.4	4.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.93		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	127	1090	488	576	1970	881	492	0	456	391	537	0
V/C Ratio(X)	0.03	0.82	0.07	0.94	0.91	0.10	0.06	0.00	0.52	0.13	0.00	0.00
Avail Cap(c_a), veh/h	216	1090	488	706	2045	915	492	0	456	391	537	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.47	0.47	0.47	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.3	28.8	22.0	17.5	9.9	5.4	23.2	0.0	26.9	24.8	0.0	0.0
Incr Delay (d2), s/veh	0.1	5.0	0.1	10.0	3.2	0.0	0.2	0.0	4.3	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	10.9	0.6	14.3	17.9	0.6	0.5	0.0	5.5	1.0	0.0	0.0
LnGrp Delay(d),s/veh	22.4	33.8	22.1	27.5	13.1	5.4	23.5	0.0	31.1	25.4	0.0	0.0
LnGrp LOS	C	C	C	C	B	A	C		C	C		
Approach Vol, veh/h		929			2414			267			49	
Approach Delay, s/veh		33.4			16.0			30.3			25.4	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		30.4	27.4	32.2		30.4	5.0	54.6
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		19.5	29.5	27.5		19.5	5.0	52.0
Max Q Clear Time (g_c+I1), s		13.4	21.7	23.0		6.2	2.1	38.2
Green Ext Time (p_c), s		0.6	1.1	4.2		0.9	0.0	11.9

Intersection Summary	
HCM 2010 Ctrl Delay	21.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	513	22	2	1261	0	18	0	3	0	0	0
Future Volume (veh/h)	132	909	22	2	1922	88	18	0	3	147	0	220
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1900	1863	1863
Adj Flow Rate, veh/h	140	967	23	2	2045	94	19	0	3	156	0	234
Adj No. of Lanes	1	2	1	1	2	1	1	1	0	0	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	2418	1082	400	2418	1082	214	0	343	383	0	343
Arrive On Green	0.68	0.68	0.68	1.00	1.00	1.00	0.22	0.00	0.22	0.22	0.00	0.22
Sat Flow, veh/h	187	3539	1583	566	3539	1583	1142	0	1583	1398	0	1583
Grp Volume(v), veh/h	140	967	23	2	2045	94	19	0	3	156	0	234
Grp Sat Flow(s),veh/h/ln	187	1770	1583	566	1770	1583	1142	0	1583	1398	0	1583
Q Serve(g_s), s	61.5	10.7	0.4	0.1	0.0	0.0	1.3	0.0	0.1	8.8	0.0	12.2
Cycle Q Clear(g_c), s	61.5	10.7	0.4	10.8	0.0	0.0	10.3	0.0	0.1	8.9	0.0	12.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	208	2418	1082	400	2418	1082	214	0	343	383	0	343
V/C Ratio(X)	0.67	0.40	0.02	0.01	0.85	0.09	0.09	0.00	0.01	0.41	0.00	0.68
Avail Cap(c_a), veh/h	208	2418	1082	400	2418	1082	214	0	343	383	0	343
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.60	0.60	0.60	0.19	0.19	0.19	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.9	6.2	4.6	0.9	0.0	0.0	35.6	0.0	27.7	31.2	0.0	32.4
Incr Delay (d2), s/veh	5.1	0.1	0.0	0.0	0.6	0.0	0.8	0.0	0.0	3.2	0.0	10.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	5.1	0.2	0.0	0.2	0.0	0.5	0.0	0.1	3.8	0.0	6.3
LnGrp Delay(d),s/veh	22.0	6.3	4.6	0.9	0.6	0.0	36.5	0.0	27.7	34.4	0.0	42.9
LnGrp LOS	C	A	A	A	A	A	D		C	C		D
Approach Vol, veh/h		1130			2141			22			390	
Approach Delay, s/veh		8.2			0.5			35.3			39.5	
Approach LOS		A			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		24.0		66.0		24.0		66.0
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green Setting (Gmax), s		19.5		61.5		19.5		61.5
Max Q Clear Time (g_c+I1), s		12.3		63.5		14.2		12.8
Green Ext Time (p_c), s		1.0		0.0		0.8		43.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.2
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	517	0	15	1277	0	0	0	27	0	0	0
Future Volume (veh/h)	184	664	212	156	1365	123	352	0	262	205	0	309
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	200	722	230	170	1484	134	383	0	285	223	0	336
Adj No. of Lanes	1	2	1	1	2	1	2	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	1544	691	443	1522	681	424	0	340	258	0	336
Arrive On Green	0.16	0.87	0.87	0.07	0.43	0.43	0.08	0.00	0.21	0.07	0.00	0.21
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	3442	0	1583	1774	0	1583
Grp Volume(v), veh/h	200	722	230	170	1484	134	383	0	285	223	0	336
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1721	0	1583	1774	0	1583
Q Serve(g_s), s	5.8	4.0	2.3	4.7	37.0	4.7	6.9	0.0	15.5	6.7	0.0	19.1
Cycle Q Clear(g_c), s	5.8	4.0	2.3	4.7	37.0	4.7	6.9	0.0	15.5	6.7	0.0	19.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	1544	691	443	1522	681	424	0	340	258	0	336
V/C Ratio(X)	0.87	0.47	0.33	0.38	0.98	0.20	0.90	0.00	0.84	0.86	0.00	1.00
Avail Cap(c_a), veh/h	230	1544	691	501	1522	681	424	0	340	258	0	336
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.7	3.5	3.4	12.3	25.2	16.0	29.5	0.0	33.9	31.3	0.0	35.4
Incr Delay (d2), s/veh	26.7	0.2	0.3	0.5	17.4	0.1	22.3	0.0	21.4	25.0	0.0	49.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	1.8	0.9	2.3	21.6	2.1	2.8	0.0	8.7	6.1	0.0	12.9
LnGrp Delay(d),s/veh	45.3	3.7	3.6	12.8	42.6	16.1	51.8	0.0	55.2	56.3	0.0	84.5
LnGrp LOS	D	A	A	B	D	B	D		E	E		F
Approach Vol, veh/h		1152			1788			668			559	
Approach Delay, s/veh		10.9			37.8			53.3			73.3	
Approach LOS		B			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	23.8	11.2	43.8	11.4	23.6	11.8	43.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.7	19.3	9.7	36.3	6.9	19.1	7.3	38.7
Max Q Clear Time (g_c+I1), s	8.7	17.5	6.7	6.0	8.9	21.1	7.8	39.0
Green Ext Time (p_c), s	0.0	0.7	0.1	20.2	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	37.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	435	60	102	381	0	0	0	0	170	0	868
Future Volume (veh/h)	0	802	280	102	601	0	0	0	0	170	0	1000
Number	7	4	14	3	8	18				1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	0				1900	1863	1863
Adj Flow Rate, veh/h	0	853	298	109	639	0				181	0	0
Adj No. of Lanes	0	2	1	1	1	0				0	1	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	1139	510	234	800	0				759	0	1192
Arrive On Green	0.00	0.32	0.32	0.02	0.14	0.00				0.43	0.00	0.00
Sat Flow, veh/h	0	3632	1583	1774	1863	0				1774	0	2787
Grp Volume(v), veh/h	0	853	298	109	639	0				181	0	0
Grp Sat Flow(s),veh/h/ln	0	1770	1583	1774	1863	0				1774	0	1393
Q Serve(g_s), s	0.0	19.4	14.2	3.5	29.9	0.0				5.9	0.0	0.0
Cycle Q Clear(g_c), s	0.0	19.4	14.2	3.5	29.9	0.0				5.9	0.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1139	510	234	800	0				759	0	1192
V/C Ratio(X)	0.00	0.75	0.58	0.47	0.80	0.00				0.24	0.00	0.00
Avail Cap(c_a), veh/h	0	1239	554	260	880	0				759	0	1192
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.60	0.60	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	27.3	25.5	21.3	34.9	0.0				16.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.4	1.4	0.9	2.9	0.0				0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	9.9	6.4	1.8	16.1	0.0				3.0	0.0	0.0
LnGrp Delay(d),s/veh	0.0	29.6	26.9	22.2	37.8	0.0				17.2	0.0	0.0
LnGrp LOS		C	C	C	D					B		
Approach Vol, veh/h		1151			748						181	
Approach Delay, s/veh		28.9			35.5						17.2	
Approach LOS		C			D						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			9.7	33.5		43.0		43.1
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s			6.5	31.5		38.5		42.5
Max Q Clear Time (g_c+I1), s			5.5	21.4		7.9		31.9
Green Ext Time (p_c), s			0.0	6.5		1.0		6.8

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	341	271	0	0	400	85	74	4	58	0	0	0
Future Volume (veh/h)	561	418	0	0	488	85	206	4	58	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1900	1863	1863			
Adj Flow Rate, veh/h	610	454	0	0	530	92	224	4	63			
Adj No. of Lanes	2	1	0	0	2	0	0	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	827	831	0	0	704	122	792	14	719			
Arrive On Green	0.05	0.15	0.00	0.00	0.23	0.23	0.45	0.45	0.45			
Sat Flow, veh/h	3442	1863	0	0	3111	522	1744	31	1583			
Grp Volume(v), veh/h	610	454	0	0	310	312	228	0	63			
Grp Sat Flow(s),veh/h/ln	1721	1863	0	0	1770	1771	1776	0	1583			
Q Serve(g_s), s	11.1	20.3	0.0	0.0	14.6	14.8	7.2	0.0	2.0			
Cycle Q Clear(g_c), s	11.1	20.3	0.0	0.0	14.6	14.8	7.2	0.0	2.0			
Prop In Lane	1.00		0.00	0.00		0.29	0.98		1.00			
Lane Grp Cap(c), veh/h	827	831	0	0	413	413	806	0	719			
V/C Ratio(X)	0.74	0.55	0.00	0.00	0.75	0.76	0.28	0.00	0.09			
Avail Cap(c_a), veh/h	1090	1107	0	0	541	541	806	0	719			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.60	0.60	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.7	29.9	0.0	0.0	32.1	32.1	15.4	0.0	14.0			
Incr Delay (d2), s/veh	1.1	0.3	0.0	0.0	4.2	4.4	0.9	0.0	0.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.3	10.6	0.0	0.0	7.6	7.7	3.7	0.0	0.9			
LnGrp Delay(d),s/veh	24.8	30.3	0.0	0.0	36.2	36.5	16.3	0.0	14.2			
LnGrp LOS	C	C			D	D	B		B			
Approach Vol, veh/h		1064			622			291				
Approach Delay, s/veh		27.1			36.3			15.8				
Approach LOS		C			D			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4			7	8
Phs Duration (G+Y+Rc), s		45.4		44.6			19.1	25.5
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5
Max Green Setting (Gmax), s		27.5		53.5			21.5	27.5
Max Q Clear Time (g_c+I1), s		9.2		22.3			13.1	16.8
Green Ext Time (p_c), s		1.4		6.3			1.5	4.2

Intersection Summary	
HCM 2010 Ctrl Delay	28.4
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	547	5	18	1336	6	9
Future Vol, veh/h	1134	5	18	1688	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1219	5	19	1815	6	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1225	0	2168	612
Stage 1	-	-	-	-	1222	-
Stage 2	-	-	-	-	946	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	565	-	40	436
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	338	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	565	-	40	436
Mov Cap-2 Maneuver	-	-	-	-	40	-
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	338	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	54.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	88	-	-	565	-
HCM Lane V/C Ratio	0.183	-	-	0.034	-
HCM Control Delay (s)	54.9	-	-	11.6	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-