KASSON CITY COUNCIL REGULAR MEETING AGENDA
Wednesday, October 23, 2019
6:00 PM

PLEDGE OF ALLIEGANCE

6:00 A. COUNCIL

1. Approve agenda - Make additions, deletions or corrections at this time.

2. Consent Agenda - All matters listed under Item 2, Consent Agenda, are considered to be routine and non-controversial by the City Council and will be enacted with one motion. There will not be separate discussion of these items unless a Council Member so requests, in which case the item will be removed from the Consent Agenda and will be considered separately.

   a. Minutes from October 9, 2019

   b. Claims processed after the October 9, 2019 regular meeting, as audited for payment

   c. Resolution Certifying Delinquent Claims to County Auditor

B. VISITORS TO THE COUNCIL

1. Liza Donabauer, David Drwon and Assoc – Selection of Finalists

C. MAYOR'S REPORT

D. PUBLIC FORUM

· May not be used to continue discussion on an agenda item that already had been held as a public hearing.
· This section is limited to 15 minutes and each speaker is limited to 4 minutes.
· Speakers not heard will be first to present at the next Council meeting.
· Speakers will only be recognized once.
· Matters under negotiation, litigation or related to personnel will not be discussed.
· Questions posed by a speaker will generally be responded to in writing.
· Speakers will be required to state their name and their address for the record.

E. PUBLIC HEARING

F. COMMITTEE REPORT

1. Planning Commission - South Fork Conditional Use Permit for a Planned Unit Development.
   a. Resolution Approving a CUP for a PUD
   b. South Fork Development Agreement
   c. South Fork Final Plat

G. OLD BUSINESS

H. NEW BUSINESS

I. ADMINISTRATORS REPORT

J. ENGINEER'S REPORT

1. TH 57- 16th Street Roundabout and 16th Street NW Extension
    a. D6 Solicitation FY 2022-2023 Local Partnership Program
    b. RESOLUTION AUTHORIZING SUBMITTAL OF A GRANT APPLICATION FOR THE LOCAL PARTNERSHIP PROGRAM (LPP)
    c. Letter Requesting LPP Funding
    d. Functional Classification Map
    e. Regional Transportation Map
    f. Feasibility Report 16th Street NW
    g. ICE Report TH 57 – 16th ST

K. PERSONNEL

1. Memo from Chief Berghuis

L. ATTORNEY

1. Closed Session – Wilker Litigation Update

M. CORRESPONDENCE

1. Zumbro River Watershed

N. ADJOURN

Please go to www.cityofkasson.com for full video

KASSON CITY COUNCIL REGULAR MEETING MINUTES
October 9, 2019

Pursuant to due call and notice thereof, a regular City Council meeting was held at City Hall on the 9th day of October, 2019 at 6:00 P.M.

THE FOLLOWING MEMBERS WERE PRESENT: Burton, Eggler, Ferris, McKern and Zelinske

THE FOLLOWING MEMBERS WERE ABSENT: None

THE FOLLOWING WERE ALSO PRESENT: Interim- Administrator Zaworski, City Clerk Rappe, City Engineer Theobald, City Attorney Melanie Leth, Chuck Coleman, Kim Smith, Everett Paulson, Doug Buck and David Dubbels

PLEDGE OF ALLIEGANCE
APPROVE AGENDA
Add: K.2 Memo from Chief Berghuis
Motion to Approve the Agenda as Amended made by Councilperson Zelinske, second by Councilperson Eggler with All Voting Aye.

CONSENT AGENDA
Minutes from September 25, 2019

Claims processed after the September 25, 2019 regular meeting, as audited for payment in the amount of $547, 699.36

Resolution Accepting Donation to KM Lion's Park
Resolution #10.1-19
Resolution accepting donations for the park and recreation department
(on file)
Resolution Accepting Donation to the Kasson Fire Department
Resolution #10.2-19
Resolution Accepting Donation to the Kasson Fire Department
(on file)

Evaluations:

Nancy Hackenmiller	Lib Asst	Inc Grade 3 Step 5 $18.31 eff 9/16/19
Jason Peck	Police Sergeant	Inc Grade 12 Step 7 $35.91 eff 8/29/19
Jesse Kasel	SRO	Inc Grade 12 Step 4 $32.62 eff 8/29/19
Gerald Runnells	Police Officer/K-9	Inc Grade 10 step 4 $28.49 eff 8/29/19
Krista Weigel	Emerg Serv Asst	At Top of scale

3.2 Liquor License for Casey's General Store off sale
Motion to Approve the Consent Agenda made by Councilperson Burton, second by Councilperson Zelinske with All Voting Aye.

VISITORS TO THE COUNCIL

Chuck Coleman – Lion's Park Shelter – Mr. Coleman invited the Council to the dedication for the shelter at Lions Park at 10am on Thursday, October 17.

MAYOR'S REPORT

2017 Street Reconstruction Project- Mayor McKern wanted to extend time for people who got a letter on June 26 that gave them until December 31 to get plans together to have the sewer laterals and sump pumps fixed. He would like to extend this a year. We need to get the word out as to why this is so important to have fixed and how it involves I & I. Engineer Theobald stated that the ones being fined have had over a year and have not been responsive. Interim Administrator Zaworski stated we have 13 people still outstanding and anticipate being down to 11 by year end. Theobald stated that staff has been doing a good job of giving people who are keeping in touch with City Hall extra time to finish their work.

Mayor McKern Congratulated the Kasson Aquatic Center received a "Best of the Best" from the Post Bulletin.

PUBLIC FORUM

PUBLIC HEARING

COMMITTEE REPORT

Library – Library Director Update – Councilperson Ferris gave the update. They have received a potential alternative method to stop water coming in under the back door. Ferris stated that Administrator Zaworski will have all of the information to post the Library Director position by Tuesday and will be posted until November 15. The Library Board has updated the position description. Ferris stated that 180 6th Graders toured the Library and were impressed with the fact that the Library has a 3D printer for use and Chrome Books available for check out.

OLD BUSINESS

NEW BUSINESS

ADMINISTRATORS REPORT

ENGINEER'S REPORT

16th Street Improvements

Resolution Approve MnDOT LRIP Grant Agreement – Engineer Theobald summed up the MnDOT LRIP Grant Agreement. **Motion to Approve the Resolution made by Councilperson Burton, second by Councilperson Eggler with All Voting Aye.**

Resolution #10.3-19

Grant Agreement to State Transportation Fund Local Road Improvement Program Grant Terms and Conditions SAP 240-109-001

(on File)

Engineering Agreement – Sump Pump and Sanitary Sewer Lateral Inspection Program -

Engineer Theobald went through the agreement and the services/projects that it encompasses. The Council feels that the earlier we start the education process on this the better. Communication is the key. **Motion to Approve the Agreement made by Councilperson Eggler, second by Councilperson Zelinske with All Voting Aye.**

PERSONNEL

Fire Department – Promotion of Lindsey Derby to Lieutenant – eff January 1 2020. ***Motion to Approve the Promotion Effective January 1, 2020 made by Councilperson Burton, second by Councilperson Ferris with All Voting Aye.***

Police Chief Memo – Chief Berghuis is recommending hiring Ryan McSweeney as a part time officer, and permission to hire another part timer with the anticipation of another resignation. **Motion to approve the Chief's request made by Councilperson Ferris, second by Councilperson Eggler with All Voting Aye.**

ATTORNEY

Closed Sessions for Wilker Litigation and 2017 Special Assessment Litigation

Closed at 6:32PM

Opened at 6:53PM Council received an update from Attorney Leth.

CORRESPONDENCE

Correspondence was reviewed.

ADJOURN 6:53PM

Motion to Adjourn made by Councilperson Burton, second by Councilperson Ferris with all voting Aye to Adjourn.

ATTEST:

_____ _____

Linda Rappe, City Clerk Chris McKern, Mayor

SIGNATURE PAGE

THE ATTACHED LIST OF BILLS PAYABLE WAS REVIEWED AND APPROVED FOR PAYMENT.

THIS INCLUDES WARRANT NUMBERS:

#1

GRAND TOTAL SUBMITTED FOR PAYMENT $ 275 709.55

DATE APPROVED: 10-23-19

#1 $275,837.94
− 128.39 VOID - Fund 604
$ 275,709.55

CITY OF KASSON
Claim Approval List
For the Accounting Period: 10/19
For Pay Date: 10/15/19

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
32684		2693 AFFORDABLE PORTABLES	640.00								
		14935 10/01/19 OCT. PORTABLES-8 STD. UNITS	640.00			101	522	4522	410		1010
		Total for Vendor:	640.00								
32720		5049 ARTISAN BEER COMPANY	43.00								
		3377608 10/08/19 BEER	43.00			609	975	4975	252		1010
		Total for Vendor:	43.00								
32731		203 BAKER & TAYLOR INC	786.05								
		2034816735 09/24/19 BOOKS	139.37			211	550	4550	218		1010
		2034821324 09/24/19 BOOKS	591.38			211	550	4550	218		1010
		2034835013 09/30/19 BOOKS	55.30			211	550	4550	218		1010
		Total for Vendor:	786.05								
32685		6023 BRAUN INTERTEC CORPORATION	136.87								
		B188177 10/09/19 PRE-DEMO HAZMAT-85 E VETS	136.87*			101	417	4417	430		1010
		Total for Vendor:	136.87								
32721		5239 BREAKTHRU BEVERAGE MN WINE &	2,355.90								
		1081036909 10/02/19 LIQUOR	208.00			609	975	4975	251		1010
		1081036909 10/02/19 WINE	2,114.29			609	975	4975	251		1010
		1081036909 10/02/19 FREIGHT	33.61			609	975	4975	335		1010
		Total for Vendor:	2,355.90								
32686		131 BUREAU OF CRIMINAL APPREHENSION	180.00								
		567428 09/26/19 ANN'L CJDN REMOTE ACCESS	180.00			101	210	4210	334		1010
		Total for Vendor:	180.00								
32687		5098 CARDMEMBER SERVICE	846.54								
		09/11/19 cr-ADOBE ACROPRO-RAPPE	-177.05			101	140	4140	210		1010
		09/04/19 POP FOR RESALE-ERDMANS	171.21			609	975	4975	254		1010
		09/04/19 CUPS-ERDMANS	7.96			609	975	4975	254		1010
		09/17/19 POP FOR RESALE-ERDMANS	150.80			609	975	4975	254		1010
		09/19/19 LIGHTS-LIONS PARK SHELTER	343.96			101	680	4522	530		1010
		09/20/19 RAPPE ROOM-ADV ACADEMY	254.96			101	140	4140	333		1010
		09/17/19 cr-WINE BAGS RETURN	-154.10			609	975	4975	210		1010

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
		09/10/19 POP FOR RESALE-ERDMANS	123.24			609	975	4975	254		1010
		09/27/19 POP FOR RESALE-ERDMANS	125.56			609	975	4975	254		1010
32732		5098 CARDMEMBER SERVICE	282.62								
		10/02/19 DVD's	147.59			211	550	4550	219		1010
		10/02/19 FURNACE FILTERS	79.68			211	550	4550	220		1010
		10/02/19 INK CARTRIDGES/TAPE	49.78			211	550	4550	210		1010
		10/02/19 AMAZON CREDIT	-2.00			211	550	4550	219		1010
		10/02/19 INTEREST	7.57			211	550	4550	430		1010
		Total for Vendor:	1,129.16								
32688		2410 CENTRAL MN MUNICIPAL POWER AGE	163,813.79								
	6665	09/30/19 CMMPA DUES-SEPTEMBER	1,500.00			604	959	4959	334		1010
	6665	09/30/19 FEES FOR SERVICES	1,529.54			604	959	4959	430		1010
	6665	09/30/19 PURCH'D POWER	134,630.98			604	956	4956	381		1010
	6665	09/30/19 PURCH'D POWER-TRANSMISSION	24,208.11			604	956	4956	381		1010
	6665	09/30/19 CAPACITY PURCHASED-SEPTEMBER	636.86			604	956	4956	381		1010
	6665	09/30/19 CIP MONTHLY ASSMNT-SEPTEMBER	1,308.30			604	959	4959	429		1010
		Total for Vendor:	163,813.79								
32689		82 CHS INC	117.03								
		09/30/19 39.582 GAL UNLD-STREETS	93.33			101	310	4310	212		1010
		09/30/19 5.019 GAL UNLD-PARKS	12.38			101	522	4522	212		1010
	441IF1502	09/19/19 GRASS SEED-ELECTRIC	11.32			604	957	4957	210		1010
		Total for Vendor:	117.03								
32742		4238 CINTAS CORP	45.11								
	8404335098	10/04/19 RESTOCK 1st AID KITS	9.03			101	920	4920	433		1010
	8404335098	10/04/19 RESTOCK 1st AID KITS	9.02			601	943	4943	433		1010
	8404335098	10/04/19 RESTOCK 1st AID KITS	9.02*			602	948	4948	433		1010
	8404335098	10/04/19 RESTOCK 1st AID KITS	9.02			604	957	4957	433		1010
	8404335098	10/04/19 RESTOCK 1st AID KITS	9.02			605	963	4963	433		1010
		Total for Vendor:	45.11								

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
32748		5627 CORE & MAIN LP	675.07								
		L246880 10/01/19 REP CLPS	586.01			601	943	4943	220		1010
		L246880 10/01/19 MANHOLE COVER HOOK	89.06			602	948	4948	240		1010
		Total for Vendor:	675.07								
32690		3314 DECKLEVER MECHANICAL INC	265.52								
		218001240 09/26/19 REPL COMPRESSOR HEAD FAN	265.52*			606	516	4516	400		1010
		Total for Vendor:	265.52								
32733		3780 DH ATHLETICS LLC	1,198.00								
		190096 10/07/19 POLY CAP-NO.2 BALLFIELD FENCE	1,198.00			101	517	4517	220		1010
		Total for Vendor:	1,198.00								
32691		187 DODGE COUNTY	6,400.43								
		10/09/19 ASSMNT PAYMNT-24.502.0060	6,400.43			101		1151			1010
		Total for Vendor:	6,400.43								
32692		69 DODGE COUNTY ENVIRONMENTAL	134.55								
		85828 09/10/19 PARTS-PLAYGROUND MODULAR	12.05			101	522	4522	220		1010
		86588 09/19/19 K.A.C. BROKEN CHAIRS	106.50*			101	514	4514	220		1010
		87090 09/25/19 DISPOSAL-PARKS WASTE	16.00			101	522	4522	220		1010
		Total for Vendor:	134.55								
32693		639 DODGE COUNTY PUBLIC HEALTH	61.55								
		09/18/19 MCANDREWS-HEP B #2	61.55			101	220	4220	444		1010
		Total for Vendor:	61.55								
32737		5813 ENTERPRISE FM TRUST	4,453.51								
Note:		charges will be split by fund at a later date.									
		FBN3805395 10/03/19 MAINT. CARDS	125.00			101	210	4210	430		1010
		FBN3805395 10/03/19 LEASES	4,328.51*			101	680	4210	550		1010
		Total for Vendor:	4,453.51								

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
32694		21 ERDMAN'S SUPERMARKETS INC	113.29								
		b699202 10/06/19 CHILI COOKOFF SUPPLIES	58.24*			877	100	4000	430		1010
		b699201 10/06/19 CHILI COOKOFF SUPPLIES	78.98*			877	100	4000	430		1010
		b699200 10/06/19 cr-CHILI COOKOFF SUPPLIES RET	-23.93*			877	100	4000	430		1010
		Total for Vendor:	113.29								
32754		6056 FERGUSON WATERWORKS #2518	467.37								
		0340888-1 10/03/19 NESS-SWEATSHIRTS	66.53			101	310	4310	214		1010
		0340888-1 10/03/19 BURKE-SWEATSHIRTS	92.50			101	310	4310	214		1010
		0340888-1 10/03/19 UNGER-SWEATSHIRTS	61.67			101	522	4522	214		1010
		0340888-1 10/03/19 CARSTENSEN-SWEATSHIRT	30.84			101	522	4522	214		1010
		0340888-1 10/03/19 BOLSTER-SWEATSHIRT	30.83			101	522	4522	214		1010
		0340888-1 10/03/19 VOSEN-SWEATSHIRTS	61.67*			602	948	4948	214		1010
		0340888-1 10/03/19 BLEESS-SWEATSHIRTS	61.67*			602	948	4948	214		1010
		0340888-1 10/03/19 BRADFORD-SWEATSHIRTS	61.66			604	957	4957	214		1010
		Total for Vendor:	467.37								
32695		2618 FIRE SAFETY USA INC	463.75								
		126651 09/05/19 REPAIRS TO ENG #1	463.75			101	220	4220	400		1010
		Total for Vendor:	463.75								
32696		2187 FREERKSEN ENTERPRISES INC	124.65								
		314443 09/11/19 REPL ENG INTAKE HOSE-ENG #2	124.65			101	220	4220	400		1010
		Total for Vendor:	124.65								
32697		2723 GIBBS LAWN & SNOW CARE INC	2,083.33								
		13643 10/01/19 MONTHLY LAWN MOW-CEMETERY	1,958.33			610	984	4984	444		1010
		13643 10/01/19 C H-WINTER APPLICATION	125.00*			101	194	4194	440		1010
		Total for Vendor:	2,083.33								
32698		5974 GREENGUARD CONSTRUCTION	100.00								
		10/01/19 BP FEE KA19-372 CANCELLED	99.00			101	240	3220			1010
		10/01/19 BP SURCHARGE KA19-372 CANCELLE	1.00			101		2080			1010
		Total for Vendor:	100.00								

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
32749		77 HAWKINS INC	5,761.17								
		4591862 09/27/19 ALUM SULFATE LIQUID	5,761.17			602	947	4947	211		1010
		Total for Vendor:	5,761.17								
32699		6054 HILL, KEN	1,650.00								
AWNING FROM MANORWOOD COURT											
		10/02/19 REPL AWNING ACCIDENTALLY HAULE	1,650.00*			101	417	4417	430		1010
		Total for Vendor:	1,650.00								
32738		2462 HOISINGTON KOEGLER GROUP INC	2,665.00								
		018-060-10 10/10/19 ORDINANCE UPDATE	2,222.50			101	191	4191	440		1010
		019-041-2 10/10/19 CONSULTING-P&Z	442.50*			101	140	4140	440		1010
		Total for Vendor:	2,665.00								
32722		25 JOHNSON BROTHERS LIQUOR CO	2,599.96								
		1404162 10/08/19 LIQUOR	2,147.61			609	975	4975	251		1010
		1404163 10/08/19 WINE	452.35			609	975	4975	251		1010
		Total for Vendor:	2,599.96								
32700		6042 JOHNSON BUILDERS & REAL ESTATE	3,000.00								
		10/07/19 STEEL DOOR, GUTTER @ KPD	3,000.00*			101	210	4210	400		1010
		Total for Vendor:	3,000.00								
32734		35 KASSON HARDWARE HANK	6.68								
		297218 09/19/19 PUTTY KNIFE/SPACKLE	6.68			211	550	4550	220		1010
32743		35 KASSON HARDWARE HANK	613.75								
		09/30/18 R&M SUPPLIES-STREETS	48.45*			101	310	4310	220		1010
		09/30/18 OPER SUPPLIES-P D	108.60*			101	210	4210	210		1010
		09/30/18 R&M SUPPLIES-PARKS	175.14			101	522	4522	220		1010
		09/30/18 R&M SUPPLIES-F D	15.85			101	220	4220	220		1010
		09/30/18 R&M SUPPLIES-ELECTRIC	52.95			604	957	4957	220		1010
		09/30/18 SALES TAX	3.64			604	957	4957	220		1010
		09/30/18 SALES TAX	-3.64			604		2025			1010
		09/30/18 D C TRANSIT TAX	0.27			604	957	4957	220		1010
		09/30/18 D C TRANSIT TAX	-0.27			604		2026			1010

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
	09/30/18	R&M SUPPLIES-WATER	72.31			601	943	4943	220		1010
	09/30/18	OPER SUPPLIES-L.S.	63.75*			609	978	4978	210		1010
	09/30/18	SALES TAX	4.38*			609	978	4978	210		1010
	09/30/18	SALES TAX	-4.38			609		2025			1010
	09/30/18	D C TRANSIT TAX	0.32*			609	978	4978	210		1010
	09/30/18	D C TRANSIT TAX	-0.32			609		2026			1010
	09/30/18	R&M SUPPLIES-C H	21.95			101	140	4140	220		1010
	09/30/18	R&M SUPPLIES-WWTP OPERATIONS	45.81			602	947	4947	220		1010
	09/30/18	R&M SUPPLIES-ARENA	8.94			606	516	4516	220		1010
		Total for Vendor:	620.43								
32701		362 KWIK TRIP STORES	192.86								
	09/30/19	8.937 GAL B20PRM-F D	25.73			101	220	4220	212		1010
	09/30/19	NON-FUEL-F D	37.10			101	220	4220	210		1010
	09/30/19	36.923 GAL UNLD-F D	85.88			101	220	4220	212		1010
	09/30/19	15.037 UNLD-WW	44.15			602	948	4948	212		1010
		Total for Vendor:	192.86								
32750		385 MAXSON ELECTRIC INC	1,569.00								
	6445 09/30/19	REPAIR CORDS ON WWTP MOTORS	1,569.00*			602	947	4947	400		1010
		Total for Vendor:	1,569.00								
32702		2617 MENARDS-ROCHESTER NORTH	52.45								
	50364 09/30/19	MAG TAPE/PRY BARS	52.45			602	948	4948	240		1010
		Total for Vendor:	52.45								
32703		2514 MN DEPT OF COMMERCE	54.47								
	1845-03 10/26/17	UTILITY REFUND-S DAY	11.52			604		2212			1010
	1377-05 10/26/17	UTILITY REFUND-S KARLSTAD	30.52			604		2212			1010
	1771-13 09/26/17	UTILITY REFUND-E TWITE	12.43			604		2212			1010
		Total for Vendor:	54.47								
32739		142 MN MUNICIPAL UTILITIES ASSN	22,500.00								
	54184 10/09/19	SAFETY MGMNT PROG 10/1-12/31	1,206.00			101	920	4920	433		1010
	54184 10/09/19	SAFETY MGMNT PROG 10/1-12/31	201.00			211	550	4550	433		1010
	54184 10/09/19	SAFETY MGMNT PROG 10/1-12/31	804.00			601	943	4943	433		1010
	54184 10/09/19	SAFETY MGMNT PROG 10/1-12/31	703.50			602	947	4947	433		1010

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
	54184	10/09/19 SAFETY MGMNT PROG 10/1-12/31	100.50*			602	948	4948	433		1010
	54184	10/09/19 SAFETY MGMNT PROG 10/1-12/31	804.00			604	957	4957	433		1010
	54184	10/09/19 SAFETY MGMNT PROG 10/1-12/31	804.00			605	963	4963	433		1010
	54184	10/09/19 SAFETY MGMNT PROG 10/1-12/31	201.00			606	516	4516	433		1010
	54184	10/09/19 SAFETY MGMNT PROG 10/1-12/31	201.00			609	976	4976	433		1010
	54184	10/09/19 SAFETY MGMNT PROG 1/1-9/30/20	3,618.00			101		1550			1010
	54184	10/09/19 SAFETY MGMNT PROG 1/1-9/30/20	603.00			211		1550			1010
	54184	10/09/19 SAFETY MGMNT PROG 1/1-9/30/20	2,412.00			601		1550			1010
	54184	10/09/19 SAFETY MGMNT PROG 1/1-9/30/20	2,110.50			602		1550			1010
	54184	10/09/19 SAFETY MGMNT PROG 1/1-9/30/20	301.50			602		1550			1010
	54184	10/09/19 SAFETY MGMNT PROG 1/1-9/30/20	2,412.00			604		1550			1010
	54184	10/09/19 SAFETY MGMNT PROG 1/1-9/30/20	2,412.00			605		1550			1010
	54184	10/09/19 SAFETY MGMNT PROG 1/1-9/30/20	603.00			606		1550			1010
	54184	10/09/19 SAFETY MGMNT PROG 1/1-9/30/20	603.00			609		1550			1010
	54184	10/09/19 JT&S PROG 10/1-12/31	600.00			604	957	4957	433		1010
	54184	10/09/19 JT&S PROG 1/1-9/30/20	1,800.00			604		1550			1010
		Total for Vendor:	22,500.00								
32744		2344 MN VALLEY TESTING LABORATORIES	433.25								
	997862	10/01/19 SUSP SOLIDS/MERC TESTING	433.25			602	947	4947	440		1010
		Total for Vendor:	433.25								
32723		60 NORTHERN BEVERAGE DIST. CO. LL	5,305.97								
	558080	10/03/19 BEER	5,303.97			609	975	4975	252		1010
	558080	10/03/19 FREIGHT	2.00			609	975	4975	335		1010
		Total for Vendor:	5,305.97								
32704		983 OLMSTED MEDICAL CENTER	130.00								
		09/30/19 PRE-EMPL PHYS-WHEELER	130.00			604	959	4959	440		1010
		Total for Vendor:	130.00								
32705		4919 PEOPLE'S ENERGY COOPERATIVE	69.70								
	2289800	10/04/19 ELEC SERV-CEMETERY 9/1-10/1	29.33*			610	984	4984	380		1010
	2289800	10/04/19 STR LT-LETH SUBDIV	40.37			101	316	4316	380		1010
		Total for Vendor:	69.70								

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
32706		201 PETTY CASH - LIBRARY	24.98								
		10/01/19 S.R.P. SUPPLIES	524.98*			211	550	4550	441		1010
		10/01/19 RETURN OF PETTY CASH	-500.00			211		1020			1010
		Total for Vendor:	24.98								
32724		23 PHILLIPS WINE & SPIRITS	5,345.45								
		2631796 10/02/19 LIQUOR	3,455.50			609	975	4975	251		1010
		2631797 10/02/19 WINE	372.50			609	975	4975	251		1010
		2631798 10/02/19 MIXES	45.00			609	975	4975	254		1010
		2634821 10/08/19 LIQUOR	1,324.45			609	975	4975	251		1010
		2634822 10/08/19 WINE	148.00			609	975	4975	251		1010
		Total for Vendor:	5,345.45								
32707		3052 POSITIVE PROMOTIONS INC	419.76								
		06384091 09/17/19 F.P.W. MATERIALS	419.76			101	220	4220	210		1010
		Total for Vendor:	419.76								
32708		4037 PREFERRED HEATING & COOLING LLC	728.00								
		2269 09/30/19 HEATER REPAIRS @ PWB	104.00*			101	310	4310	400		1010
		2269 09/30/19 HEATER REPAIRS @ PWB	104.00			101	312	4312	400		1010
		2269 09/30/19 HEATER REPAIRS @ PWB	104.00*			101	517	4517	400		1010
		2269 09/30/19 HEATER REPAIRS @ PWB	104.00			601	943	4943	400		1010
		2269 09/30/19 HEATER REPAIRS @ PWB	104.00*			602	947	4947	400		1010
		2269 09/30/19 HEATER REPAIRS @ PWB	104.00			604	957	4957	400		1010
		2269 09/30/19 HEATER REPAIRS @ PWB	104.00			605	963	4963	400		1010
		2269 09/30/19 SALES TAX	7.15			604	957	4957	400		1010
		2269 09/30/19 SALES TAX	-7.15			604		2025			1010
		2269 09/30/19 D C TRANSIT TAX	0.52			604	957	4957	400		1010
		2269 09/30/19 D C TRANSIT TAX	-0.52			604		2026			1010
		Total for Vendor:	728.00								
32709		3440 R & R SPECIALTIES OF WISCONSIN	253.40								
		68640-IN 10/01/19 BALDOR BRUSH CHG OUT KIT	253.40			606	516	4516	220		1010
		Total for Vendor:	253.40								

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
32710		780 RAPPE, LINDA	121.22								
		10/09/19 MILES-PNP MEETING	121.22			101	140	4140	333		1010
		Total for Vendor:	121.22								
32712		2005 RESERVE ACCOUNT	500.00								
		22870844-6 10/10/19 POSTAGE METER REFILL	140.00			101	140	4140	325		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	15.00			101	210	4210	325		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	15.00*			101	310	4310	325		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	15.00			101	510	4510	325		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	10.00			211	550	4550	210		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	15.00*			290	650	4650	325		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	20.00			601	944	4944	325		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	20.00			602	949	4949	325		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	100.00			604	959	4959	325		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	15.00			605	963	4963	325		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	10.00			606	516	4516	210		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	100.00*			609	976	4976	210		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	10.00			610	984	4984	210		1010
		22870844-6 10/10/19 POSTAGE METER REFILL	15.00*			877	100	4000	430		1010
		Total for Vendor:	500.00								
32713		6043 SANCO EQUIPMENT LLC	931.62								
		0073983 10/07/19 EDGE CUTTING BOLTS & WELDS	931.62			101	312	4312	220		1010
		Total for Vendor:	931.62								
32725		63 SCHOTT DIST CO INC	9,006.75								
		368852 10/03/19 BEER	8,718.75			609	975	4975	252		1010
		368852 10/03/19 WINE	160.00			609	975	4975	251		1010
		368852 10/03/19 NA BEVERAGE	128.00			609	975	4975	254		1010
		Total for Vendor:	9,006.75								
32735		64 SELCO	1,449.55								
		046882 09/26/19 6 USB FLASH DRIVES	45.18			211	550	4550	210		1010
		046903 10/01/19 OCT. AUTOMATION & PC SUPPORT	1,404.37			211	550	4550	309		1010
		Total for Vendor:	1,449.55								

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
32726		5894 SMALL LOT MN	815.76								
		MN31938 10/04/19 WINE	791.76			609	975	4975	251		1010
		MN31938 10/04/19 FREIGHT	24.00			609	975	4975	335		1010
		Total for Vendor:	815.76								
32727		3850 SOUTHERN GLAZER'S OF MN	1,071.55								
		5048288 09/30/19 FREIGHT	1.55			609	975	4975	335		1010
		5048289 09/30/19 LIQUOR	276.18			609	975	4975	251		1010
		5048289 09/30/19 FREIGHT	4.65			609	975	4975	335		1010
		1875584 10/09/19 LIQUOR	71.95			609	975	4975	251		1010
		1875584 10/09/19 WINE	764.57			609	975	4975	251		1010
		1875584 10/09/19 FREIGHT	20.15			609	975	4975	335		1010
		0052161 10/09/19 LIQUOR CREDIT	-67.50			609	975	4975	251		1010
		Total for Vendor:	1,071.55								
32740		5708 STAPLES BUSINESS CREDIT	16.89								
		7300844200 09/25/19 SELF INKING STAMP-F D	32.99			101	220	4220	210		1010
		7300522563 10/04/19 PRICE MATCH CR-CLSP ENVEL	-6.00			101	140	4140	210		1010
		7300522563 10/04/19 PRICE MATCH CR-JET STREAM	-10.10			101	140	4140	210		1010
		Total for Vendor:	16.89								
32745		153 STUSSY CONSTRUCTION INC	1,788.13								
		44966 09/30/19 3/4" ROAD ROCK	646.51			610	984	4984	430		1010
		44966 09/30/19 3/4" ROAD ROCK	1,141.62			601	943	4943	220		1010
		Total for Vendor:	1,788.13								
32751		407 TEAM LABORATORY CHEMICAL CORP	2,359.50								
		INV0018103 10/10/19 EZ DOSE IT	1,620.00			602	948	4948	210		1010
		INV0018103 10/10/19 SUPER BUGS	739.50			602	947	4947	210		1010
		Total for Vendor:	2,359.50								
32714		2737 THOMAS TOOL & SUPPLY INC	2,258.98								
		M00335 09/03/19 PLATE COMPACTOR	500.00			601	943	4943	240		1010
		M00335 09/03/19 PLATE COMPACTOR	500.00			605	963	4963	240		1010
		M00335 09/03/19 PLATE COMPACTOR	859.00			101	310	4310	240		1010
		M03682 10/04/19 HAMMER DRILL/DRIV KIT	199.99			602	947	4947	240		1010

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
		M03682 10/04/19 HAMMER DRILL/DRIV KIT	199.99			101	310	4310	240		1010
		Total for Vendor:	2,258.98								
32746		3895 TITAN MACHINERY	7,782.21								
		13058893GS 10/04/19 REPAIRS TO GRADER	3,891.10*			101	310	4310	400		1010
		13058893GS 10/04/19 REPAIRS TO GRADER	3,891.11			101	312	4312	400		1010
		Total for Vendor:	7,782.21								
32715		6055 TOWNSQUARE MEDIA FARIBAULT	325.00								
		1177238A-1 10/01/19 FESTIVAL RADIO ADS	315.00*			877	100	4000	430		1010
		1177238B-2 10/01/19 FESTIVAL RADIO ADS	10.00*			877	100	4000	430		1010
		Total for Vendor:	325.00								
32716		4108 ULTIMATE SAFETY CONCEPTS INC	157.50								
		184784 09/25/19 CUSTOM LEATHER FORNT	157.50			101	220	4220	240		1010
		Total for Vendor:	157.50								
32717		630 UNIVERSAL TRUCK EQUIPMENT INC	1,076.75								
		50421 10/01/19 PARTS-SANDER	1,076.75			101	312	4312	220		1010
		Total for Vendor:	1,076.75								
32752		939 USA BLUEBOOK	514.58								
		023133 09/27/19 DEIONIZED WATER/pH BUFFER	154.58			602	947	4947	210		1010
		023133 09/27/19 REPLACEMENT PROBE/CABLE	360.00			601	943	4943	240		1010
		Total for Vendor:	514.58								
32718		3382 VERIZON WIRELESS	1,866.67								
		9838458270 09/20/19 CELL PHONES-P D	1,056.97			101	210	4210	321		1010
		9838458270 09/20/19 CELL PHONES-STREETS	93.49			101	310	4310	321		1010
		9838458270 09/20/19 CELL PHONES-PARKS	123.19			101	510	4510	321		1010
		9838458270 09/20/19 CELL PHONES-WATER	56.83			601	944	4944	321		1010
		9838458270 09/20/19 CELL PHONES-WW	145.71			602	949	4949	321		1010
		9838458270 09/20/19 CELL PHONE-PW DIRECTOR	53.46			604	959	4959	321		1010
		9838458270 09/20/19 CELL PHONES-ELECTRIC	242.13			604	959	4959	321		1010
		9838458270 09/20/19 CELL PHONES-ARENA	94.89			606	516	4516	321		1010
		Total for Vendor:	1,866.67								

* ... Over spent expenditure

Claim/	Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
32728		5047 WATERVILLE FOOD & ICE INC	31.50								
		05-911433 10/03/19 ICE-LIQUOR STORE	31.50*			609	975	4975	257		1010
		Total for Vendor:	31.50								
32719		637 WEBER, LETH & WOESSNER PLC	4,304.00								
		SEPT '19 09/30/19 8.8 HRS LEGAL-ADMINISTRATION	1,272.50*			101	160	4160	304		1010
		SEPT '19 09/30/19 4.3 HRS LEGAL-COUNCIL	623.50			101	111	4111	304		1010
		SEPT '19 09/30/19 5.1 HRS LEGAL-'17 STR ASSMNT	711.50*			423	311	4311	430	41602	1010
		SEPT '19 09/30/19 11.7 HRS LEGAL-P&Z	1,696.50*			101	191	4191	304		1010
		Total for Vendor:	4,304.00								
32729		2407 WINE MERCHANTS	296.00								
		7255188 10/08/19 WINE	296.00			609	975	4975	251		1010
		Total for Vendor:	296.00								
		# of Claims 65	Total:	275,837.94							

For the Accounting Period: 10/19

For Pay Date: 10/15/19

* ... Over spent expenditure

Claim Check	Vendor #/Name/ Invoice #/Inv Date/Description	Document $/ Line $	Disc $	PO #	Fund	Org	Acct	Object	Proj	Cash Account
*** Cancelled in 10/19 ****	*** Claim from another period (10/17) ****									
26991	5604 TWITE, ERIC T	12.43								
	1771-13 09/26/17 RL/WA MTR DEP REFUND AFT APPL	12.43			604		2212			1010
*** Cancelled in 10/19 ****	*** Claim from another period (11/17) ****									
27225	5617 DAY, SUSAN	11.52								
	1845-03 10/26/17 RL MTR DEP REFUND AFT APPL TO	11.52			604		2212			1010
*** Cancelled in 10/19 ****	*** Claim from another period (11/17) ****									
27229	5621 KARLSTAD, STEVEN	30.52								
	1377-05 10/26/17 RL MTR DEP REFUND AFT APPL TO	30.52			604		2212			1010
*** Cancelled in 10/19 ****	*** Claim from another period (6/18) ****									
28800	5702 EGGERT, RICHARD	73.92								
	1405-02 05/25/18 RL MTR DEP REFUND AFT APPL TO	73.92			604		2212			1010

# of Claims 4 Total: 128.39

Fund/Account	Amount
101 General Fund	
1010 CASH-OPERATING	$44,463.45
211 Library Fund	
1010 CASH-OPERATING	$3,363.88
290 Economic Development	
1010 CASH-OPERATING	$15.00
423 3rd,4th 5th Av 2017 Street Assessment	
1010 CASH-OPERATING	$711.50
601 Water Fund	
1010 CASH-OPERATING	$6,065.79
602 Sewer Fund	
1010 CASH-OPERATING	$14,327.03
604 Electric Fund	
1010 CASH-OPERATING	$170,120.41
605 Storm Water	
1010 CASH-OPERATING	$3,844.02
606 ICE ARENA	
1010 CASH-OPERATING	$1,436.75
609 Liquor Fund	
1010 CASH-OPERATING	$28,264.26
610 Maple Grove Cemetery	
1010 CASH-OPERATING	$2,644.17
877 Festival in Park Fund	
1010 CASH-OPERATING	$453.29
Total:	$275,709.55

CITY OF KASSON
Claim Approval Signature Page
For the Accounting Period: 10/19

CITY OF KASSON
401 5TH STREET SE
KASSON. MN 55944-2204

The claim batch dated _____are approved for payment.

APPROVED _____Council Member

_____Council Member

CITY OF KASSON
RESOLUTION #10.___-19

WHEREAS, during 2018 & 2019 the City of Kasson provided electrical services to properties within the City; and

WHEREAS, provisions of the City Code provide that bills for these services remaining unpaid for an extended period shall be certified against the affected properties; and

WHEREAS, provisions of the City Code provide that all charges may be assessed against the property; and

WHEREAS, payment for the service is due after the service has been provided;

NOW, THEREFORE BE IT RESOLVED BY THE COUNCIL OF THE CITY OF KASSON, MINNESOTA:

The Finance Director is hereby authorized to certify to the Dodge County Auditor these charges:

1.	Harlan Jacobson & Colleen Jacobson	302 5th St SE PID# 24.355.0050	Delinquent electric invoice Administrative Fee	$6,822.11 50.00

The County Auditor shall collect these charges, including 9% interest, along with the 2019 property taxes collectable in 2020.

ADOPTED this 23rd day of October, 2019.

ATTEST:

_____ _____

Chris McKern, Mayor Linda Rappe, City Clerk

The motion for the adoption of the foregoing resolution was made by Council Member _____ and duly seconded by Council Member _____. Upon a vote being taken, the following members voted in favor thereof: _____. Those against same: _____.

RESOLUTION #10.X-19
CITY OF KASSON

RESOLUTION APPROVING A CONDITIONAL USE PERMIT FOR A PLANNED UNIT DEVELOPMENT FOR SOUTH FORK THIRD

WHEREAS, South Fork Homes LLC, owner of the property in question has submitted a request for a Conditional Use Permit for a Planned Unit Development for South Fork Third, Kasson, MN, and;

WHEREAS, at a public hearing duly held on the 14th day of October, 2019, the Planning Commission heard testimony of all persons wishing to comment on the proposed Conditional Use Permit for a Planned Unit Development for South Fork Third; and

WHEREAS, the Kasson Code of Ordinances, lists in Section 154.187 single family dwellings as a Conditional Use in an R-3 Multi-Family Residential District; and

WHEREAS, the appropriate City Staff and consultants have performed a technical review of the application, including attachments, for a Conditional Use Permit for a Planned Unit Development; and

WHEREAS, following the public testimony and report of the technical review, the Planning Commission reviewed all relevant information regarding the proposed Conditional Use Permit for a Planned Unit Development and recommends approval;

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF KASSON, MINNESOTA that the following Findings are hereby adopted regarding the application for a Conditional Use Permit for a Planned Unit Development for South Fork Third:

SECTION 154.029 (B)(2)

(a) The use will not create an excessive burden on existing parks, schools, streets and other public facilities which serve or are proposed to serve the area.
The development will have little impact on the parks, schools, streets and other public facilities.

(b) The use will be sufficiently compatible or separated by distance or screening from adjacent residentially zoned or used land so that existing homes will not be depreciated in value and there will be no deterrence to development of vacant land.
The development will be a compatible use.

(c) The structure and site shall have an appearance that will not have an adverse effect upon adjacent residential properties.
The development will not have an adverse effect upon adjacent residential properties.

(d) The use, in the opinion of the City, is reasonably related to the overall needs of the City and to the existing land use.
The development will add to the residential units in the City of Kasson.

(e) The use is consistent with the purpose of this chapter and the purposes of the zoning district in which the applicant intends to locate the proposed use.
The development will be a compatible use.

(f) The use is not in conflict with the comprehensive plan of the City.
The development will be a compatible use.

(g) The use will not cause traffic hazards or congestion.
The development will have little impact on traffic hazards or congestion.

(h) The traffic generated by the proposed use can be safely accommodated on existing or planned street systems; and the existing public roads providing access to the site will not need to be upgraded or improved by the City in order to handle the additional traffic generated by the use.
The development will be accessed from County 13.

(i) Adequate measures have been taken or are proposed to prevent or control offensive odor, dust, noise, vibration or lighting which would otherwise disturb the use of neighboring property.
The development will be a compatible use.

(j) Adequate utilities, parking, drainage and other necessary facilities will be provided.
The development will be a compatible use.

(k) The proposed use will not impede the normal and orderly development or improvements of the surrounding property.
The development will be a compatible use.

(l) The proposed use will not be injurious to the use and enjoyment of other property in the neighborhood and will not significantly diminish or impair the values of the property.
The development will be a compatible use.

(m) The use will not disrupt the character of the neighborhood.
The development will be a compatible use.

BE IT FURTHER RESOLVED that the Conditional Use Permit for a Planned Unit Development for South Fork Third is hereby approved subject to the following conditions of approval:

1. Provide Association documents that establish community ownership of common areas, accepts responsibility for the maintenance of those areas, commits the Association to professional management and establishes and adequate funding mechanism for that maintenance. Any change in association management must be approved by the Planning Commission.
2. Provide that a Capital Maintenance account of appropriate size will be placed on deposit and that an annual fund account of this fund will be furnished to the city. Prior to January 1st of each year.
3. Provide waiver agreement to be signed by each property owner at the time of applying for a building permit or transferring utility billing, detailing the City‘s lack of maintenance responsibility.
4. Supply As-built documents to the city for all existing and future streets and utility connections.
5. City agrees to flush city hydrants, but only in order to maintain the integrity of the water product. The flushing is not intended to serve as maintenance of the water mains.
6. Agree to notify City Public Works, on an emergency basis, in the event of future water main repair or maintenance.
7. All service lines will be installed as per city specifications.
8. Change street limit signs to yellow(advisory) so as to remove confusion that city police will enforce the posted speed limit.

9. Building permits may be issued when streets are certified by City Engineer as being capable of supporting construction vehicles.
10. Provide a Final plat
11. Development agreement with a performance bond
12. WAC/SAC/Parkland – due at final plat
13. All easements to be recorded
14. Follow city specifications on water/sewer/hydrants/subdrains and all infrastructure to be built to city specifications
15. Association ownership and maintenance of common areas (water/sewer/streets/hydrants) to include subdrains
16. Provide Pond maintenance agreement between South Fork and pond owner, possible upgrade required by State

Adopted this 23rd day of October, 2019.

_____
Chris McKern, Mayor

ATTEST:

_____
Nancy Zaworski, Interim City Administrator

The motion for adoption of the foregoing resolution was made by Council Member _____and duly seconded by Council Member _____. Upon a vote being taken, the following members voted in favor thereof: _____. Those against same: ____.

CITY OF KASSON
RESOLUTION # 9.X-19

RESOLUTION APPROVING THE FINAL PLAT OF THE SOUTH FORK THIRD SUBDIVISION

WHEREAS, South Fork Homes, LLC, the owners of the property in question have submitted a request for a Final Plat, and;

WHEREAS, at a public hearing duly held on the 9th day of September 2019, the Planning Commission heard testimony of all persons wishing to comment on the proposed Final Plat; and

WHEREAS, the appropriate City Staff and consultants have performed a technical review of the proposed Final Plat; and

WHEREAS, following the public testimony and report of the technical review, the Planning Commission reviewed all relevant information regarding the proposed Final Plat; and

WHEREAS, it is the finding of the Planning Commission that conditions established for the approval of the Final Plat have been addressed; and

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF KASSON, MINNESOTA:

That the said Final Plat of South Fork Third Subdivision is hereby approved by the City Council of the City of Kasson with the following conditions:

Include Engineer recommendations in Final Plat.

Adopted this 25th day of September, 2019.

ATTEST:

_____ _____

Linda Rappe, City Clerk Chris McKern, Mayor

The motion for the adoption of the foregoing resolution was made by Council Member _____ and duly seconded by Council Member _____. Upon a vote being taken, the following members voted in favor thereof: _____. Those against same: ____.

District 6 Rochester MN
2900 48th St. NW

August 9th, 2019

To: District 6 County and City Engineers

RE: MnDOT Fiscal Year (FY) 2022 - 2023 Local Partnership Program – Solicitation

The purpose of the Local Partnership Program (LPP) is to address problems on the trunk highway system that are of concern to Local Units of Government, but are typically not large-scale or high enough priority that they are directly selected as projects in the regular MnDOT Road Program. Selected projects must:

- Provide a clear benefit to the trunk highway system as well as to the local community
- Be developed and administered by the local agency
- Have preliminary design, final design, right-of-way and utility relocation costs (as appropriate) paid for by the local agency
- The work on the trunk highway shall be designed to MnDOT Trunk Highway Standards

Minnesota Department of Transportation (MnDOT) District 6 will be accepting candidate projects for the FY 2022 – 2023 Local Partnership Program, due by October 31, 2018. The proposed budget for each fiscal year 2022 and fiscal year 2023 is $1,300,000. There is no minimum or maximum award amount. Project costs can include up to 8% for construction engineering.

The LPP exists to provide funding for projects that deliver benefit to both the local community and the trunk highway system. These funds are intended to pay for a portion of the trunk highway eligible construction costs of the project. The Right-of-Way, Utility Relocation, Preliminary and Final Design Costs are not eligible for funding. This program will pay for the eligible trunk highway costs and up to 8% of the construction engineering costs (for inspection, contract administration, surveying and materials testing as applicable, based on the trunk highway eligible costs). MnDOT District 6's participation on the project is based on eligibility as determined in MnDOT's Cost Participation Policy, which in turn is based on Minnesota Statutes.

Please note that the following schedule has been established to allow local Agencies the opportunity to complete surveying, wetland identification and other preliminary design activities before winter sets in. It also allows project procurements to occur in the proper fiscal year:

- Application – Deadline October 31st, 2019
- Project selection – Week of November 16, 2019
- Publication of selected projects - December 2nd, 2019
- Selected projects should be awarded by or before June 30, 2021 and June 30, 2022 respectively
- Project Kick off meeting – Date to be decided

The application should contain a letter of intent, a sketch/layout of the project and estimate.

The District selection committee composed of 2 City Engineers, 2 County Engineers and 2 DOT D6 employees will select projects using the selection criteria developed by District 6 committee. Committee selection participants will be invited by District 6 State Aid Engineer among the Cities and Counties that didn't submit application for the FY 2022-2023 solicitation.

Submit applications to District 6 State Aid no later than Friday, October 31st, 2019. For questions regarding the Local Partnership Program contact Craig Lenz at 507-286-7558.

We are looking forward to working with you.

Sincerely,

Fausto Cabral
State Aid Engineer
507-286-7620
fausto.cabral@state.mn.us

CITY OF KASSON
RESOLUTION #x-x

A RESOLUTION AUTHORIZING SUBMITTAL OF A GRANT APPLICATION FOR THE LOCAL PARTNERSHIP PROGRAM (LPP) FOR TH 57 AND 16TH ST ROUNDABOUT AND 16TH ST NW EXTENSION

WHEREAS, the District 6 State Aid Engineer has given notice of grant opportunities from the Minnesota State Transportation Fund for Local Partnership (LPP) to assist MnDOT and local agencies on transportation projects; and,

WHEREAS, the City of Kasson considers the proposed roundabout at the intersection of TH 57 and 16th Street a critical improvement to your regional transportation system; and,

WHEREAS, the proposed construction of 16th Street N.W. from TH 57 to CSAH 21 will provide a City collector roadway that will improve traffic operations.

NOW, THEREFORE, BE IT RESOLVED, The City Council hereby supports the pursuit of Local Partnership Program (LPP) funding and authorizes staff to prepare and submit such application.

Adopted by the Kasson City Council this 23rd day of October 2019.

_____
Mayor Chris McKern

ATTEST:

_____
Linda Rappe, City Clerk

The motion for the adoption of the foregoing resolution was made by Council Member _____ and duly seconded by Council Member _____. Upon a vote being taken, the following members voted in favor thereof: _____. Those against same: ____

TREE CITY USA

CITY OF KASSON

401 FIFTH STREET SE
KASSON, MINNESOTA 55944-2204
PHONE: (507) 634-7071
FAX: (507) 634-4737

October 23, 2019

Fausto Cabral
District 6 State Aid Engineer
MnDOT District 6
2900 48th Street NW
Rochester, MN 55901

RE: Kasson, MN
TH 57 and 16th Street NW roundabout and 16th Street NW extension
2022 – 2023 Local Partnership Program (LPP) Application

Dear Mr. Cabral:

The City of Kasson is applying for $1,300,000 of funding from 2022 – 2023 Local Partnership Program (LPP) for the roundabout proposed at the intersection of TH 57 and 16th Street NE in the City of Kasson, MN. The City of Kasson plans to use an additional $2,700,000 of MSAS and local funds to fund the entire $4,000,000 project. The proposed project includes Schedule 1-3 on the enclosed feasibility report. Schedules 4-5 will be completed later as a separate project.

Background

The City of Kasson is proposing to extend 16th Street N.W. from the intersection of TH 57 to C.S.A.H. 21 to continue to provide a robust regional transportation network. The proposed improvements have been identified in the City's Comprehensive Plan, Regional Transportation Plan and Capital Improvement Plan. The proposed improvements will provide a connection from a Minor Arterial (TH 57) to a Major Collector (C.S.A.H. 21). 16th Street NW is not currently on the City's MSAS system, but the City plans reallocate mileage to the proposed project corridor to allow for MSAS funding.

Project Benefits

The roundabout will provide benefits to both the community and the trunk highway system by improving traffic and pedestrian circulation and safety at the intersection.

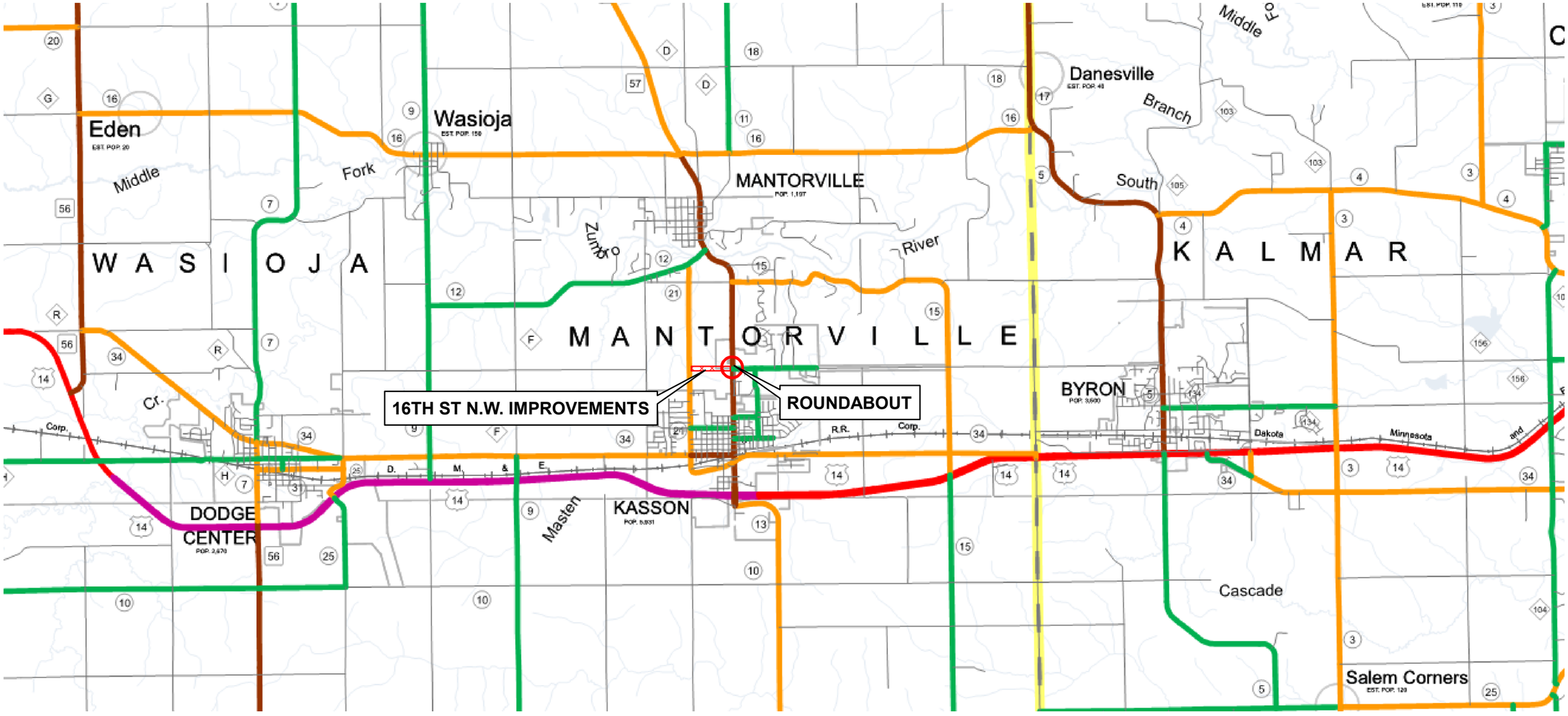
Enclosed is a Functional Classification Map, Regional Transportation Map, Intersection Control Evaluation (ICE) report and Feasibility Report.

Please contact me with any questions.

Sincerely,

Nancy Zaworski, Interim City Administrator

Cc: Brandon W. Theobald, P.E., City Engineer



Dodge
Functional Classification

- Interstate
- Other Freeways & Expressways
- Principal Arterial - Other
- Minor Arterial
- Major Collector
- Minor Collector
- Local
- County Boundary

35	INTERSTATE TRUNK HWY
10	U.S. TRUNK HWY
55	STATE TRUNK HWY
23	COUNTY STATE AID HWY
15	COUNTY ROAD

FINAL: September 2015
Produced by: Geographic Information and Mapping Section

No Scale

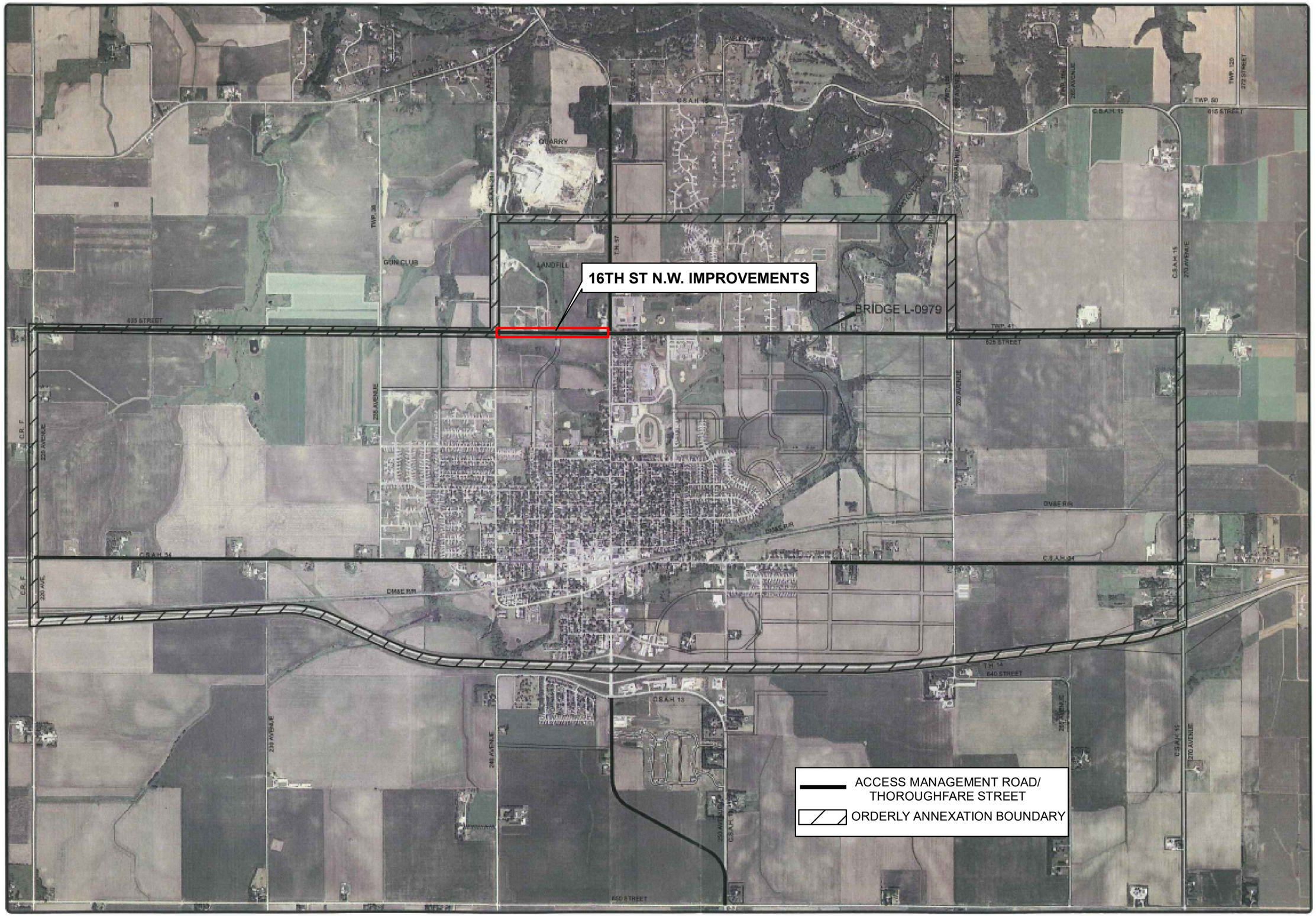
N

whks engineers + planners + land surveyors

FUNCTIONAL CLASSIFICATION MAP

16TH ST N.W. DEVELOPMENT
CITY OF KASSON
DODGE COUNTY, MN

Date: 10/17/2019
WHKS No. 8104.18
SHEET 1 OF 1



whks
engineers + planners + land surveyors

CITY OF KASSON
REGIONAL TRANSPORTATION MAP

16TH ST N.W. DEVELOPMENT
CITY OF KASSON
DODGE COUNTY, MN

Date: 10/17/2019

WHKS No.
8104.18

SHEET
1 OF 1

2905 South Broadway
Rochester, MN 55904-5515
Phone: 507.288.3923
Fax: 507.288.2675
Email: rochester@whks.com
Website: www.whks.com

whks
engineers + planners + land surveyors

October 18, 2019

Mr. Chris McKern
Honorable Mayor
City of Kasson
401 5th Street SE
Kasson, MN 55944

RE: Kasson, MN
16th Street NW Development
Feasibility Report

Dear Honorable Mayor and Council:

The City of Kasson has requested a preliminary feasibility report for the construction of the following street and utilities:

1. 16th Street NW from County Highway 21 to TH 57.
2. A road, hereinafter referred to as North Service Street, 400 ft west of TH 57 perpendicular to 16th Street NW providing access to the properties north of 16th Street NW.
3. Roundabout at the intersection of TH 57 and 16th Street NE.
4. Sanitary, and storm system improvements to serve the area.

The report is needed to assist in determining the feasibility of the proposed project and in determining special assessments for the adjacent property owners.

The scope of this feasibility report includes the construction of the aforementioned roadways and the extension of municipal utilities such as sanitary sewer, and storm sewer. The following is a summary of the existing conditions, proposed street and utility construction, opinion of costs and special assessments for all the abutting properties.

Existing Conditions

Below is a summary of the existing conditions for the roads listed above and the adjacent site. The project streets and existing utilities are shown on **Figure 1 - Proposed Improvements** in the Appendix.

1. County Highway 21
    - The existing roadway is an undivided highway composed of two (2) 12 ft lanes. It includes two (2) 4 ft buffers on each side along with concrete curb and gutter. An 8 ft bituminous shared-use path runs along the eastern side of the roadway separated from the back of curb by a 3 ft grass boulevard. The existing roadway is in fair condition and the path is in good condition.

- The relevant portion of County Highway 21 lies outside the City's corporate limits.

2. Parcels Fronting 16th Street NW
   - Schuette Enterprises and Dodge County Environmental Qual are the current owners of the properties south of the 16th Street NW. Both parcels are undeveloped and not within the City's corporate limits.
   - Dodge County and Clever Pigs Properties LLC are the current owners of the properties north of the proposed 16th Street NW. Clever Pigs Properties LLC operates a trucking and automotive repair facility on the property immediately adjacent to TH 57. Dodge County operates a landfill on the property adjacent to County Road 21 and the other County property west of Clever Pigs Properties LLC is undeveloped. All the parcels, with the exception of the two (2) parcels owned by the County reside within the City's corporate limits.

3. Lots on fronting North Service Street
   - Dodge County, Allen R. Radel, Clever Pigs Properties LLC, James L. Foote and Richard Tune are the current owners of the properties adjacent to the proposed North Service Road. These lots are undeveloped, single-family residential use, or being used for surface storage. All the parcels, with the exception of the parcel owned by the County reside within the City's corporate limits.

4. Existing Utilities.
   - The City's water system stops at the northeast corner of the intersection of TH 57 and 16th Street NE. They system serves properties east of TH 57. There is a private watermain along the east side of TH 57 from 16th Street NE to the Holy Family Catholic Church which serves the High School and Church. The City should consider changing the watermain from a private to a public watermain.
   - A sanitary forcemain runs from County Road 21 to an existing manhole located along the west side of TH 57 just south of its intersection with 16th Street NE. The manhole connects the forcemain to a conventional gravity sewer system which runs along the south side of 16th Street NE. The forcemain conveys a significant portion of the wastewater from the northwesterly portion of the City's corporate limits. The existing forcemain will reside within the paved limits of proposed 16th Street NW due to its present location.

5. TH 57
   - The existing roadway north of its intersection with 16th Street NE is an undivided highway composed of two (2) 12 ft through lanes with a 9.5 foot paved buffer along both sides. The existing roadway just south of its intersection with 16th Street NE comprises of two (2) 12 ft through lanes and a 12 ft right turn lane. The existing roadway is in fair condition.
   - TH 57 north of its intersection with 16th Street NE resides within the City's corporate limits. Only the easterly portion of TH 57 resides within the City's corporate limits from its intersection with 16th Street NE to the north boundary line for the Dollar General.
   - Clever Pigs Properties LLC has two (2) driveway accesses to TH 57.

6. 16th Street NE
    - The existing roadway is an undivided unstriped City Street 44 ft in width with concrete curb and gutter along each side. There is a 5 ft wide side concrete sidewalk along the south side. The north side does not have any sidewalk adjacent to the intersection. A 10 ft wide shared-use path starts along the north side approximately 250 ft east of the intersection which continues to the east. The existing roadway is in fair condition and the path is in good condition.

    - The school has access to 16th NE just east of the intersection of TH 57 and 16th Street NE.

    - The City of Kasson owns the property at the southeast corner of the intersection which contains a single family dwelling and the property adjoining to the east which is vacant. The School owns the property at the northeast corner of the intersection.

Private utilities are located underground within the street right-of-way of 16th Street NW and a large overhead transmission line runs along the northerly street right-of-way of 16th Street NW. Relocation costs of Private utilities are not included in this report.

Proposed Construction

WHKS prepared an Intersection Control Evaluation (ICE) report for the intersection of Mantorville Avenue (TH 57) and 16th Street. Based on the report summary of findings a roundabout is recommended at the intersection of Mantorville Avenue (TH 57) and 16th Street. A copy of the ICE report has been included in the Appendix.

The construction of the proposed improvements will help address deficiencies and improve conditions as follows:

- Extension of the City's public utilities to existing and future development within the City's corporate limits and to future development outside the current City's corporate limits.
- Construction of a roadway connecting County Highway 21 and TH 57 allowing for future development along the new street and northern part of the City.
- Reduction of two (2) direct access points onto TH 57, improving safety and traffic flow for TH 57 through town.
- Construction of the roundabout will improve traffic circulation at the intersection of TH 57 and 16th Street NE.

The proposed street width of the new section of 16th Street NW is 37 ft – 4in from back of curb to back of curb. This width includes two (2) 12 ft undivided driving lanes, two (2) 4 ft paved shoulders, and concrete curb and gutter. There will be a 10 ft wide trail along the north side 9 ft from the back of curb.

The new section of 16th Street NW is proposed to be constructed of 5 in of bituminous pavement over 12 in of aggregate base on 6 in of breaker run. A geotextile fabric will be included beneath the proposed street section as a separation layer.

The proposed street width of the new North Service Street is 37 ft - 4 in from back of curb to back of curb. This includes two (2) 12 ft undivided driving lanes, two (2) 4 ft paved shoulders, and concrete curb and gutter along both sides. The road section is proposed to be the same as 16th Street NW. No shared-use path is proposed for this stretch of roadway.

The construction of 16th Street NW will necessitate the widening of County Highway 21 south of its intersection with 16th Street NW for a right turn lane to provide safe access onto the new road. The turn lane is proposed to be 8 in of concrete over 10 in of aggregate base. A geotextile fabric will be included beneath the proposed street section as a separation layer. MNDOT standard dimensions will be utilized for the lane construction. The new turning lane will encroach into the existing shared-use path. The path will be reconstructed to its existing width around the new lane.

The roundabout drive surface width is 23 ft from back of curb to back of curb. This includes one (1) 12 ft drive lane, two (2) 5 ft paved shoulders and concrete curb and gutter along both sides. The roundabout access and exit lanes are 20 ft in width from back of curb to back of curb. This includes one (1) 12 ft drive lane, two (2) 3.5 ft paved shoulders and concrete curb and gutter along both sides. The access and exit lanes are separated by four (4) concrete raised medians. There will be a 10 ft wide paved trail along the north exterior and a 5 ft wide concrete sidewalk along south exterior.

Approximately 590 l.f. of 8 in gravity sewer main will be constructed along the west side of TH 57, from the existing manhole at the intersection of TH 57 and 16th Street NE to just north of the northerly property line of James Foote. The new sanitary sewer main will serve the existing commercial structure and two (2) existing dwellings along the west side of TH 57 just north of the intersection.

Watermain improvements are not proposed as part of these improvements.

New storm sewer is proposed for the roundabout, section of 16th Street NW and the northerly portion of the North Service Street. Runoff will be collected by catch basins and conveyed by a concrete pipe network which will discharge to the proposed regional pond located at the southeasterly corner of the intersection of County Road 21 and 16th Street NW. The regional pond will outlet to the existing culvert which crosses County Road 21 just south of the intersection of 16th Street NW and County Road 21.

The proposed improvements will be designed and constructed in accordance with the Municipal State Aid standards. The proposed project streets and utilities are shown on **Figure 1- Proposed Improvements** in the Appendix.

Street Right-of-way and Permits

An 80 ft wide street right-of-way is proposed along 16th Street NW and a 66 ft wide right-of-way is proposed along the North Service Street. Right-of-way acquisition will be required for 16th Street NW and the North Service Street. Annexation of the right-of-way for 16th Street NW will be required.

A Minnesota Department of Health watermain extension permit, Minnesota Pollution Control Agency construction stormwater NPDES permit, Minnesota Pollution Control Agency sanitary sewer extension permit, and a Dodge County utility permit are required for the project.

Opinion of Construction Costs

The following cost opinions are based on anticipated 2022 construction costs. Tables 1 and 2 of Engineers Opinion of Probable Construction Cost have been included in the Appendix. City Officials are reminded that construction costs may change significantly after an extended period of time. The cost opinions contained in this report should be updated if more than one-year elapses before construction begins.

The proposed project has been broken down into five (5) schedules. The project schedules are depicted on **Figure 2-Proposed Schedule** in the Appendix.

Roundabout-Schedule 1
The estimated total project construction cost opinion for Schedule 1 to construct the roundabout as described previously is **$2,000,000.** The cost opinion includes an 18% allowance for engineering, a 10% allowance for construction contingencies, and 5% allowance for administrative. A breakdown of costs is shown in Table 1 in the Appendix.

16th Street NW-Schedule 2
The estimated total project construction cost opinion for Schedule 2 to construct the easterly portion of 16th Street NW is **$764,000**. The cost opinion includes an 18% allowance for engineering, a 10% allowance for construction contingencies, and 5% allowance for administrative. A breakdown of costs is shown in Table 1 in the Appendix.

16th Street NW-Schedule 3
The estimated total project construction cost opinion for Schedule 3 to construct the westerly portion of 16th Street NW is **$1,267,000**. The cost opinion includes an 18% allowance for engineering, a 10% allowance for construction contingencies, and 5% allowance for administrative. A breakdown of costs is shown in Table 1 in the Appendix.

North Service Street-Schedule 4
The estimated total project construction cost opinion for Schedule 4 to construct the North Service Street is **$484,000**. The cost opinion includes an 18% allowance for engineering, a 10% allowance for construction contingencies, and 5% allowance for administrative. A breakdown of costs is shown in Table 1 in the Appendix.

Utility Extension-Schedule 5
The estimated total project construction cost opinion for Schedule 5 to construct the sanitary sewer as described previously is **$61,000**. The cost opinion includes an 18% allowance for engineering, a 10% allowance for construction contingencies, and 5% allowance for administrative. A breakdown of costs is shown in Table 1 in the Appendix.

Recommendations and Schedule

This project is feasible from an engineering standpoint. It is recommended that the City conduct a legal and fiscal review of the proposed project.

It is recommended that the City recover a portion of the project project costs through special assessments and connection charges, per City Policy, Municipal State Aid and the MnDOT Funding Programs.

Per City Council policy, a portion of the project costs could be assessed. For the purpose of the report we have discuss the assessments described below. Future discussion on assessments and connection charges is recommended.

Roundabout-Schedule 1
No assessments are proposed for the construction of the roundabout.

16th Street NW-Schedule 2
The total preliminary assessment amount for constructing the street and all the utilities for this proposed phase of the street improvements project is $725,000. The total roadway frontage is approximately 1,616 l.f. The calculated assessment is $449 per linear foot of frontage benefitting from the facilities. Clever Pigs Properties LLC already has direct access to TH 57. The access is being eliminated by the project and they will be required to access TH 57 via the new Service Street and 16th Street NW. Schuette Enterprises LLC is proposed to be assessed for the parcel frontage along 16th Street NW.

We recommend that an agreement be prepared with the County in regards to access to this section of 16th Street NW since we propose not to assess the County for access. The agreement would allow the City to back assess the County for construction costs should they request an access to the Street in the future.

16th Street NW-Schedule 3
No assessments are proposed for this proposed phase of the street improvements project.

We recommend that an agreement be prepared with the County in regards to access to this section of 16th Street NW since we propose not to assess the County for access. The agreement would allow the City to back assess the County for construction costs should they request an access to the Street in the future.

North Service Street-Schedule 4
The total preliminary assessment amount for constructing the street and all the utilities for this proposed phase of the street improvements project is $484,000. The total roadway frontage is approximately 2,054 l.f. The calculated assessment is $236 per linear foot of frontage benefitting from the facilities. Clever Pigs Properties LLC, James Foote and Richard R. Tune already have direct access to TH 57. There access to TH 57 will be eliminated by the project and they will be required to access TH 57 via the new Service Street and therefore we propose not to assess them. Allan R. Radel is proposed to be assessed for the parcel frontage along the Service Road.

Utility Extension-Schedule 5
The total preliminary assessment amount for constructing the sanitary sewer main extension for this proposed phase of the street improvements project is $61,000. Assessments for the sewer main were determined by each property benefiting from the utility extension. There two (2) dwellings and one (1) commercial structure that would be served off the new main.

Below is a summary of the assessments.

16th Street NW -Schedule 2 Assessment Tabulation

Owner	Address or Parcel #	Frontage (ft)	Cost Per Linear Foot of Frontage	Total
Schuette Enterprises LLC	13.028.1500	808	$ 449	$ 362,500
Allan R. Radel	24.028.0501 & 24.429.0100	0	$ 449	$ 0
Clever Pigs Properties LLC	1601 Mantorville Ave N	0	$ 449	$ 0
James Foote	1701 Mantorville Ave N	0	$ 449	$ 0
Richard R. Tune	1801 Mantorville Ave N	0	$ 449	$ 0
	Total	**808**		**$ 362,500**

North Service Street-Schedule 4 Assessment Tabulation

Owner	Address or Parcel #	Frontage (ft)	Cost Per Linear Foot of Frontage	Total
Schuette Enterprises LLC	13.028.1500	0	$ 236	$ 0
Allan R. Radel	24.028.0501 & 24.429.0100	322	$ 236	$ 76,000
Clever Pigs Properties LLC	1601 Mantorville Ave N	0	$ 236	$ 0
James Foote	1701 Mantorville Ave N	0	$ 236	$ 0
Richard R. Tune	1801 Mantorville Ave N	0	$ 236	$ 0
	Total	**322**		**$ 76,000**

Sanitary Sewer Main Extension Assessment Tabulation

Owner	Address or Parcel #	Each	Sanitary Sewer Each Cost	Total
Schuette Enterprises LLC	13.028.1500	0	$ 20,300	$ 0
Allan R. Radel	24.028.0501 & 24.429.0100	0	$ 20,300	$ 0
Clever Pigs Properties LLC	1601 Mantorville Ave N	1	$ 20,300	$ 20,300
James Foote	1701 Mantorville Ave N	1	$ 20,300	$ 20,300
Richard R. Tune	1801 Mantorville Ave N	1	$ 20,300	$ 20,300
	Total	**3**		**$ 61,000**

The City Council should review this report and provide direction on the project schedule and project options and assessments.

Please contact us with any questions.

Sincerely,

***WHKS** & CO.*

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

Brandon W. Theobald
License No. 48229

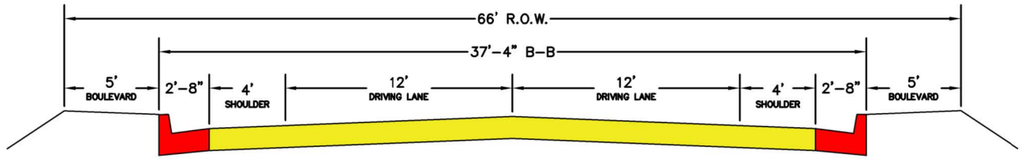
BWT/tjb

Cc: Nancy Zaworski, Interim Administrator
Charlie Bradford, Public Works Director

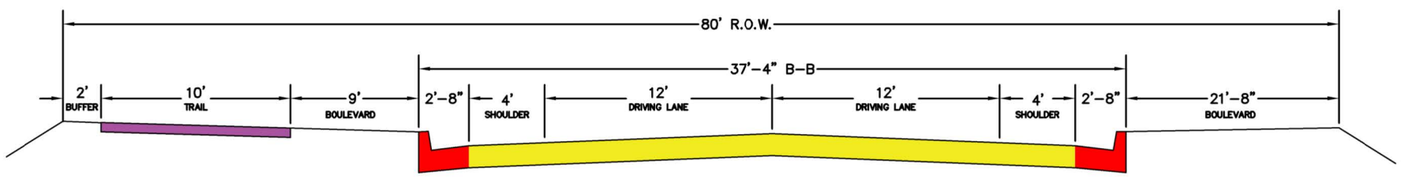
APPENDIX

Figure 1 Proposed Improvements Plan
Figure 2 Proposed Schedule Plan
Table 1 Engineer's Opinion of Probable Construction Cost
Table 2 Engineers Opinion of Probable Construction Cost

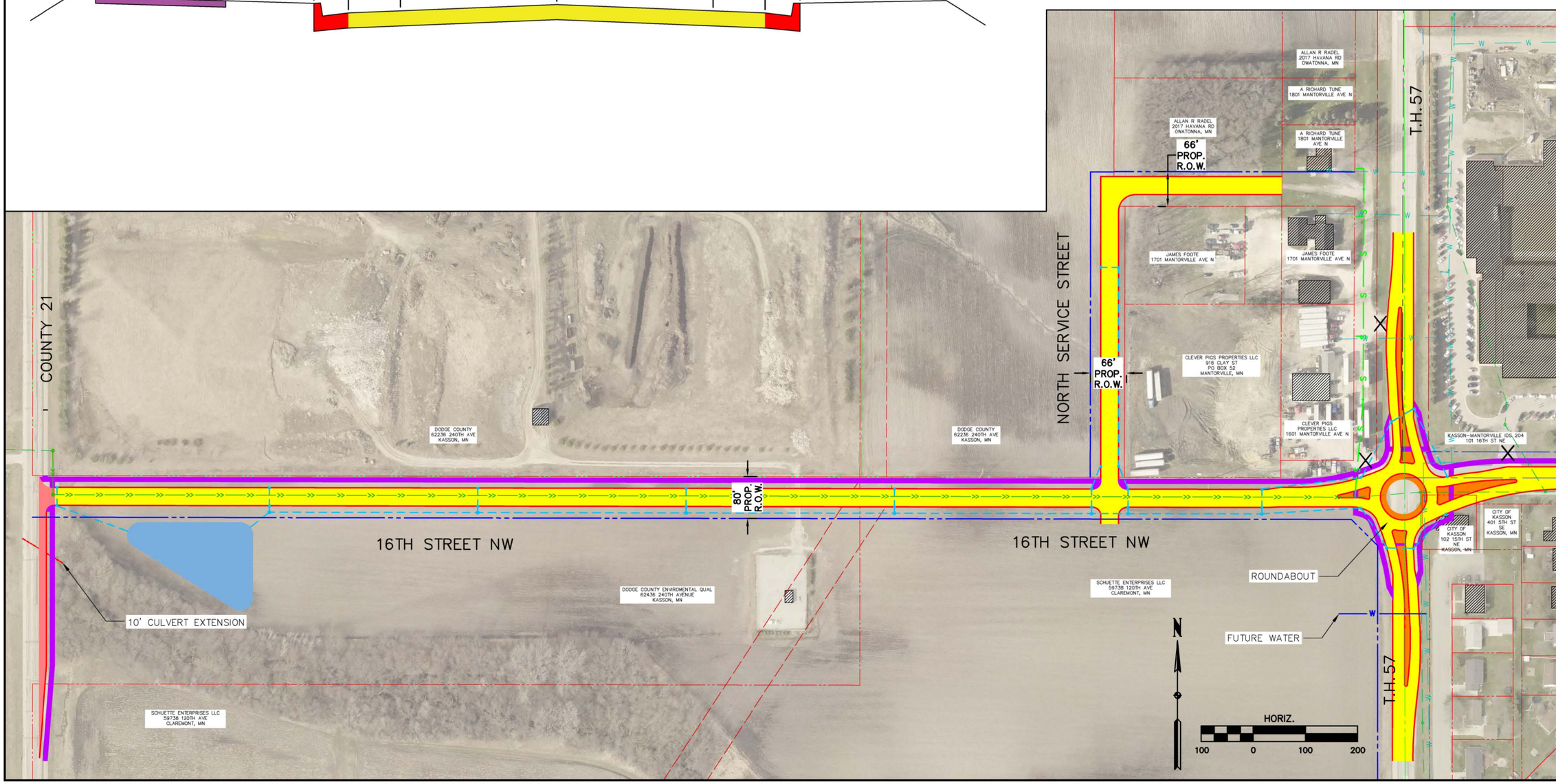
NORTH SERVICE STREET



16TH STREET NW



- RAISED MEDIAN
- CONCRETE ROADWAY
- BITUMINOUS ROADWAY
- BITUMINOUS TRAIL
- CONCRETE CURB & GUTTER
- AGGREGATE SHOULDER
- POND
- EXISTING SANITARY SEWER FORCEMAIN
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- X CLOSED ACCESS



whks engineers + planners + land surveyors

City of Kasson

NO.	DATE	DESCRIPTION

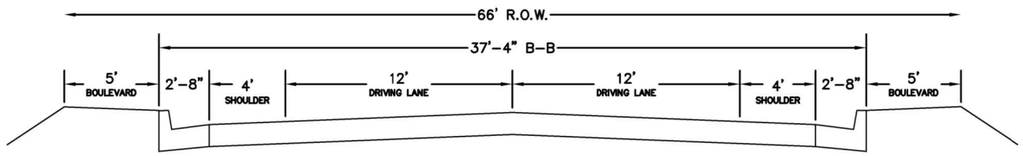
REVISIONS

FIGURE 1 – PROPOSED IMPROVEMENTS

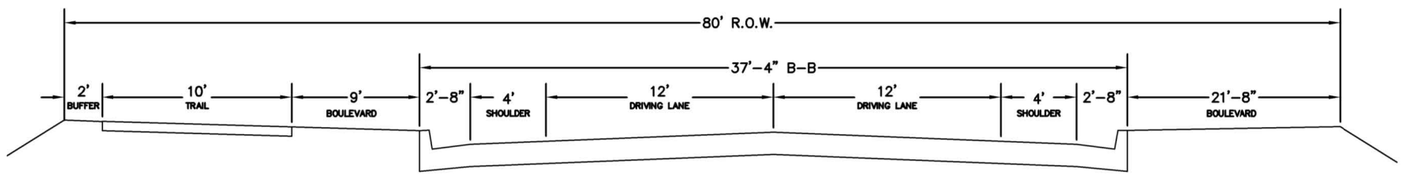
16TH ST NW EXTENSION
KASSON, MN
2019

SCALE: AS SHOWN
WHKS PROJECT NO.
DRAWN BY: MR
CHECKED BY: BWT
SHEET 1 OF 1

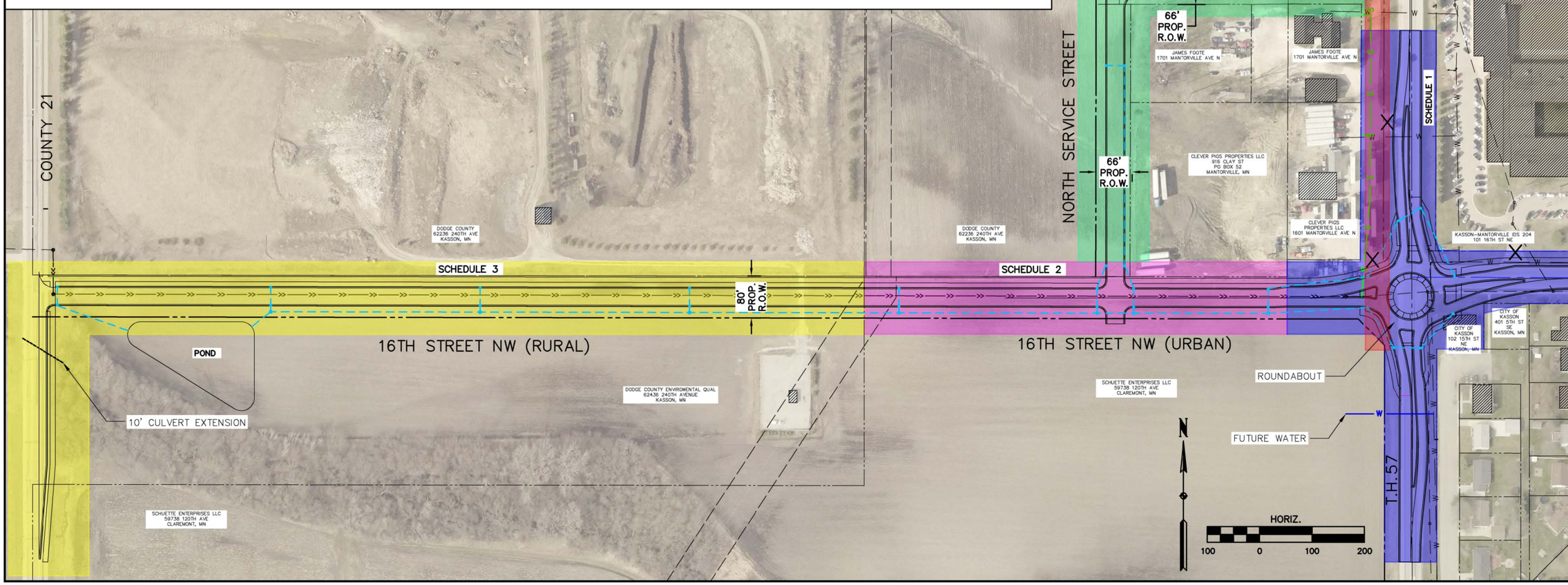
NORTH SERVICE STREET



16TH STREET NW



SCHEDULE 1
SCHEDULE 2
SCHEDULE 3
SCHEDULE 4
SCHEDULE 5
EXISTING SANITARY SEWER FORCEMAIN
PROPOSED SANITARY SEWER
PROPOSED STORM SEWER
CLOSED ACCESS



whks engineers + planners + land surveyors

City of Kasson

REVISIONS

NO.	DATE	DESCRIPTION

FIGURE 2 – PROPOSED SCHEDULE

16TH ST NW EXTENSION
KASSON, MN
2019

SCALE: AS SHOWN
WHKS PROJECT NO.
DRAWN BY: MR
CHECKED BY: BWT
SHEET 1 OF 1

TABLE 1: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
16th Street NW Construction Schedules 1-5
KASSON, MINNESOTA
8/1/19

Schedule 1 - Grand Total: $2,000,000.00

Roadway

Common Excavation	15,000	C.Y.	@	$	7.00	$ 105,000
Mobilization	1	LUMP SUM	@	$	100,000.00	$ 100,000
Geotextile Fabric, Type 5	10,400	S.Y.	@	$	2.25	$ 23,400
Aggregate Base, Class 5 (CV) 18"	5300	C.Y.	@	$	35.00	$ 185,500
Aggregate Base, Class 5 (CV) 8"	200	C.Y.	@	$	35.00	$ 7,000
Bituminous Pavement - Wearing 2.5"	1,650	TONS	@	$	95.00	$ 156,800
Bituminous Pavement - Non-Wearing 2.5"	1,650	TONS	@	$	95.00	$ 156,800
Bituminous Pavement - Wearing 3"	180	TONS	@	$	150.00	$ 27,000
Concrete B624 Curb & Gutter	4,600	L.F	@	$	20.00	$ 92,000
Concrete Driveover Curb & Gutter	400	L.F	@	$	35.00	$ 14,000
Subdrain w/Geotextile Sock	2,650	L.F	@	$	17.00	$ 45,100
F&I Storm Sewer Pipe	1000	E.A.	@	$	75.00	$ 75,000
Catch Basin	20	E.A.	@	$	2,800.00	$ 56,000
Pond Construction	1	LUMP SUM	@	$	40,000.00	$ 40,000
Storm Manhole	6	E.A.	@	$	4,250.00	$ 25,500
5' Wide Concrete Sidewalk	400	S.Y.	@	$	80.00	$ 32,000
Raised Concrete Median	1,200	S.Y.	@	$	80.00	$ 96,000
Concrete Pavement 7" thick	450	S.Y.	@	$	110.00	$ 49,500
Pedestrian Ramps	21	E.A.	@	$	2,500.00	$ 52,500
Traffic Control	1	LUMP SUM	@	$	25,000.00	$ 25,000
Signing/Striping	1	LUMP SUM	@	$	25,000.00	$ 25,000
Lighting	9	E.A.	@	$	7,000.00	$ 63,000
Erosion Control/Turf Establishment	1	LUMP SUM	@	$	18,000.00	$ 18,000
					Subtotal	$ 1,470,100
					Contingency (10%)	$ 147,000
					Engineering (18%)	$ 291,100
					Administrative (5%)	$ 73,500
					Total	$ 1,981,700

Trail

Bituminous Pavement - Wearing 3"	100	TONS	@	$	95.00	$ 9,500
Aggregate Base, Class 5 (CV) 8"	120	C.Y.	@	$	35.00	$ 4,200
					Subtotal	$ 13,700.00
					Contingency (10%)	$ 1,400.00
					Engineering (18%)	$ 2,700.00
					Administrative (5%)	$ 700.00
					Total	$ 18,500.00

Sanitary Sewer

NA	NA	NA	@	NA		NA
					Subtotal	$ -
					Contingency (10%)	$ -
					Engineering (18%)	$ -
					Administrative (5%)	$ -
					Total	$ -

Water

NA	NA	NA	@	NA		NA
					Subtotal	$ -
					Contingency (10%)	$ -
					Engineering (18%)	$ -
					Administrative (5%)	$ -
					Total	$ -

TABLE 1: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
16th Street NW Construction Schedules 1-5
KASSON, MINNESOTA
8/1/19

Schedule 2 - Grand Total: $764,000.00

Roadway

Common Excavation	6,000	C.Y.	@	$	7.00	$ 42,000
Mobalization	1	LUMP SUM	@	$	50,000.00	$ 50,000
Geotextile Fabric, Type 5	3,900	S.Y.	@	$	2.25	$ 8,800
Aggregate Base, Class 5 (CV) 18"	1950	C.Y.	@	$	35.00	$ 68,300
Bituminous Pavement - Wearing 2.5"	520	TONS	@	$	95.00	$ 49,400
Bituminous Pavement - Non-Wearing 2.5"	520	TONS	@	$	95.00	$ 49,400
Concrete Curb & Gutter	1,680	L.F	@	$	20.00	$ 33,600
F&I Storm Sewer Pipe	1,420	L.F	@	$	75.00	$ 106,500
Catch Basin	10	E.A.	@	$	2,800.00	$ 28,000
F&I 48" Storm Manhole	4	E.A.	@	$	4,500.00	$ 18,000
Pond Construction	1	L.S.	@	$	20,000.00	$ 20,000
Signing/Striping	1	LUMP SUM	@	$	5,000.00	$ 5,000
Lighting	7	E.A.	@	$	7,000.00	$ 49,000
Erosion Control/Turf Establishment	1	LUMP SUM	@	$	10,000.00	$ 10,000
					Subtotal	$ 538,000
					Contingency (10%)	$ 53,800
					Engineering (18%)	$ 106,500
					Administrative (5%)	$ 26,900
					Total	$ 725,200

Trail

Bituminous Pavement - Wearing 3"	170	TONS	@	$	95.00	$ 16,200
Pedestrian Ramp	2	EACH	@	$	2,500.00	$ 5,000
Aggregate Base, Class 5 (CV) 8"	220	C.Y.	@	$	35.00	$ 7,700
					Subtotal	$ 28,900.00
					Contingency (10%)	$ 2,900.00
					Engineering (18%)	$ 5,700.00
					Administrative (5%)	$ 1,400.00
					Total	$38,900

Sanitary Sewer

NA	NA	NA	@	NA		NA
					Subtotal	$ -
					Contingency (10%)	$ -
					Engineering (18%)	$ -
					Administrative (5%)	$ -
					Total	$ -

Water

NA	NA	NA	@	NA		NA
					Subtotal	$ -
					Contingency (10%)	$ -
					Engineering (18%)	$ -
					Administrative (5%)	$ -
					Total	$ -

TABLE 1: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
16th Street NW Construction Schedules 1-5
KASSON, MINNESOTA
8/1/19

Schedule 3 - Grand Total: $1,267,000.00

Roadway

Common Excavation	8,000	C.Y.	@	$ 7.00	$	56,000
Mobilization	1	LUMP SUM	@	$ 50,000.00	$	50,000
Geotextile Fabric, Type 5	6,760	S.Y.	@	$ 2.25	$	15,200
Aggregate Base, Class 5 (CV) 18"	3,380	C.Y.	@	$ 35.00	$	118,300
Bituminous Pavement - Wearing 2.5"	880	TONS	@	$ 95.00	$	83,600
Bituminous Pavement - Non-Wearing 2.5"	880	TONS	@	$ 95.00	$	83,600
Concrete Curb & Gutter	3,590	L.F.	@	$ 20.00	$	71,800
F&I Storm Sewer Pipe	1,490	L.F.	@	$ 75.00	$	111,800
Catch Basin	8	E.A.	@	$ 2,800.00	$	22,400
F&I 48" Storm Manhole	3	E.A.	@	$ 4,500.00	$	13,500
10' Culvert Extension	1	LUMP SUM	@	$ 10,000.00	$	10,000
Pond Construction	1	L.S.	@	$ 30,000.00	$	30,000
Signing/Striping	1	LUMP SUM	@	$ 5,000.00	$	5,000
Lighting	15	E.A.	@	$ 7,000.00	$	105,000
Erosion Control/Turf Establishment	1	LUMP SUM	@	$ 10,000.00	$	10,000
Concrete Turn Lane	760	S.Y.	@	$ 110.00	$	83,600
				Subtotal	$	869,800
				Contingency (10%)	$	87,000
				Engineering (18%)	$	172,200
				Administrative (5%)	$	43,500
				Total	$	1,172,500

Trail

Bituminous Pavement - Wearing 3"	450	TONS	@	$ 95.00	$	42,800
Pedestrian Ramp	3	EACH	@	$ 2,500.00	$	7,500
Aggregate Base, Class 5 (CV) 8"	570	C.Y.	@	$ 35.00	$	20,000
				Subtotal	$	70,300
				Contingency (10%)	$	7,000
				Engineering (18%)	$	13,900
				Administrative (5%)	$	3,500
				Total	$	94,700

Sanitary Sewer

NA	NA	NA	@	NA	NA	
				Subtotal	$	-
				Contingency (10%)	$	-
				Engineering (18%)	$	-
				Administrative (5%)	$	-
				Total	$	-

Water

NA	NA	NA	@	NA	NA	
				Subtotal	$	-
				Contingency (10%)	$	-
				Engineering (18%)	$	-
				Administrative (5%)	$	-
				Total	$	-

TABLE 1: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
16th Street NW Construction Schedules 1-5
KASSON, MINNESOTA
8/1/19

Schedule 4 - Grand Total: $484,000.00

Roadway

Common Excavation	4,320	C.Y.	@	$	7.00	$	30,200
Mobilization	1	LUMP SUM	@	$	30,000.00	$	30,000
Geotextile Fabric, Type 5	4,320	S.Y.	@	$	2.25	$	9,700
Aggregate Base, Class 5 (CV) 18"	2,160	C.Y.	@	$	35.00	$	75,600
Bituminous Pavement - Wearing 2.5"	570	TONS	@	$	95.00	$	54,200
Bituminous Pavement - Non-Wearing 2.5"	570	TONS	@	$	95.00	$	54,200
Concrete Curb & Gutter	1,960	L.F	@	$	20.00	$	39,200
F&I Storm Sewer Pipe	420	L.F.	@	$	75.00	$	31,500
Catch Basin	2	E.A.	@	$	2,800.00	$	5,600
Lighting	2	LUMP SUM	@	$	7,000.00	$	14,000
Erosion Control/Turf Establishment	1	LUMP SUM	@	$	15,000.00	$	15,000
					Subtotal	$	359,200
					Contingency (10%)	$	35,900
					Engineering (18%)	$	71,100
					Administrative (5%)	$	18,000
					Total	$	484,200

Trail

NA	NA	NA	@	NA		NA	
					Subtotal	$	-
					Contingency (10%)	$	-
					Engineering (18%)	$	-
					Administrative (5%)	$	-
					Total	$	-

Sanitary Sewer

NA	NA	NA	@	NA		NA	
					Subtotal	$	-
					Contingency (10%)	$	-
					Engineering (18%)	$	-
					Administrative (5%)	$	-
					Total	$	-

Water

NA	NA	NA	@	NA		NA	
					Subtotal	$	-
					Contingency (10%)	$	-
					Engineering (18%)	$	-
					Administrative (5%)	$	-
					Total	$	-

TABLE 1: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
16th Street NW Construction Schedules 1-5
KASSON, MINNESOTA
8/1/19

Schedule 5 - Grand Total: $61,000.00

Roadway

NA	NA	NA	@	NA	NA
				Subtotal	$ -
				Contingency (10%)	$ -
				Engineering (18%)	$ -
				Administrative (5%)	$ -
				Total	$ -

Trail

NA	NA	NA	@	NA	NA
				Subtotal	$ -
				Contingency (10%)	$ -
				Engineering (18%)	$ -
				Administrative (5%)	$ -
				Total	$ -

Storm Sewer

NA	NA	NA	@	NA	NA
				Subtotal	$ -
				Contingency (10%)	$ -
				Engineering (18%)	$ -
				Administrative (5%)	$ -
				Total	$ -

Sanitary Sewer

8" Sanitary Sewer	600	L.F.	@	$ 45.00	$ 27,000
Sanitary Manhole	3	EACH	@	$ 4,500.00	$ 13,500
Sanitary Service	3	EACH	@	$ 1,200.00	$ 3,600
Connect to Existing Manhole	1	EACH	@	$ 1,000.00	$ 1,000
				Subtotal	$ 45,100.00
				Contingency (10%)	$ 4,500.00
				Engineering (18%)	$ 8,900.00
				Administrative (5%)	$ 2,300.00
				Total	$60,800

Water

NA	NA	NA	@	NA	NA

TABLE 2: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST
16th Street NW Construction Schedules 1-5
KASSON, MINNESOTA
8/1/2019

	ROADWAY	TRAIL	SANITARY	TOTAL
SCHEDULE 1	$ 1,982,000.00	$ 18,000.00	$ -	$ 2,000,000.00
SCHEDULE 2	$ 725,000.00	$ 39,000.00	$ -	$ 764,000.00
SCHEDULE 3	$ 1,172,000.00	$ 95,000.00	$ -	$ 1,267,000.00
SCHEDULE 4	$ 484,000.00	$ -	$ -	$ 484,000.00
SCHEDULE 5	$ -	$ -	$ 61,000.00	$ 61,000.00
TOTAL	$ 4,363,000.00	$ 152,000.00	$ 61,000.00	**$ 4,576,000.00**

SCHEDULE 1

	ROADWAY	TRAIL	SANITARY	TOTAL
CITY - GENERAL FUND		$ 18,000.00		$ 18,000.00
CITY - MSAS	$ 682,000.00			$ 682,000.00
CITY -STORM				$ -
CITY - SANITARY				$ -
CITY - WATER				$ -
CITY - SRTS				$ -
MNDOT	$ 1,300,000.00			$ 1,300,000.00
SCHUETTE ENTERPRISES LLC				$ -
PARCEL # 13.028.1500				$ -
ALLAN R. RADEL				$ -
PARCEL #24.028.0501				$ -
PARCEL # 24.429.0100				$ -
CLEVER PIGS PROPERTIES LLC				$ -
1601 MANTORVILLE AVE N				$ -
JAMES FOOTE				$ -
1701 MANTORVILLE AVE N				$ -
RICHARD R. TUNE				$ -
1801 MANTORVILLE AVE N				$ -
TOTAL	$ 1,982,000.00	$ 18,000.00	$ -	**$ 2,000,000.00**

SCHEDULE 2				
	ROADWAY	TRAIL	SANITARY	TOTAL
CITY - GENERAL FUND		$ 39,000.00		$ 39,000.00
CITY - MSAS	$ 362,500.00			$ 362,500.00
CITY -STORM				$ -
CITY - SANITARY				$ -
CITY - WATER				$ -
CITY - SRTS				$ -
MNDOT				$ -
SCHUETTE ENTERPRISES LLC				$ -
PARCEL # 13.028.1500	$ 362,500.00			$ 362,500.00
ALLAN R. RADEL				$ -
PARCEL #24.028.0501				$ -
PARCEL # 24.429.0100				$ -
CLEVER PIGS PROPERTIES LLC				$ -
1601 MANTORVILLE AVE N				$ -
JAMES FOOTE				$ -
1701 MANTORVILLE AVE N				$ -
RICHARD R. TUNE				$ -
1801 MANTORVILLE AVE N				$ -
TOTAL	$ 725,000.00	$ 39,000.00	$ -	**$ 764,000.00**

SCHEDULE 3				
	ROADWAY	TRAIL	SANITARY	TOTAL
CITY - GENERAL FUND				$ -
CITY - MSAS	$ 1,172,000.00			$ 1,172,000.00
CITY -STORM				$ -
CITY - SANITARY				$ -
CITY - WATER				$ -
CITY - SRTS		$ 95,000.00		$ 95,000.00
MNDOT				$ -
SCHUETTE ENTERPRISES LLC				$ -
PARCEL # 13.028.1500				$ -
ALLAN R. RADEL				$ -
PARCEL #24.028.0501				$ -
PARCEL # 24.429.0100				$ -
CLEVER PIGS PROPERTIES LLC				$ -
1601 MANTORVILLE AVE N				$ -
JAMES FOOTE				$ -
1701 MANTORVILLE AVE N				$ -
RICHARD R. TUNE				$ -
1801 MANTORVILLE AVE N				$ -
TOTAL	$ 1,172,000.00	$ 95,000.00	$ -	**$ 1,267,000.00**

SCHEDULE 4				
	ROADWAY	TRAIL	SANITARY	TOTAL
CITY - GENERAL FUND	$ 408,000.00			$ 408,000.00
CITY - MSAS				$ -
CITY -STORM				$ -
CITY - SANITARY				$ -
CITY - WATER				$ -
CITY - SRTS				$ -
MNDOT				$ -
SCHUETTE ENTERPRISES LLC				$ -
PARCEL # 13.028.1500				$ -
ALLAN R. RADEL				$ -
PARCEL #24.028.0501	$ 76,000.00			$ 76,000.00
PARCEL # 24.429.0100				$ -
CLEVER PIGS PROPERTIES LLC				$ -
1601 MANTORVILLE AVE N				$ -
JAMES FOOTE				$ -
1701 MANTORVILLE AVE N				$ -
RICHARD R. TUNE				$ -
1801 MANTORVILLE AVE N				$ -
TOTAL	$ 484,000.00	$ -	$ -	**$ 484,000.00**

SCHEDULE 5				
	ROADWAY	TRAIL	SANITARY	TOTAL
CITY - GENERAL FUND				$ -
CITY - MSAS				$ -
CITY -STORM				$ -
CITY - SANITARY				$ -
CITY - WATER				$ -
CITY - SRTS				$ -
MNDOT				$ -
SCHUETTE ENTERPRISES LLC				
PARCEL # 13.028.1500				$ -
ALLAN R. RADEL				
PARCEL #24.028.0501				$ -
PARCEL # 24.429.0100				$ -
CLEVER PIGS PROPERTIES LLC				
1601 MANTORVILLE AVE N			$ 20,300.00	$ 20,300.00
JAMES FOOTE				
1701 MANTORVILLE AVE N			$ 20,300.00	$ 20,300.00
RICHARD R. TUNE				
1801 MANTORVILLE AVE N			$ 20,300.00	$ 20,300.00
TOTAL	$ -	$ -	$ 61,000.00	**$ 61,000.00**

Total				
	ROADWAY	TRAIL	SANITARY	TOTAL
CITY - GENERAL FUND	$ 408,000.00	$ 57,000.00	$ -	$ 465,000.00
CITY - MSAS	$ 2,216,500.00	$ -	$ -	$ 2,216,500.00
CITY -STORM	$ -	$ -	$ -	$ -
CITY - SANITARY	$ -	$ -	$ -	$ -
CITY - WATER	$ -	$ -	$ -	$ -
CITY - SRTS	$ -	$ 95,000.00	$ -	$ 95,000.00
MNDOT	$ 1,300,000.00	$ -	$ -	$ 1,300,000.00
SCHUETTE ENTERPRISES LLC				
PARCEL # 13.028.1500	$ 362,500.00			$ 362,500.00
ALLAN R. RADEL				
PARCEL #24.028.0501	$ 76,000.00			$ 76,000.00
PARCEL # 24.429.0100				$ -
CLEVER PIGS PROPERTIES LLC				$ -
1601 MANTORVILLE AVE N			$ 20,300.00	$ 20,300.00
JAMES FOOTE				$ -
1701 MANTORVILLE AVE N			$ 20,300.00	$ 20,300.00
RICHARD R. TUNE				$ -
1801 MANTORVILLE AVE N			$ 20,300.00	$ 20,300.00
TOTAL	$ 4,363,000.00	$ 152,000.00	$ 61,000.00	**$ 4,576,000.00**

INTERSECTION CONTROL EVALUATION REPORT FOR

Mantorville Avenue (TH 57) and 16th Street

KASSON, MINNESOTA

Prepared for:
City of Kasson, MN
2019

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

Eric J. Tott, P.E.

54543

Date License. No.

whks

engineers + planners + land surveyors

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Project Description

This intersection control evaluation (ICE) has been prepared for the intersection of Mantorville Avenue (TH 57) and 16th Street in the City of Kasson, Dodge County, Minnesota. This report applies the signal justification warrants, as outlined in the Minnesota Manual on Uniform Traffic Control Devices (MUTCD) and uses engineering methods outlined in the Highway Capacity Manual 6th Edition. This report presents the findings of different traffic control evaluations.

Currently, the area surrounding the intersection is mixed agricultural / residential / commercial. The northwest quadrant consists of a commercial auto repair shop. The northeast quadrant consists of the Kasson-Mantorville Senior High School. The southeast quadrant consists of a residential subdivision. The southwest quadrant consists of an agricultural field. The analyzed intersection is approximately 200 feet west of the southwest entrance to Kasson-Mantorville Senior High School and 800 feet south of the northwest entrance to the Kasson-Mantorville Senior High School.

The purpose of this ICE report is to determine which type of intersection control is the most beneficial for the intersection. Specifically, this report will look at whether side-street stop, multi-way stop, traffic signal, or a roundabout is the most beneficial method of traffic control for the intersection.

Intersection Location

The intersection of Mantorville Avenue (TH 57) and 16th Street is located in the City of Kasson, Minnesota. The study area lies in the east central region of Dodge County. See Figure 1.

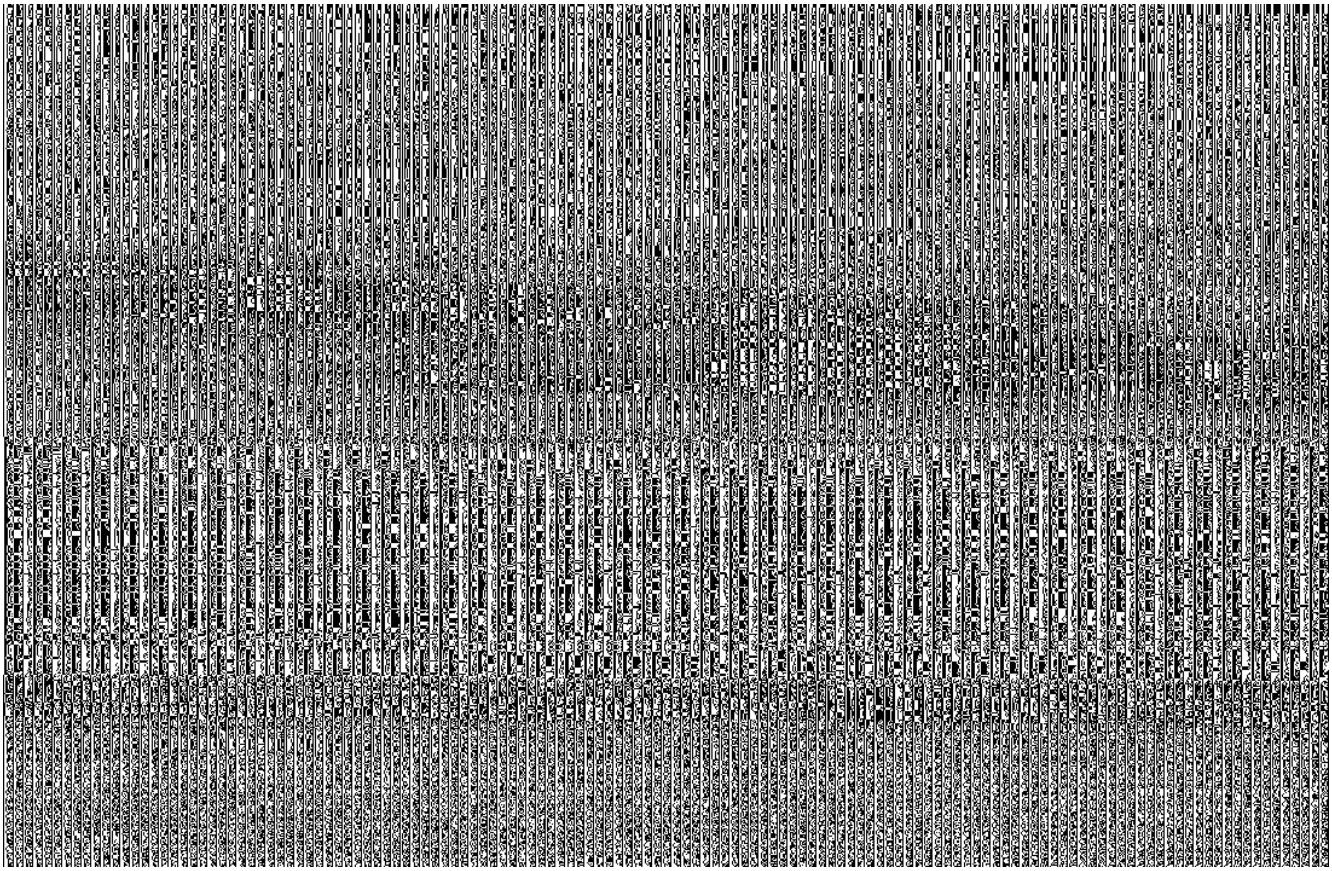


FIGURE 1 – Location Map

Existing Intersection Characteristics

Mantorville Avenue is a north-south route. The side street, 16th Avenue, is an east-west route. Currently the intersection is a three-leg intersection operating under side-street stop control, with free-flow on Mantorville Avenue. The south approach consists of one lane in each direction with a right turn lane. The north approach consists of one lane in each direction. The east approach consists of one lane in each direction. There is an entrance on the west side of the intersection to the auto repair shop. See Figure 2 for existing lane configuration. The speed limit on Mantorville Avenue is 50 mph. The speed limit on the side street 16th Street is 30 mph.

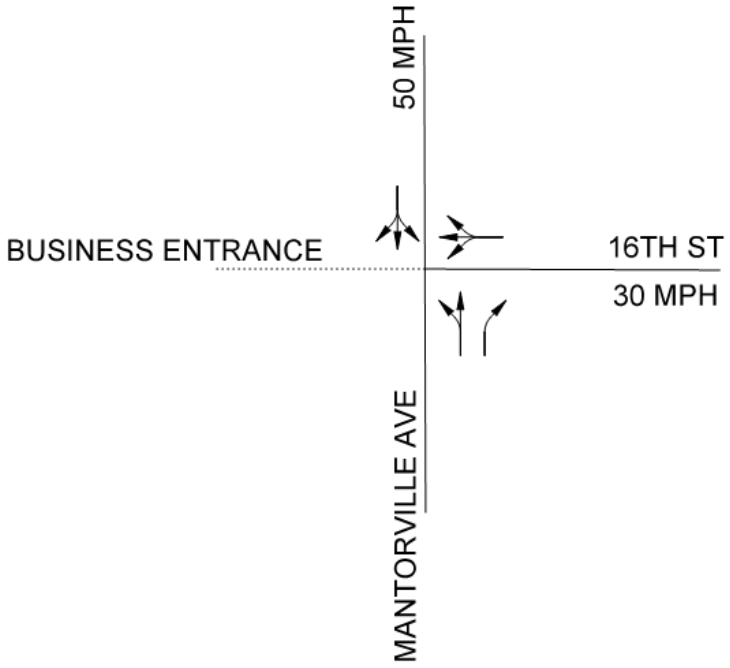


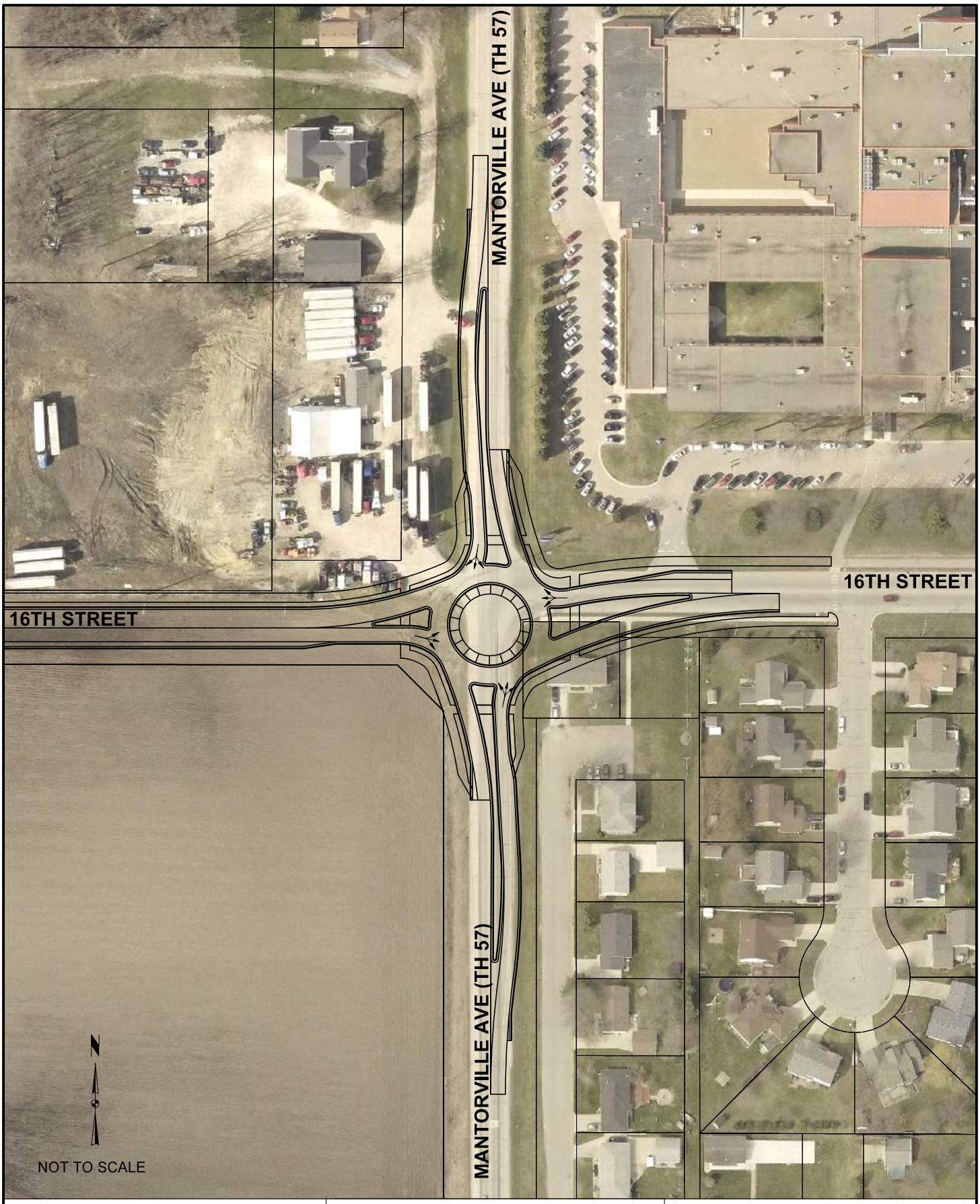
FIGURE 2 – Existing Lane Configuration

Proposed Lane Configuration

The City plans to extend 16th Street west to 240th Avenue. As a result, the intersection of Mantorville Avenue (TH 57) and 16th Street would become a four-legged intersection. All traffic analysis was performed using the four-legged configuration. The lane configuration for signalized control included northbound and southbound left turn lanes to provide additional capacity for left turning traffic. See Figure 3 for the conceptual lane configuration with left turn lanes.

A single lane roundabout is also evaluated in this ICE report. All approaches to the roundabout are single lanes with no auxiliary lanes. See Figure 4 for the conceptual roundabout configuration.

ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST	CONCEPTUAL LANE CONFIGURATION	whks engineers + planners + land surveyors



ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	CONCEPTUAL ROUNDABOUT FIGURE 4	whks engineers + planners + land surveyors

Traffic Volumes

Existing Traffic

Directional intersection traffic volumes were obtained from intersection traffic counts performed Tuesday December 18, 2018. See Appendix A for the traffic count data. Traffic counts were performed from 6 AM to 7 PM. The AM peak hour occurred from 7:15 AM to 8:15 AM. The PM peak hour occurred from 5 PM to 6 PM. The growth factor used for the future traffic was 1% per year. Using a 1% compound growth factor, the traffic count volumes were factored up to obtain design year (2038) volumes. See Figure 5 for the traffic volumes.

Traffic Changes Due to Planned Development

Developments are planned for the proposed 16th Street extension including a 10-acre industrial manufacturing site, 18 acres of retail commercial development, 12 acres of high density residential development and 62 acres of low density residential. See Figure 6. The peak hour trip generation was estimated using The Institute of Transportation Engineers (ITE) Trip Generation Manual using the land use types provided by the City of Kasson. How drivers will drive to and depart from the development sites was determined by evaluating where the project generated traffic was expected to enter and exit each of the future development sites. The location of major streets and the type of adjacent streets were also considered when estimating the distribution. See Appendix B for a summary of the trip distribution and assignments. It is anticipated that the traffic patterns through the city will change after the extension of 16th Street. Estimated traffic pattern revisions were made based on current ADT maps. It is assumed that approximately 750 vehicles per day currently using northbound and southbound Mantorville Avenue will use the extension of 16th Street. See Appendix B for ADT revisions. See Figure 7 for 2038 additional peak hour traffic due to future development including the ADT revisions.

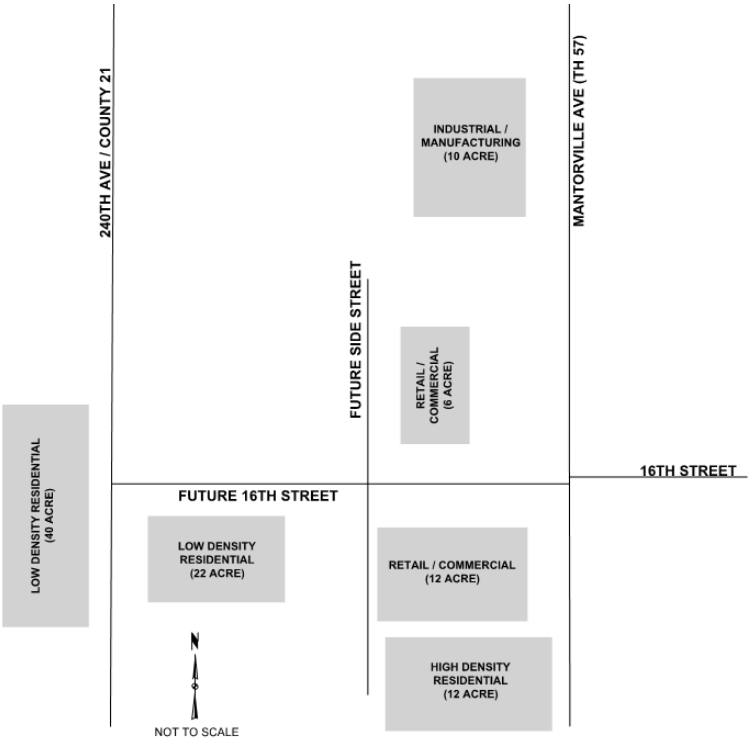
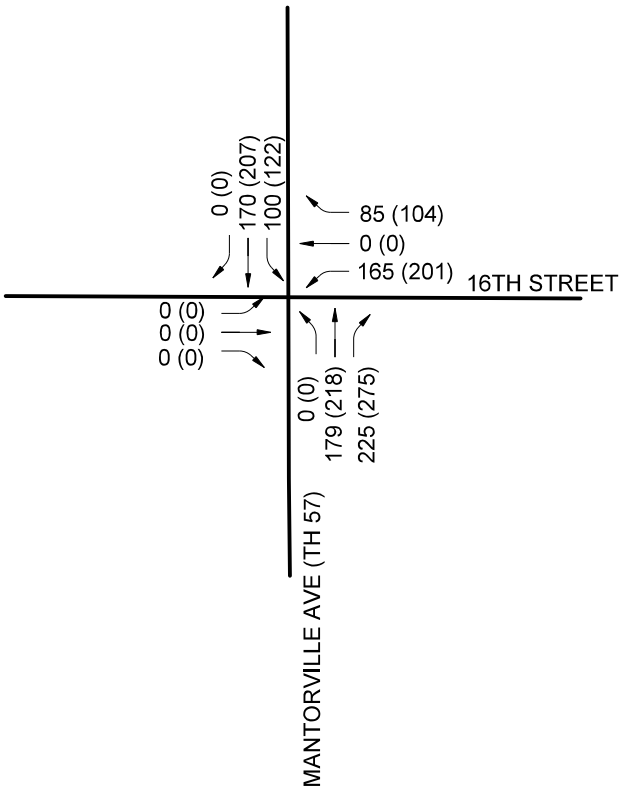
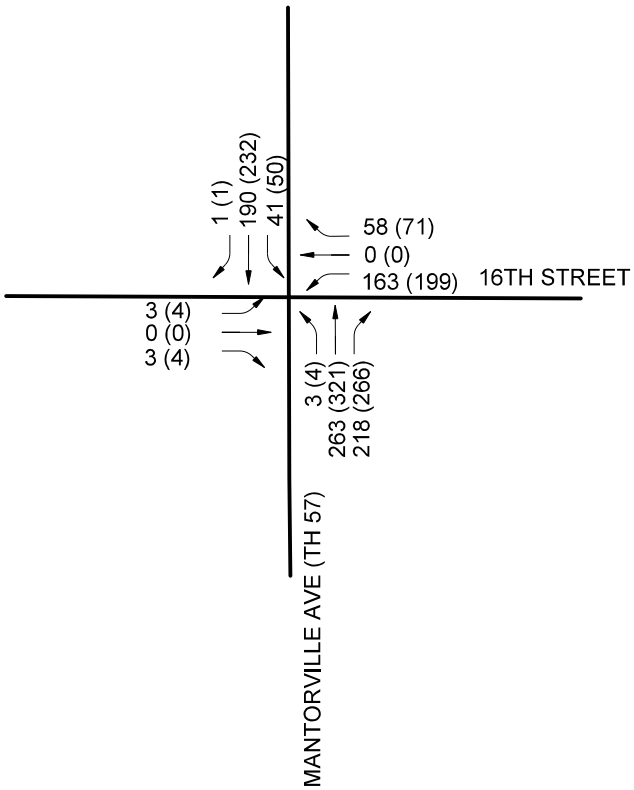


FIGURE 6 – Proposed Developments



AM PEAK HOUR TRAFFIC



PM PEAK HOUR TRAFFIC

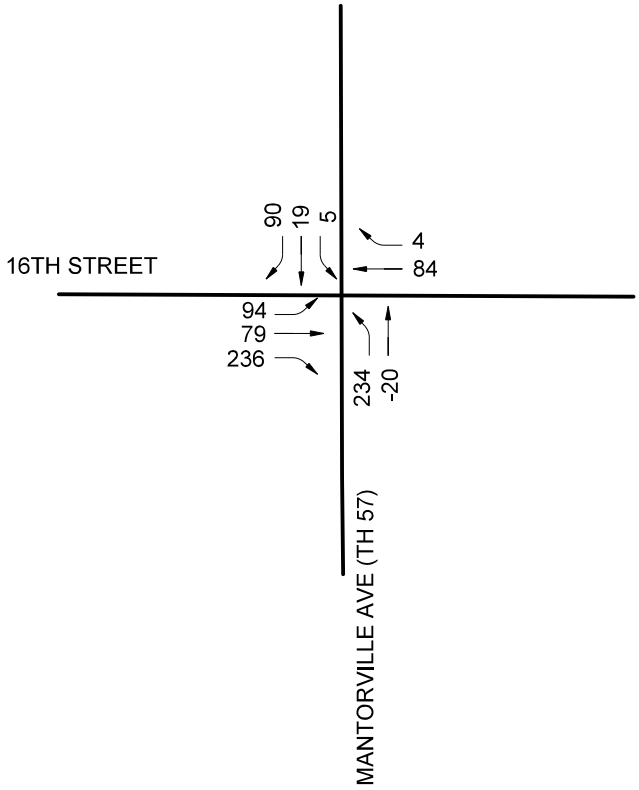
NOT TO SCALE

LEGEND

MOVEMENT DESIGNATION

22 (40) 2018 (2038) PEAK VOLUME

MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	BACKGROUND TRAFFIC SUMMARY HOURLY VOLUMES FIGURE 5	whks engineers + planners + land surveyors



FUTURE 2038 TRAFFIC
DUE TO DEVELOPMENT

NOT TO SCALE

LEGEND

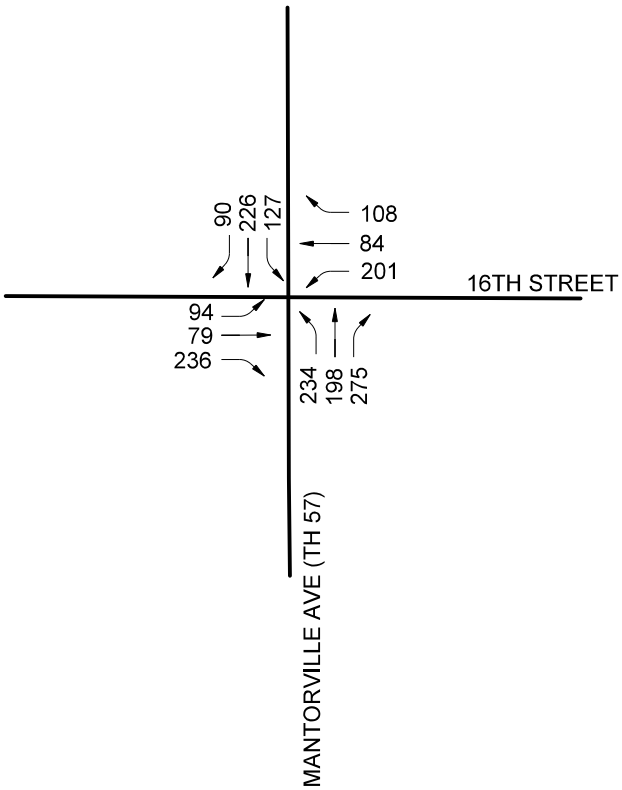
MOVEMENT DESIGNATION

22 TRAFFIC VOLUME

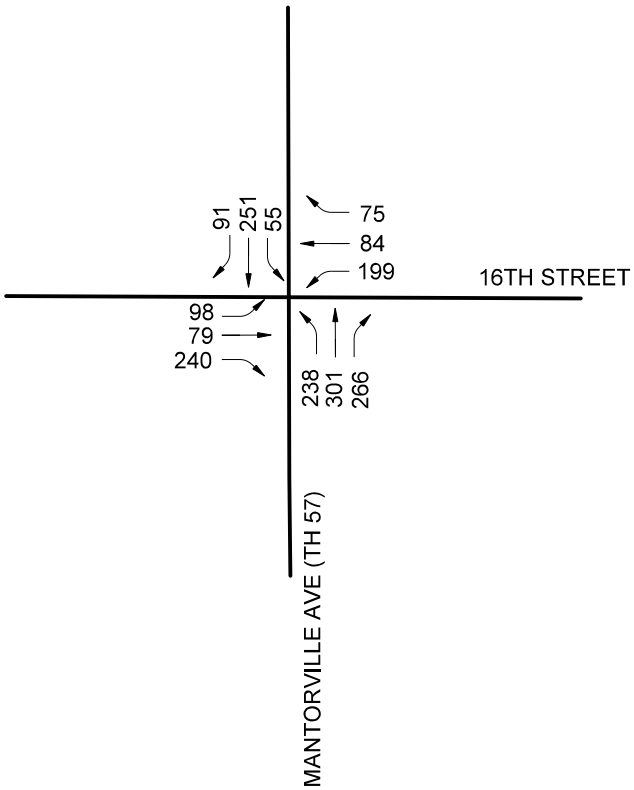
MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	FUTURE 2038 DEVELOPMENT FIGURE 7	whks engineers + planners + land surveyors

Total Traffic

The peak hour total traffic volumes at the intersection were generated by combining the projected development traffic and the projected background traffic volumes. The turning movement diagrams and associated total 2038 volumes are shown in Figure 8.



AM PEAK HOUR TRAFFIC



PM PEAK HOUR TRAFFIC

NOT TO SCALE

LEGEND

MOVEMENT DESIGNATION

22 TRAFFIC VOLUME

MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	TOTAL 2038 VOLUMES WITH DEVELOPMENT FIGURE 8	whks engineers + planners + land surveyors

Intersection Analyses

The capacity of the intersection was analyzed using the procedures outlined in the *Highway Capacity Manual 6th Edition* (HCM), the intersection was modeled using Synchro Studio 9 with SimTraffic 9 and Sidra Intersection 8.0. The results of the analysis for each scenario follow.

Level of Service (LOS) at intersections is primarily a function of peak hour turning movement volumes, intersection lane configuration, and traffic control. For intersection analysis, the HCM defines LOS in terms of the average control delay at the intersection in seconds per vehicle. Level of service is broken down into letter grades, with LOS A representing good operations and LOS F representing poor operations. LOS E is considered to be at capacity. MnDOT policy is that LOS D is acceptable in urban areas. Table 1 shows the level of service correlations to seconds of delay for signalized intersections and stop control (unsignalized) intersections. Currently in the United States, roundabout control is also categorized as unsignalized.

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

TABLE 1 – Intersection LOS Criteria

2018 Existing Traffic Volumes Capacity Analysis

The intersection was analyzed using the Synchro/SimTraffic and Sidra Intersection software programs, which use the Highway Capacity Manual (HCM) methodology. The intersection was analyzed using the 2018 traffic volumes. Four intersection control types were analyzed; side-street stop, multi-way stop, traffic signal, and roundabout. A summary of the detailed LOS results for each intersection control type is shown in Appendix C.

Side-Street Stop Control

During the AM and PM peak hours, all movements are expected to operate at satisfactory levels of service. See Table 2 for LOS Summary and Figure 9 for lane LOS.

Multi-Way Stop Control

During the AM and PM peak hours, all movements are expected to operate at satisfactory levels of service. See Table 2 for LOS Summary and Figure 10 for lane LOS.

Signal Control

During the AM and PM peak hours, all movements are expected to operate at satisfactory levels of service. See Table 2 for LOS Summary and Figure 11 for lane LOS.

Roundabout Control

During the AM and PM peak hours, all movements are expected to operate at satisfactory levels of service. See Table 2 for LOS Summary and Figure 12 for lane LOS.

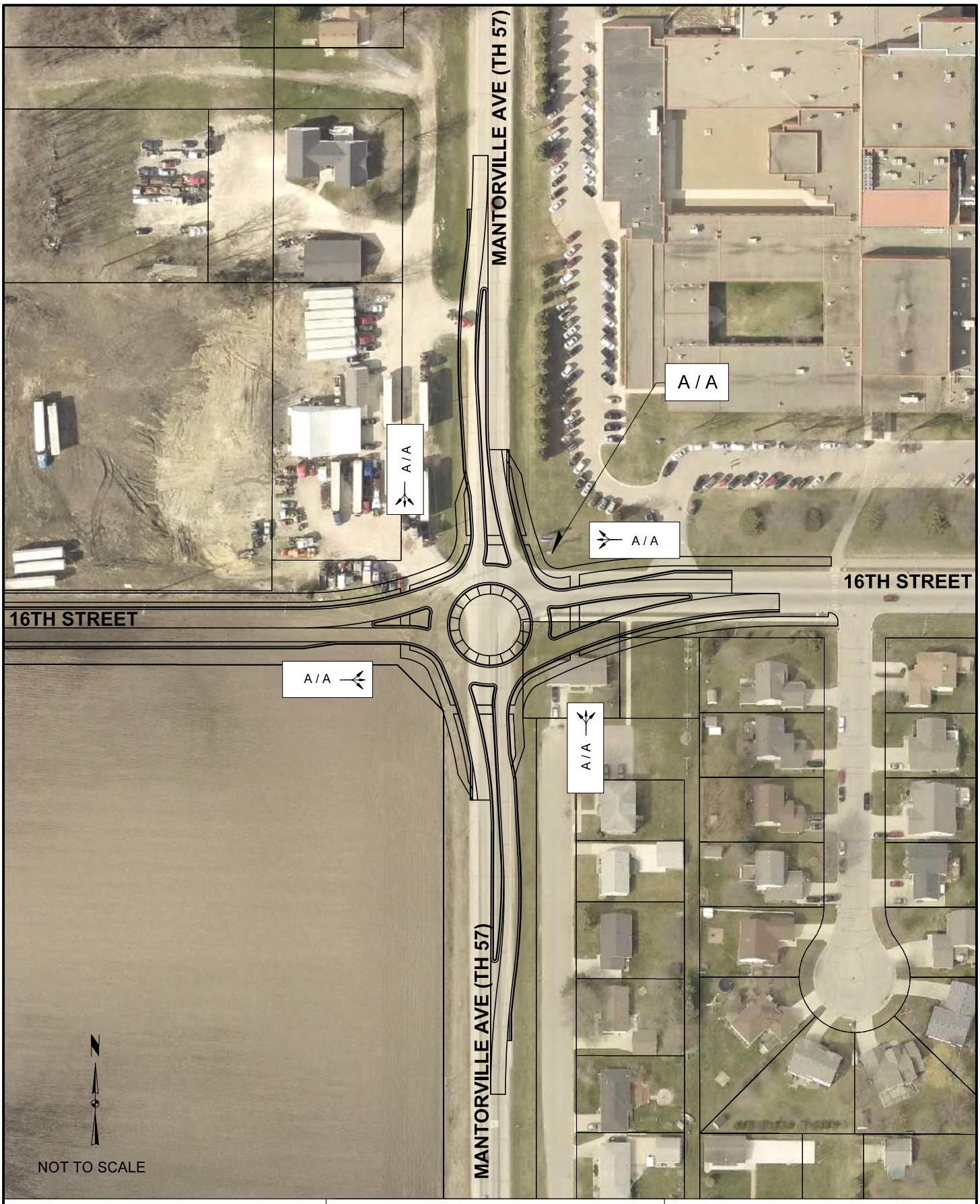
2018 Level of Service									
		Side Street Stop		Multi-Way Stop		Traffic Signal		Roundabout	
		AM	PM	AM	PM	AM	PM	AM	PM
APPROACH	NB	A	A	B	B	B	B	A	A
	SB	A	A	B	B	B	B	A	A
	EB	A	B	B	A	A	A	A	A
	WB	C	C	B	B	B	B	A	A
Intersection LOS				B	B	B	B	A	A

TABLE 2 – 2018 LOS Summary

ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	2018 SIDE STREET STOP CONTROL LEVEL OF SERVICE & GEOMETRY FIGURE 9	whks engineers + planners + land surveyors

ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	2018 ALL WAY STOP CONTROL LEVEL OF SERVICE & GEOMETRY FIGURE 10	whks engineers + planners + land surveyors

ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	2018 SIGNALIZED CONTROL LEVEL OF SERVICE & GEOMETRY FIGURE 11	whks engineers + planners + land surveyors



ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	2018 ROUNDABOUT CONTROL LEVEL OF SERVICE & GEOMETRY FIGURE 12	whks engineers + planners + land surveyors

2038 Traffic Volumes Capacity Analysis

The intersection was analyzed using the Synchro/SimTraffic and Sidra Intersection software programs, which use the Highway Capacity Manual (HCM) methodology. The intersection was analyzed using the 2038 total traffic volumes with development. Four intersection control types analyzed; side-street stop, multi-way stop, traffic signal, and roundabout.

A summary of the detailed LOS results for each intersection control type are shown in the Appendix D.

Side-Street Stop Control

During the AM and PM peak hours, the northbound and southbound movements are expected to operate at a satisfactory level of service. The eastbound and westbound movements are expected to operate at a LOS F. See Table 3 for LOS Summary and Figure 13 for lane LOS.

Based on this analysis, side street stop control is not an acceptable method of control for this intersection.

Multi-Way Stop Control

During the AM and PM peak hour the intersection is expected to operate at an overall LOS F. All movements are expected to operate at unsatisfactory levels of service. See Table 3 for LOS Summary and Figure 14 for lane LOS.

Based on this analysis, multi-way stop control is not an acceptable method of control for this intersection.

Signal Control

The lane configuration for signalized control included northbound and southbound left turn lanes to provide additional capacity for left turning traffic.

During the AM and PM peak hours, the intersection is expected to operate at an overall LOS B. The individual movements are also expected to operate at satisfactory levels of service. See Table 3 for LOS Summary and Figure 15 for lane LOS.

Based on this analysis, traffic signal control is an acceptable method of control for this intersection.

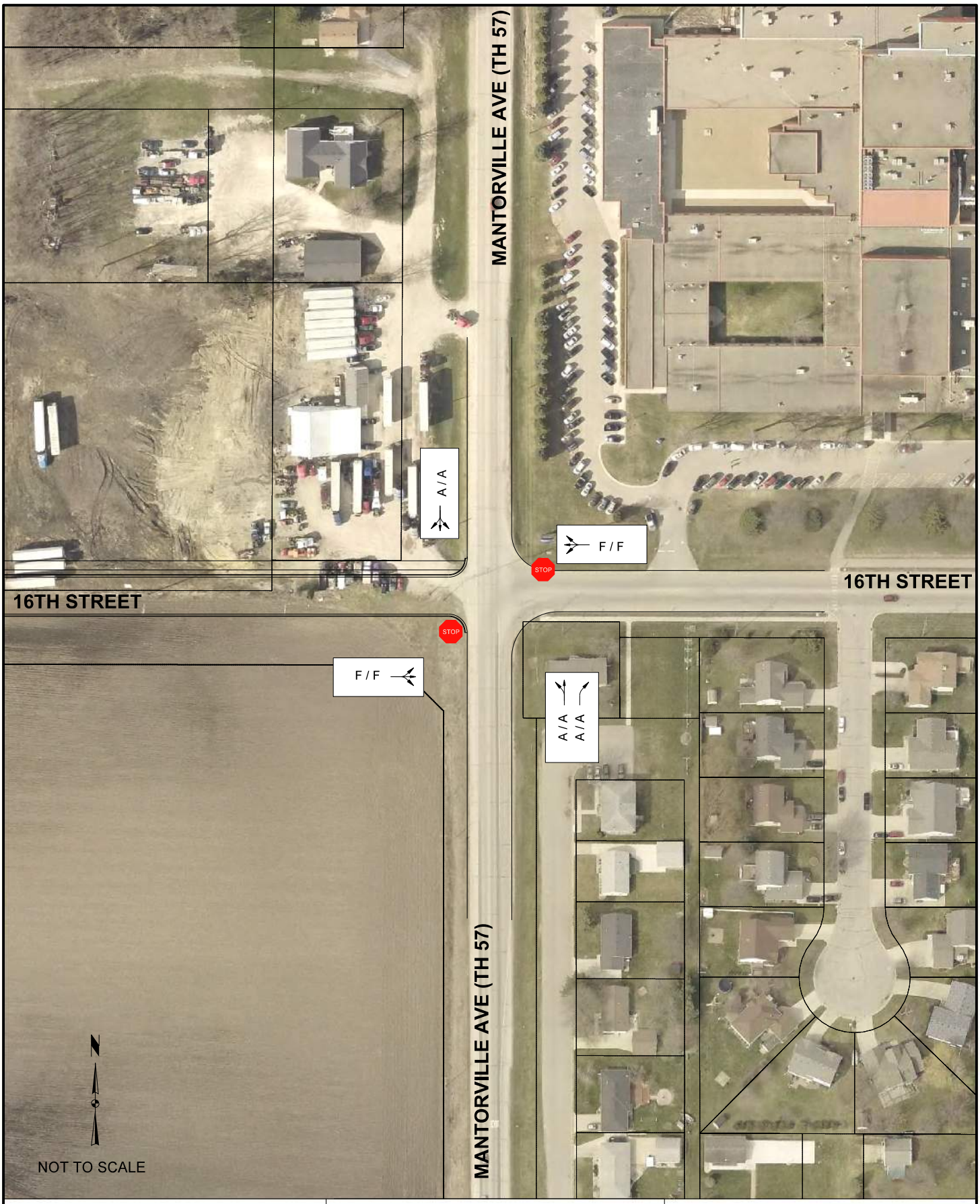
Roundabout Control

During the AM and PM peak hours, the intersection is expected to operate at an overall LOS C. The individual movements are also expected to operate at satisfactory levels of service. See Table 3 for LOS Summary and Figure 16 for lane LOS.

Based on this analysis, roundabout control is an acceptable method of control for this intersection.

2038 Level of Service									
		Side Street Stop		Multi-Way Stop		Traffic Signal		Roundabout	
		AM	PM	AM	PM	AM	PM	AM	PM
APPROACH	NB	A	A	F	F	B	B	C	C
	SB	A	A	F	F	B	B	C	B
	EB	F	F	F	F	B	B	C	B
	WB	F	F	F	F	B	B	B	C
Intersection LOS				F	F	B	B	C	C

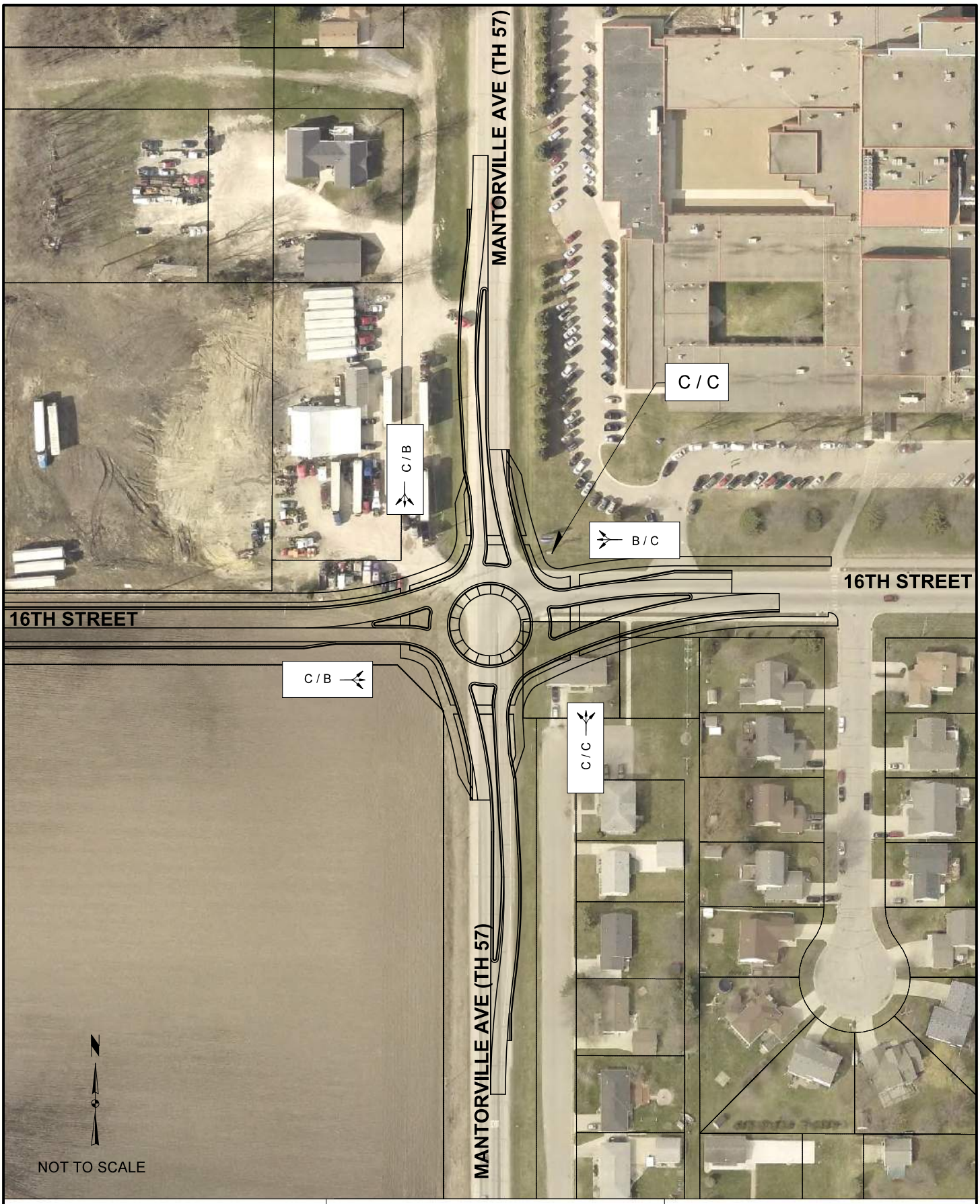
TABLE 3 – 2038 LOS Summary



ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	2038 SIDE STREET STOP CONTROL LEVEL OF SERVICE & GEOMETRY FIGURE 13	whks engineers + planners + land surveyors

ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	2038 ALL WAY STOP CONTROL LEVEL OF SERVICE & GEOMETRY FIGURE 14	whks engineers + planners + land surveyors

ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	2038 SIGNALIZED CONTROL LEVEL OF SERVICE & GEOMETRY FIGURE 15	whks engineers + planners + land surveyors



ICE REPORT MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	2038 ROUNDABOUT CONTROL LEVEL OF SERVICE & GEOMETRY FIGURE 16	whks engineers + planners + land surveyors

Warrant Analysis

A warrant analysis was performed in accordance with the 2018 Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD). A warrant analysis was performed for a multi-way stop application and for a traffic signal control at the intersection. There are no warrants for the installation of roundabouts. However, MnDOT current policy states that roundabouts are considered warranted if traffic volumes meet the criteria for either multi-way stop or traffic signal control warrants.

Multi-way Stop Control

The multi-way stop application warrant requires that the combined vehicular volumes on both the major streets and minor streets meet certain volumes (300 for combined major streets and 200 for combined minor streets) over 8 hours as well as that the average delay to the minor street vehicular traffic is at least 30 seconds per vehicle during the highest hour. The vehicular volumes are met for this warrant. A detailed warrant analysis for multi-way stop applications can be found in Appendix E.

Traffic Signal Control

A signal warrant analysis was also completed for this intersection using the counts obtained in December of 2018. For this analysis, the MnMUTCD signal Warrants 1-9 were evaluated for this intersection. The right turning traffic from the minor leg (16TH Street) was not included in the warrant analysis. This is based on MnDOT standard practice since these movements are made relatively easily, have minimal conflicts and therefore do not require a traffic signal to minimize delay or improve safety. The traffic signal warrants were analyzed for the intersection and warrants are met. A detailed warrant analysis for signal applications can be found in Appendix E.

Roundabout Control

Since warrants are met for multi-way stop control and traffic signal control, a roundabout is warranted.

Safety Analysis

Crash data was obtained from MnDOT. There have been nineteen recorded crashes at the intersection of Mantorville Avenue (TH 57) and 16th Street. The majority of crashes were right angle, distracted driving and failed-to-yield. Other crash types included turning, rear end, weather related, defective brakes, ran-off-road and sideswipe. See Appendix F for the detailed crash data.

Based on the crash data provided at this location, there is a need to address safety issues. Right angle, distracted driving and failed-to-yield crashes are severe crash types at high speeds.

General discussion of the type of traffic control and how it affects intersection safety is presented below.

Traffic Signal Control

Traffic signal control makes traffic flow smoother and safer when used in proper situations. However, traffic signals cause traffic to stop where it may not have had to stop before. When used at an intersection where not justified, signals can cause unnecessary delay and frustration in drivers, who then seek alternate routes.

Installing traffic signals may reduce crashes by 23% (p. 16, DRCRF[1]) and reduce property damage only crashes and injuries by 23% (p. 16, DRCRF[1]). Actual crash reductions vary due to site-specific factors.

Roundabout Control

Studies show that roundabout control improves safety in the following ways:

1. Slower vehicle speeds
2. Decreased number of conflict points
3. Reduction of accident severity

Installing a roundabout is a good traffic calming technique. Reduced vehicle speed is achieved by controlling geometrics and, therefore, speed reduction can be realized at all times of the day and during various traffic volumes. Roundabout control is a flexible type of control that handles varying traffic volumes efficiently.

Installing a roundabout may reduce crashes by 44% (p. 30, DRCRF[1]) and may reduce property damage only crashes by 42% and injuries by 82% (p. 31, DRCRF[1]). Actual crash reductions vary due to site-specific factors.

Schools

The analyzed intersection is approximately 200 feet west of the southwest entrance to Kasson-Mantorville Senior High School and 800 feet south of the northwest entrance to the Kasson-Mantorville Senior High School. Based on the MNDOT Traffic Engineering Manual, Chapter 13, it is not recommended to install a marked crosswalk across Mantorville Avenue due to the posted speed being greater than 45 mph. If a roundabout is constructed at this intersection, the speed would be reduced allowing for a marked crosswalk and advanced warning signs be installed. A roundabout would provide safer pedestrian crossings at this intersection by reducing speed.

Right of way

No additional right of way is required for the construction of a traffic signal or roundabout.

Political Concerns

Drivers are familiar with traffic signal controlled intersections with left and right turn lanes. Driver familiarity would not be a concern for traffic signal control.

While roundabouts are becoming more common, some communities still experience resistance to their installation. The first roundabout in the neighboring City of Byron was accepted with positive feedback. The proposed roundabout would be the second in this area and user familiarity is not expected to be a concern.

Findings and Recommendations

Capacity Analysis

Side-street stop control and multi-way stop control do not provide an acceptable Level of Service for future traffic.

The capacity analyses showed that signalized control or roundabout control would both provide acceptable Levels of Service.

Warrant Analysis

Multi-way stop and traffic signal warrants are met for design year volumes. Since warrants are met for multi-way stop control or traffic signal control a roundabout is warranted.

Safety Analysis

Based on the crash data provided, specific safety issues do need to be addressed in the proposed improvements. The majority of the crashes were right angle, distracted driving and failed to yield.

Roundabouts offer significant safety benefits in comparison to signalized intersections. Roundabouts provide an overall reduction in vehicle speed, eliminate dangerous intersections, such as red-light running, and remove some of the most serious conflict points including angle, left-turn, and head-on crashes.[(2)]

It should be noted that roundabout control is expected to provide an additional 20% reduction in crashes and an additional 60% reduction in injuries over signalized control.

Geometric Analysis

With traffic signal control, the intersection will need to be reconstructed with northbound and southbound turn lanes.

With roundabout control, the roadway approaches to the intersection will need to be reconstructed. Single lane approaches and a single circulating lane roundabout will be adequate for current and projected traffic.

Summary of Findings

Side-street and multi-way stop control do not provide an acceptable Level of Service for future traffic. Therefore side-street and multi-way stop control would not be acceptable methods of control. The capacity analyses show that signalized or roundabout control would both provide acceptable Levels of Service. MnDOT warrants are met for design year volumes for either signalized or roundabout control.

Based on the crash data provided, there are specific safety issues that need to be addressed in the proposed improvements. Roundabout control is a good traffic calming technique. Reduced vehicle speed is achieved by controlling geometrics and therefore, speed reduction can be realized at all times of the day and under varying traffic volumes. Roundabout control is expected to provide an additional 20% reduction in crashes and an additional 60% reduction in injuries over signalized control.

Based on these factors and the analyses performed in this study, a roundabout is recommended at the intersection of Mantorville Avenue (TH 57) and 16th Street.

Cost Analysis

A signalized intersection along with associated roadway improvements is estimated to cost $852,000.

A roundabout along with associated roadway improvements is estimated to cost $1,033,000.

Estimated costs are total construction cost and include engineering. A detailed summary of the cost estimates is included in Appendix G.

References

(1) Geni Bahar, Maurice Masliah, Rhys Wolff, Peter Park, Desktop Reference for Crash Reduction Factors, Report No. FHWA-SA-08-011 (Washington, D.C.: US Department of Transportation Federal Highway Administration, 2008).

(2) Christopher W. Jenks et. al, ROUNDABOUTS: An Informational Guide, Second Edition, Report No. 672 (Washington, D.C.: US Department of Transportation Federal Highway Administration, 2010), p.3-33.

APPENDIX A

Traffic Count Data

1601 Mantorville Ave N - TMC
Tue Dec 18, 2018
Full Length (6AM-7PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598071, Location: 44.043897, -92.748263

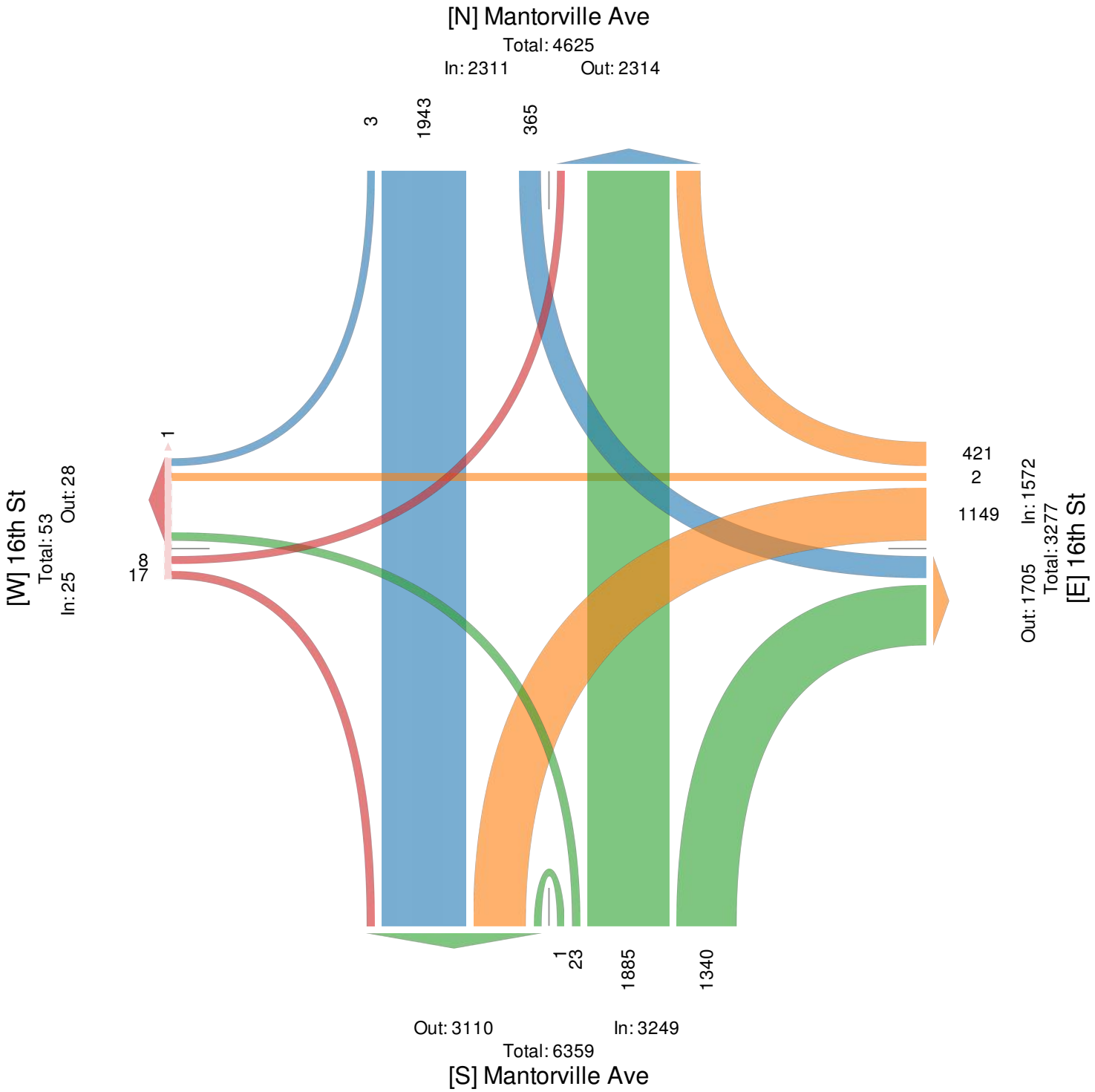
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mantorville Ave						16th St						Mantorville Ave						16th St						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2018-12-18 6:00AM	0	126	23	0	149	0	18	0	89	0	107	0	41	61	0	0	102	0	0	0	0	0	0	0	358
7:00AM	0	178	96	0	274	0	72	0	165	0	237	0	212	185	0	0	397	0	0	0	0	0	0	0	908
8:00AM	0	121	26	0	147	0	38	0	92	0	130	0	64	88	3	0	155	0	0	0	1	0	1	0	433
9:00AM	1	105	12	0	118	0	9	1	39	0	49	0	41	97	0	0	138	0	1	0	0	0	1	0	306
10:00AM	1	114	6	0	121	0	7	0	44	0	51	0	50	93	0	0	143	0	4	0	1	0	5	0	320
11:00AM	0	129	13	0	142	0	17	0	45	0	62	0	44	128	3	1	176	0	1	0	0	0	1	0	381
12:00PM	0	143	11	0	154	0	24	0	56	0	80	0	55	132	1	0	188	0	0	0	0	0	0	0	422
1:00PM	0	158	9	0	167	0	13	0	44	0	57	0	40	123	4	0	167	0	3	0	0	0	3	0	394
2:00PM	0	187	35	0	222	0	14	0	58	0	72	0	78	169	1	0	248	0	0	0	1	0	1	0	543
3:00PM	0	183	26	0	209	0	78	0	170	0	248	0	114	186	4	0	304	0	3	0	0	0	3	0	764
4:00PM	0	204	45	0	249	0	42	1	114	0	157	0	246	215	4	0	465	0	1	0	2	0	3	1	874
5:00PM	1	190	41	0	232	0	58	0	163	0	221	0	218	263	3	0	484	0	3	0	3	0	6	0	943
6:00PM	0	105	22	0	127	0	31	0	70	0	101	0	137	145	0	0	282	0	1	0	0	0	1	0	511
Total	3	1943	365	0	2311	0	421	2	1149	0	1572	0	1340	1885	23	1	3249	0	17	0	8	0	25	1	7157
% Approach	0.1%	84.1%	15.8%	0%	-	-	26.8%	0.1%	73.1%	0%	-	-	41.2%	58.0%	0.7%	0%	-	-	68.0%	0%	32.0%	0%	-	-	-
% Total	0%	27.1%	5.1%	0%	32.3%	-	5.9%	0%	16.1%	0%	22.0%	-	18.7%	26.3%	0.3%	0%	45.4%	-	0.2%	0%	0.1%	0%	0.3%	-	-
Lights	2	1882	350	0	2234	-	402	2	1103	0	1507	-	1303	1815	12	1	3131	-	13	0	5	0	18	-	6890
% Lights	66.7%	96.9%	95.9%	0%	96.7%	-	95.5%	100%	96.0%	0%	95.9%	-	97.2%	96.3%	52.2%	100%	96.4%	-	76.5%	0%	62.5%	0%	72.0%	-	96.3%
Single-Unit Trucks	1	26	2	0	29	-	4	0	20	0	24	-	9	26	9	0	44	-	2	0	1	0	3	-	100
% Single-Unit Trucks	33.3%	1.3%	0.5%	0%	1.3%	-	1.0%	0%	1.7%	0%	1.5%	-	0.7%	1.4%	39.1%	0%	1.4%	-	11.8%	0%	12.5%	0%	12.0%	-	1.4%
Articulated Trucks	0	16	0	0	16	-	0	0	1	0	1	-	1	23	2	0	26	-	2	0	2	0	4	-	47
% Articulated Trucks	0%	0.8%	0%	0%	0.7%	-	0%	0%	0.1%	0%	0.1%	-	0.1%	1.2%	8.7%	0%	0.8%	-	11.8%	0%	25.0%	0%	16.0%	-	0.7%
Buses	0	19	13	0	32	-	15	0	25	0	40	-	27	21	0	0	48	-	0	0	0	0	0	-	120
% Buses	0%	1.0%	3.6%	0%	1.4%	-	3.6%	0%	2.2%	0%	2.5%	-	2.0%	1.1%	0%	0%	1.5%	-	0%	0%	0%	0%	0%	-	1.7%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

1601 Mantorville Ave N - TMC
Tue Dec 18, 2018
Full Length (6AM-7PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598071, Location: 44.043897, -92.748263

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



1601 Mantorville Ave N - TMC
Tue Dec 18, 2018
AM Peak (7:15AM - 8:15AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598071, Location: 44.043897, -92.748263

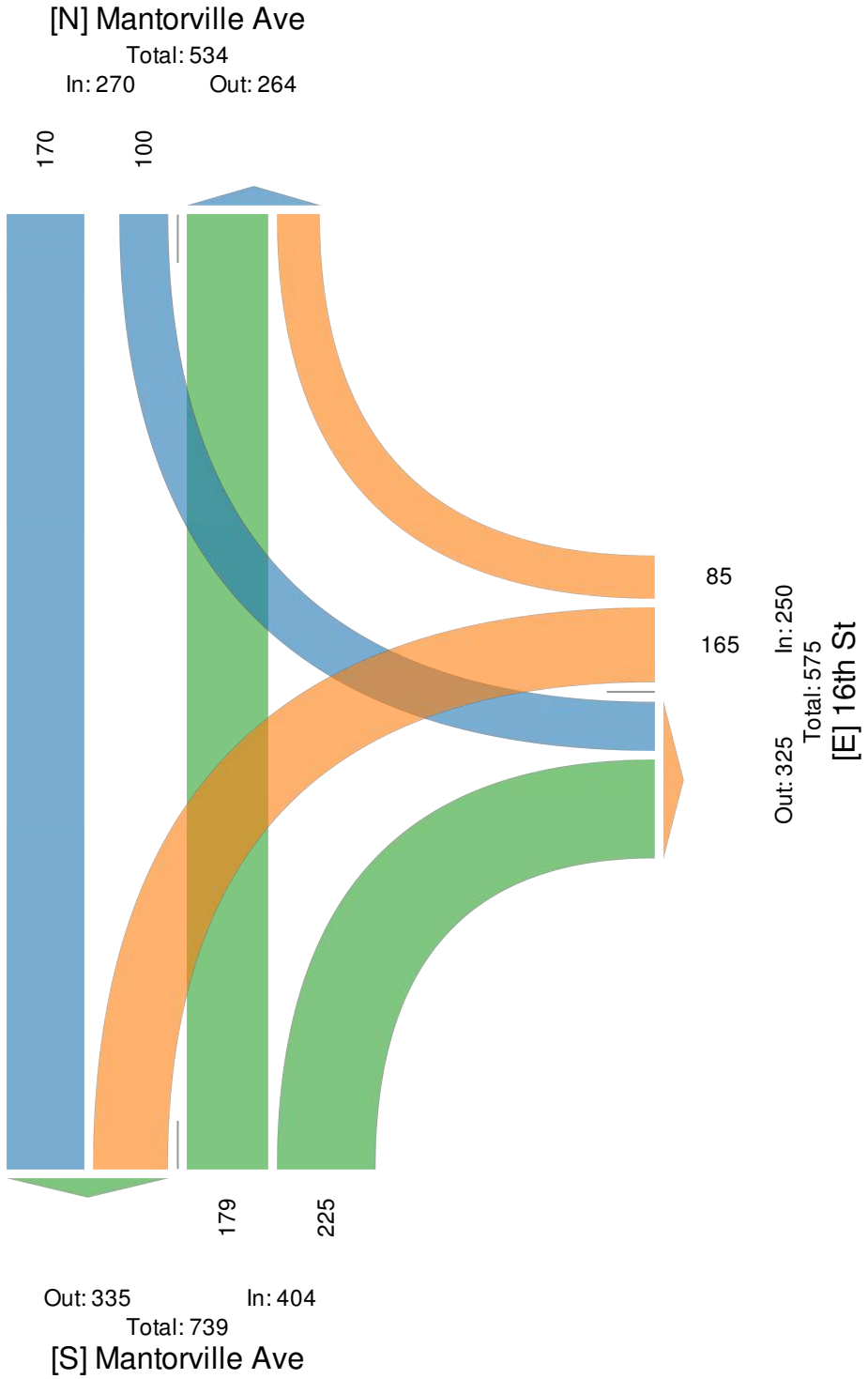
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mantorville Ave						16th St						Mantorville Ave						16th St						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2018-12-18 7:15AM	0	50	22	0	**72**	0	16	0	37	0	**53**	0	60	41	0	0	**101**	0	0	0	0	0	**0**	0	**226**
7:30AM	0	47	35	0	**82**	0	20	0	32	0	**52**	0	65	63	0	0	**128**	0	0	0	0	0	**0**	0	**262**
7:45AM	0	43	24	0	**67**	0	28	0	55	0	**83**	0	62	55	0	0	**117**	0	0	0	0	0	**0**	0	**267**
8:00AM	0	30	19	0	**49**	0	21	0	41	0	**62**	0	38	20	0	0	**58**	0	0	0	0	0	**0**	0	**169**
Total	0	170	100	0	**270**	0	85	0	165	0	**250**	0	225	179	0	0	**404**	0	0	0	0	0	**0**	0	**924**
% Approach	0%	63.0%	37.0%	0%	**-**	-	34.0%	0%	66.0%	0%	**-**	-	55.7%	44.3%	0%	0%	**-**	-	0%	0%	0%	0%	**-**	-	-
% Total	0%	18.4%	10.8%	0%	**29.2%**	-	9.2%	0%	17.9%	0%	**27.1%**	-	24.4%	19.4%	0%	0%	**43.7%**	-	0%	0%	0%	0%	**0%**	-	-
PHF	-	0.850	0.714	-	**0.823**	-	0.759	-	0.750	-	**0.753**	-	0.865	0.710	-	-	**0.789**	-	-	-	-	-	**-**	-	0.865
Lights	0	167	90	0	**257**	-	82	0	163	0	**245**	-	218	173	0	0	**391**	-	0	0	0	0	**0**	-	893
% Lights	0%	98.2%	90.0%	0%	**95.2%**	-	96.5%	0%	98.8%	0%	**98.0%**	-	96.9%	96.6%	0%	0%	**96.8%**	-	0%	0%	0%	0%	**-**	-	96.6%
Single-Unit Trucks	0	1	1	0	**2**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	0	0	0	0	**0**	-	3
% Single-Unit Trucks	0%	0.6%	1.0%	0%	**0.7%**	-	0%	0%	0%	0%	**0%**	-	0.4%	0%	0%	0%	**0.2%**	-	0%	0%	0%	0%	**-**	-	0.3%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	2	0	0	**2**	-	0	0	0	0	**0**	-	2
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	1.1%	0%	0%	**0.5%**	-	0%	0%	0%	0%	**-**	-	0.2%
Buses	0	2	9	0	**11**	-	3	0	2	0	**5**	-	6	4	0	0	**10**	-	0	0	0	0	**0**	-	26
% Buses	0%	1.2%	9.0%	0%	**4.1%**	-	3.5%	0%	1.2%	0%	**2.0%**	-	2.7%	2.2%	0%	0%	**2.5%**	-	0%	0%	0%	0%	**-**	-	2.8%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**-**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

1601 Mantorville Ave N - TMC
Tue Dec 18, 2018
AM Peak (7:15AM - 8:15AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598071, Location: 44.043897, -92.748263

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



1601 Mantorville Ave N - TMC
Tue Dec 18, 2018
Midday Peak (12PM - 1PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598071, Location: 44.043897, -92.748263

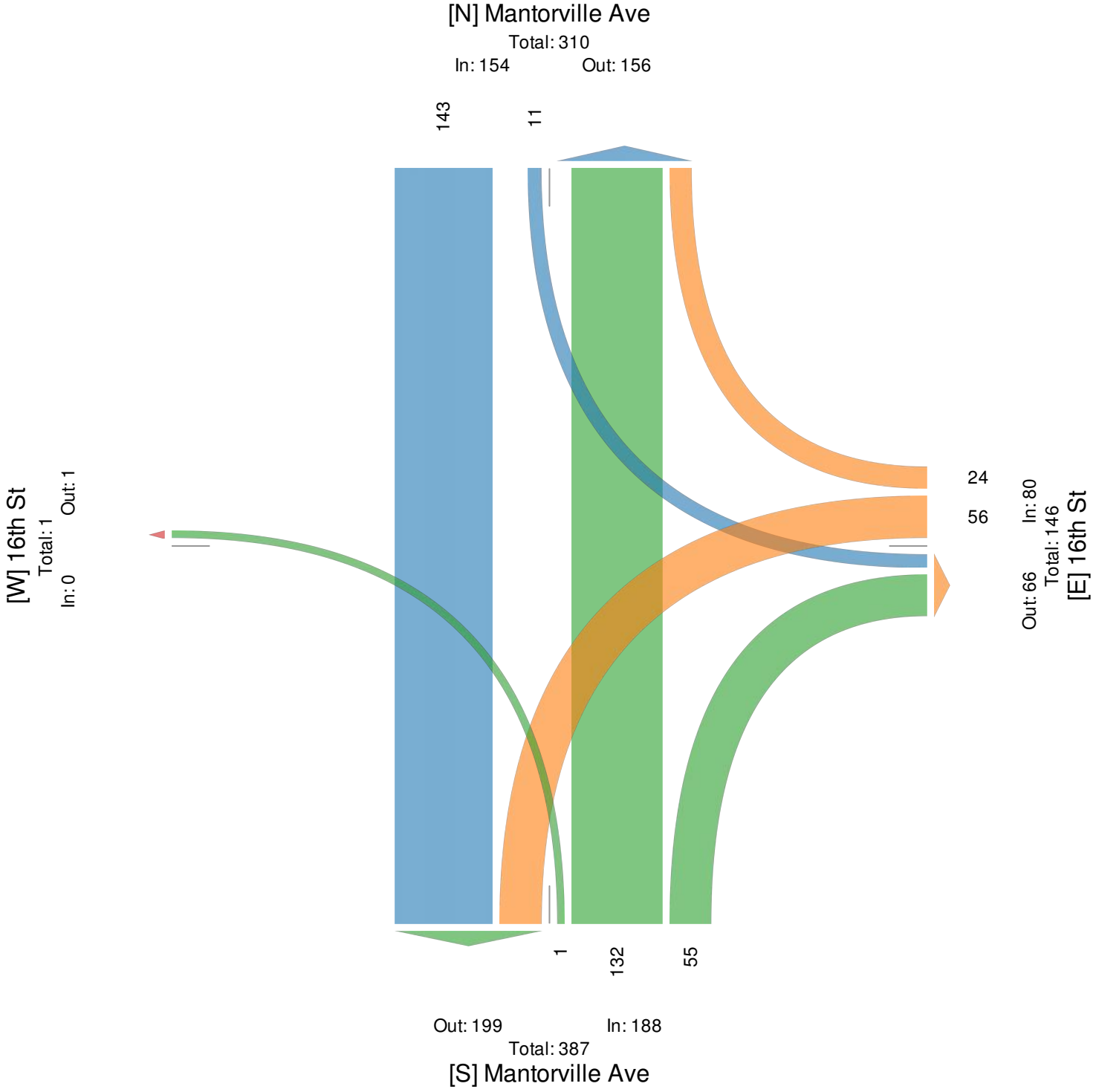
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mantorville Ave						16th St						Mantorville Ave						16th St						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2018-12-18 12:00PM	0	39	1	0	**40**	0	5	0	11	0	**16**	0	14	36	0	0	**50**	0	0	0	0	0	**0**	0	**106**
12:15PM	0	41	4	0	**45**	0	5	0	21	0	**26**	0	8	30	0	0	**38**	0	0	0	0	0	**0**	0	**109**
12:30PM	0	30	5	0	**35**	0	7	0	15	0	**22**	0	18	34	0	0	**52**	0	0	0	0	0	**0**	0	**109**
12:45PM	0	33	1	0	**34**	0	7	0	9	0	**16**	0	15	32	1	0	**48**	0	0	0	0	0	**0**	0	**98**
Total	0	143	11	0	**154**	0	24	0	56	0	**80**	0	55	132	1	0	**188**	0	0	0	0	0	**0**	0	**422**
% Approach	0%	92.9%	7.1%	0%	**-**	-	30.0%	0%	70.0%	0%	**-**	-	29.3%	70.2%	0.5%	0%	**-**	-	0%	0%	0%	0%	**-**	-	-
% Total	0%	33.9%	2.6%	0%	**36.5%**	-	5.7%	0%	13.3%	0%	**19.0%**	-	13.0%	31.3%	0.2%	0%	**44.5%**	-	0%	0%	0%	0%	**0%**	-	-
PHF	-	0.872	0.550	-	**0.856**	-	0.857	-	0.667	-	**0.769**	-	0.764	0.917	0.250	-	**0.904**	-	-	-	-	-	**-**	-	0.968
Lights	0	137	10	0	**147**	-	23	0	49	0	**72**	-	51	126	0	0	**177**	-	0	0	0	0	**0**	-	396
% Lights	0%	95.8%	90.9%	0%	**95.5%**	-	95.8%	0%	87.5%	0%	**90.0%**	-	92.7%	95.5%	0%	0%	**94.1%**	-	0%	0%	0%	0%	**-**	-	93.8%
Single-Unit Trucks	0	3	1	0	**4**	-	1	0	4	0	**5**	-	2	4	1	0	**7**	-	0	0	0	0	**0**	-	16
% Single-Unit Trucks	0%	2.1%	9.1%	0%	**2.6%**	-	4.2%	0%	7.1%	0%	**6.3%**	-	3.6%	3.0%	100%	0%	**3.7%**	-	0%	0%	0%	0%	**-**	-	3.8%
Articulated Trucks	0	3	0	0	**3**	-	0	0	1	0	**1**	-	1	1	0	0	**2**	-	0	0	0	0	**0**	-	6
% Articulated Trucks	0%	2.1%	0%	0%	**1.9%**	-	0%	0%	1.8%	0%	**1.3%**	-	1.8%	0.8%	0%	0%	**1.1%**	-	0%	0%	0%	0%	**-**	-	1.4%
Buses	0	0	0	0	**0**	-	0	0	2	0	**2**	-	1	1	0	0	**2**	-	0	0	0	0	**0**	-	4
% Buses	0%	0%	0%	0%	**0%**	-	0%	0%	3.6%	0%	**2.5%**	-	1.8%	0.8%	0%	0%	**1.1%**	-	0%	0%	0%	0%	**-**	-	0.9%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**-**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

1601 Mantorville Ave N - TMC
Tue Dec 18, 2018
Midday Peak (12PM - 1PM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598071, Location: 44.043897, -92.748263

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



1601 Mantorville Ave N - TMC

Tue Dec 18, 2018

PM Peak (5PM - 6PM) - Overall Peak Hour

All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 598071, Location: 44.043897, -92.748263

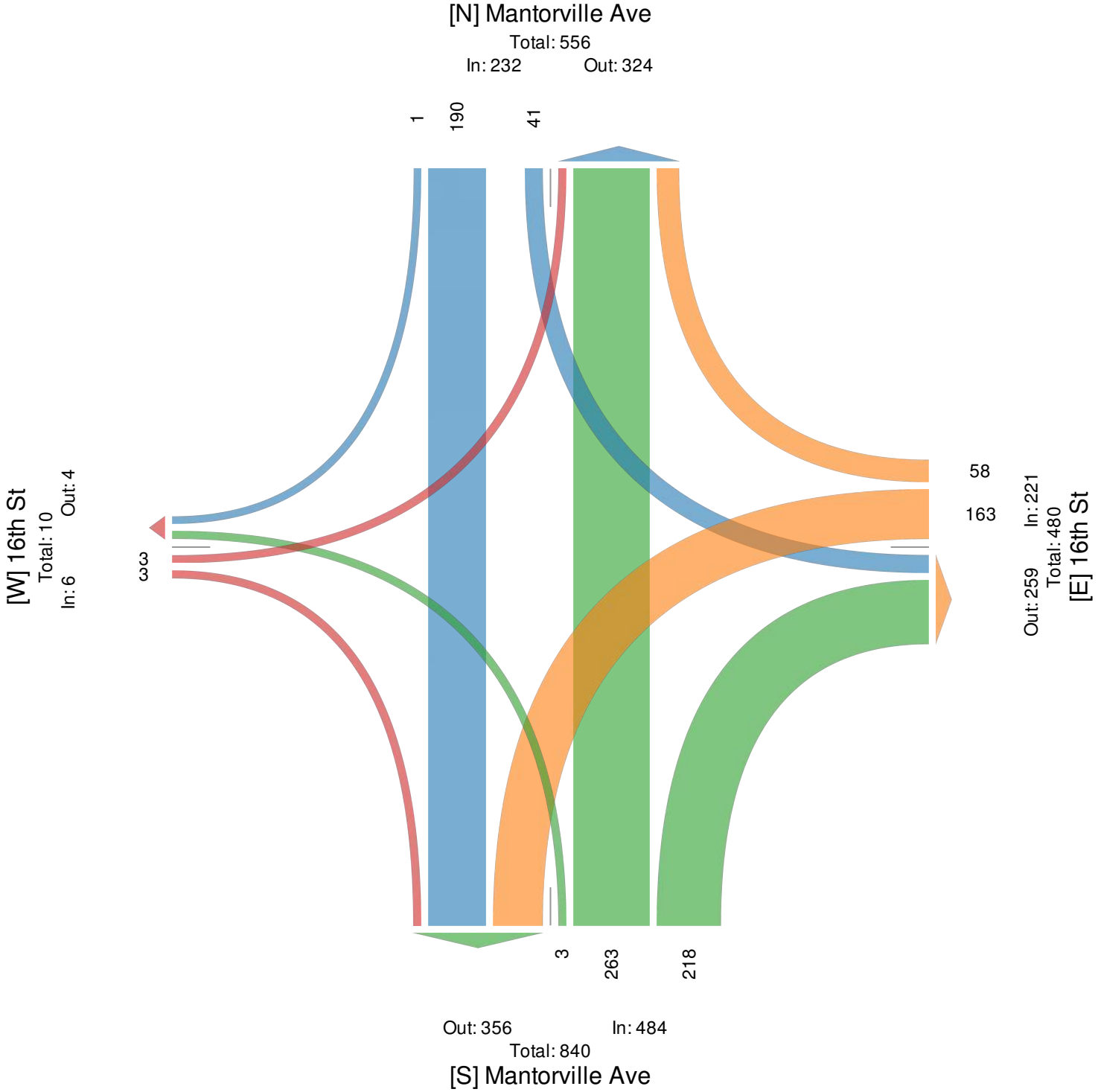
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Mantorville Ave						16th St						Mantorville Ave						16th St						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2018-12-18 5:00PM	0	38	9	0	**47**	0	10	0	26	0	**36**	0	49	68	0	0	**117**	0	1	0	0	0	**1**	0	**201**
5:15PM	1	67	5	0	**73**	0	6	0	25	0	**31**	0	53	68	2	0	**123**	0	1	0	3	0	**4**	0	**231**
5:30PM	0	47	12	0	**59**	0	15	0	44	0	**59**	0	46	66	1	0	**113**	0	1	0	0	0	**1**	0	**232**
5:45PM	0	38	15	0	**53**	0	27	0	68	0	**95**	0	70	61	0	0	**131**	0	0	0	0	0	**0**	0	**279**
Total	1	190	41	0	**232**	0	58	0	163	0	**221**	0	218	263	3	0	**484**	0	3	0	3	0	**6**	0	**943**
% Approach	0.4%	81.9%	17.7%	0%	**-**	-	26.2%	0%	73.8%	0%	**-**	-	45.0%	54.3%	0.6%	0%	**-**	-	50.0%	0%	50.0%	0%	**-**	-	-
% Total	0.1%	20.1%	4.3%	0%	**24.6%**	-	6.2%	0%	17.3%	0%	**23.4%**	-	23.1%	27.9%	0.3%	0%	**51.3%**	-	0.3%	0%	0.3%	0%	**0.6%**	-	-
PHF	0.250	0.709	0.683	-	**0.795**	-	0.537	-	0.599	-	**0.582**	-	0.779	0.967	0.375	-	**0.924**	-	0.750	-	0.250	-	**0.375**	-	0.845
Lights	1	187	41	0	**229**	-	57	0	163	0	**220**	-	217	262	0	0	**479**	-	2	0	2	0	**4**	-	932
% Lights	100%	98.4%	100%	0%	**98.7%**	-	98.3%	0%	100%	0%	**99.5%**	-	99.5%	99.6%	0%	0%	**99.0%**	-	66.7%	0%	66.7%	0%	**66.7%**	-	98.8%
Single-Unit Trucks	0	1	0	0	**1**	-	1	0	0	0	**1**	-	0	0	1	0	**1**	-	0	0	0	0	**0**	-	3
% Single-Unit Trucks	0%	0.5%	0%	0%	**0.4%**	-	1.7%	0%	0%	0%	**0.5%**	-	0%	0%	33.3%	0%	**0.2%**	-	0%	0%	0%	0%	**0%**	-	0.3%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	1	2	0	**3**	-	1	0	1	0	**2**	-	5
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0.4%	66.7%	0%	**0.6%**	-	33.3%	0%	33.3%	0%	**33.3%**	-	0.5%
Buses	0	2	0	0	**2**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	0	0	0	0	**0**	-	3
% Buses	0%	1.1%	0%	0%	**0.9%**	-	0%	0%	0%	0%	**0%**	-	0.5%	0%	0%	0%	**0.2%**	-	0%	0%	0%	0%	**0%**	-	0.3%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

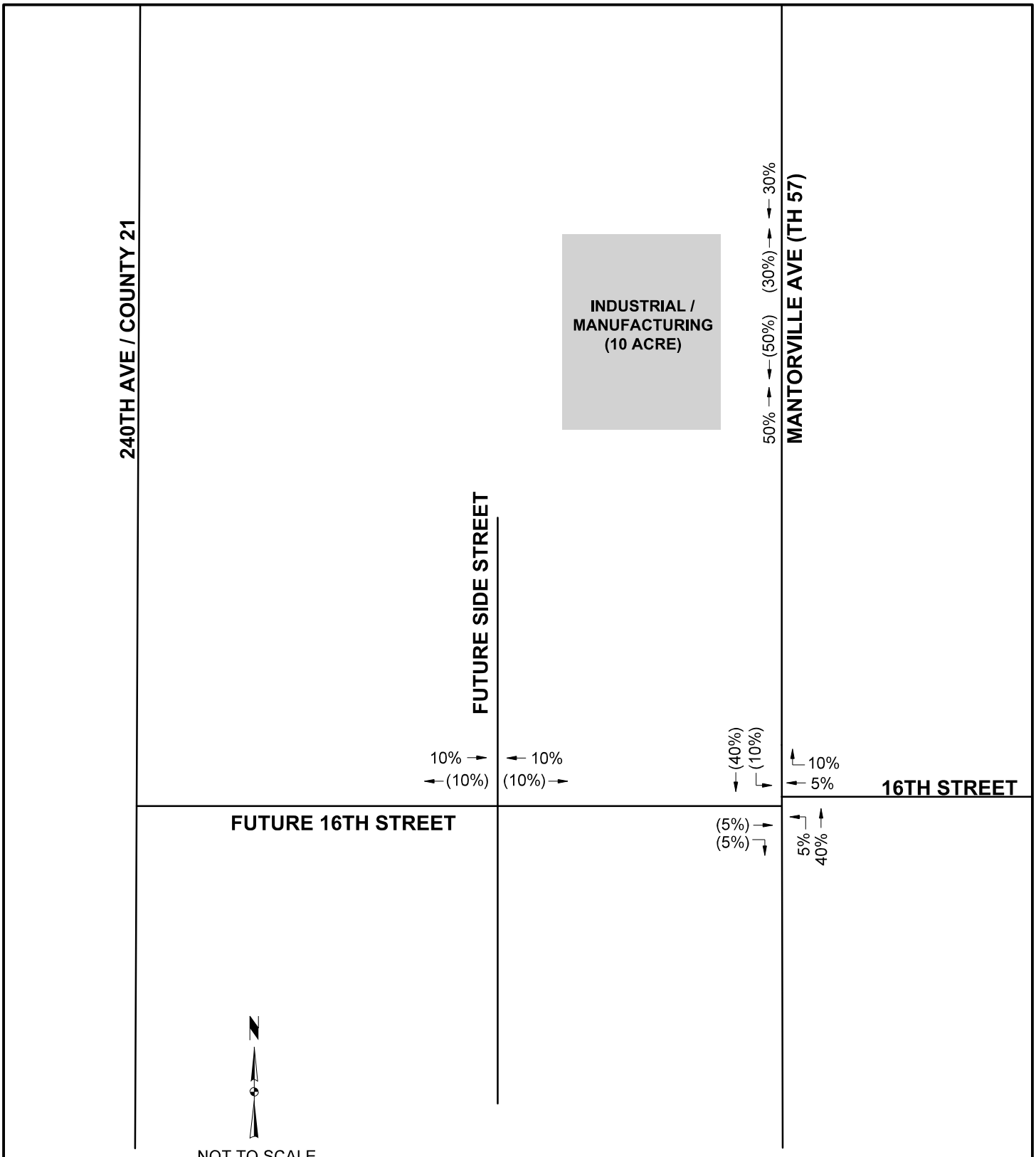
1601 Mantorville Ave N - TMC
Tue Dec 18, 2018
PM Peak (5PM - 6PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 598071, Location: 44.043897, -92.748263

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



APPENDIX B

Trip Generation

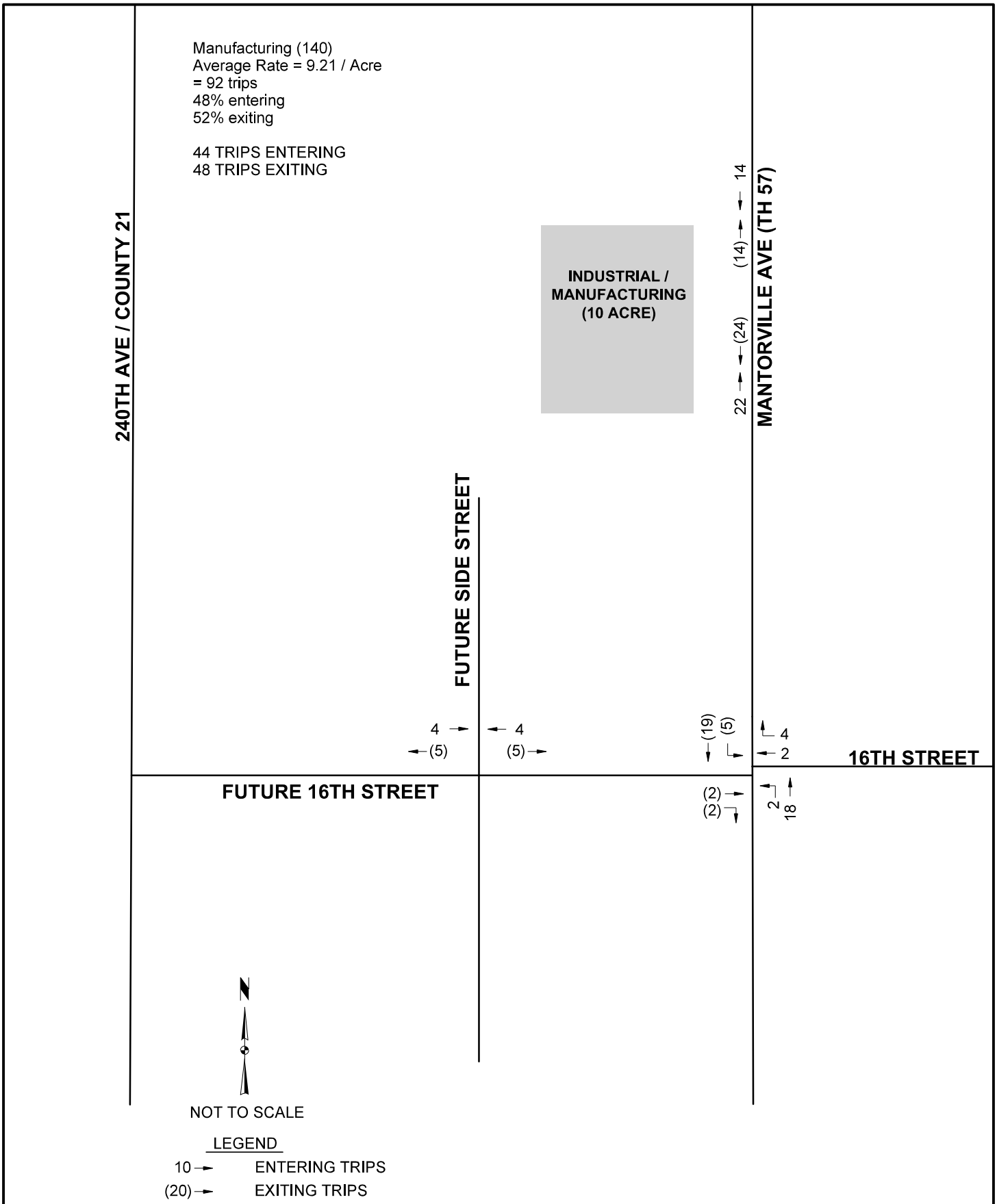


MANTORVILLE AVE (TH 57) & 16TH ST

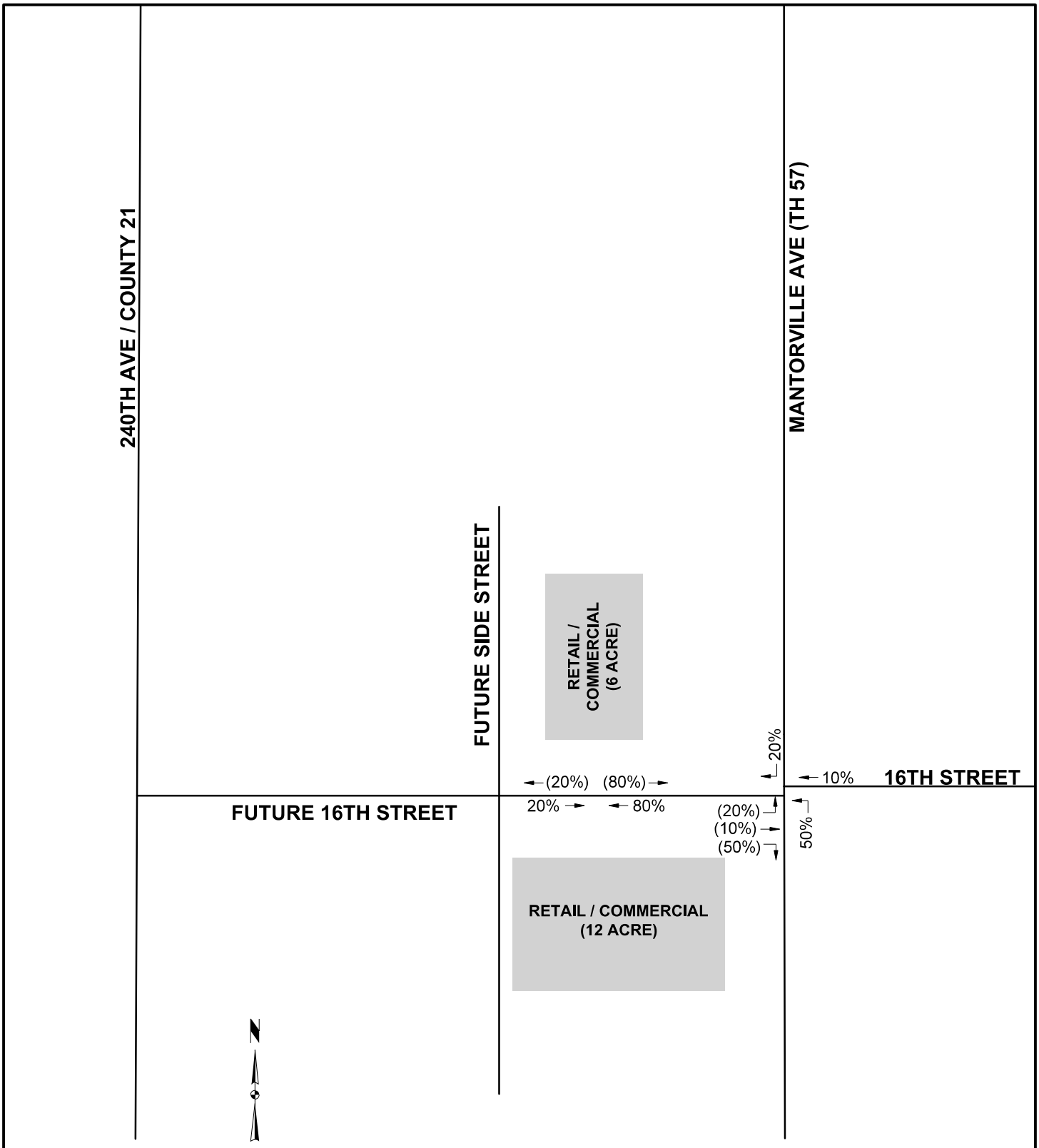
KASSON, MN

FUTURE
INDUSTRIAL / MANUFACTURING
DEVELOPMENT

whks
engineers + planners + land surveyors



MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	FUTURE INDUSTRIAL / MANUFACTURING DEVELOPMENT	whks engineers + planners + land surveyors



LEGEND

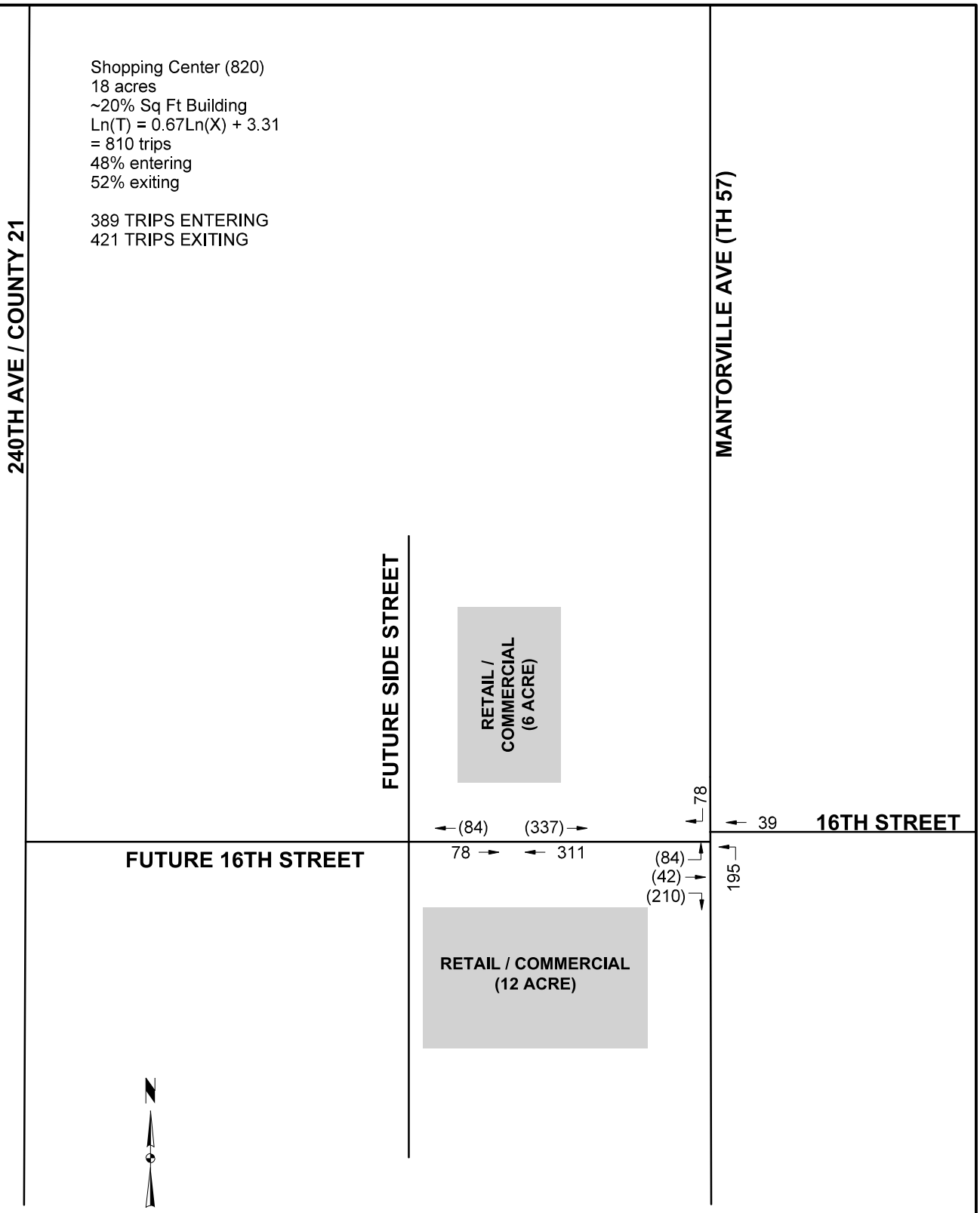
50% → PERCENTAGE OF ENTERING TRIPS

(50%) → PERCENTAGE OF EXITING TRIPS

MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	FUTURE RETAIL / COMMERCIAL DEVELOPMENT	whks engineers + planners + land surveyors

Shopping Center (820)
18 acres
~20% Sq Ft Building
Ln(T) = 0.67Ln(X) + 3.31
= 810 trips
48% entering
52% exiting

389 TRIPS ENTERING
421 TRIPS EXITING

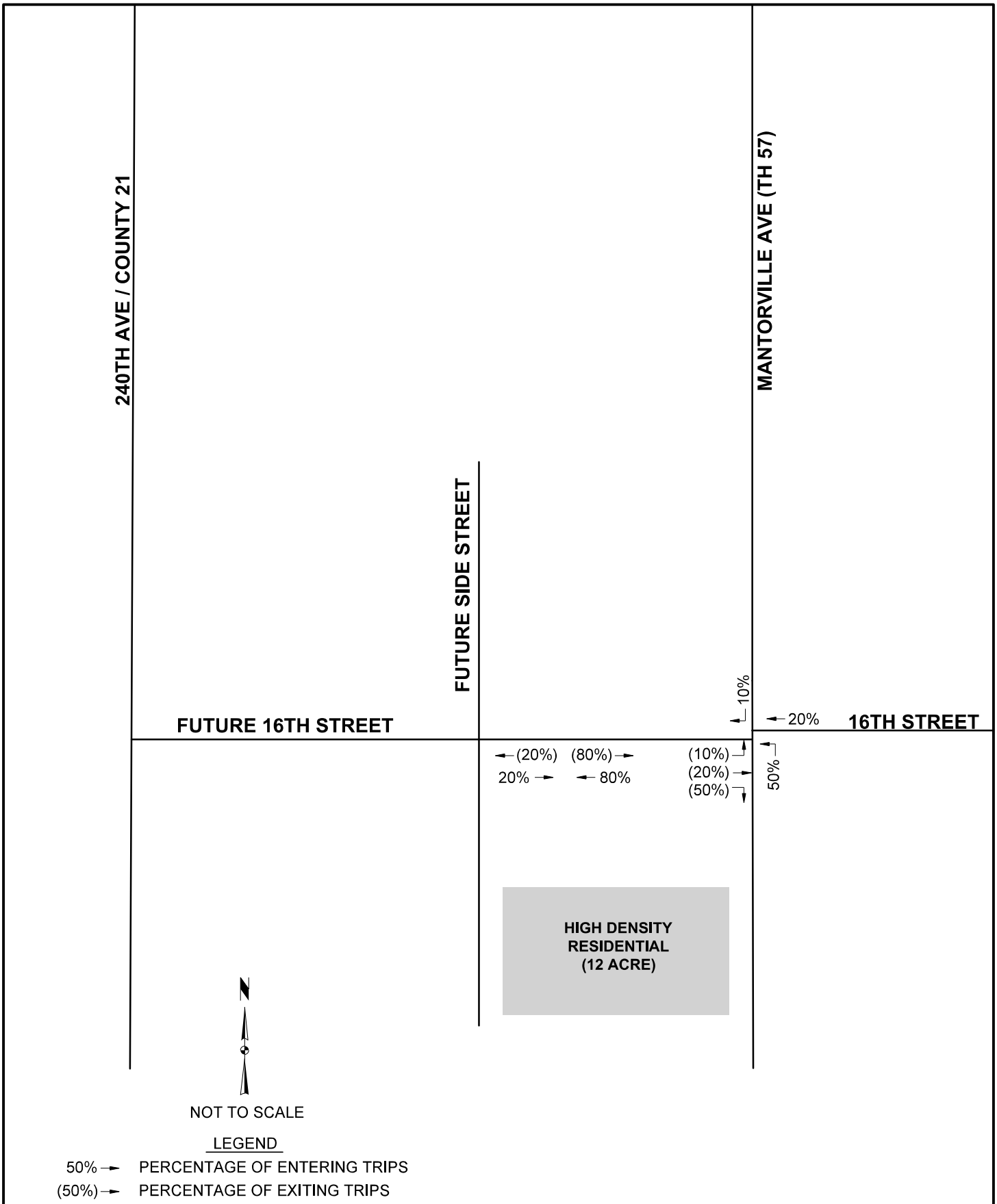


NOT TO SCALE

LEGEND

10 → ENTERING TRIPS
(20) → EXITING TRIPS

MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	FUTURE RETAIL / COMMERCIAL DEVELOPMENT	whks engineers + planners + land surveyors



MANTORVILLE AVE (TH 57) & 16TH ST

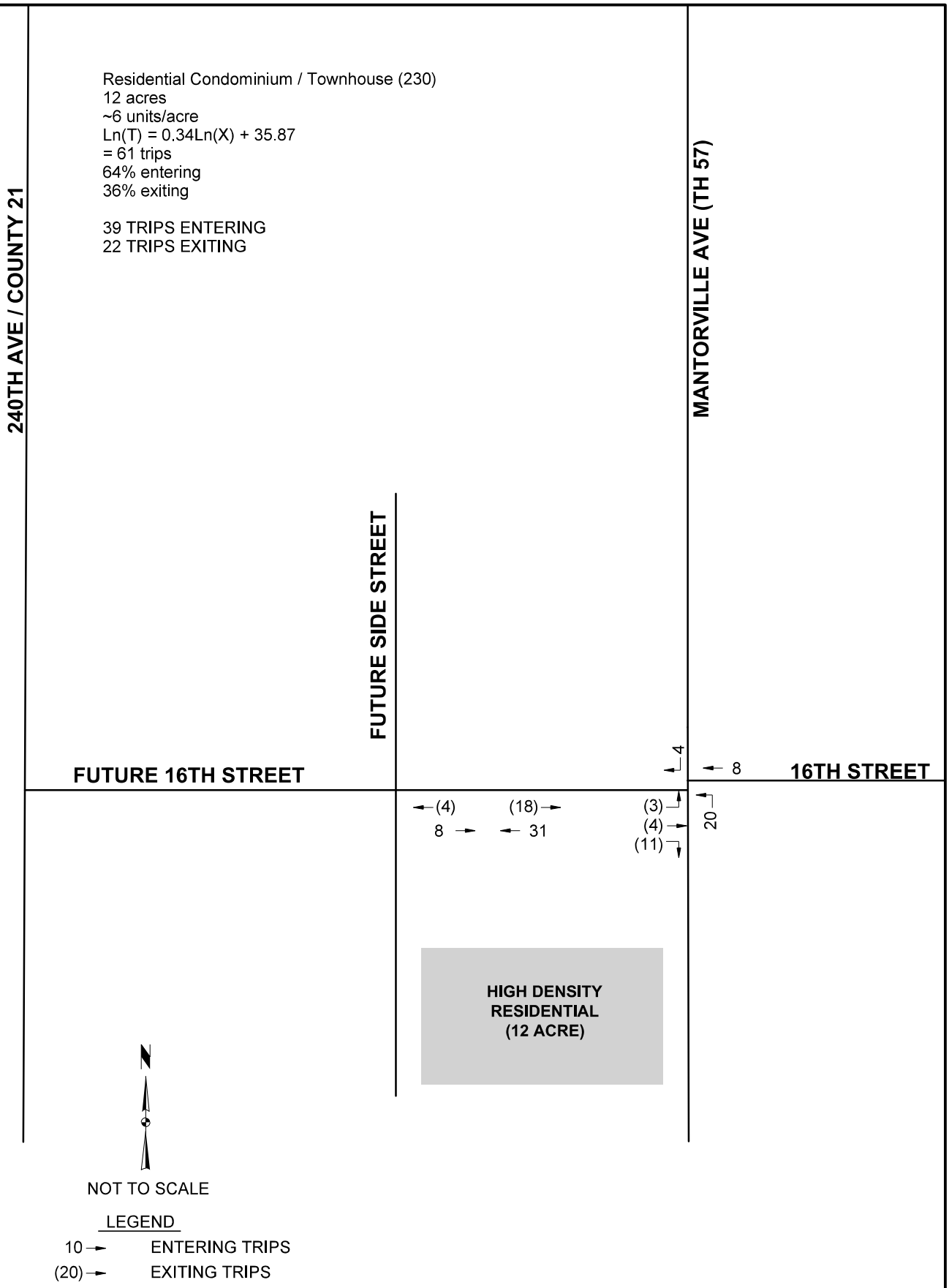
KASSON, MN

FUTURE
HIGH DENSITY RESIDENTIAL
DEVELOPMENT

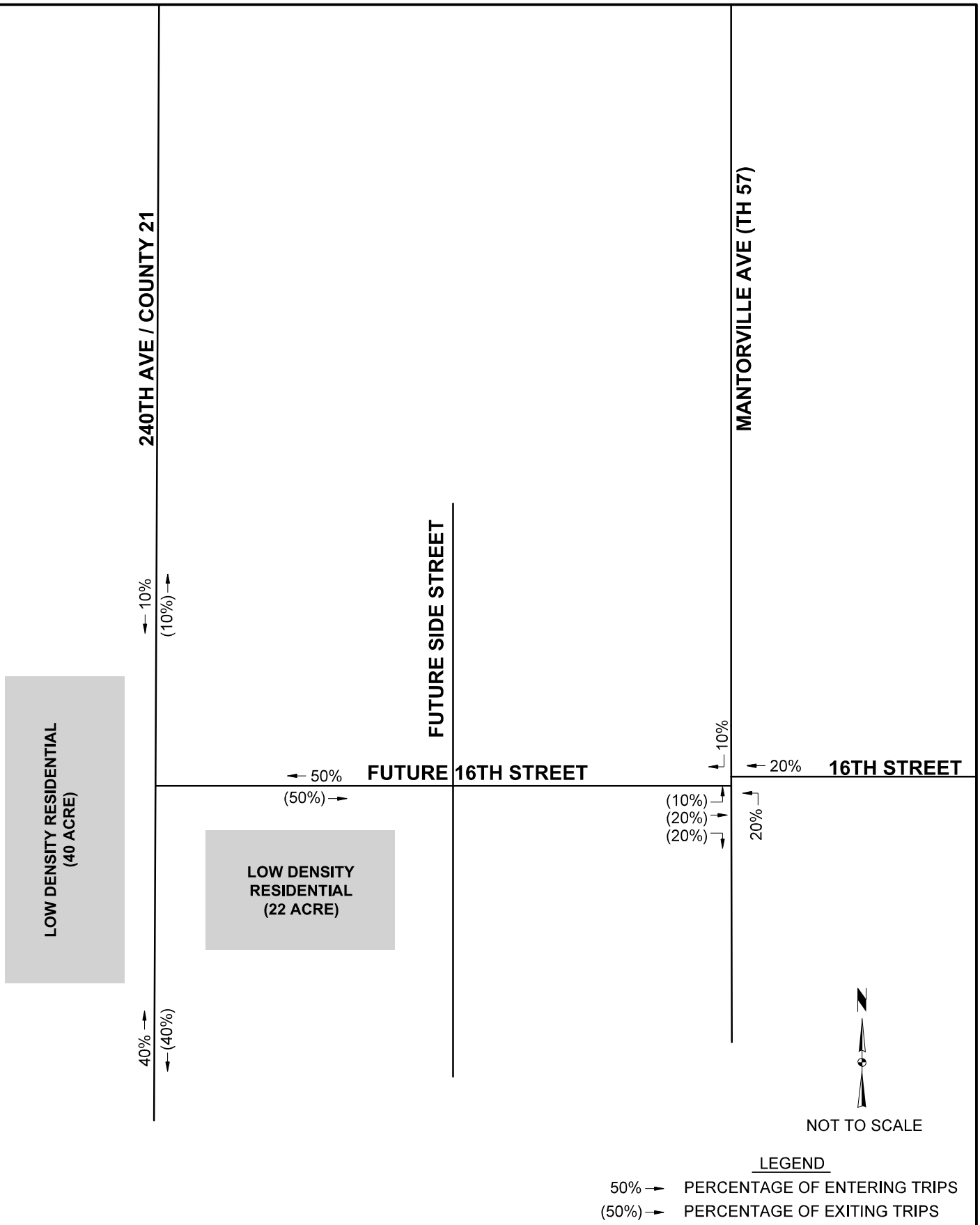
whks
engineers + planners + land surveyors

Residential Condominium / Townhouse (230)
12 acres
~6 units/acre
Ln(T) = 0.34Ln(X) + 35.87
= 61 trips
64% entering
36% exiting

39 TRIPS ENTERING
22 TRIPS EXITING



MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	FUTURE HIGH DENSITY RESIDENTIAL DEVELOPMENT	whks engineers + planners + land surveyors



MANTORVILLE AVE (TH 57) & 16TH ST

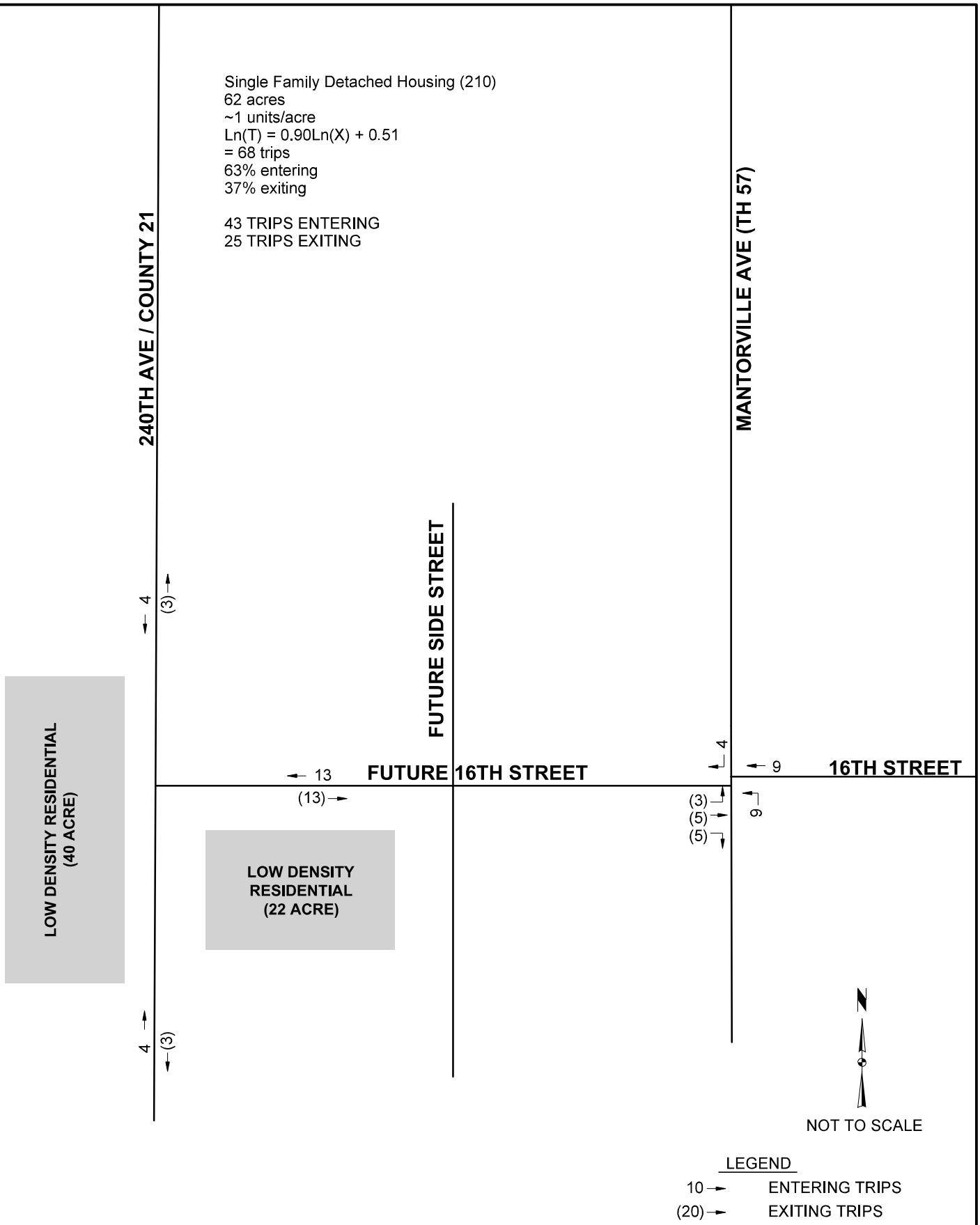
KASSON, MN

FUTURE
LOW DENSITY RESIDENTIAL
DEVELOPMENT

whks
engineers + planners + land surveyors

Single Family Detached Housing (210)
62 acres
~1 units/acre
Ln(T) = 0.90Ln(X) + 0.51
= 68 trips
63% entering
37% exiting

43 TRIPS ENTERING
25 TRIPS EXITING



MANTORVILLE AVE (TH 57) & 16TH ST

KASSON, MN

FUTURE
LOW DENSITY RESIDENTIAL
DEVELOPMENT

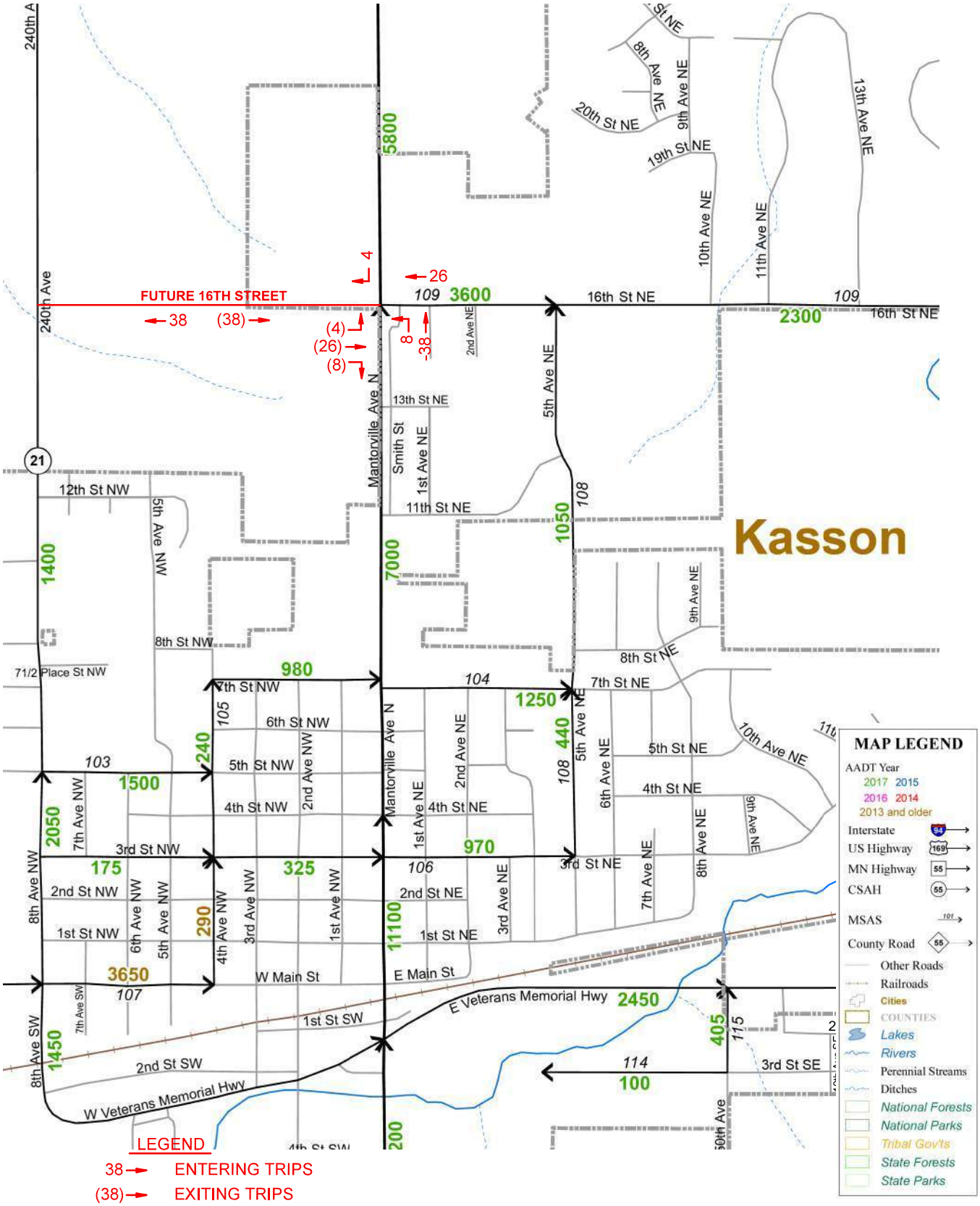
whks
engineers + planners + land surveyors

LEGEND

50% → PERCENTAGE OF ENTERING TRIPS

(50%) → PERCENTAGE OF EXITING TRIPS

MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	EXISTING ADT ANALYSIS	whks engineers + planners + land surveyors



MANTORVILLE AVE (TH 57) & 16TH ST KASSON, MN	EXISTING ADT ANALYSIS	whks engineers + planners + land surveyors

APPENDIX C

2018 Intersection Capacity Analysis Reports

Appendix C-1 : 2018 AM Peak Side Street Stop Control
Appendix C-2 : 2018 PM Peak Side Street Stop Control
Appendix C-3 : 2018 AM Peak All-Way Stop Control
Appendix C-4 : 2018 PM Peak All-Way Stop Control
Appendix C-5 : 2018 AM Peak Traffic Signal Control
Appendix C-6 : 2018 PM Peak Traffic Signal Control
Appendix C-7 : 2018 AM Peak Roundabout Control
Appendix C-8 : 2018 PM Peak Roundabout Control

Appendix C-1 : 2018 AM Peak Side Street Stop Control

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	165	0	85	0	179	225	100	170	0
Future Vol, veh/h	0	0	0	165	0	85	0	179	225	100	170	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	179	0	92	0	195	245	109	185	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	643	597	185	597	597	195	185	0	0	195	0	0
Stage 1	402	402	-	195	195	-	-	-	-	-	-	-
Stage 2	241	195	-	402	402	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	386	416	857	415	416	846	1390	-	-	1378	-	-
Stage 1	625	600	-	807	739	-	-	-	-	-	-	-
Stage 2	762	739	-	625	600	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	321	379	857	387	379	846	1390	-	-	1378	-	-
Mov Cap-2 Maneuver	321	379	-	387	379	-	-	-	-	-	-	-
Stage 1	625	547	-	807	739	-	-	-	-	-	-	-
Stage 2	679	739	-	570	547	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	22.2	0	2.9
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1390	-	-	-	475	1378	-	-
HCM Lane V/C Ratio	-	-	-	-	0.572	0.079	-	-
HCM Control Delay (s)	0	-	-	0	22.2	7.8	0	-
HCM Lane LOS	A	-	-	A	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	3.5	0.3	-	-

Appendix C-2 : 2018 PM Peak Side Street Stop Control

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	3	163	0	58	3	263	218	41	190	1
Future Vol, veh/h	3	0	3	163	0	58	3	263	218	41	190	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	3	177	0	63	3	286	237	45	207	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	620	588	207	590	589	286	208	0	0	286	0	0
Stage 1	296	296	-	292	292	-	-	-	-	-	-	-
Stage 2	324	292	-	298	297	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	400	421	833	419	421	753	1363	-	-	1276	-	-
Stage 1	712	668	-	716	671	-	-	-	-	-	-	-
Stage 2	688	671	-	711	668	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	355	403	833	404	403	753	1363	-	-	1276	-	-
Mov Cap-2 Maneuver	355	403	-	404	403	-	-	-	-	-	-	-
Stage 1	710	641	-	714	669	-	-	-	-	-	-	-
Stage 2	629	669	-	680	641	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	21.1	0	1.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1363	-	-	498	460	1276	-	-
HCM Lane V/C Ratio	0.002	-	-	0.013	0.522	0.035	-	-
HCM Control Delay (s)	7.6	0	-	12.3	21.1	7.9	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	3	0.1	-	-

Appendix C-3 : 2018 AM Peak All-Way Stop Control

Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	165	0	85	0	179	225	100	170	0
Future Vol, veh/h	0	0	0	165	0	85	0	179	225	100	170	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	179	0	92	0	195	245	109	185	0
Number of Lanes	0	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	0	12.7	10.6	12.8
HCM LOS	-	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	0%	66%	37%
Vol Thru, %	100%	0%	100%	0%	63%
Vol Right, %	0%	100%	0%	34%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	179	225	0	250	270
LT Vol	0	0	0	165	100
Through Vol	179	0	0	0	170
RT Vol	0	225	0	85	0
Lane Flow Rate	195	245	0	272	293
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.309	0.34	0	0.422	0.446
Departure Headway (Hd)	5.719	5.011	6.281	5.587	5.468
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	628	719	0	644	660
Service Time	3.449	2.74	4.332	3.617	3.497
HCM Lane V/C Ratio	0.311	0.341	0	0.422	0.444
HCM Control Delay	11	10.3	9.3	12.7	12.8
HCM Lane LOS	B	B	N	B	B
HCM 95th-tile Q	1.3	1.5	0	2.1	2.3

Appendix C-4 : 2018 PM Peak All-Way Stop Control

Intersection	
Intersection Delay, s/veh	11.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	3	163	0	58	3	263	218	41	190	1
Future Vol, veh/h	3	0	3	163	0	58	3	263	218	41	190	1
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	3	177	0	63	3	286	237	45	207	1
Number of Lanes	0	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	9.2	12.2	11.5	11.8
HCM LOS	A	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	0%	50%	74%	18%
Vol Thru, %	99%	0%	0%	0%	82%
Vol Right, %	0%	100%	50%	26%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	266	218	6	221	232
LT Vol	3	0	3	163	41
Through Vol	263	0	0	0	190
RT Vol	0	218	3	58	1
Lane Flow Rate	289	237	7	240	252
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.45	0.322	0.011	0.381	0.381
Departure Headway (Hd)	5.603	4.89	6.061	5.71	5.442
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	645	737	590	632	663
Service Time	3.325	2.612	4.105	3.738	3.467
HCM Lane V/C Ratio	0.448	0.322	0.012	0.38	0.38
HCM Control Delay	12.8	9.9	9.2	12.2	11.8
HCM Lane LOS	B	A	A	B	B
HCM 95th-tile Q	2.3	1.4	0	1.8	1.8

Appendix C-5 : 2018 AM Peak Traffic Signal Control

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	165	0	85	0	179	225	100	170	0
Future Volume (veh/h)	0	0	0	165	0	85	0	179	225	100	170	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	1900	1863	1900	1900	1863	1900	1900	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	0	0	0	179	0	92	0	195	245	109	185	0
Adj No. of Lanes	0	1	0	0	1	0	0	1	1	0	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
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	0	745	0	498	27	201	0	745	633	275	419	0
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
Prop Arrive On Green	0.00	0.00	0.00	0.40	0.00	0.40	0.00	0.40	0.40	0.40	0.40	0.00
Ln Grp Delay, s/veh	0.0	0.0	0.0	11.3	0.0	0.0	0.0	9.9	11.4	11.6	0.0	0.0
Ln Grp LOS				B				A	B	B		
Approach Vol, veh/h		0			271			440			294	
Approach Delay, s/veh		0.0			11.3			10.7			11.6	
Approach LOS					B			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		7.0		8.0		8.0		8.0
Phs Duration (G+Y+Rc), s		22.5		22.5		22.5		22.5
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		18.0		18.0		18.0		18.0
Max Allow Headway (MAH), s		5.0		0.0		5.0		5.4
Max Q Clear (g_c+l1), s		6.9		0.0		7.8		7.9
Green Ext Time (g_e), s		3.1		0.0		3.0		1.1
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		0.00		0.00		0.00		0.00

Left-Turn Movement Data				
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		0		0		414		913

Through Movement Data				
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		1863		1863		1048		66

Right-Turn Movement Data				
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1583		0		0		503

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment						L+T		L+T+R

Lanes in Grp	0	0	0	0	0	1	0	1
Grp Vol (v), veh/h	0	0	0	0	0	294	0	271
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	1461	0	1482
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	2.5	0.0	4.8
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	5.8	0.0	5.9
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	964	0	1440
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	18.0	0.0	18.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	14.8	0.0	18.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	2.5	0.0	4.8
Time to First Blk (g_f), s	0.0	18.0	0.0	18.0	0.0	3.3	0.0	1.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	3.3	0.0	1.0
Prop LT Inside Lane (P_L)	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.66
Lane Grp Cap (c), veh/h	0	0	0	0	0	694	0	726
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.37
Avail Cap (c_a), veh/h	0	0	0	0	0	694	0	726
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	9.7	0.0	9.8
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	1.9	0.0	1.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	11.6	0.0	11.3
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	2.6	0.0	2.4
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	3.0	0.0	2.7
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.06
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T		T				
Lanes in Grp	0	1	0	1	0	0	0	0
Grp Vol (v), veh/h	0	195	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1863	0	1863	0	0	0	0
Q Serve Time (g_s), s	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	745	0	745	0	0	0	0
V/C Ratio (X)	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	745	0	745	0	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.0	0.0	0.0	0.0	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
Control Delay (d), s/veh	0.0	9.9	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R						
Lanes in Grp	0	1	0	0	0	0	0	0
Grp Vol (v), veh/h	0	245	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1583	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.34
Lane Grp Cap (c), veh/h	0	633	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	633	0	0	0	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	9.6	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.8	0.0	0.0	0.0	0.0	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
Control Delay (d), s/veh	0.0	11.4	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		11.1						
HCM 2010 LOS		B						

Appendix C-6 : 2018 PM Peak Traffic Signal Control

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	3	163	0	58	3	263	218	41	190	1
Future Volume (veh/h)	3	0	3	163	0	58	3	263	218	41	190	1
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	1900	1863	1900	1900	1863	1900	1900	1863	1863	1900	1863	1900
Adj Flow Rate, veh/h	3	0	3	177	0	63	3	286	237	45	207	1
Adj No. of Lanes	0	1	0	0	1	0	0	1	1	0	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
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	390	38	308	550	21	154	82	743	633	158	607	3
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
Prop Arrive On Green	0.40	0.00	0.40	0.40	0.00	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Ln Grp Delay, s/veh	8.1	0.0	0.0	10.8	0.0	0.0	10.8	0.0	11.2	10.5	0.0	0.0
Ln Grp LOS	A			B			B		B	B		
Approach Vol, veh/h		6			240			526			253	
Approach Delay, s/veh		8.1			10.8			11.0			10.5	
Approach LOS		A			B			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		7.0		8.0		8.0		8.0
Phs Duration (G+Y+Rc), s		22.5		22.5		22.5		22.5
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		18.0		18.0		18.0		18.0
Max Allow Headway (MAH), s		5.0		5.3		5.0		5.3
Max Q Clear (g_c+l1), s		7.0		2.1		6.2		7.2
Green Ext Time (g_e), s		3.3		1.2		3.4		1.0
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		0.00		0.00		0.00		0.00

Left-Turn Movement Data				
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		4		676		158		1027

Through Movement Data				
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		1857		95		1518		52

Right-Turn Movement Data				
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1583		771		7		384

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment		L+T		L+T+R		L+T+R		L+T+R

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	289	0	6	0	253	0	240
Grp Sat Flow (s), veh/h/ln	0	1861	0	1542	0	1683	0	1463
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4
Cycle Q Clear Time (g_c), s	0.0	5.0	0.0	0.1	0.0	4.2	0.0	5.2
Perm LT Sat Flow (s_l), veh/h/ln	0	1192	0	1360	0	893	0	1436
Shared LT Sat Flow (s_sh), veh/h/ln	0	1862	0	1817	0	0	0	1796
Perm LT Eff Green (g_p), s	0.0	18.0	0.0	18.0	0.0	18.0	0.0	18.0
Perm LT Serve Time (g_u), s	0.0	13.8	0.0	12.8	0.0	13.0	0.0	17.9
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4
Time to First Blk (g_f), s	0.0	14.6	0.0	2.0	0.0	7.7	0.0	0.7
Serve Time pre Blk (g_fs), s	0.0	5.0	0.0	0.1	0.0	4.2	0.0	0.7
Prop LT Inside Lane (P_L)	0.00	0.01	0.00	0.50	0.00	0.18	0.00	0.74
Lane Grp Cap (c), veh/h	0	825	0	737	0	767	0	724
V/C Ratio (X)	0.00	0.35	0.00	0.01	0.00	0.33	0.00	0.33
Avail Cap (c_a), veh/h	0	825	0	737	0	767	0	724
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	9.6	0.0	8.1	0.0	9.4	0.0	9.6
Incr Delay (d2), s/veh	0.0	1.2	0.0	0.0	0.0	1.1	0.0	1.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	10.8	0.0	8.1	0.0	10.5	0.0	10.8
1st-Term Q (Q1), veh/ln	0.0	2.5	0.0	0.0	0.0	2.2	0.0	2.1
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.2	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.8	0.0	0.0	0.0	2.4	0.0	2.3
%ile Storage Ratio (RQ%)	0.00	0.08	0.00	0.00	0.00	0.07	0.00	0.05
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	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
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R						
Lanes in Grp	0	1	0	0	0	0	0	0
Grp Vol (v), veh/h	0	237	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1583	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.50	0.00	0.00	0.00	0.26
Lane Grp Cap (c), veh/h	0	633	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	633	0	0	0	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	9.5	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.7	0.0	0.0	0.0	0.0	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
Control Delay (d), s/veh	0.0	11.2	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		10.8						
HCM 2010 LOS		B						

Appendix C-7 : 2018 AM Peak Roundabout Control

MOVEMENT SUMMARY

Site: [Mantorville Ave & 16th St]

2018 AM ROUNDABOUT
Site Category: -
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	1	3.0	0.369	6.6	LOS A	2.2	55.6	0.35	0.20	0.35	34.1
8	T1	195	3.0	0.369	6.6	LOS A	2.2	55.6	0.35	0.20	0.35	34.1
18	R2	245	3.0	0.369	6.6	LOS A	2.2	55.6	0.35	0.20	0.35	33.2
Approach		440	3.0	0.369	6.6	LOS A	2.2	55.6	0.35	0.20	0.35	33.6
East: RoadName												
1	L2	179	3.0	0.250	5.7	LOS A	1.2	31.6	0.40	0.27	0.40	32.8
6	T1	1	3.0	0.250	5.7	LOS A	1.2	31.6	0.40	0.27	0.40	32.8
16	R2	92	3.0	0.250	5.7	LOS A	1.2	31.6	0.40	0.27	0.40	32.0
Approach		273	3.0	0.250	5.7	LOS A	1.2	31.6	0.40	0.27	0.40	32.5
North: RoadName												
7	L2	109	3.0	0.266	5.8	LOS A	1.3	34.3	0.39	0.26	0.39	33.6
4	T1	185	3.0	0.266	5.8	LOS A	1.3	34.3	0.39	0.26	0.39	33.6
14	R2	1	3.0	0.266	5.8	LOS A	1.3	34.3	0.39	0.26	0.39	32.7
Approach		295	3.0	0.266	5.8	LOS A	1.3	34.3	0.39	0.26	0.39	33.6
West: RoadName												
5	L2	1	3.0	0.004	4.5	LOS A	0.0	0.4	0.50	0.30	0.50	34.3
2	T1	1	3.0	0.004	4.5	LOS A	0.0	0.4	0.50	0.30	0.50	34.3
12	R2	1	3.0	0.004	4.5	LOS A	0.0	0.4	0.50	0.30	0.50	33.4
Approach		3	3.0	0.004	4.5	LOS A	0.0	0.4	0.50	0.30	0.50	34.0
All Vehicles		1011	3.0	0.369	6.1	LOS A	2.2	55.6	0.38	0.24	0.38	33.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: [Mantorville Ave & 16th St]

2018 AM ROUNDABOUT
Site Category: -
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	33.3	mph	33.3	mph
Travel Distance (Total)	636.2	veh-mi/h	763.4	pers-mi/h
Travel Time (Total)	19.1	veh-h/h	22.9	pers-h/h
Demand Flows (Total)	1011	veh/h	1213	pers/h
Percent Heavy Vehicles (Demand)	3.0	%		
Degree of Saturation	0.369			
Practical Spare Capacity	130.3	%		
Effective Intersection Capacity	2738	veh/h		
Control Delay (Total)	1.71	veh-h/h	2.06	pers-h/h
Control Delay (Average)	6.1	sec	6.1	sec
Control Delay (Worst Lane)	6.6	sec		
Control Delay (Worst Movement)	6.6	sec	6.6	sec
Geometric Delay (Average)	0.0	sec		
Stop-Line Delay (Average)	6.1	sec		
Idling Time (Average)	4.3	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	2.2	veh		
95% Back of Queue - Distance (Worst Lane)	55.6	ft		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	238	veh/h	285	pers/h
Effective Stop Rate	0.24		0.24	
Proportion Queued	0.38		0.38	
Performance Index	30.4		30.4	
Cost (Total)	283.07	$/h	283.07	$/h
Fuel Consumption (Total)	26.3	gal/h		
Carbon Dioxide (Total)	235.5	kg/h		
Hydrocarbons (Total)	0.021	kg/h		
Carbon Monoxide (Total)	0.289	kg/h		
NOx (Total)	0.364	kg/h		

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 91.8% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	485,217	veh/y	582,261	pers/y
Delay	822	veh-h/y	987	pers-h/y
Effective Stops	114,187	veh/y	137,025	pers/y
Travel Distance	305,371	veh-mi/y	366,445	pers-mi/y
Travel Time	9,173	veh-h/y	11,007	pers-h/y
Cost	135,873	$/y	135,873	$/y

Fuel Consumption	12,609	gal/y
Carbon Dioxide	113,017	kg/y
Hydrocarbons	10	kg/y
Carbon Monoxide	139	kg/y
NOx	175	kg/y

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Appendix C-8 : 2018 PM Peak Roundabout Control

MOVEMENT SUMMARY

Site: [Mantorville Ave & 16th St]

2018 PM ROUNDABOUT
Site Category: -
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	3	3.0	0.413	6.9	LOS A	2.7	69.2	0.24	0.10	0.24	34.0
8	T1	286	3.0	0.413	6.9	LOS A	2.7	69.2	0.24	0.10	0.24	34.0
18	R2	237	3.0	0.413	6.9	LOS A	2.7	69.2	0.24	0.10	0.24	33.0
Approach		526	3.0	0.413	6.9	LOS A	2.7	69.2	0.24	0.10	0.24	33.5
East: RoadName												
1	L2	177	3.0	0.245	6.1	LOS A	1.2	29.6	0.48	0.37	0.48	32.5
6	T1	1	3.0	0.245	6.1	LOS A	1.2	29.6	0.48	0.37	0.48	32.5
16	R2	63	3.0	0.245	6.1	LOS A	1.2	29.6	0.48	0.37	0.48	31.6
Approach		241	3.0	0.245	6.1	LOS A	1.2	29.6	0.48	0.37	0.48	32.3
North: RoadName												
7	L2	45	3.0	0.228	5.3	LOS A	1.1	28.3	0.38	0.25	0.38	34.3
4	T1	207	3.0	0.228	5.3	LOS A	1.1	28.3	0.38	0.25	0.38	34.3
14	R2	1	3.0	0.228	5.3	LOS A	1.1	28.3	0.38	0.25	0.38	33.4
Approach		252	3.0	0.228	5.3	LOS A	1.1	28.3	0.38	0.25	0.38	34.3
West: RoadName												
5	L2	3	3.0	0.009	4.3	LOS A	0.0	0.9	0.48	0.30	0.48	34.1
2	T1	1	3.0	0.009	4.3	LOS A	0.0	0.9	0.48	0.30	0.48	34.1
12	R2	3	3.0	0.009	4.3	LOS A	0.0	0.9	0.48	0.30	0.48	33.2
Approach		8	3.0	0.009	4.3	LOS A	0.0	0.9	0.48	0.30	0.48	33.7
All Vehicles		1027	3.0	0.413	6.3	LOS A	2.7	69.2	0.33	0.20	0.33	33.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: [Mantorville Ave & 16th St]

2018 PM ROUNDABOUT
Site Category: -
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	33.4	mph	33.4	mph
Travel Distance (Total)	645.9	veh-mi/h	775.1	pers-mi/h
Travel Time (Total)	19.3	veh-h/h	23.2	pers-h/h
Demand Flows (Total)	1027	veh/h	1233	pers/h
Percent Heavy Vehicles (Demand)	3.0	%		
Degree of Saturation	0.413			
Practical Spare Capacity	105.6	%		
Effective Intersection Capacity	2485	veh/h		
Control Delay (Total)	1.79	veh-h/h	2.15	pers-h/h
Control Delay (Average)	6.3	sec	6.3	sec
Control Delay (Worst Lane)	6.9	sec		
Control Delay (Worst Movement)	6.9	sec	6.9	sec
Geometric Delay (Average)	0.0	sec		
Stop-Line Delay (Average)	6.3	sec		
Idling Time (Average)	4.7	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	2.7	veh		
95% Back of Queue - Distance (Worst Lane)	69.2	ft		
Queue Storage Ratio (Worst Lane)	0.02			
Total Effective Stops	207	veh/h	248	pers/h
Effective Stop Rate	0.20		0.20	
Proportion Queued	0.33		0.33	
Performance Index	31.2		31.2	
Cost (Total)	283.58	$/h	283.58	$/h
Fuel Consumption (Total)	26.4	gal/h		
Carbon Dioxide (Total)	236.3	kg/h		
Hydrocarbons (Total)	0.021	kg/h		
Carbon Monoxide (Total)	0.291	kg/h		
NOx (Total)	0.364	kg/h		

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 91.5% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	493,043	veh/y	591,652	pers/y
Delay	861	veh-h/y	1,033	pers-h/y
Effective Stops	99,245	veh/y	119,094	pers/y
Travel Distance	310,045	veh-mi/y	372,054	pers-mi/y
Travel Time	9,279	veh-h/y	11,135	pers-h/y
Cost	136,116	$/y	136,116	$/y

Fuel Consumption	12,652	gal/y
Carbon Dioxide	113,410	kg/y
Hydrocarbons	10	kg/y
Carbon Monoxide	140	kg/y
NOx	175	kg/y

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APPENDIX D

2038 Intersection Capacity Analysis Reports

Appendix D-1 : 2038 AM Peak Side Street Stop Control
Appendix D-2 : 2038 PM Peak Side Street Stop Control
Appendix D-3 : 2038 AM Peak All-Way Stop Control
Appendix D-4 : 2038 PM Peak All-Way Stop Control
Appendix D-5 : 2038 AM Peak Traffic Signal Control
Appendix D-6 : 2038 PM Peak Traffic Signal Control
Appendix D-7 : 2038 AM Peak Roundabout Control
Appendix D-8 : 2038 PM Peak Roundabout Control

Appendix D-1 : 2038 AM Peak Side Street Stop Control

Intersection	
Int Delay, s/veh	4048.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	94	79	236	201	84	108	234	198	275	127	226	90
Future Vol, veh/h	94	79	236	201	84	108	234	198	275	127	226	90
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	102	86	257	218	91	117	254	215	299	138	246	98

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1399	1295	295	1466	1344	215	343	0	0	215	0	0
Stage 1	571	571	-	724	724	-	-	-	-	-	-	-
Stage 2	828	724	-	742	620	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	118	162	744	~ 106	152	825	1216	-	-	1355	-	-
Stage 1	506	505	-	417	430	-	-	-	-	-	-	-
Stage 2	365	430	-	408	480	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 4	98	744	~ 13	92	825	1216	-	-	1355	-	-
Mov Cap-2 Maneuver	~ 4	98	-	~ 13	92	-	-	-	-	-	-	-
Stage 1	351	440	-	289	298	-	-	-	-	-	-	-
Stage 2	150	298	-	~ 188	419	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 11750.7	$ 7870.2	2.9	2.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1216	-	-	17	24	1355	-	-
HCM Lane V/C Ratio	0.209	-	-	26.151	17.799	0.102	-	-
HCM Control Delay (s)	8.7	0	$ 11750.7	$ 7870.2	8	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.8	-	-	56.4	53.4	0.3	-	-

Notes

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

Appendix D-2 : 2038 PM Peak Side Street Stop Control

Intersection	
Int Delay, s/veh	2795.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	98	79	240	199	84	75	238	301	266	55	251	91
Future Vol, veh/h	98	79	240	199	84	75	238	301	266	55	251	91
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	107	86	261	216	91	82	259	327	289	60	273	99

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1373	1287	322	1460	1336	327	372	0	0	327	0	0
Stage 1	442	442	-	845	845	-	-	-	-	-	-	-
Stage 2	931	845	-	615	491	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	123	164	719	~ 107	153	714	1186	-	-	1233	-	-
Stage 1	594	576	-	357	379	-	-	-	-	-	-	-
Stage 2	320	379	-	479	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 7	100	719	~ 14	93	714	1186	-	-	1233	-	-
Mov Cap-2 Maneuver	~ 7	100	-	~ 14	93	-	-	-	-	-	-	-
Stage 1	387	540	-	232	247	-	-	-	-	-	-	-
Stage 2	116	247	-	241	514	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 7102.5	$ 7157.5	2.6	1.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1186	-	-	28	24	1233	-	-
HCM Lane V/C Ratio	0.218	-	-	16.188	16.214	0.048	-	-
HCM Control Delay (s)	8.9	0	$	7102.5	$ 7157.5	8.1	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.8	-	-	56.2	48.6	0.2	-	-

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

Appendix D-3 : 2038 AM Peak All-Way Stop Control

Intersection	
Intersection Delay, s/veh	142
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	94	79	236	201	84	108	234	198	275	127	226	90
Future Vol, veh/h	94	79	236	201	84	108	234	198	275	127	226	90
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	102	86	257	218	91	117	254	215	299	138	246	98
Number of Lanes	0	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	130.9	126.3	131.3	183.3
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	54%	0%	23%	51%	29%
Vol Thru, %	46%	0%	19%	21%	51%
Vol Right, %	0%	100%	58%	27%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	432	275	409	393	443
LT Vol	234	0	94	201	127
Through Vol	198	0	79	84	226
RT Vol	0	275	236	108	90
Lane Flow Rate	470	299	445	427	482
Geometry Grp	7	7	2	2	5
Degree of Util (X)	1.305	0.75	1.152	1.135	1.293
Departure Headway (Hd)	11.563	10.539	10.951	11.257	10.914
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	319	347	333	325	337
Service Time	9.263	8.239	8.951	9.257	8.914
HCM Lane V/C Ratio	1.473	0.862	1.336	1.314	1.43
HCM Control Delay	190.1	39	130.9	126.3	183.3
HCM Lane LOS	F	E	F	F	F
HCM 95th-tile Q	19.6	5.8	15.4	14.7	20.1

Appendix D-4 : 2038 PM Peak All-Way Stop Control

Intersection	
Intersection Delay, s/veh	164.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	98	79	240	199	84	75	238	301	266	55	251	91
Future Vol, veh/h	98	79	240	199	84	75	238	301	266	55	251	91
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	107	86	261	216	91	82	259	327	289	60	273	99
Number of Lanes	0	1	0	0	1	0	0	1	1	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	137.2	94.9	225.2	131.1
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	0%	24%	56%	14%
Vol Thru, %	56%	0%	19%	23%	63%
Vol Right, %	0%	100%	58%	21%	23%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	539	266	417	358	397
LT Vol	238	0	98	199	55
Through Vol	301	0	79	84	251
RT Vol	0	266	240	75	91
Lane Flow Rate	586	289	453	389	432
Geometry Grp	7	7	2	2	5
Degree of Util (X)	1.62	0.725	1.175	1.035	1.153
Departure Headway (Hd)	10.999	10.031	10.509	11.249	10.927
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	334	364	349	327	337
Service Time	8.699	7.731	8.509	9.249	8.927
HCM Lane V/C Ratio	1.754	0.794	1.298	1.19	1.282
HCM Control Delay	319	35.1	137.2	94.9	131.1
HCM Lane LOS	F	E	F	F	F
HCM 95th-tile Q	31.6	5.5	16.6	11.9	15.5

Appendix D-5 : 2038 AM Peak Traffic Signal Control

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	79	236	201	84	108	234	198	275	127	226	90
Future Volume (veh/h)	94	79	236	201	84	108	234	198	275	127	226	90
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	1900	1863	1900	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	102	86	257	218	91	117	254	215	299	138	246	98
Adj No. of Lanes	0	1	0	0	1	0	1	1	1	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
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	207	165	373	357	144	144	424	745	633	444	507	202
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
Prop Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Ln Grp Delay, s/veh	14.5	0.0	0.0	17.0	0.0	0.0	22.7	10.1	12.5	14.1	0.0	12.4
Ln Grp LOS	B			B			C	B	B	B		B
Approach Vol, veh/h		445			426			768			482	
Approach Delay, s/veh		14.5			17.0			15.2			12.9	
Approach LOS		B			B			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		5.0		8.0		6.0		8.0
Phs Duration (G+Y+Rc), s		22.5		22.5		22.5		22.5
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		18.0		18.0		18.0		18.0
Max Allow Headway (MAH), s		4.9		5.7		4.9		5.7
Max Q Clear (g_c+l1), s		19.4		11.8		11.2		14.9
Green Ext Time (g_e), s		0.0		3.1		3.6		1.7
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		0.00		0.00		0.00		0.00

Left-Turn Movement Data				
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		1032		271		883		589

Through Movement Data				
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		1863		412		1268		359

Right-Turn Movement Data				
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1583		934		505		359

Left Lane Group Data								
Assigned Mvmt	0	5	0	7	0	1	0	3
Lane Assignment				L+T+R				L+T+R

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	254	0	445	0	138	0	426
Grp Sat Flow (s), veh/h/ln	0	1032	0	1617	0	883	0	1307
Q Serve Time (g_s), s	0.0	10.9	0.0	0.0	0.0	5.7	0.0	3.0
Cycle Q Clear Time (g_c), s	0.0	17.4	0.0	9.8	0.0	9.2	0.0	12.9
Perm LT Sat Flow (s_l), veh/h/ln	0	1032	0	1192	0	883	0	1054
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1645	0	0	0	1248
Perm LT Eff Green (g_p), s	0.0	18.0	0.0	18.0	0.0	18.0	0.0	18.0
Perm LT Serve Time (g_u), s	0.0	11.5	0.0	5.1	0.0	14.5	0.0	8.2
Perm LT Q Serve Time (g_ps), s	0.0	10.9	0.0	0.0	0.0	5.7	0.0	3.0
Time to First Blk (g_f), s	0.0	0.0	0.0	4.6	0.0	0.0	0.0	1.6
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	4.6	0.0	0.0	0.0	1.6
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	0.23	0.00	1.00	0.00	0.51
Lane Grp Cap (c), veh/h	0	424	0	745	0	444	0	644
V/C Ratio (X)	0.00	0.60	0.00	0.60	0.00	0.31	0.00	0.66
Avail Cap (c_a), veh/h	0	424	0	745	0	444	0	644
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	16.5	0.0	11.0	0.0	12.3	0.0	11.7
Incr Delay (d2), s/veh	0.0	6.1	0.0	3.5	0.0	1.8	0.0	5.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.7	0.0	14.5	0.0	14.1	0.0	17.0
1st-Term Q (Q1), veh/ln	0.0	3.1	0.0	4.4	0.0	1.4	0.0	4.6
2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.7	0.0	0.2	0.0	0.9
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	3.8	0.0	5.2	0.0	1.6	0.0	5.6
%ile Storage Ratio (RQ%)	0.00	0.11	0.00	0.13	0.00	0.05	0.00	0.12
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T						
Lanes in Grp	0	1	0	0	0	0	0	0
Grp Vol (v), veh/h	0	215	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1863	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	745	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	745	0	0	0	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.0	0.0	0.0	0.0	0.0	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
Control Delay (d), s/veh	0.0	10.1	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R				T+R		
Lanes in Grp	0	1	0	0	0	1	0	0
Grp Vol (v), veh/h	0	299	0	0	0	344	0	0
Grp Sat Flow (s), veh/h/ln	0	1583	0	0	0	1774	0	0
Q Serve Time (g_s), s	0.0	6.3	0.0	0.0	0.0	6.5	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	6.3	0.0	0.0	0.0	6.5	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.58	0.00	0.28	0.00	0.27
Lane Grp Cap (c), veh/h	0	633	0	0	0	709	0	0
V/C Ratio (X)	0.00	0.47	0.00	0.00	0.00	0.48	0.00	0.00
Avail Cap (c_a), veh/h	0	633	0	0	0	709	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	10.0	0.0	0.0	0.0	10.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.5	0.0	0.0	0.0	2.4	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
Control Delay (d), s/veh	0.0	12.5	0.0	0.0	0.0	12.4	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	2.7	0.0	0.0	0.0	3.2	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.5	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	3.2	0.0	0.0	0.0	3.6	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.09	0.00	0.00	0.00	0.11	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		14.9						
HCM 2010 LOS		B						

Appendix D-6 : 2038 PM Peak Traffic Signal Control

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	79	240	199	84	75	238	301	266	55	251	91
Future Volume (veh/h)	98	79	240	199	84	75	238	301	266	55	251	91
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	1900	1863	1900	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	107	86	261	216	91	82	259	327	289	60	273	99
Adj No. of Lanes	0	1	0	0	1	0	1	1	1	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
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	213	162	374	374	156	108	403	745	633	379	522	189
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
Prop Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Ln Grp Delay, s/veh	14.7	0.0	0.0	15.6	0.0	0.0	25.1	11.7	12.3	13.8	0.0	13.0
Ln Grp LOS	B			B			C	B	B	B		B
Approach Vol, veh/h		454			389			875			432	
Approach Delay, s/veh		14.7			15.6			15.8			13.1	
Approach LOS		B			B			B			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Case No		5.0		8.0		6.0		8.0
Phs Duration (G+Y+Rc), s		22.5		22.5		22.5		22.5
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green (Gmax), s		18.0		18.0		18.0		18.0
Max Allow Headway (MAH), s		4.9		5.7		4.9		5.7
Max Q Clear (g_c+l1), s		20.0		11.9		10.4		13.5
Green Ext Time (g_e), s		0.0		3.0		4.2		2.3
Prob of Phs Call (p_c)		1.00		1.00		1.00		1.00
Prob of Max Out (p_x)		0.00		0.00		0.00		0.00

Left-Turn Movement Data				
Assigned Mvmt		5		7		1		3
Mvmt Sat Flow, veh/h		1006		286		803		624

Through Movement Data				
Assigned Mvmt		2		4		6		8
Mvmt Sat Flow, veh/h		1863		406		1306		389

Right-Turn Movement Data				
Assigned Mvmt		12		14		16		18
Mvmt Sat Flow, veh/h		1583		935		473		270

Left Lane Group Data								
Assigned Mvmt		0	5	0	7	0	1	0	3
Lane Assignment					L+T+R				L+T+R

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	259	0	454	0	60	0	389
Grp Sat Flow (s), veh/h/ln	0	1006	0	1627	0	803	0	1283
Q Serve Time (g_s), s	0.0	10.9	0.0	0.0	0.0	2.6	0.0	1.6
Cycle Q Clear Time (g_c), s	0.0	18.0	0.0	9.9	0.0	8.4	0.0	11.5
Perm LT Sat Flow (s_l), veh/h/ln	0	1006	0	1231	0	803	0	1050
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	1688	0	0	0	1214
Perm LT Eff Green (g_p), s	0.0	18.0	0.0	18.0	0.0	18.0	0.0	18.0
Perm LT Serve Time (g_u), s	0.0	10.9	0.0	6.5	0.0	12.3	0.0	8.1
Perm LT Q Serve Time (g_ps), s	0.0	10.9	0.0	0.0	0.0	2.6	0.0	1.6
Time to First Blk (g_f), s	0.0	0.0	0.0	4.4	0.0	0.0	0.0	1.6
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	4.4	0.0	0.0	0.0	1.6
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	0.24	0.00	1.00	0.00	0.56
Lane Grp Cap (c), veh/h	0	403	0	750	0	379	0	638
V/C Ratio (X)	0.00	0.64	0.00	0.61	0.00	0.16	0.00	0.61
Avail Cap (c_a), veh/h	0	403	0	750	0	379	0	638
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	17.4	0.0	11.1	0.0	12.9	0.0	11.3
Incr Delay (d2), s/veh	0.0	7.7	0.0	3.6	0.0	0.9	0.0	4.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	25.1	0.0	14.7	0.0	13.8	0.0	15.6
1st-Term Q (Q1), veh/ln	0.0	3.2	0.0	4.5	0.0	0.6	0.0	4.1
2nd-Term Q (Q2), veh/ln	0.0	0.9	0.0	0.8	0.0	0.1	0.0	0.8
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	4.0	0.0	5.3	0.0	0.7	0.0	4.9
%ile Storage Ratio (RQ%)	0.00	0.11	0.00	0.13	0.00	0.02	0.00	0.11
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment		T						
Lanes in Grp	0	1	0	0	0	0	0	0
Grp Vol (v), veh/h	0	327	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1863	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	745	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	745	0	0	0	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.9	0.0	0.0	0.0	0.0	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
Control Delay (d), s/veh	0.0	11.7	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		R				T+R		
Lanes in Grp	0	1	0	0	0	1	0	0
Grp Vol (v), veh/h	0	289	0	0	0	372	0	0
Grp Sat Flow (s), veh/h/ln	0	1583	0	0	0	1779	0	0
Q Serve Time (g_s), s	0.0	6.0	0.0	0.0	0.0	7.1	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	6.0	0.0	0.0	0.0	7.1	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	0.57	0.00	0.27	0.00	0.21
Lane Grp Cap (c), veh/h	0	633	0	0	0	712	0	0
V/C Ratio (X)	0.00	0.46	0.00	0.00	0.00	0.52	0.00	0.00
Avail Cap (c_a), veh/h	0	633	0	0	0	712	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	9.9	0.0	0.0	0.0	10.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.4	0.0	0.0	0.0	2.7	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
Control Delay (d), s/veh	0.0	12.3	0.0	0.0	0.0	13.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	2.6	0.0	0.0	0.0	3.4	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.0	0.0	0.0	0.5	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	3.0	0.0	0.0	0.0	4.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.08	0.00	0.00	0.00	0.12	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		15.0						
HCM 2010 LOS		B						

Appendix D-7 : 2038 AM Peak Roundabout Control

MOVEMENT SUMMARY

Site: [Mantorville Ave & 16th St]

2038 AM ROUNDABOUT
Site Category: -
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	254	3.0	0.808	21.6	LOS C	17.6	449.4	0.94	1.31	1.97	27.2
8	T1	215	3.0	0.808	21.6	LOS C	17.6	449.4	0.94	1.31	1.97	27.3
18	R2	299	3.0	0.808	21.6	LOS C	17.6	449.4	0.94	1.31	1.97	26.7
Approach		768	3.0	0.808	21.6	LOS C	17.6	449.4	0.94	1.31	1.97	27.0
East: RoadName												
1	L2	218	3.0	0.581	14.4	LOS B	4.7	119.6	0.77	0.94	1.25	29.5
6	T1	91	3.0	0.581	14.4	LOS B	4.7	119.6	0.77	0.94	1.25	29.5
16	R2	117	3.0	0.581	14.4	LOS B	4.7	119.6	0.77	0.94	1.25	28.8
Approach		427	3.0	0.581	14.4	LOS B	4.7	119.6	0.77	0.94	1.25	29.3
North: RoadName												
7	L2	138	3.0	0.650	16.7	LOS C	6.2	158.3	0.82	1.04	1.45	29.1
4	T1	246	3.0	0.650	16.7	LOS C	6.2	158.3	0.82	1.04	1.45	29.1
14	R2	98	3.0	0.650	16.7	LOS C	6.2	158.3	0.82	1.04	1.45	28.4
Approach		482	3.0	0.650	16.7	LOS C	6.2	158.3	0.82	1.04	1.45	28.9
West: RoadName												
5	L2	102	3.0	0.625	16.2	LOS C	5.4	138.0	0.81	1.01	1.39	29.3
2	T1	86	3.0	0.625	16.2	LOS C	5.4	138.0	0.81	1.01	1.39	29.3
12	R2	257	3.0	0.625	16.2	LOS C	5.4	138.0	0.81	1.01	1.39	28.6
Approach		445	3.0	0.625	16.2	LOS C	5.4	138.0	0.81	1.01	1.39	28.9
All Vehicles		2122	3.0	0.808	17.9	LOS C	17.6	449.4	0.85	1.11	1.59	28.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: [Mantorville Ave & 16th St]

2038 AM ROUNDABOUT
Site Category: -
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	28.3	mph	28.3	mph
Travel Distance (Total)	1336.2	veh-mi/h	1603.4	pers-mi/h
Travel Time (Total)	47.3	veh-h/h	56.7	pers-h/h
Demand Flows (Total)	2122	veh/h	2546	pers/h
Percent Heavy Vehicles (Demand)	3.0	%		
Degree of Saturation	0.808			
Practical Spare Capacity	5.2	%		
Effective Intersection Capacity	2626	veh/h		
Control Delay (Total)	10.54	veh-h/h	12.65	pers-h/h
Control Delay (Average)	17.9	sec	17.9	sec
Control Delay (Worst Lane)	21.6	sec		
Control Delay (Worst Movement)	21.6	sec	21.6	sec
Geometric Delay (Average)	0.0	sec		
Stop-Line Delay (Average)	17.9	sec		
Idling Time (Average)	9.1	sec		
Intersection Level of Service (LOS)	LOS C			
95% Back of Queue - Vehicles (Worst Lane)	17.6	veh		
95% Back of Queue - Distance (Worst Lane)	449.4	ft		
Queue Storage Ratio (Worst Lane)	0.11			
Total Effective Stops	2359	veh/h	2831	pers/h
Effective Stop Rate	1.11		1.11	
Proportion Queued	0.85		0.85	
Performance Index	138.7		138.7	
Cost (Total)	741.73	$/h	741.73	$/h
Fuel Consumption (Total)	61.8	gal/h		
Carbon Dioxide (Total)	553.6	kg/h		
Hydrocarbons (Total)	0.050	kg/h		
Carbon Monoxide (Total)	0.657	kg/h		
NOx (Total)	0.858	kg/h		

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 92.9% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,018,435	veh/y	1,222,122	pers/y
Delay	5,060	veh-h/y	6,072	pers-h/y
Effective Stops	1,132,316	veh/y	1,358,780	pers/y
Travel Distance	641,369	veh-mi/y	769,643	pers-mi/y
Travel Time	22,691	veh-h/y	27,230	pers-h/y
Cost	356,032	$/y	356,032	$/y

Fuel Consumption	29,659	gal/y
Carbon Dioxide	265,723	kg/y
Hydrocarbons	24	kg/y
Carbon Monoxide	316	kg/y
NOx	412	kg/y

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Appendix D-8 : 2038 PM Peak Roundabout Control

MOVEMENT SUMMARY

Site: [Mantorville Ave & 16th St]

2038 PM ROUNDABOUT
Site Category: -
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	259	3.0	0.851	23.9	LOS C	25.4	649.7	1.00	1.37	2.11	26.6
8	T1	327	3.0	0.851	23.9	LOS C	25.4	649.7	1.00	1.37	2.11	26.6
18	R2	289	3.0	0.851	23.9	LOS C	25.4	649.7	1.00	1.37	2.11	26.0
Approach		875	3.0	0.851	23.9	LOS C	25.4	649.7	1.00	1.37	2.11	26.4
East: RoadName												
1	L2	216	3.0	0.601	16.6	LOS C	4.6	116.7	0.80	0.99	1.37	28.6
6	T1	91	3.0	0.601	16.6	LOS C	4.6	116.7	0.80	0.99	1.37	28.6
16	R2	82	3.0	0.601	16.6	LOS C	4.6	116.7	0.80	0.99	1.37	27.9
Approach		389	3.0	0.601	16.6	LOS C	4.6	116.7	0.80	0.99	1.37	28.5
North: RoadName												
7	L2	60	3.0	0.584	14.4	LOS B	4.7	121.4	0.78	0.95	1.25	30.2
4	T1	273	3.0	0.584	14.4	LOS B	4.7	121.4	0.78	0.95	1.25	30.2
14	R2	99	3.0	0.584	14.4	LOS B	4.7	121.4	0.78	0.95	1.25	29.5
Approach		432	3.0	0.584	14.4	LOS B	4.7	121.4	0.78	0.95	1.25	30.1
West: RoadName												
5	L2	107	3.0	0.602	14.8	LOS B	5.2	132.7	0.78	0.97	1.29	29.8
2	T1	86	3.0	0.602	14.8	LOS B	5.2	132.7	0.78	0.97	1.29	29.8
12	R2	261	3.0	0.602	14.8	LOS B	5.2	132.7	0.78	0.97	1.29	29.1
Approach		453	3.0	0.602	14.8	LOS B	5.2	132.7	0.78	0.97	1.29	29.4
All Vehicles		2149	3.0	0.851	18.7	LOS C	25.4	649.7	0.87	1.13	1.63	28.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: [Mantorville Ave & 16th St]

2038 PM ROUNDABOUT
Site Category: -
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	28.1	mph	28.1	mph
Travel Distance (Total)	1352.7	veh-mi/h	1623.2	pers-mi/h
Travel Time (Total)	48.2	veh-h/h	57.9	pers-h/h
Demand Flows (Total)	2149	veh/h	2579	pers/h
Percent Heavy Vehicles (Demand)	3.0	%		
Degree of Saturation	0.851			
Practical Spare Capacity	-0.1	%		
Effective Intersection Capacity	2525	veh/h		
Control Delay (Total)	11.19	veh-h/h	13.42	pers-h/h
Control Delay (Average)	18.7	sec	18.7	sec
Control Delay (Worst Lane)	23.9	sec		
Control Delay (Worst Movement)	23.9	sec	23.9	sec
Geometric Delay (Average)	0.0	sec		
Stop-Line Delay (Average)	18.7	sec		
Idling Time (Average)	9.3	sec		
Intersection Level of Service (LOS)	LOS C			
95% Back of Queue - Vehicles (Worst Lane)	25.4	veh		
95% Back of Queue - Distance (Worst Lane)	649.7	ft		
Queue Storage Ratio (Worst Lane)	0.16			
Total Effective Stops	2428	veh/h	2913	pers/h
Effective Stop Rate	1.13		1.13	
Proportion Queued	0.87		0.87	
Performance Index	154.7		154.7	
Cost (Total)	755.22	$/h	755.22	$/h
Fuel Consumption (Total)	62.8	gal/h		
Carbon Dioxide (Total)	562.6	kg/h		
Hydrocarbons (Total)	0.051	kg/h		
Carbon Monoxide (Total)	0.667	kg/h		
NOx (Total)	0.877	kg/h		

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 93.5% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,031,478	veh/y	1,237,774	pers/y
Delay	5,369	veh-h/y	6,443	pers-h/y
Effective Stops	1,165,362	veh/y	1,398,435	pers/y
Travel Distance	649,286	veh-mi/y	779,144	pers-mi/y
Travel Time	23,145	veh-h/y	27,774	pers-h/y
Cost	362,505	$/y	362,505	$/y

Fuel Consumption	30,143	gal/y
Carbon Dioxide	270,055	kg/y
Hydrocarbons	25	kg/y
Carbon Monoxide	320	kg/y
NOx	421	kg/y

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APPENDIX E

Warrants

Appendix E-1 : All-Way Stop Warrants
Appendix E-2 : Traffic Signal Warrants

Appendix E-1 : All-Way Stop Warrants

16TH & Mantorville
2038 Traffic Volumes
Multi-Way Stop Warrants

MnDOT Warrants:

	Met	Not Met
A. Where traffic control signals are justified, the multiway 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 leftturn 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.		✓

Appendix E-2 : Traffic Signal Warrants

HCS7 Signal Warrants

Signal Warrants Analysis

File Name:	2038Warrants.xsw
Analyst:	ETOTT
Agency:	WHKS
Date Performed:	1/21/2019
Time Analyzed:	2038
Jurisdiction:	
Analysis Year:	2038
Project Description:	KASSON MN
Units:	U.S. Customary

General

Major Street Direction: North-South
Starting Time Interval: 7
Median Type: Undivided
Major Street Speed (mi/h): 0
Nearest Signal (ft): 0

Population <10,000: No
Coordinated Signal System: No
Crashes Per Year: 0
Adequate Trials of Crash Experience Alternatives: No

School Crossing and Roadway Network

Number of Students in Highest Hour: 0
Number of Adequate Gaps in Period: 0
Number of Minutes in Period: 0

Two or More Major Routes: No
Weekend Count: No
5-year Growth Factor (%): 0

Railroad Crossing

Grade Crossing Approach: None
Highest Volume Hour with Trains: Unknown
Distance to Stop Line (ft):

Rail Traffic (trains/day): 4
High Occupancy Buses (%): 0
Tractor-Trailer Trucks (%): 10

Geometry and Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	1	1	1	1	1	0
Lane Usage		LTR			LTR		L	T	R	L	TR	

Traffic Volumes (veh/h)

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Hour												
07 - 08	94	79	0	201	84	0	234	198	275	127	226	90
08 - 09	1	0	0	112	0	0	4	107	78	32	148	0
09 - 10	1	0	0	48	1	0	0	118	50	15	128	1
10 - 11	6	0	0	54	0	0	0	113	61	7	139	1
11 - 12	1	0	0	55	0	0	4	156	54	16	157	0
12 - 13	0	0	0	68	0	0	1	161	67	13	174	0
13 - 14	4	0	0	54	0	0	5	150	49	11	193	0
14 - 15	1	0	0	71	0	0	1	206	95	43	228	0
15 - 16	4	0	0	207	0	0	5	227	139	32	223	0
16 - 17	4	0	0	139	1	0	5	262	300	55	249	0
17 - 18	98	79	0	199	84	0	238	301	266	55	251	91
18 - 19	1	0	0	85	0	0	0	177	167	27	128	0

Pedestrian Volumes and Gaps (Per Hour)

	Eastbound		Westbound		Northbound		Southbound	
	Gaps	Volume	Gaps	Volume	Gaps	Volume	Gaps	Volume
Hour								
07 - 08	0	0	0	0	0	0	0	0
08 - 09	0	0	0	0	0	0	0	0
09 - 10	0	0	0	0	0	0	0	0
10 - 11	0	0	0	0	0	0	0	0
11 - 12	0	0	0	0	0	0	0	0
12 - 13	0	0	0	0	0	0	0	0
13 - 14	0	0	0	0	0	0	0	0
14 - 15	0	0	0	0	0	0	0	0
15 - 16	0	0	0	0	0	0	0	0
16 - 17	0	0	0	0	0	0	0	0
17 - 18	0	0	0	0	0	0	0	0
18 - 19	0	0	0	0	0	0	0	0

Delay

Hour	Eastbound secs/veh	Eastbound veh-hrs	Westbound secs/veh	Westbound veh-hrs	Northbound secs/veh	Northbound veh-hrs	Southbound secs/veh	Southbound veh-hrs
07 - 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08 - 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 - 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 - 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12 - 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13 - 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 - 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 - 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16 - 17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 - 18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18 - 19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Summary

Hour	Major Volume	Minor Volume	Total Volume	1A 100%	1A 80%	1B 100%	1B 80%	2 100%	3A 100%	3B 100%	4A 100%	4B 100%
07 - 08	1150	285	1608	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	369	112	482	No	No	No	No	No	No	No	No	No
09 - 10	312	49	362	No	No	No	No	No	No	No	No	No
10 - 11	321	54	381	No	No	No	No	No	No	No	No	No
11 - 12	387	55	443	No	No	No	No	No	No	No	No	No
12 - 13	416	68	484	No	No	No	No	No	No	No	No	No
13 - 14	408	54	466	No	No	No	No	No	No	No	No	No
14 - 15	573	71	645	No	No	No	No	No	No	No	No	No
15 - 16	626	207	837	Yes	Yes	No	No	No	No	No	No	No
16 - 17	871	140	1015	No	Yes	No	Yes	No	No	No	No	No
17 - 18	1202	283	1662	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	499	85	585	No	No	No	No	No	No	No	No	No
Total	7134	1463	8970	3	4	2	3	2	0	2	0	0

Results

Warrant 1: Eight-Hour Vehicular Volume [ ]
- A. Minimum Vehicular Volumes [ ]
- B. Interruption of Continuous Traffic [ ]
- 80% Vehicular --and-- Interruption Volumes [ ]

Warrant 2: Four-Hour Vehicular Volume [ ]
- Four-Hour Vehicular Volumes [ ]

Warrant 3: Peak Hour [X]
- A. Peak-Hour Conditions [ ]
- B. Peak-Hour Vehicular Volume Hours Met [X]

Warrant 4: Pedestrian Volume [ ]
- A. Four Hour Volumes [ ]
- B. One-Hour Volumes [ ]

Warrant 5: School Crossing [ ]
- Gaps Same Period [ ]
- Student Volumes [ ]
- Nearest Traffic Control Signal [ ]

Warrant 6: Coordinated Signal System [ ]
- Degree of Platooning [ ]

Warrant 7: Crash Experience [ ]
- A. Adequate Trials of Alternatives [ ]
- B. Reported Crashes [ ]
- C. 80% Volumes for Warrants 1A, 1B --or-- 4 [ ]

Warrant 8: Roadway Network [ ]
- A. Weekday Volume [ ]
- B. Weekend Volume [ ]

Warrant 9: Grade Crossing [ ]
A. Grade Crossing within 140 ft --and-- [ ]
B. Peak-Hour Vehicular Volumes [ ]

This text report was created in HCS™ Signal Warrants Version 7.7 on 1/21/2019 9:59:13 AM

APPENDIX F

Crash Data

Crash Detail Report

KASSON

Report Version 1.0 March 2010

Crash ID: 061950040	**Date:** 05/25/2006	**Time:** 0755	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

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

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	W	
Veh Act:	STOPPED TRAFFIC	RIGHT TURN	
Veh Type:	PASSENGER CAR	SPORT UNTILITY VEHICLE	
Age:	16	44	
Gender:	F	M	
Cond:	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 062730038	**Date:** 09/29/2006	**Time:** 0742	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	NOT APPLICABLE
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	CLOUDY	**# of Vehicles:**	3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	S	S
Veh Act:	LEFT TURN	STOPPED TRAFFIC	STRAIGHT AHEAD
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	VAN OR MINIVAN
Age:	41	37	34
Gender:	F	M	F
Cond:	NORMAL	NORMAL	NORMAL
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	DISTRACTION
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NOT SPECIFIED

Crash ID: 063570136	**Date:** 12/21/2006	**Time:** 1730	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	NOT APPLICABLE
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	REAR END
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	3.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	S
Veh Act:	STRAIGHT AHEAD	STRAIGHT AHEAD	STOPPED TRAFFIC
Veh Type:	PASSENGER CAR	VAN OR MINIVAN	PICKUP TRUCK
Age:	39	47	29
Gender:	M	M	M
Cond:	NORMAL	NORMAL	NORMAL
Cont Fact	NO IMPROPER DRIVING	DISTRACTION	NO IMPROPER DRIVING
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	NO IMPROPER DRIVING

Crash ID: 070400445	**Date:** 02/09/2007	**Time:** 1507	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	RIGHT ANGLE
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	CLEAR	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	W	
Veh Act:	STRAIGHT AHEAD	LEFT TURN	
Veh Type:	PICKUP TRUCK	PICKUP TRUCK	
Age:	53	18	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	FAIL TO YIELD ROW	
Cont Fact	NO IMPROPER DRIVING	IMPROPER TURN	

Crash ID: 071580171	**Date:** 05/21/2007	**Time:** 1523	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.065	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	NON-JUNCTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	NOT APPLICABLE
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	REAR END
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	N	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	41	17	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	DISTRACTION	
Cont Fact	NOT SPECIFIED	FAIL TO YIELD ROW	

Crash ID: 071760141	**Date:** 06/25/2007	**Time:** 1305	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	INTERSECTION-RELATED
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	NOT APPLICABLE
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	NOT APPLICABLE
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	N	
Veh Act:	STRAIGHT AHEAD	STOPPED TRAFFIC	
Veh Type:	SPORT UNTILITY VEHICLE	PICKUP TRUCK	
Age:	16	57	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	DISTRACTION	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 080240239	**Date:** 01/24/2008	**Time:** 0755	**Sys:** 05-MSAS		
County: DODGE	**City:** KASSON		**Route:** 19800109	000+00.000	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	ICE/PACKED SNOW	**Diagram:**	UNKNOWN
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	W	
Veh Act:	RIGHT TURN	STOPPED TRAFFIC	
Veh Type:	SPORT UNTILITY VEHICLE	VAN OR MINIVAN	
Age:	36	74	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	WEATHER	NO IMPROPER DRIVING	
Cont Fact	ILLEGAL SPEED	NOT SPECIFIED	

Crash ID: 082690095	**Date:** 09/24/2008	**Time:** 1455	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	DRY	**Diagram:**	NOT APPLICABLE
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	W	
Veh Act:	SLOWING TRAFFIC	STOPPED TRAFFIC	
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	
Age:	16	17	
Gender:	M	M	
Cond:	NORMAL	NORMAL	
Cont Fact	DEFECTIVE BRAKES	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID: 092180097	**Date:** 08/05/2009	**Time:** 1628	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	NOT APPLICABLE
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	UNKNOWN
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	EAST	N	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	VAN OR MINIVAN	PASSENGER CAR	
Age:	15	15	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	INEXPERIENCE	
Cont Fact	INEXPERIENCE	NO IMPROPER DRIVING	

Crash ID: 093090085	**Date:** 11/03/2009	**Time:** 1502	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	UNKNOWN
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	E	
Veh Act:	STRAIGHT AHEAD	STOPPED TRAFFIC	
Veh Type:	PASSENGER CAR	PICKUP TRUCK	
Age:	16	16	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	DISTRACTION	NOT SPECIFIED	

Crash ID:	100890104	**Date:**	03/29/2010	**Time:**	1545
County:	DODGE	**City:**	KASSON		

Sys: 03-MN
Route: 00000057 001+00.070

Severity:	NON-INCAPACITATING INJURY	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AND GRADE	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	RIGHT ANGLE
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	N	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	78	17	
Gender:	M	F	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID:	111690200	**Date:**	06/16/2011	**Time:**	1659
County:	DODGE	**City:**	KASSON		

Sys: 03-MN
Route: 00000057 001+00.070

Severity:	PROPERTY DAMAGE	**First Event:**	OFF ROADWAY ON SHOULDER
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	NOT APPLICABLE
Crash Type:	COLL W/BANK/DITCH/CURB	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	RAN OFF ROAD - RIGHT SIDE
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	1.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S		
Veh Act:	RIGHT TURN		
Veh Type:	TRUCK W/ SEMI TRAILER		
Age:	70		
Gender:	M		
Cond:	NORMAL		
Cont Fact	IMPROPER TURN		
Cont Fact	OTHER HUMAN FACTOR		

Crash ID:	112860175	**Date:** 10/13/2011	**Time:** 1545	**Sys:**	03-MN
County:	DODGE	**City:** KASSON		**Route:**	00000057 001+00.070

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	LEFT TURN INTO TRAFFIC
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	CLOUDY	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	N	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PASSENGER CAR	
Age:	26	17	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	UNKNOWN	NO IMPROPER DRIVING	

Crash ID:	130070161	**Date:** 01/07/2013	**Time:** 1806	**Sys:**	03-MN
County:	DODGE	**City:** KASSON		**Route:**	00000057 001+00.070

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AT HILLCREST	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	RIGHT ANGLE
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	CLEAR	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	N	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	SPORT UNTILITY VEHICLE	PASSENGER CAR	
Age:	71	56	
Gender:	M	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	NO IMPROPER DRIVING	NO IMPROPER DRIVING	

Crash ID: 132060107	**Date:** 07/24/2013	**Time:** 1532	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	UNKNOWN
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	W	N	
Veh Act:	LEFT TURN	STRAIGHT AHEAD	
Veh Type:	PASSENGER CAR	PICKUP TRUCK	
Age:	38	57	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	FAIL TO YIELD ROW	NO IMPROPER DRIVING	
Cont Fact	VISION OBSCURED - OTHER	NOT SPECIFIED	

Crash ID: 140080171	**Date:** 01/08/2014	**Time:** 0730	**Sys:** 03-MN		
County: DODGE	**City:** KASSON		**Route:** 00000057	001+00.070	

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	NOT APPLICABLE
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	UNKNOWN
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	
Veh Act:	STOPPED TRAFFIC	STRAIGHT AHEAD	
Veh Type:	SPORT UNTILITY VEHICLE	SPORT UNTILITY VEHICLE	
Age:	59	18	
Gender:	F	F	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	DISTRACTION	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID:	142490091	**Date:** 09/05/2014	**Time:** 2151	**Sys:**	03-MN
County:	DODGE	**City:** KASSON		**Route:**	00000057 001+00.070

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	T-INTERSECTION
Road Char:	STRAIGHT AT HILLCREST	**Traffic Device:**	OFFICER/FLAGMAN/SCHOOL
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	50
Surf Cond:	DRY	**Diagram:**	SIDESWIPE PASSING
Light Cond:	DARK - STREET LIGHTS ON	**Officer:**	
Weather 1:	CLEAR	**Reliability:**	CONFIDENT
Weather 2:	CLEAR	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	S	S	
Veh Act:	PED. INNATTENTION/DISTRACT	LEFT TURN	
Veh Type:	PASSENGER CAR	VAN OR MINIVAN	
Age:	17	56	
Gender:	M	F	
Cond:	NORMAL	NORMAL	
Cont Fact	DISREGARD TRAFFIC DEVICE	NO IMPROPER DRIVING	
Cont Fact	VISION OBSCURED - WINDSHIE	NO IMPROPER DRIVING	

Crash ID:	150080160	**Date:** 01/08/2015	**Time:** 1305	**Sys:**	05-MSAS
County:	DODGE	**City:** KASSON		**Route:**	19800109 000+00.001

Severity:	POSSIBLE INJURY	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	4-LEGGED INTERSECTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	STOP SIGN OTHER
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	30
Surf Cond:	ICE/PACKED SNOW	**Diagram:**	UNKNOWN
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	BLOWING SAND/DUST/SNOW	**Reliability:**	CONFIDENT
Weather 2:	SNOW	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	W	
Veh Act:	RIGHT TURN	STOPPED TRAFFIC	
Veh Type:	PICKUP TRUCK	PASSENGER CAR	
Age:	67	17	
Gender:	M	M	
Cond:	NORMAL	NORMAL	
Cont Fact	WEATHER	NO IMPROPER DRIVING	
Cont Fact	NOT SPECIFIED	NOT SPECIFIED	

Crash ID:	153350111	**Date:**	12/01/2015	**Time:**	0758
County:	DODGE	**City:**	KASSON		

Sys: 03-MN
Route: 00000057 001+00.070

Severity:	PROPERTY DAMAGE	**First Event:**	ON ROADWAY
Road Type:	2 LANES UNDIV 2_WAY	**To Junction:**	NON-JUNCTION
Road Char:	STRAIGHT AND LEVEL	**Traffic Device:**	SCHOOL ZONE SIGN
Crash Type:	COLL W/MV IN TRANSPORT	**Speed Limit:**	40
Surf Cond:	WET	**Diagram:**	UNKNOWN
Light Cond:	DAYLIGHT	**Officer:**	
Weather 1:	CLOUDY	**Reliability:**	CONFIDENT
Weather 2:	NOT SPECIFIED	**# of Vehicles:**	2.00

	Unit 1	Unit 2	Unit 3
Trav Dir:	N	N	
Veh Act:	STOPPED TRAFFIC	SLOWING TRAFFIC	
Veh Type:	PASSENGER CAR	PICKUP TRUCK	
Age:	17	16	
Gender:	F	M	
Cond:	NORMAL	NORMAL	
Cont Fact	NO IMPROPER DRIVING	DISTRACTION	
Cont Fact	NOT SPECIFIED	INEXPERIENCE	

Selection Filter:

WORK AREA: COUNTY_CODE('20') - SPATIAL FILTER APPLIED

Analyst:

Eric Tott

Notes:

APPENDIX G

Cost Analysis

Roundabout Cost Estimate

whks
engineers + planners + land surveyors

	Item	Unit	Quantity	Unit Price	Cost
1	REMOVAL OF PAVEMENT	SY	4900	$ 5.50	$ 26,950
2	EXCAVATION	CY	8267	$ 10.00	$ 82,670
3	TOPSOIL BORROW	CY	400	$ 15.00	$ 6,000
4	AGGREGATE BASE 8"	CY	2352	$ 30.00	$ 70,560
5	CURB AND GUTTER	LF	4100	$ 30.00	$ 123,000
6	HMA PAVEMENT 6" THICKNESS	TON	2400	$ 80.00	$ 192,000
7	PAVED P.C. MEDIANS / TRUCK APRON	SY	1300	$ 43.00	$ 55,900
8	STORM CATCH BASIN	EACH	12	$ 3,500.00	$ 42,000
9	STORM SEWER	LF	600	$ 50.00	$ 30,000
10	APRONS	EACH	1	$ 1,300.00	$ 1,300
11	TRAFFIC CONTROL	LS	1	$ 20,000.00	$ 20,000
12	SELECT GRANULAR BORROW 20"	CY	5915	$ 20.00	$ 118,300
13	4" PE SUBDRAIN	LF	4100	$ 5.0	$ 20,500
14	MOBILIZATION	LS	1	$ 20,000.0	$ 20,000
				SUBTOTAL	**$ 809,180**
				10% CONTINGENCY	**$ 80,918**
				ENGINEERING	**$ 142,416**

City Total $ 1,033,000

Traffic Signal Cost Estimate

whks
engineers + planners + land surveyors

	Item	Unit	Quantity	Unit Price	Cost
1	TRAFFIC SIGNAL SYSTEM	LS	1	$ 250,000.0	$ 250,000
2	REMOVAL OF PAVEMENT	SY	5950	$ 5.50	$ 32,725
3	EXCAVATION	CY	4623	$ 10.00	$ 46,230
4	TOPSOIL BORROW	CY	500	$ 15.00	$ 7,500
5	AGGREGATE BASE 8"	CY	1315	$ 30.00	$ 39,450
6	CURB AND GUTTER	LF	160	$ 30.00	$ 4,800
7	HMA PAVEMENT 6" THICKNESS	TON	2250	$ 80.00	$ 180,000
8	TRAFFIC CONTROL	LS	1	$ 20,000.00	$ 20,000
9	SELECT GRANULAR BORROW 20"	CY	3308	$ 20.00	$ 66,160
10	4" PE SUBDRAIN	LF	160	$ 5.0	$ 800
11	MOBILIZATION	LS	1	$ 20,000.0	$ 20,000
				Subtotal	**$ 667,665**
				10% Contingency	**$ 66,767**
				ENGINEERING	**$ 117,509**

City Total $ 852,000

KASSON Police

Kasson Police Department
19 East Main Street
Kasson, MN 55944
507-634-3881
Fax: 507-634-4698

October 14, 2019

To the Mayor and City Council,

As requested, I am writing this letter to answer questions and offer explanations about my request for additional officers in the 2020 budget. I appreciate the opportunity to justify my request and hope that you will understand why I consider adding additional officers a priority that can no longer be overlooked.

I consider the police department to be similar to a private business. We are expected to provide a high-quality product to the citizens of Kasson with excellent customer service. As with any business when the demand for a product goes up, customer service needs to go up accordingly. That's the issue the police department is dealing with at this time.

In 2008 KPD hired an officer for the position of School Resource Officer. At the same time Chief Johnson retired and was replaced by Chief Schuck. When hired, the SRO was considered a replacement for the position vacated by Chief Johnson. Technically our officer numbers stayed level by hiring the SRO. However, by placing that officer in the schools instead of on patrol, our patrol officer numbers decreased once Chief Schuck was promoted and taken off the road. Our department worked with this patrol officer deficit until early 2019 when the Council approved hiring an additional officer. While greatly appreciated, this hire merely took our staffing back to a level that was established prior to 2008.

Just so the Council understands how much of a strain this patrol officer deficit has been for our department, please review the following statistics. In 2008 KPD handled 1,865 calls for service. In 2018 KPD handled 4,869 calls for service. In a 10 year period during which our officer staffing levels did not change, we saw a 62% increase in calls for service. In the past five years these numbers have increased by 25%. With all due respect, why would the Council allow this to happen to what should be considered one of, if not the most, essential departments in the City? So far in 2019 KPD is on pace to handle 5,301 calls for service. If this number remains true, it will be the first time we have topped 5,000 calls for service and an 8% increase from 2018 to 2019. As you are well aware, these numbers will only go up as the City adds to its growing population.

Chief Kent Berghuis

KASSON Police

Kasson Police Department
19 East Main Street
Kasson, MN 55944
507-634-3881
Fax: 507-634-4698

It is the recommendation of the FBI that police departments be staffed so there is, on average, one full-time police officer for every 500 residents. The rationale for this recommendation is officer safety. In 2016 the national average was 2.4 officers for every 1,000 residents. Kasson is quickly approaching a population of 7,000 residents, which means we would need 14 full-time police officers to be on pace with FBI recommendations. This probably isn't a realistic number at this time. However, we currently have nine full-time police officers meaning we are adequately staffed to police a community of 4,500 people. When was the last time Kasson had a population of 4,500 people? That number is way back in the rear-view mirror.

Based on our current officer numbers I don't believe we would be adequately staffed should a critical incident occur in our community. In my opinion we are one mass shooting, one officer involved shooting or one train derailment away from having our police department exposed for its inadequate staffing. While KPD has very good officers, there is only so much that can be done with limited numbers. With this in mind I believe that the Council needs to decide how they want others to view the City of Kasson should a critical incident take place. Ultimately, a lack of preparedness is a reflection on the Council as much as it is the police department.

While it's important to consider the impact our staffing levels have on customer service, you also need to understand the impact it has on our current employees. We have absolutely no flexibility with our scheduling. Currently, the only way for an officer to get time off is to have another full-time officer work overtime or hope one of our part-time officers is willing to cover a shift. In the past we've had part-time officers who wanted to work as many hours as possible. That's no longer the case as our part-time officers work multiple jobs and are not always available. Because covering shifts is more of a challenge, we have officers who come to work sick or have maxed out their vacation and comp time balances. Police work is stressful and being able to take time off when needed is absolutely necessary.

Now that you understand my concerns, I would like to share with you my plans should we be allowed to hire two new officers in 2020:

- **KPD would be closer to providing 24-hour, two officer police coverage:** As it stands right now, we have approximately 57 hours per week of single officer police coverage in the City of Kasson, not including holidays. This is 57 hours per week where an officer is

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working alone and at greater risk of being injured or killed. Two new officers will significantly reduce these hours of single officer coverage. The benefits will be an increase in officer safety and the ability to maintain, if not improve, our high level of customer service to the citizens of Kasson.

- **KPD would be able to move away from hiring part-time officers:** Hiring part-time officers is expensive. By the time we provide equipment and training, we have spent thousands of dollars to get a part-time officer on the road. Unfortunately, because the state has changed licensing standards for part-time officers (part-time licenses no longer exist, all officers need a full-time license), the part-time officers we do hire are younger and looking for full-time jobs. As they try to gain experience necessary to get a full-time job, these officers work for multiple agencies and are not always available.

  KPD would like to get away from using part-time officers. If we are allowed two new officers in the 2020 budget, each rotation would have an officer available to work flex schedules. When an officer is sick or needs time off, the flex shift officer would slide into the shift that needs to be filled. Barring any unforeseen circumstances, this should resolve most of the issues we are having with officers getting time off. There are still some issues with this plan that will only be remedied by hiring more officers down the road, but it's a start.

These are the pressing issues I would be able to address with the two officers requested in the 2020 budget. Getting these new officers won't stop us from asking for more officers in the future as departmental needs change. At some point our community will be big enough and the calls for service will increase to the point where we may need to add another investigator, another School Resource Officer and more patrol officers. I would ask the Council to keep an open mind and understand that these requests will be made after careful consideration of staffing needs.

I understand the Council has a tax levy to consider and needs to answer to the public. However, KPD needs to answer to the public as well. When our officers are so busy that we can't address quality of life issues that citizens believe are important, that's a problem. When there are different events held in the community such as the Fair, Big Iron Classic and Festival in the Park and the police department doesn't have enough officers on the street to deal with the influx of

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people and calls for service, that's a problem. I would guess that most people moving to Kasson appreciate the quality of life and safety offered in this community. I would also guess that many of our new citizens moved here from Rochester where they had to pay a little more to get the services they expected. Perhaps the Council is underestimating what the citizens of Kasson are willing to pay to maintain the quality of life they seek.

Thank you for your time and willingness to consider my request.

Respectfully submitted,

Chief Kent Berghuis

Greater Zumbro River Watershed

Comprehensive Watershed Management Plan

Waterside Chats

Goal

Your input and knowledge is crucial to the future of the Greater Zumbro River Watershed. Please join us at one of the **Waterside Chats** hosted by the Greater Zumbro River One Watershed, One Plan team to provide your feedback on problems, risks and opportunities in the watershed and how they should be prioritized in the 10 year, comprehensive watershed management plan.

Why Should I Participate?

We need your local knowledge of the watershed!

Priority resources and issues have been identified from local and state plans, studies, reports, state agency feedback, and resident surveys. Now, we need your input on the prioritization of these water and natural resources issues! Your feedback will be used to formulate the final list of priority issues that will be addressed in this 10 year plan.

Planning Area

The Greater Zumbro River Watershed Comprehensive Watershed Management Plan includes the Zumbro River Watershed & a portion of the Mississippi River—Lake Pepin Watershed illustrated on the map to the right.

Waterside Chats Locations

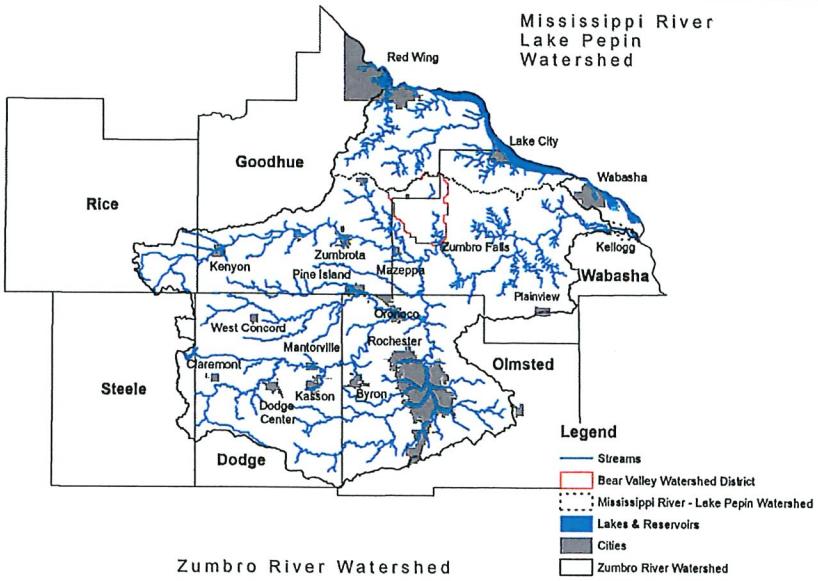
Mantorville Thursday, October 24th 2019
Zumbro Valley Recreation Club, 25202 615th St

Mazeppa Thursday, November 7th 2019
Mazeppa Community Center, 281 County Rd 1

Lake City Thursday, November 14th 2019
Sportsman's Club, 2200 S Oak St.

Time: 6-8 pm

Light sandwiches & refreshments will be served. RSVPs are not necessary, but will help us prepare materials, food and space. You may RSVP with the location you plan to attend to pwservice@co.olmsted.mn.us or call 507-328-7070



We Look Forward to Seeing You!

The Planning Workgroup

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