Waldemar Residential Development

Sarah Properties Ltd.

January 28, 2015

Executive Summary

HDR was retained to undertake a traffic impact study for a residential development proposed by Sarah Properties Limited. The site is located northwest of 10th Line and County Road 109, in the community of Waldemar, within the Township of Amaranth. The site is planned to be connected to Mill Street (10th Line) via Evans Avenue, Main Street, and an additional connection (Street 1) south of David Street.

The existing road network in the vicinity of the proposed development consists of county and local roads with two-lane cross sections (one lane per direction) and intersections, which are all controlled by stop signs on the minor street. Turning lanes or storage lanes are currently not provided on any of the intersection approaches.

The proposed site will accommodate 336 detached single family homes within a lot area of approximately 35 hectares. Trip generation analysis conducted for the development estimated that during peak commuting times, 63 inbound and 189 outbound site trips would be introduced onto the existing road network during the AM peak hour. The PM peak hour is estimated to have 212 inbound and 124 outbound site related trips.

An analysis of existing, 2019 future background, and 2019 future total traffic conditions (background plus proposed development) shows that all studied intersections will continue to operate at level of service (LOS) 'A' which indicates no capacity deficiencies or congestion. The proposed site is expected to generate the most new vehicles at the 10th Line / County Road 109 intersection compared to the other intersections in the area, decreasing SB left turn and right turn (SBL/R) movement related LOS from 'B' to 'C'. At LOS 'C', delays and queues for the SBL/R movement are expected to remain at acceptable levels.

Overall, the proposed residential development is not expected to adversely impact existing and future traffic operations in the area, as the existing road network (roads and intersections) is capable of accommodating site generated traffic volumes as well future background growth in the area. No external road improvements will be required other than tying in the proposed development roads with the existing road network.

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Appendices

1. Introduction

HDR was retained by Sarah Properties Limited to undertake a traffic study to support the development of 336 single-family detached homes in the community of Waldemar, within the Township of Amaranth. The subject site is located northwest of County Road 109 and 10th Line, with planned site connections to Mill Street (10th Line) via Evans Avenue, Main Street, and an additional connection (Street 1) south of David Street. The site location is shown in **Exhibit 1**.

Exhibit 1: Site Location

These units are contained within a 35.021 hectare lot area and construction is expected to take approximately five years before full build out.

1.1 Scope of Work

The proposed scope of work for the traffic study is summarized below and was discussed and

agreed to by RJ Burnside & Associates Limited, who were representing the Township of Amaranth:

Scenarios

Scenarios to be analyzed:

- Existing 2014 traffic conditions
- 2019 Background traffic conditions (includes road growth and traffic from approved or under construction background developments in the immediate area)
- 2019 Total traffic conditions (2019 background plus the proposed development)

Time Periods

Time periods that were analyzed are the development peak hours, which include:

- Weekday AM Peak Hour (between 7:00 – 9:00 AM)
- Weekday PM Peak Hour (between 4:00 – 6:00 PM)

Intersections

Intersections analyzed for capacity purposes include:

- 10th Line / County Road 109
- John Street (10th Line) / Street 1
- Mill Street (10th Line) / David Street
- Mill Street (10th Line) / Station Street
- Mill Street (10th Line) / Henry Street
- 9th Line / Station Street
- 9th Line / County Road 109

1.2 Intersection Operations Analysis Methodology

Intersection operations were assessed for intersections in the study area using the software program Synchro 8, Traffic Signal Coordination Software Version 8 Build 801, which employs methodology from the ***Highway Capacity Manual (HCM2000)*** published by the Transportation Research Board National Research Council. Synchro 8 can analyze both signalized and unsignalized intersections in a road corridor or network taking into account the spacing, interaction, queues and operations between intersections.

The two-way unsignalized intersection analysis considers two separate measures of performance:

- The capacity of the critical intersection movements, which is based on a volume to capacity ratio.
- The level of service for the critical movements, which is based on the average control delay per vehicle for the various critical movements within the intersection.

Level of service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between ‘A’ and ‘F’, with ‘F’ being the longest delay. The volume to capacity (v/c) ratio is a measure of the degree of capacity utilized at an intersection.

2. Existing Conditions

2.1 Site Area Description

The subject site is located northwest of County Road 109 and 10th Line in the community of Waldemar within the Township of Amaranth. In the immediate area, the site is currently surrounded by undeveloped land to the north, west, and south, and existing detached homes to the east. All intersections in the study area are unsignalized and stop sign controlled. Truck restriction signage is placed on 10th Line and 9th Line in the vicinity of Waldemar. It is also noted that the land use is primarily residential.

2.2 Road Network

The existing road network configurations are illustrated in **Exhibit 2** and described below.

County Road 109	An east-west undivided rural highway under the jurisdiction of the County of Dufferin with a two-lane cross section within the study area. The posted speed limit is 80 km/hr.
10th Line	A north-south rural concession road with a two-lane cross section. The street name changes to John Street and Mill Street when passing though the Waldemar area. There is truck restriction signage placed approaching Waldemar. The posted speed limit is 50 km/hr.
9th Line	A north-south rural road with a two-lane cross section, with residential driveway connections on east and west sides. There is truck restriction signage placed approaching Waldemar. The posted speed limit is 50 km/hr.
David Street	An east-west local residential road with a two lane cross section. The posted speed limit is 40 km/hr.
Station Street	An east-west local residential road with a two lane cross section. The posted speed limit is 50 km/hr.
Henry Street	An east-west local residential road with a two lane cross section. The posted speed limit is 40 km/hr.

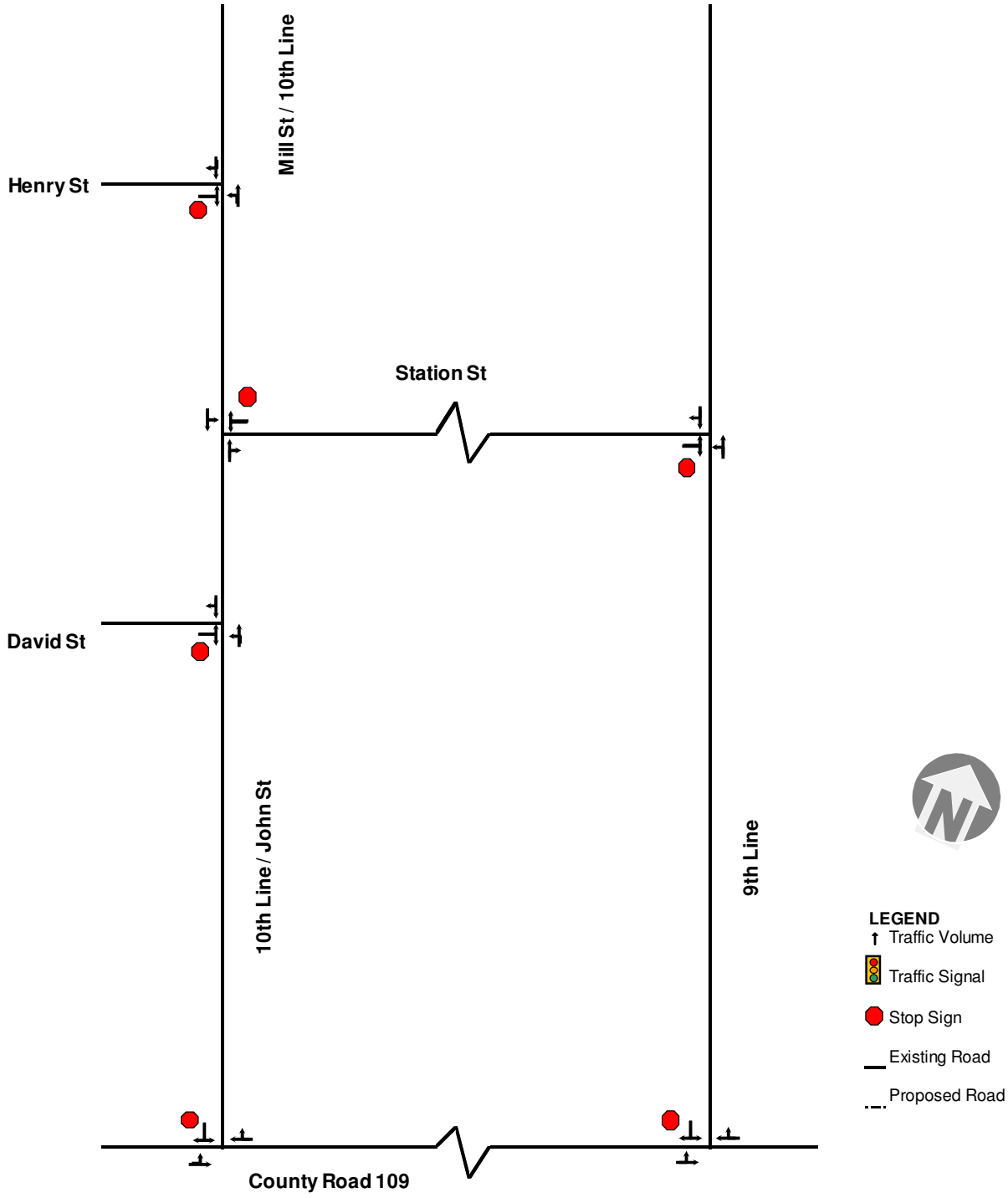


Exhibit 2: Site Lane Configuration

2.3 Traffic Data Collection

Existing weekday AM and PM peak hour turning movement counts for this study were obtained from traffic surveys commissioned by HDR. The dates of the traffic counts are summarized in **Table 3**.

Table 3: Summary of Traffic Counts

Location	Date	Source
County Road 109/10th Line	Weekday AM: June 18, 2014 Weekday PM: June 18, 2014	Commissioned by HDR
County Road 109/9th Line	Weekday AM: June 18, 2014 Weekday PM: June 18, 2014	Commissioned by HDR
10th Line/David Street	Weekday AM: June 18, 2014 Weekday PM: June 18, 2014	Commissioned by HDR
10th Line/Station Street	Weekday AM: June 18, 2014 Weekday PM: June 18, 2014	Commissioned by HDR
10th Line/Henry Street	Weekday AM: June 18, 2014 Weekday PM: June 18, 2014	Commissioned by HDR
9th Line/Station Street	Weekday AM: July 8, 2014 Weekday PM: July 8, 2014	Commissioned by HDR

The existing weekday AM and PM peak hour turning movement counts at the study intersections are illustrated in **Exhibit 3** and **Exhibit 4**, respectively.

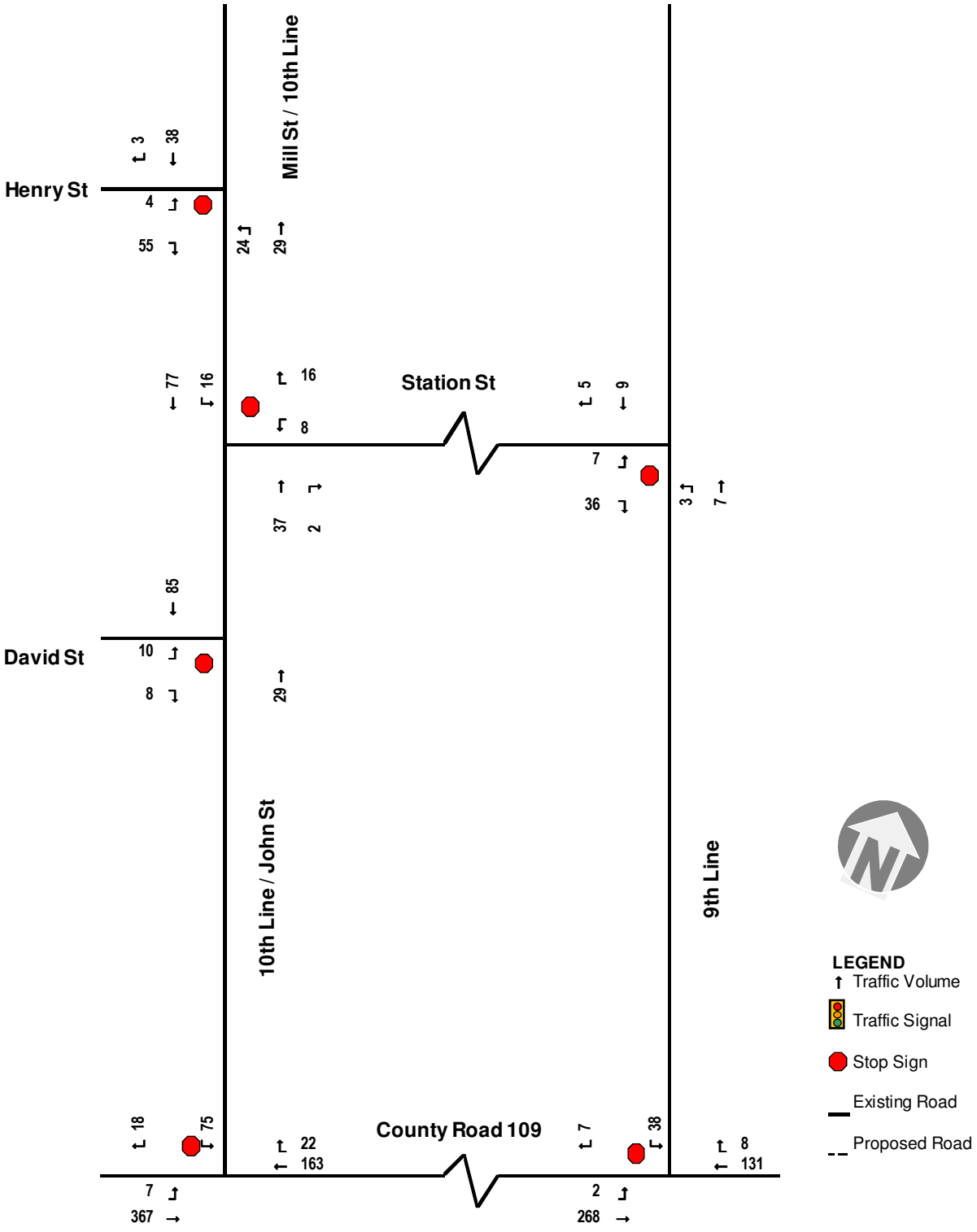


Exhibit 3: Existing AM Traffic Volumes

Exhibit 4: Existing PM Traffic Volumes

2.4 Existing Traffic Intersection Operations

Based on existing road configurations illustrated in **Exhibit 2** and existing traffic volumes shown in **Exhibit 3** and **4**, the existing unsignalized intersection operations are summarized in **Table 4**. Detailed HCM output sheets are provided in **Appendix A**. It was noted that truck restriction signage is in place along 10th Line and 9th in the vicinity of Waldemar, however trucks were observed in the conducted traffic count surveys and subsequently included in the Synchro analysis.

Table 4: Existing Traffic Unsignalized Intersection Operations

Intersection & Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
	LOS	(delays) (s)	v/c	95th Percentile Queue (m)	LOS	(delays) (s)	v/c	95th Percentile Queue (m)
10th Line / County Road 109								
Overall	**A**	**(2.1)**	**0.20**		**A**	**(1.3)**	**0.29**	
EBL/T	A	(0.2)	0.01	0.1	A	(1.0)	0.02	0.6
WBT/R	A	(0.0)	0.12	0	A	(0.0)	0.29	0
SBL/R	B	(13.8)	0.20	5.5	B	(15.4)	0.13	3.3
10th Line / Henry Street								
Overall	**A**	**(4.7)**	**0.10**		**A**	**(2.5)**	**0.04**	
EBL/R	A	(9.1)	0.10	2.6	A	(9.3)	0.04	0.9
NBL/T	A	(3.6)	0.03	0.7	A	(2.0)	0.02	0.5
SBT/R	A	(0.0)	0.04	0.0	A	(0.0)	0.04	0
9th Line / County Road 109								
Overall	**A**	**(1.2)**	**0.10**		**A**	**(0.5)**	**0.19**	
EBL/T	A	(0.1)	0.00	0.0	A	(0.3)	0	0.1
WBT/R	A	(0.0)	0.10	0.0	A	(0.0)	0.19	0
SBL/R	B	(12.2)	0.10	2.5	B	(11.8)	0.03	0.7
10th Line (Mill St) / Station St								
Overall	**A**	**(2.2)**	**0.03**		**A**	**(2.2)**	**0.08**	
WBL/R	A	(9.2)	0.03	0.8	A	(9.5)	0.04	0.9
NBT/R	A	(0.0)	0.03	0.0	A	(0.0)	0.08	0
SBL/T	A	(1.3)	0.01	0.3	A	(3.1)	0.02	0.6
10th Line (Mill St) / David Street								
Overall	**A**	**(1.3)**	**0.07**		**A**	**(0.4)**	**0.03**	
EBL/R	A	(9.4)	0.03	0.7	A	(9.0)	0.01	0.2
NBL/T	A	(0.0)	0.00	0.0	A	(0.1)	0	0
SBT/R	A	(0.0)	0.07	0.0	A	(0.0)	0.03	0
9th Line / Station St								
Overall	**A**	**(5.9)**	**0.06**		**A**	**(5.7)**	**0.03**	
EBL/R	A	(8.6)	0.06	1.5	A	(8.8)	0.02	0.6
NBL/T	A	(2.3)	0.00	0.1	A	(5.7)	0.03	0.6
SBT/R	A	(0.0)	0.01	0.0	A	(0.0)	0.01	0

v/c – volume to capacity ratio, LOS – Level of Service

Under existing traffic conditions, overall Level of Service 'A' was observed for all intersections during both peak hours. For individual movements, the southbound left/right movement at 9th and 10th Line at County Road 109 exhibited LOS 'B', due to higher opposing traffic volumes. Queues and v/c ratios were low throughout the study area.

3. 2019 Background Traffic Conditions

Forecasts of future background traffic consist of background traffic growth to the year 2019 and the background development. The horizon year of 2019 was selected for the analysis period, as this represents an appropriate time frame within which the proposed development is expected to be fully developed.

3.1 Planned Road Network Improvements

There are no major planned road improvements by 2019 in the study area.

3.2 Background Traffic Growth

An annual growth rate of 2% per annum was applied to all observed movements in the study area. As historical intersection traffic counts were unavailable, a conservative approach was taken when assuming growth in the area. Furthermore, future traffic patterns were assumed to remain identical to existing observed patterns, as there are no additional developments planned for the region. These assumptions was proposed to RJ Burnside and accepted.

3.3 Background Development Traffic

No background developments planned for construction were determined to occur within the next five years in the vicinity of the study area.

3.4 Background Trip Distribution

The trip distribution for future background traffic volumes was based on the 2014 turning movement counts, as there were no additional developments planned in the vicinity of the study area. This distribution approach was approved by RJ Burnside. The trip distribution for assigning new traffic related to background growth is summarized in **Table 8**.

Table 8: Trip Distribution for Background Traffic Growth

Direction: To/From	Via	2014 TMC			
		Weekday AM Peak		Weekday PM Peak	
		In	Out	In	Out
North	10th Line	53%	20%	28%	56%
	9th Line	6%	4%	3%	7%
South	10th Line	37%	63%	48%	31%
	- Then West via County Road 109	9%	10%	12%	26%
	- Then East via County Road 109	28%	53%	36%	5%
	9th Line				
	- Then East via County Road 109	4%	13%	21%	6%
Total		**100%**	**100%**	**100%**	**100%**

The assignment of background traffic growth for the study area in 2019 is shown in **Exhibit 4** and **Exhibit 5** for the AM and PM peak hours, respectively.

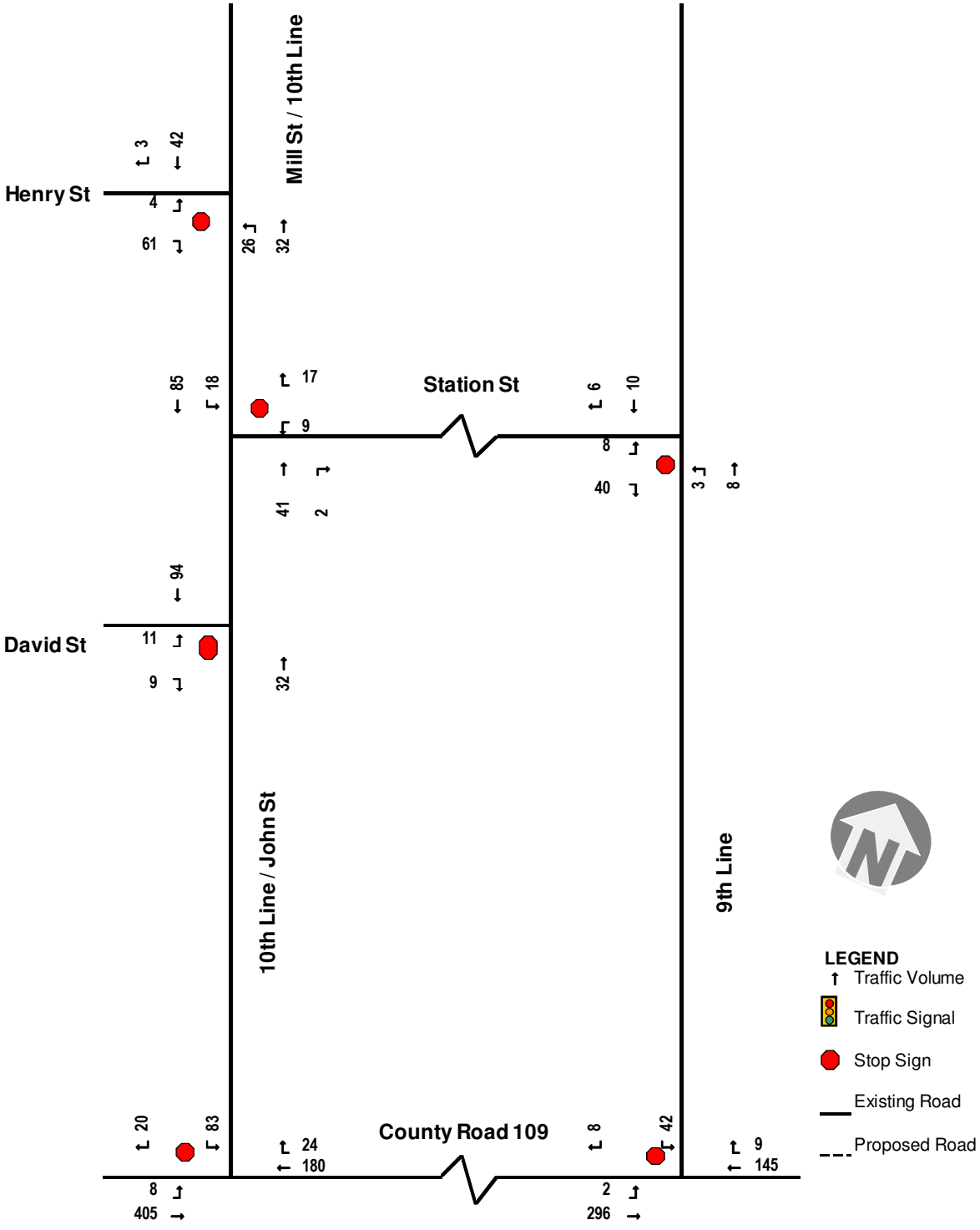


Exhibit 4: 2019 AM Background Traffic Volumes

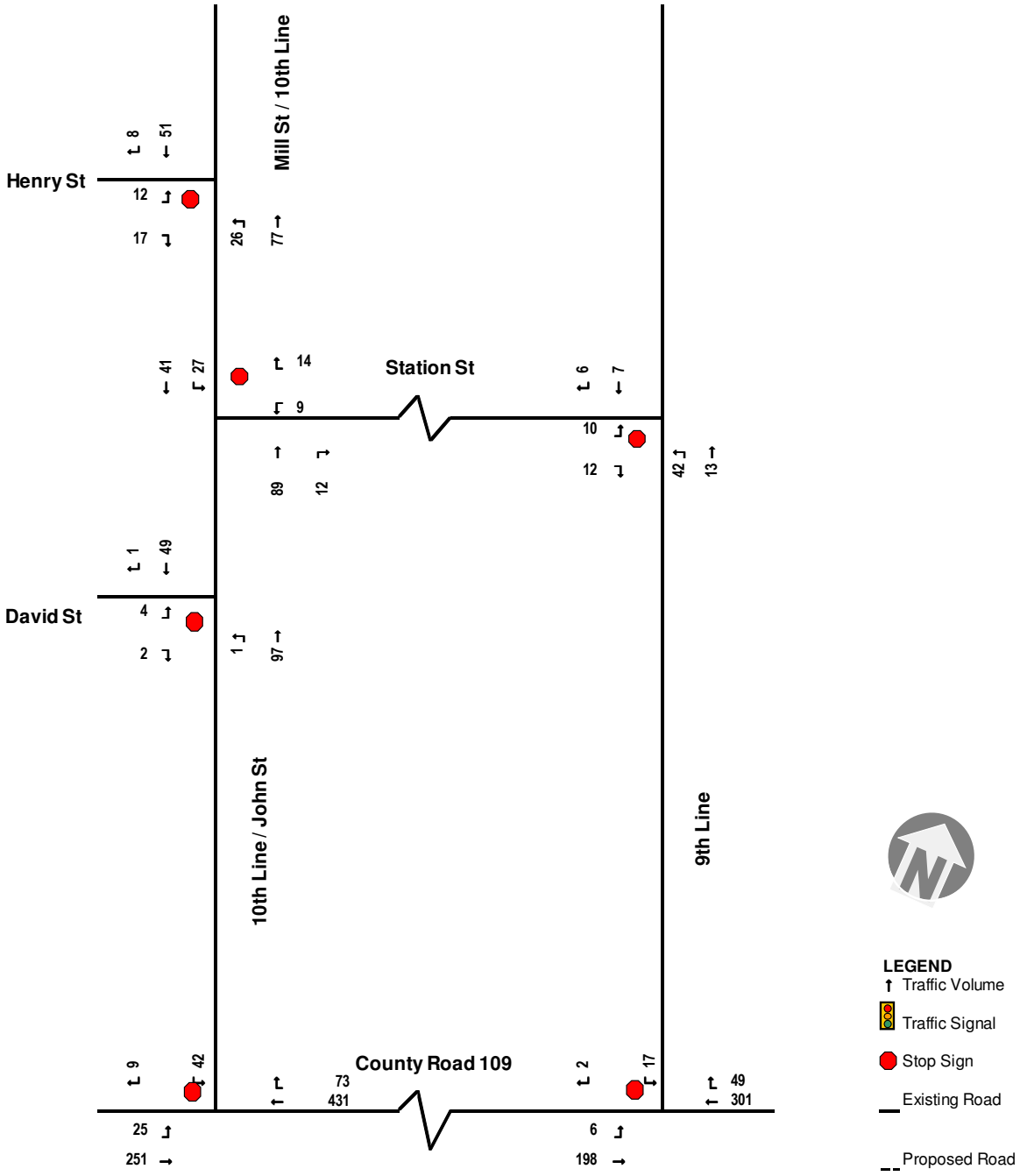


Exhibit 5: 2019 PM Background Traffic Volumes

3.5 Background Traffic Intersection Operations

Based on the road network illustrated in **Exhibit 2** and 2019 background traffic shown in **Exhibits 4** and **5**, the background unsignalized intersection operations are summarized in **Table 9**. Detailed HCM output sheets are provided in **Appendix B**.

Table 9: 2019 Background Traffic Unsignalized Intersection Operations

Intersection & Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
	LOS	(delays) (s)	v/c	95th Percentile Queue (m)	LOS	(delays) (s)	v/c	95th Percentile Queue (m)
10th Line / County Road 109								
Overall	**A**	**(2.3)**	**0.24**		**A**	**(1.4)**	**0.32**	
EBL/T	A	(0.2)	0.01	0.1	A	(1.1)	0.03	0.6
WBT/R	A	(0.0)	0.13	0	A	(0.0)	0.32	0
SBL/R	B	(15.0)	0.24	6.9	B	(16.9)	0.16	4.1
10th Line / Henry Street								
Overall	**A**	**(4.8)**	**0.12**		**A**	**(2.5)**	**0.04**	
EBL/R	A	(9.2)	0.12	3	A	(9.4)	0.04	1
NBL/T	A	(3.5)	0.03	0.7	A	(2.0)	0.02	0.5
SBT/R	A	(0.0)	0.05	0.0	A	(0.0)	0.04	0
9th Line / County Road 109								
Overall	**A**	**(1.3)**	**0.12**		**A**	**(0.5)**	**0.21**	
EBL/T	A	(0.1)	0.00	0.0	A	(0.3)	0.01	0.1
WBT/R	A	(0.0)	0.11	0.0	A	(0.0)	0.21	0
SBL/R	B	(12.8)	0.12	3	B	(12.4)	0.04	0.9
10th Line (Mill St) / Station St								
Overall	**A**	**(2.2)**	**0.04**		**A**	**(2.2)**	**0.09**	
WBL/R	A	(9.3)	0.04	0.8	A	(9.6)	0.04	1
NBT/R	A	(0.0)	0.03	0.0	A	(0.0)	0.09	0
SBL/T	A	(1.4)	0.01	0.3	A	(3.1)	0.03	0.6
10th Line (Mill St) / David Street								
Overall	**A**	**(1.3)**	**0.07**		**A**	**(0.4)**	**0.03**	
EBL/R	A	(9.5)	0.03	0.7	A	(9.1)	0.01	0.2
NBL/T	A	(0.0)	0.00	0.0	A	(0.1)	0	0
SBT/R	A	(0.0)	0.07	0.0	A	(0.0)	0.03	0
9th Line / Station St								
Overall	**A**	**(5.9)**	**0.07**		**A**	**(5.7)**	**0.03**	
EBL/R	A	(8.8)	0.07	1.7	A	(8.9)	0.03	0.6
NBL/T	A	(2.1)	0.00	0.1	A	(5.7)	0.03	0.7
SBT/R	A	(0.0)	0.01	0.0	A	(0.0)	0.01	0

v/c – volume to capacity ratio, LOS – Level of Service

For 2019 future background traffic conditions, all studied intersections will continue to operate at overall Level of Service 'A' for both peak hours. For individual movements, the southbound left/right movement at both 9th and 10th Line at County Road 109 will continue to operate at LOS 'B' with marginal increases to delays and queues. Delays, queues and v/c ratios are expected to remain low (relative to existing conditions) throughout the study area.

4. Site Details

4.1 Site Concept Plan

Sarah Properties Ltd. is proposing to construct 336 detached homes within a 35.021 hectare lot, located northwest of County Road 109. The proposed site concept plan is shown in **Exhibit 6**.

Exhibit 6: Site Concept Plan

4.2 Site Access

As shown in **Exhibit 6**, the accesses for the proposed development will consist of connections to 10th Line (Mill Street / John Street) via Evans Avenue (connected to Henry Street), Main Street (interpreted as a connection to David Street), and Street 1. The minor approach (i.e. east-

west roads) at these connection points are assumed to be stop-controlled while 10th Line will remain as the main street with free flow movement.

4.3 Site Trip Generation

The trip generation for the residential development was based upon information in the publication ***Trip Generation Manual, 9th Edition*** by the Institute of Transportation Engineers ("ITE"). The "Single Family Home" land use code 210 was used to generate trips for the proposed detached houses.

10th Line and 9th Line are considered to be the predominant access/egress routes to the proposed residential development to/from County Road 109. Furthermore, a lack of transit service and the rural nature of the surrounding area led to the assumption that the modal split for future site related trips will consist of 100% auto trips.

The trip generation in/out percentage splits for the residential development for the AM and PM peak hour is summarized in **Table 6**.

Table 6: Proposed Residential Development Trip Rates

Intersection	AM Peak Hour (trips/hour)			PM Peak Hour (trips/hour)		
	In	Out	Total	In	Out	Total
ITE	0.19	0.56	0.75	0.63	0.37	1.00

The resulting vehicular traffic generation for the proposed residential units is summarized in **Table 7**.

Table 7: Vehicular Site Traffic Generation

Residential Units (336 Units)		Weekday AM Peak Hour	Weekday PM Peak Hour
Trip Rate	veh/unit	0.75	1.00
Net Trip	veh/h	252	336
Inbound Trips	veh/h	63	212
Outbound Trips	veh/h	189	124

4.4 Trip Distribution

As mentioned in **Section 3.4**, the trip distribution is based on existing traffic distribution observed from the 2014 turning movement counts. The assignment of the resulting site traffic is shown in **Exhibit 7** and **8** for the AM and PM peak hours, respectively.

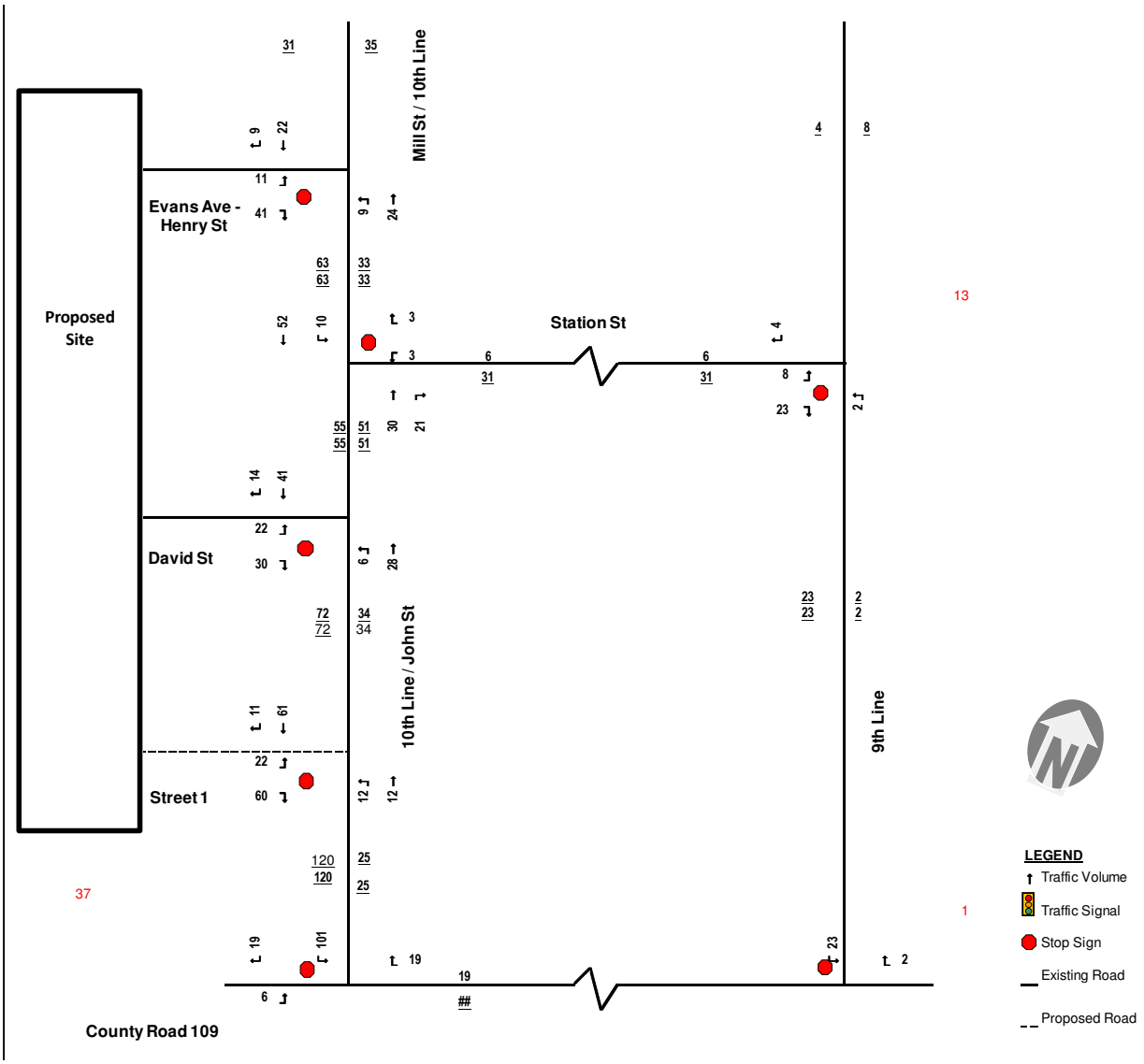


Exhibit 7: Waldemar Residential Development Trips – AM Peak Hour

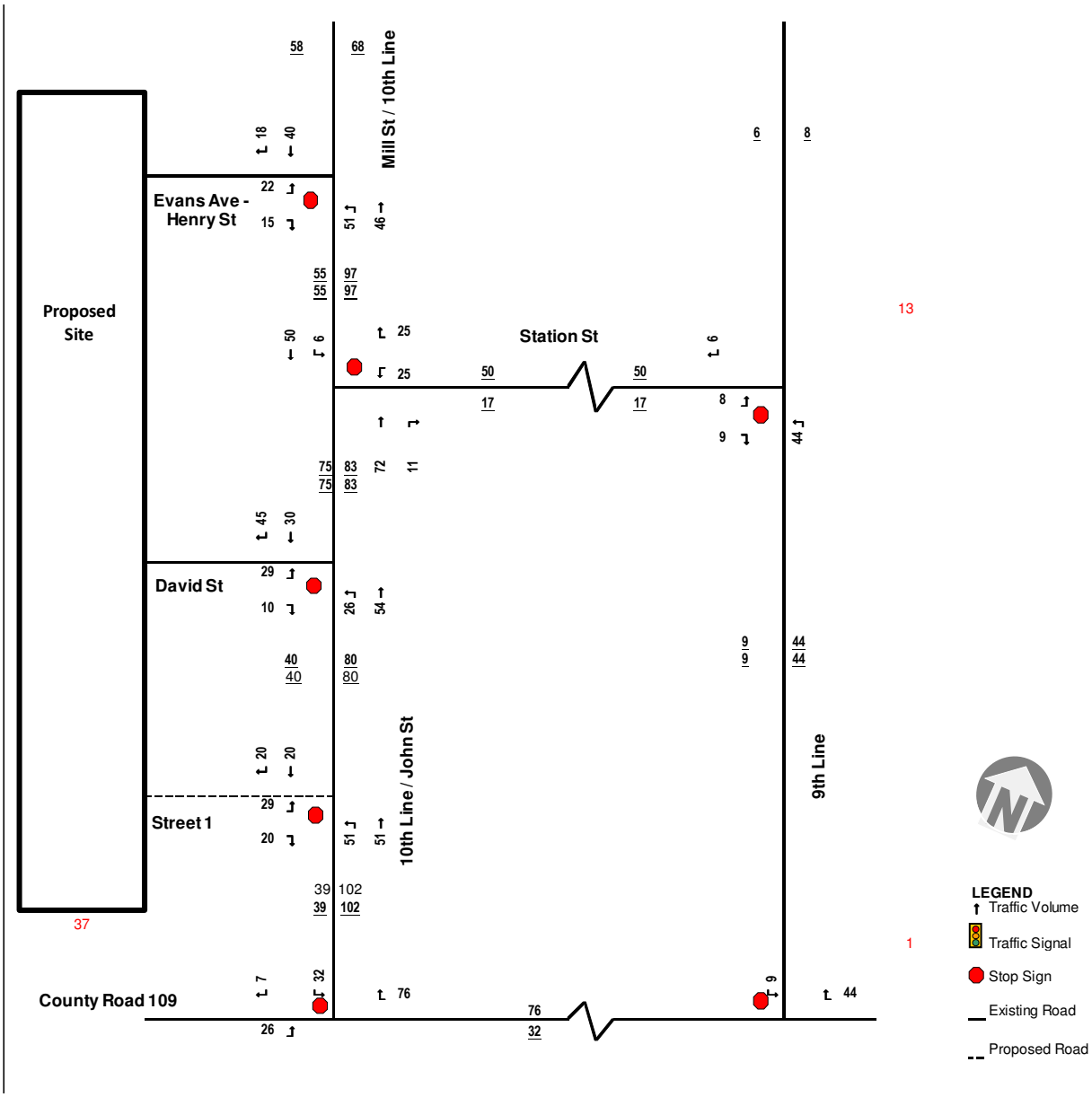


Exhibit 8: Waldemar Residential Development Trips – PM Peak Hour

5. 2019 Total Traffic Conditions

5.1 Total Traffic Intersection Operations

The 2019 total traffic volumes include 2019 background traffic plus the resulting site traffic created by the proposed development. The resulting future total traffic volumes are shown in **Exhibit 8** and **Exhibit 9** for the AM and PM peak hours, respectively.

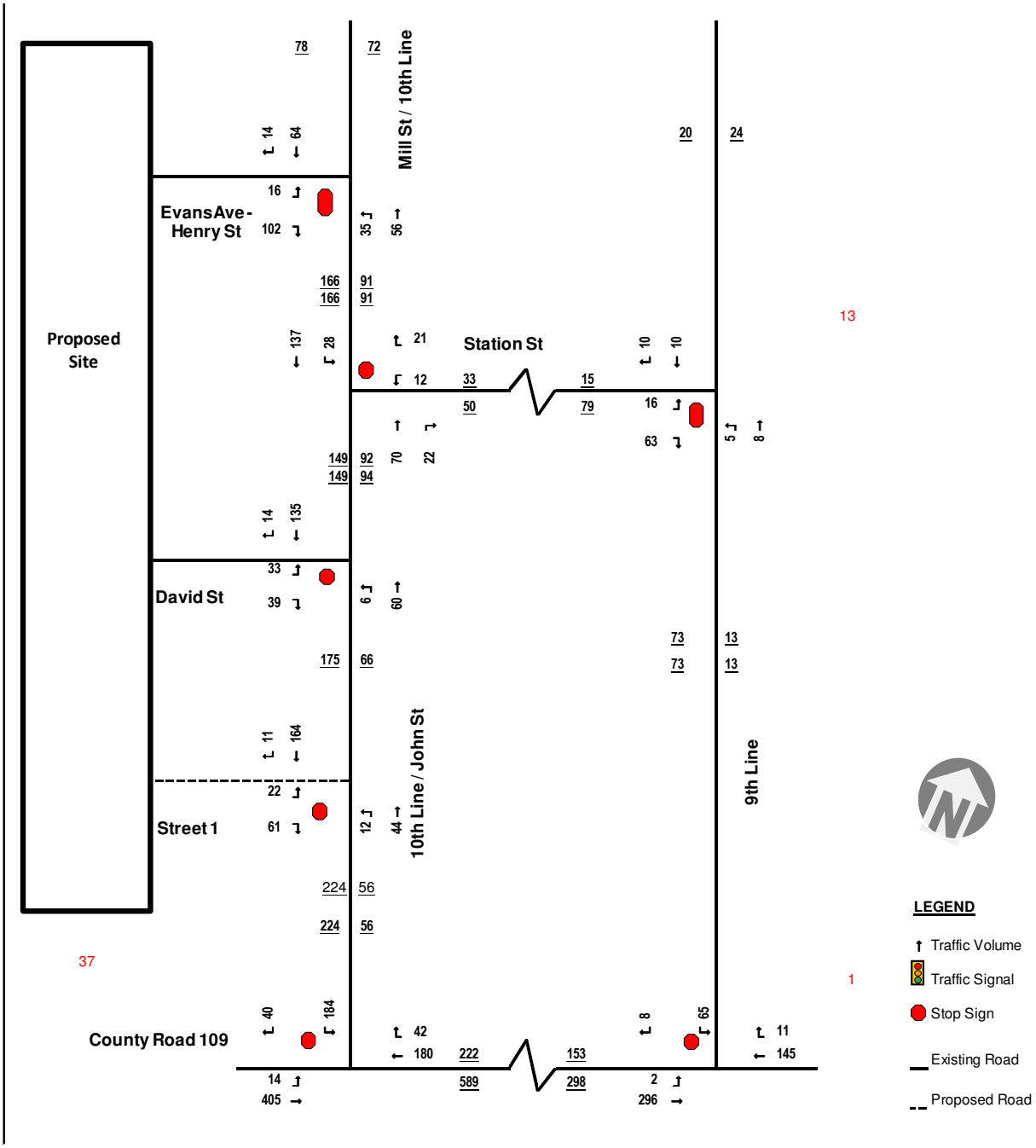


Exhibit 8: 2019 Future Total Volumes – AM Peak Hour

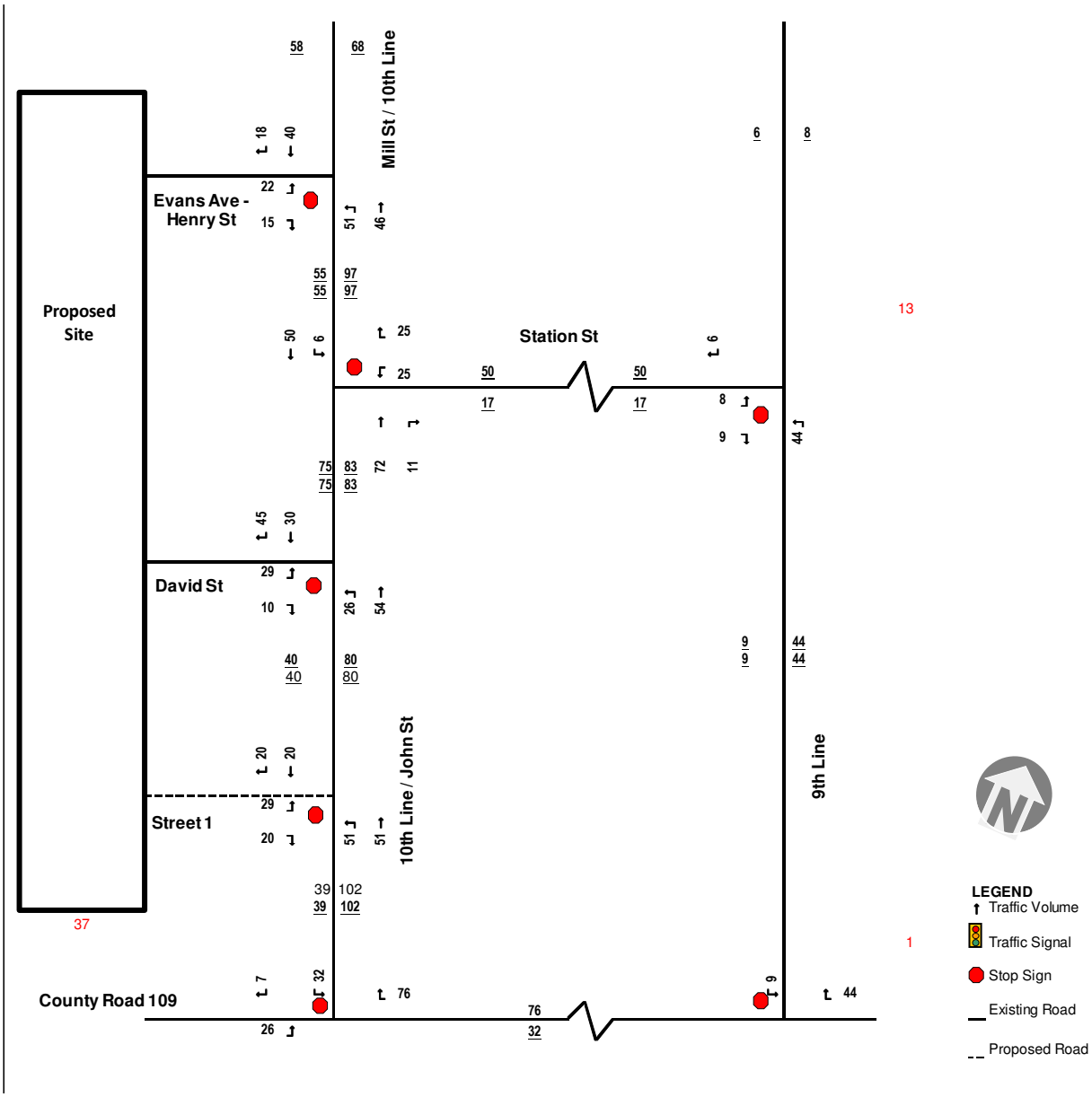


Exhibit 9: 2019 Future Total Volumes – PM Peak Hour

The analysis of the unsignalized intersections based on future total traffic is summarized in **Table 13**. Detailed HCM output sheets are provided in **Appendix C**.

Table 13: 2019 Future Total Traffic Unsignalized Intersection Operations

	Weekday AM Peak Hour				Weekday PM Peak Hour			
	LOS	(delays) (s)	v/c	95th Percentile Queue (m)	LOS	(delays) (s)	v/c	95th Percentile Queue (m)
10th Line / County Road 109								
Overall	**A**	**(5.8)**	**0.54**		**A**	**(2.7)**	**0.37**	
EBL/T	A	(0.4)	0.01	0.3	A	(2.1)	0.06	1.5
WBT/R	A	(0.0)	0.14	0	A	(0.0)	0.37	0
SBL/R	C	(21.8)	0.54	23.5	C	(22.2)	0.32	10.2
10th Line / Henry Street								
Overall	**A**	**(5.3)**	**0.23**		**A**	**(3.7)**	**0.13**	
EBL/R	B	(10.3)	0.23	6.8	B	(11.4)	0.13	3.4
NBL/T	A	(3.2)	0.04	1.1	A	(3.3)	0.07	1.6
SBT/R	A	(0.0)	0.08	0.0	A	(0.0)	0.09	0
9th Line / County Road 109								
Overall	**A**	**(1.9)**	**0.17**		**A**	**(0.7)**	**0.24**	
EBL/T	A	(0.1)	0.00	0.0	A	(0.3)	0.01	0.1
WBT/R	A	(0.0)	0.11	0.0	A	(0.0)	0.24	0
SBL/R	B	(13.5)	0.17	4.7	B	(12.8)	0.06	1.4
10th Line (Mill St) / Station St								
Overall	**A**	**(1.9)**	**0.07**		**A**	**(3.0)**	**0.17**	
WBL/R	A	(9.9)	0.05	1.2	B	(11.8)	0.17	4.7
NBT/R	A	(0.0)	0.07	0.0	A	(0.0)	0.16	0
SBL/T	A	(1.4)	0.02	0.5	A	(2.3)	0.04	0.9
10th Line (Mill St) / David Street								
Overall	**A**	**(2.8)**	**0.13**		**A**	**(2.0)**	**0.08**	
EBL/R	B	(10.5)	0.13	3.3	B	(10.5)	0.07	1.7
NBL/T	A	(0.7)	0.01	0.1	A	(1.3)	0.02	0.5
SBT/R	A	(0.0)	0.12	0.0	A	(0.0)	0.08	0
9th Line / Station St								
Overall	**A**	**(6.7)**	**0.12**		**A**	**(6.4)**	**0.06**	
EBL/R	A	(9.0)	0.12	3	A	(9.4)	0.05	1.3
NBL/T	A	(2.9)	0.01	0.1	A	(6.5)	0.06	1.5
SBT/R	A	(0.0)	0.02	0.0	A	(0.0)	0.01	0
10th Line (Mill St) / Street 1								
Overall	**A**	**(3.1)**	**0.14**		**A**	**(2.8)**	**0.08**	
EBL/R	B	(10.4)	0.14	3.7	B	(10.4)	0.08	1.9
NBL/T	A	(0.0)	0.14	0.0	A	(2.1)	0.04	0.9
SBT/R	A	(1.7)	0.01	0.3	A	(0.0)	0.06	0

v/c – volume to capacity ratio, LOS – Level of Service

Under 2019 future total traffic conditions, overall Level of Service 'A' is predicted for all intersections during both peak hours. For individual movements, when compared against the 2019 future background scenario, the proposed site will introduce marginal increases to delays (less than seven seconds) on the roads relating to the development's access/egress points.

The largest increase in delay is predicted at the southbound left/right movement at the 10th Line / County Road 109 intersection, where an additional delay of up to seven seconds during both peak hours is expected when compared against future background conditions.

Overall, the proposed residential development is not expected to adversely impact existing traffic conditions in the study area. Existing road capacity will be sufficient to accommodate forecasted traffic volumes, based on the resulting delays, queues, and v/c ratios.

5.2 Queuing Summary

A comparison of queues for all scenarios for key movements within the study area outlined in **Exhibit 2** was conducted. The queuing results for existing, 2019 background, and 2019 total traffic conditions are based on the Synchro 95th percentile queues, and are provided in **Table 15**.

Table 15: 95th Percentile Queue Summary

Intersection & Movement	95th Percentile Queue (m)					
	Weekday AM Peak Hour			Weekday PM Peak Hour		
	Existing	2019 Background	2019 Total	Existing	2019 Background	2019 Total
10th Line / County Road 109						
EBL/T	0.1	0.1	0.3	0.6	0.6	1.5
WBT/R	0	0.0	0	0	0.0	0
SBL/R	5.5	6.9	23.5	3.3	4.1	10.2
10th Line / Henry Street						
EBL/R	2.6	3.0	6.8	0.9	1.0	3.4
NBL/T	0.7	0.7	1.1	0.5	0.5	1.6
SBT/R	0	0.0	0.0	0	0.0	0
9th Line / County Road 109						
EBL/T	0.0	0.0	0.0	0.1	0.1	0.1
WBT/R	0.0	0.0	0.0	0	0.0	0
SBL/R	2.5	3.0	4.7	0.7	0.9	1.4
10th Line (Mill St) / Station St						
WBL/R	0.8	0.8	1.2	0.9	1.0	4.7
NBT/R	0	0.0	0.0	0	0.0	0
SBL/T	0.3	0.3	0.5	0.6	0.6	0.9
10th Line (Mill St) / David Street						
EBL/R	0.7	0.7	3.3	0.2	0.2	1.7
NBL/T	0.0	0.0	0.1	0	0.0	0.5
SBT/R	0.0	0.0	0.0	0	0.0	0
9th Line / Station St						
EBL/R	1.5	1.7	3.0	0.6	0.6	1.3
NBL/T	0.1	0.1	0.1	0.6	0.7	1.5
SBT/R	0	0.0	0.0	0	0.0	0
10th Line (Mill St) / Street 1						
EBL/R			3.1			1.5
NBL/T			0.0			0.8
SBT/R			0.2			0

95th percentile Queue
Note: No storage lanes are provided in the study area

Under total traffic conditions, 95th percentile queues will be accommodated for all turning movements, as site related traffic volumes are expected to be low when compared to intersection capacity. The largest increase in queuing (from 7 to 23.5m) is expected to occur for the southbound left/right movement at the 10th Line/ County Road 109 intersection, which is the equivalent of about 4 cars waiting 7 more seconds on average to turn. There will be no issues with this queue length as there are no adjacent driveways or intersections affected by the queue.

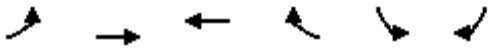
6. Conclusions and Recommendations

All existing roads in Waldemar and leading to/from Waldemar can accommodate the proposed addition of 336 homes. An analysis of existing, 2019 future background, and 2019 future total traffic conditions demonstrated that all studied intersections will operate at LOS ‘A’. The proposed site is expected to generate the most vehicles at the 10th Line / County Road 109 intersection compared to the other intersections in the area, however, delays and queues for the SBL/R movement are expected to remain at acceptable levels.

Overall, the proposed residential development is not expected to adversely impact existing and future traffic operations in the area, as the existing road network is capable of accommodating site generated traffic volumes as well long term future background growth.

Appendix A

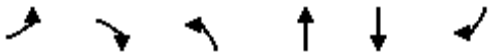
Existing Traffic Intersection Operations Calculations



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	7	367	163	22	75	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	8	395	175	24	81	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	199				597	187
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	199				597	187
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	99				83	98
cM capacity (veh/h)	1350				462	860

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	402	199	100
Volume Left	8	0	81
Volume Right	0	24	19
cSH	1350	1700	507
Volume to Capacity	0.01	0.12	0.20
Queue Length 95th (m)	0.1	0.0	5.5
Control Delay (s)	0.2	0.0	13.8
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	13.8
Approach LOS			B

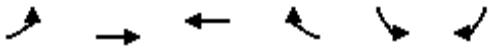
Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	55	24	29	38	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.58	0.58	0.58	0.58	0.58
Hourly flow rate (vph)	7	95	41	50	66	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	201	68	71			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	201	68	71			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	99	91	97			
cM capacity (veh/h)	769	1001	1440			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	91	71
Volume Left	7	41	0
Volume Right	95	0	5
cSH	981	1440	1700
Volume to Capacity	0.10	0.03	0.04
Queue Length 95th (m)	2.6	0.7	0.0
Control Delay (s)	9.1	3.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	3.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	19.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	268	131	8	38	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	2	327	160	10	46	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	170				496	165
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	170				496	165
tC, single (s)	4.1				6.4	6.5
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.6
p0 queue free %	100				91	99
cM capacity (veh/h)	1420				527	814

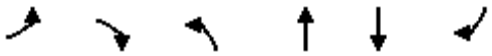
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	329	170	55
Volume Left	2	0	46
Volume Right	0	10	9
cSH	1420	1700	557
Volume to Capacity	0.00	0.10	0.10
Queue Length 95th (m)	0.0	0.0	2.5
Control Delay (s)	0.1	0.0	12.2
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	12.2
Approach LOS			B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	16	37	2	16	77
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	10	19	45	2	19	93
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	177	46			47	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	177	46			47	
tC, single (s)	6.4	6.5			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.6			2.2	
p0 queue free %	99	98			99	
cM capacity (veh/h)	807	942			1573	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	29	47	112
Volume Left	10	0	19
Volume Right	19	2	0
cSH	893	1700	1573
Volume to Capacity	0.03	0.03	0.01
Queue Length 95th (m)	0.8	0.0	0.3
Control Delay (s)	9.2	0.0	1.3
Lane LOS	A		A
Approach Delay (s)	9.2	0.0	1.3
Approach LOS	A		

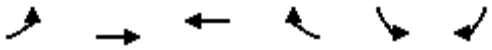
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	8	0	29	85	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	13	11	0	38	112	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	150	112	112			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	150	112	112			
tC, single (s)	6.7	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.8	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	774	947	1490			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	38	112
Volume Left	13	0	0
Volume Right	11	0	0
cSH	843	1490	1700
Volume to Capacity	0.03	0.00	0.07
Queue Length 95th (m)	0.7	0.0	0.0
Control Delay (s)	9.4	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.4	0.0	0.0
Approach LOS	A		

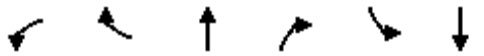
Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	14.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1623				1023	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

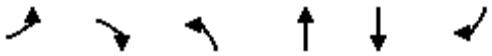
Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		0.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1023	1085			1623	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	7	36	3	7	9	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68
Hourly flow rate (vph)	10	53	4	10	13	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	36	17	21			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	36	17	21			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.5			
p0 queue free %	99	95	100			
cM capacity (veh/h)	974	1068	1416			

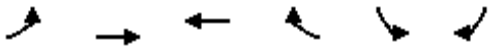
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	63	15	21
Volume Left	10	4	0
Volume Right	53	0	7
cSH	1051	1416	1700
Volume to Capacity	0.06	0.00	0.01
Queue Length 95th (m)	1.5	0.1	0.0
Control Delay (s)	8.6	2.3	0.0
Lane LOS	A	A	
Approach Delay (s)	8.6	2.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

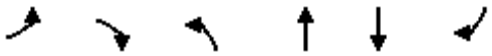
Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		0.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	23	227	390	66	38	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	247	424	72	41	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	496				757	460
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	496				757	460
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	98				89	99
cM capacity (veh/h)	1028				369	606

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	272	496	50
Volume Left	25	0	41
Volume Right	0	72	9
cSH	1028	1700	396
Volume to Capacity	0.02	0.29	0.13
Queue Length 95th (m)	0.6	0.0	3.3
Control Delay (s)	1.0	0.0	15.4
Lane LOS	A		C
Approach Delay (s)	1.0	0.0	15.4
Approach LOS			C

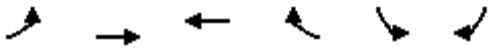
Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	11	15	24	70	46	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	14	19	30	88	58	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	209	62	66			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	209	62	66			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	98	98	98			
cM capacity (veh/h)	768	973	1548			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	32	118	66
Volume Left	14	30	0
Volume Right	19	0	9
cSH	874	1548	1700
Volume to Capacity	0.04	0.02	0.04
Queue Length 95th (m)	0.9	0.5	0.0
Control Delay (s)	9.3	2.0	0.0
Lane LOS	A	A	
Approach Delay (s)	9.3	2.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	179	273	44	15	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	5	183	279	45	15	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	323				494	301
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	323				494	301
tC, single (s)	4.3				6.4	6.7
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.8
p0 queue free %	100				97	100
cM capacity (veh/h)	1142				536	639

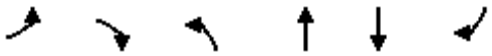
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	188	323	17
Volume Left	5	0	15
Volume Right	0	45	2
cSH	1142	1700	546
Volume to Capacity	0.00	0.19	0.03
Queue Length 95th (m)	0.1	0.0	0.7
Control Delay (s)	0.3	0.0	11.8
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	11.8
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	13	81	11	24	37
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	12	19	121	16	36	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	256	129			137	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	256	129			137	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			98	
cM capacity (veh/h)	719	926			1459	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	31	137	91
Volume Left	12	0	36
Volume Right	19	16	0
cSH	835	1700	1459
Volume to Capacity	0.04	0.08	0.02
Queue Length 95th (m)	0.9	0.0	0.6
Control Delay (s)	9.5	0.0	3.1
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	3.1
Approach LOS	A		

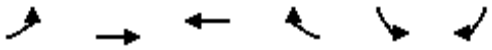
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	19.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	2	1	88	44	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	2	1	98	49	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	149	49	50			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	149	49	50			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	847	1025	1570			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	7	99	50
Volume Left	4	1	0
Volume Right	2	0	1
cSH	899	1570	1700
Volume to Capacity	0.01	0.00	0.03
Queue Length 95th (m)	0.2	0.0	0.0
Control Delay (s)	9.0	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.1	0.0
Approach LOS	A		

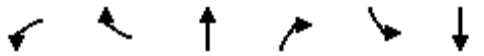
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	15.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1623				1023	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

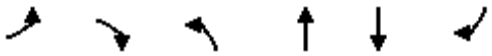
Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		0.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1023	1085			1623	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	9	11	38	11	6	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	11	13	45	13	7	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	112	10	13			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112	10	13			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	97			
cM capacity (veh/h)	865	1077	1619			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	58	13
Volume Left	11	45	0
Volume Right	13	0	6
cSH	970	1619	1700
Volume to Capacity	0.02	0.03	0.01
Queue Length 95th (m)	0.6	0.6	0.0
Control Delay (s)	8.8	5.7	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	5.7	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	19.3%	ICU Level of Service	A
Analysis Period (min)	15		

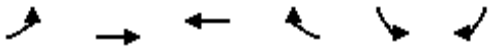
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		0.0%	ICU Level of Service A
Analysis Period (min)		15	

Appendix B

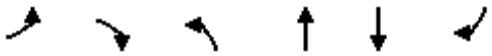
2019 Background Traffic Intersection Operations Calculations



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	8	405	180	24	83	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	9	435	194	26	89	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	219				659	206
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	219				659	206
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	99				79	97
cM capacity (veh/h)	1327				424	839

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	444	219	111
Volume Left	9	0	89
Volume Right	0	26	22
cSH	1327	1700	469
Volume to Capacity	0.01	0.13	0.24
Queue Length 95th (m)	0.1	0.0	6.9
Control Delay (s)	0.2	0.0	15.0
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	15.0
Approach LOS			C

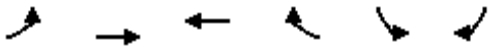
Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	61	26	32	42	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.58	0.58	0.58	0.58	0.58
Hourly flow rate (vph)	7	105	45	55	72	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	220	75	78			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220	75	78			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	99	89	97			
cM capacity (veh/h)	749	992	1431			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	112	100	78
Volume Left	7	45	0
Volume Right	105	0	5
cSH	973	1431	1700
Volume to Capacity	0.12	0.03	0.05
Queue Length 95th (m)	3.0	0.7	0.0
Control Delay (s)	9.2	3.5	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	3.5	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	296	145	9	42	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	2	361	177	11	51	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	188				548	182
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	188				548	182
tC, single (s)	4.1				6.4	6.5
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.6
p0 queue free %	100				90	99
cM capacity (veh/h)	1399				491	795

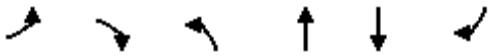
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	363	188	61
Volume Left	2	0	51
Volume Right	0	11	10
cSH	1399	1700	523
Volume to Capacity	0.00	0.11	0.12
Queue Length 95th (m)	0.0	0.0	3.0
Control Delay (s)	0.1	0.0	12.8
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	12.8
Approach LOS			B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	27.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	9	17	41	2	18	85
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	11	20	49	2	22	102
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	196	51			52	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	196	51			52	
tC, single (s)	6.4	6.5			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.6			2.2	
p0 queue free %	99	98			99	
cM capacity (veh/h)	786	936			1567	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	31	52	124
Volume Left	11	0	22
Volume Right	20	2	0
cSH	878	1700	1567
Volume to Capacity	0.04	0.03	0.01
Queue Length 95th (m)	0.8	0.0	0.3
Control Delay (s)	9.3	0.0	1.4
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	1.4
Approach LOS	A		

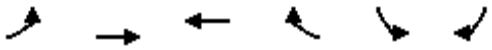
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	11	9	0	32	94	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	14	12	0	42	124	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	166	124	124			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	166	124	124			
tC, single (s)	6.7	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.8	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	758	933	1476			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	26	42	124
Volume Left	14	0	0
Volume Right	12	0	0
cSH	828	1476	1700
Volume to Capacity	0.03	0.00	0.07
Queue Length 95th (m)	0.7	0.0	0.0
Control Delay (s)	9.5	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.5	0.0	0.0
Approach LOS	A		

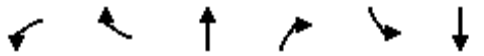
Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	14.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1623				1023	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

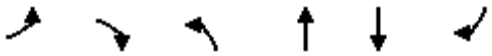
Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		0.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1023	1085			1623	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	8	40	3	8	10	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68
Hourly flow rate (vph)	12	59	4	12	15	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	40	19	24			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	40	19	24			
tC, single (s)	6.7	6.3	4.4			
tC, 2 stage (s)						
tF (s)	3.8	3.4	2.5			
p0 queue free %	99	94	100			
cM capacity (veh/h)	905	1048	1412			

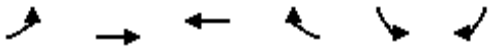
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	71	16	24
Volume Left	12	4	0
Volume Right	59	0	9
cSH	1021	1412	1700
Volume to Capacity	0.07	0.00	0.01
Queue Length 95th (m)	1.7	0.1	0.0
Control Delay (s)	8.8	2.1	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	2.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

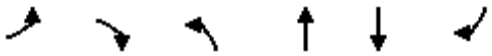
Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		0.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	251	431	73	42	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	273	468	79	46	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	548				835	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	548				835	508
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	97				86	98
cM capacity (veh/h)	983				331	569

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	300	548	55
Volume Left	27	0	46
Volume Right	0	79	10
cSH	983	1700	357
Volume to Capacity	0.03	0.32	0.16
Queue Length 95th (m)	0.6	0.0	4.1
Control Delay (s)	1.1	0.0	16.9
Lane LOS	A		C
Approach Delay (s)	1.1	0.0	16.9
Approach LOS			C

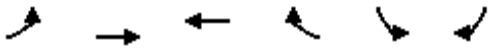
Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	12	17	26	77	51	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	15	21	32	96	64	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	230	69	74			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	69	74			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	98	98	98			
cM capacity (veh/h)	747	964	1539			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	36	129	74
Volume Left	15	32	0
Volume Right	21	0	10
cSH	860	1539	1700
Volume to Capacity	0.04	0.02	0.04
Queue Length 95th (m)	1.0	0.5	0.0
Control Delay (s)	9.4	2.0	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	2.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	6	198	301	49	17	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	6	202	307	50	17	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	357				546	332
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	357				546	332
tC, single (s)	4.3				6.4	6.7
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.8
p0 queue free %	99				97	100
cM capacity (veh/h)	1108				499	612

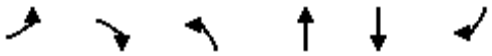
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	208	357	19
Volume Left	6	0	17
Volume Right	0	50	2
cSH	1108	1700	509
Volume to Capacity	0.01	0.21	0.04
Queue Length 95th (m)	0.1	0.0	0.9
Control Delay (s)	0.3	0.0	12.4
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	12.4
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	9	14	89	12	26	41
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	13	21	133	18	39	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	281	142			151	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	281	142			151	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			97	
cM capacity (veh/h)	694	911			1443	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	34	151	100
Volume Left	13	0	39
Volume Right	21	18	0
cSH	812	1700	1443
Volume to Capacity	0.04	0.09	0.03
Queue Length 95th (m)	1.0	0.0	0.6
Control Delay (s)	9.6	0.0	3.1
Lane LOS	A		A
Approach Delay (s)	9.6	0.0	3.1
Approach LOS	A		

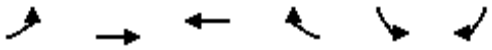
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	2	1	97	49	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	2	1	108	54	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	165	55	56			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	165	55	56			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	830	1018	1562			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	7	109	56
Volume Left	4	1	0
Volume Right	2	0	1
cSH	884	1562	1700
Volume to Capacity	0.01	0.00	0.03
Queue Length 95th (m)	0.2	0.0	0.0
Control Delay (s)	9.1	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	0.1	0.0
Approach LOS	A		

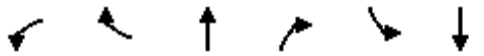
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	15.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1623				1023	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

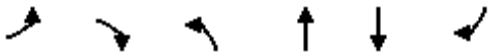
Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		0.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1023	1085			1623	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	12	42	12	7	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	14	49	14	8	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	125	12	15			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	125	12	15			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	97			
cM capacity (veh/h)	848	1075	1616			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	26	64	15
Volume Left	12	49	0
Volume Right	14	0	7
cSH	958	1616	1700
Volume to Capacity	0.03	0.03	0.01
Queue Length 95th (m)	0.6	0.7	0.0
Control Delay (s)	8.9	5.7	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9	5.7	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	19.6%	ICU Level of Service	A
Analysis Period (min)	15		

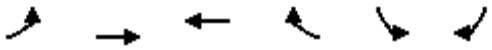
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		0.0%	ICU Level of Service A
Analysis Period (min)		15	

Appendix C

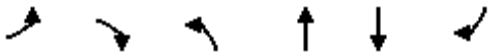
2019 Total Traffic Intersection Operations Calculations



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	14	405	180	42	184	40
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	15	435	194	45	198	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	239				682	216
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	239				682	216
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	99				52	95
cM capacity (veh/h)	1305				409	829

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	451	239	241
Volume Left	15	0	198
Volume Right	0	45	43
cSH	1305	1700	450
Volume to Capacity	0.01	0.14	0.54
Queue Length 95th (m)	0.3	0.0	23.5
Control Delay (s)	0.4	0.0	21.8
Lane LOS	A		C
Approach Delay (s)	0.4	0.0	21.8
Approach LOS			C

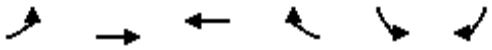
Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	16	102	35	56	64	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.58	0.58	0.58	0.58	0.58	0.58
Hourly flow rate (vph)	28	176	60	97	110	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	340	122	134			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	340	122	134			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	96	81	96			
cM capacity (veh/h)	631	934	1363			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	203	157	134
Volume Left	28	60	0
Volume Right	176	0	24
cSH	877	1363	1700
Volume to Capacity	0.23	0.04	0.08
Queue Length 95th (m)	6.8	1.1	0.0
Control Delay (s)	10.3	3.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.3	3.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	296	145	11	65	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	2	361	177	13	79	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	190				549	184
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	190				549	184
tC, single (s)	4.1				6.4	6.5
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.6
p0 queue free %	100				84	99
cM capacity (veh/h)	1396				490	794

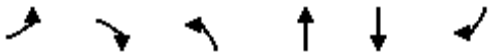
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	363	190	89
Volume Left	2	0	79
Volume Right	0	13	10
cSH	1396	1700	512
Volume to Capacity	0.00	0.11	0.17
Queue Length 95th (m)	0.0	0.0	4.7
Control Delay (s)	0.1	0.0	13.5
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	13.5
Approach LOS			B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	21	70	22	28	137
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	14	25	84	27	34	165
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	330	98			111	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	330	98			111	
tC, single (s)	6.4	6.5			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.6			2.2	
p0 queue free %	98	97			98	
cM capacity (veh/h)	654	880			1492	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	40	111	199
Volume Left	14	0	34
Volume Right	25	27	0
cSH	782	1700	1492
Volume to Capacity	0.05	0.07	0.02
Queue Length 95th (m)	1.2	0.0	0.5
Control Delay (s)	9.9	0.0	1.4
Lane LOS	A		A
Approach Delay (s)	9.9	0.0	1.4
Approach LOS	A		

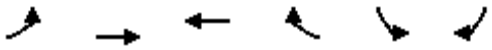
Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	33	39	6	60	135	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	43	51	8	79	178	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	282	187	196			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282	187	196			
tC, single (s)	6.7	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.8	3.3	2.2			
p0 queue free %	93	94	99			
cM capacity (veh/h)	644	860	1389			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	95	87	196
Volume Left	43	8	0
Volume Right	51	0	18
cSH	745	1389	1700
Volume to Capacity	0.13	0.01	0.12
Queue Length 95th (m)	3.3	0.1	0.0
Control Delay (s)	10.5	0.7	0.0
Lane LOS	B	A	
Approach Delay (s)	10.5	0.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1623				1023	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (veh/h)	22	61	164	11	12	44
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	29	80	216	14	16	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	312	223			230	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	312	223			230	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	90			99	
cM capacity (veh/h)	676	822			1350	

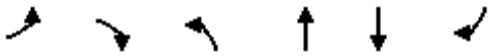
Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	109	230	74
Volume Left	29	0	16
Volume Right	80	14	0
cSH	777	1700	1350
Volume to Capacity	0.14	0.14	0.01
Queue Length 95th (m)	3.7	0.0	0.3
Control Delay (s)	10.4	0.0	1.7
Lane LOS	B		A
Approach Delay (s)	10.4	0.0	1.7
Approach LOS	B		

Intersection Summary			
Average Delay		3.1	
Intersection Capacity Utilization		24.4%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1023	1085			1623	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	16	63	5	8	10	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68
Hourly flow rate (vph)	24	93	7	12	15	15
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	49	22	29			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	49	22	29			
tC, single (s)	6.7	6.3	4.4			
tC, 2 stage (s)						
tF (s)	3.8	3.4	2.5			
p0 queue free %	97	91	99			
cM capacity (veh/h)	892	1044	1405			

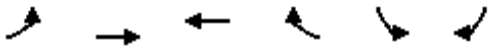
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	116	19	29
Volume Left	24	7	0
Volume Right	93	0	15
cSH	1009	1405	1700
Volume to Capacity	0.12	0.01	0.02
Queue Length 95th (m)	3.0	0.1	0.0
Control Delay (s)	9.0	2.9	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	2.9	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	16.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

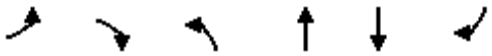
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	51	251	431	149	74	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	273	468	162	80	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	630				933	549
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	630				933	549
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	94				71	97
cM capacity (veh/h)	915				280	539

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	328	630	98
Volume Left	55	0	80
Volume Right	0	162	17
cSH	915	1700	306
Volume to Capacity	0.06	0.37	0.32
Queue Length 95th (m)	1.5	0.0	10.2
Control Delay (s)	2.1	0.0	22.2
Lane LOS	A		C
Approach Delay (s)	2.1	0.0	22.2
Approach LOS			C

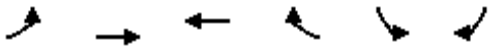
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	35	32	77	123	91	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	44	40	96	154	114	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	478	131	149			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	478	131	149			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	91	96	93			
cM capacity (veh/h)	514	890	1445			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	84	250	149
Volume Left	44	96	0
Volume Right	40	0	35
cSH	643	1445	1700
Volume to Capacity	0.13	0.07	0.09
Queue Length 95th (m)	3.4	1.6	0.0
Control Delay (s)	11.4	3.3	0.0
Lane LOS	B	A	
Approach Delay (s)	11.4	3.3	0.0
Approach LOS	B		

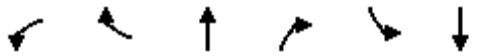
Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	6	198	301	93	26	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	6	202	307	95	27	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	402				569	355
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	402				569	355
tC, single (s)	4.3				6.4	6.7
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.8
p0 queue free %	99				95	100
cM capacity (veh/h)	1066				484	593

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	208	402	29
Volume Left	6	0	27
Volume Right	0	95	2
cSH	1066	1700	491
Volume to Capacity	0.01	0.24	0.06
Queue Length 95th (m)	0.1	0.0	1.4
Control Delay (s)	0.3	0.0	12.8
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	12.8
Approach LOS			B

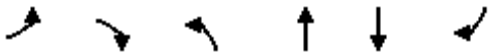
Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		31.5%	ICU Level of Service
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	34	39	161	23	33	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	51	58	240	34	49	136
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	492	257			275	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	492	257			275	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	93			96	
cM capacity (veh/h)	519	786			1300	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	109	275	185
Volume Left	51	0	49
Volume Right	58	34	0
cSH	634	1700	1300
Volume to Capacity	0.17	0.16	0.04
Queue Length 95th (m)	4.7	0.0	0.9
Control Delay (s)	11.8	0.0	2.3
Lane LOS	B		A
Approach Delay (s)	11.8	0.0	2.3
Approach LOS	B		

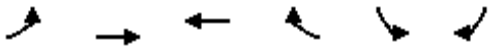
Intersection Summary			
Average Delay		3.0	
Intersection Capacity Utilization		30.8%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	33	12	27	151	79	46
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	37	13	30	168	88	51
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	341	113	139			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	341	113	139			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	98			
cM capacity (veh/h)	645	945	1457			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	50	198	139
Volume Left	37	30	0
Volume Right	13	0	51
cSH	705	1457	1700
Volume to Capacity	0.07	0.02	0.08
Queue Length 95th (m)	1.7	0.5	0.0
Control Delay (s)	10.5	1.3	0.0
Lane LOS	B	A	
Approach Delay (s)	10.5	1.3	0.0
Approach LOS	B		

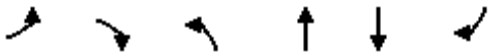
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1623				1023	1085

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

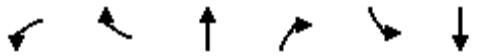
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	29	20	51	149	71	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	32	22	57	166	79	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	369	90	101			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	369	90	101			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	98	96			
cM capacity (veh/h)	611	973	1504			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	54	222	101
Volume Left	32	57	0
Volume Right	22	0	22
cSH	721	1504	1700
Volume to Capacity	0.08	0.04	0.06
Queue Length 95th (m)	1.9	0.9	0.0
Control Delay (s)	10.4	2.1	0.0
Lane LOS	B	A	
Approach Delay (s)	10.4	2.1	0.0
Approach LOS	B		

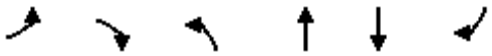
Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	1023	1085			1623	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	18	21	86	13	7	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	21	25	101	15	8	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	233	15	22			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233	15	22			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	98	94			
cM capacity (veh/h)	712	1070	1606			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	46	116	22
Volume Left	21	101	0
Volume Right	25	0	14
cSH	868	1606	1700
Volume to Capacity	0.05	0.06	0.01
Queue Length 95th (m)	1.3	1.5	0.0
Control Delay (s)	9.4	6.5	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	6.5	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1023	1085

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	0	0	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		