Eder Property, Part Lot 25, Concession 9 (Goulbourn)

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Strategy Report

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1 Screening

This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines, incorporating the 2023 Revision to Transportation Impact Assessment Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required, and this study has been prepared to support this plan of development.

The lands are located adjacent to the W-4 Urban Expansion Area Lands (W-4 Lands) outlined in the City's Official Plan Schedule C17. The W-4 Lands are classified as Category 1 lands and identified for urban expansion through the Future Neighbourhood Overlay. To address the Official Plan process for urban expansion lands, the community design process has been initiated and the existing conditions review for the greater Stittsville/Kanata area, per the City's terms of reference, has been completed. The review noted existing collision concerns with Flewellyn Road at Shea Road, the need to link active mode connections to the existing community to the north, and accommodation of transit through the W-4 Lands will be needed to meet service requirements for new residents. Additional elements were noted in the greater Stittsville/Kanata context, although they are not relevant to the W-4 Lands or the subject lands within this study.

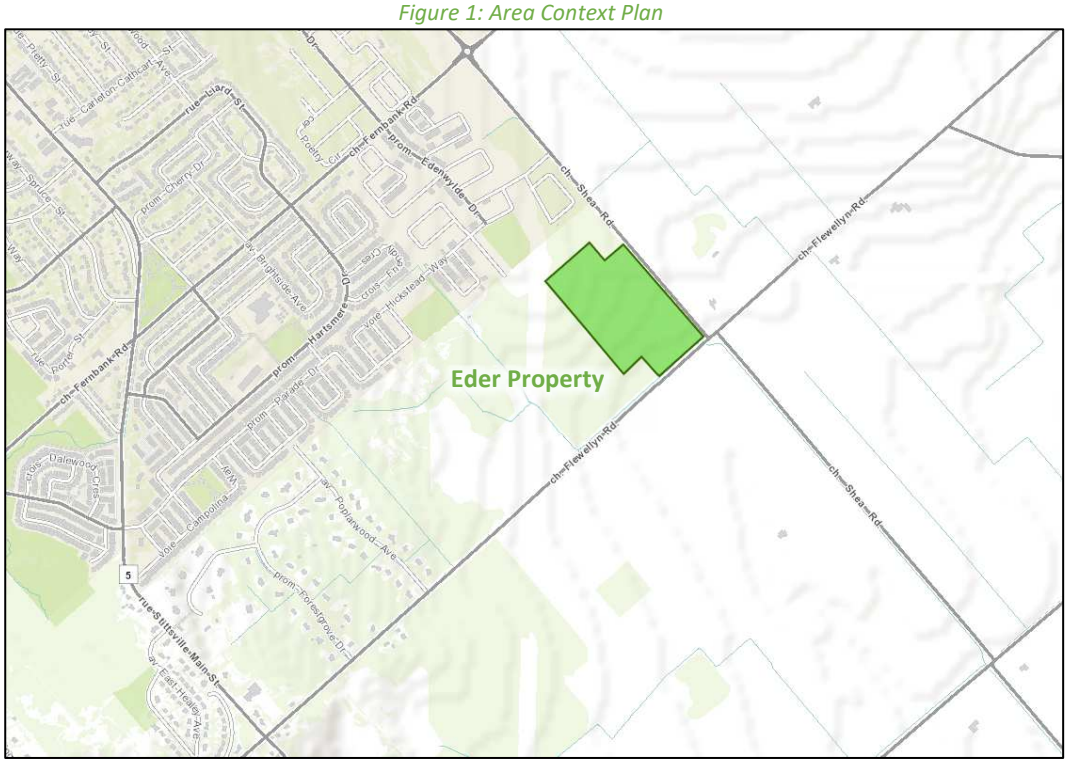
2 Existing and Planned Conditions

2.1 Proposed Development

The proposed development is located within Eder Property, Part Lot 25, Concession 9 (Goulbourn), designated as Parts 1 and 2, Plan 4R34873, which is reside outside the urban boundary, is bounded by Shea Road, Flewellyn Road, and the existing community south of Maverick Crescent. The current zoning is Rural (RU). A total of 284 townhomes, 63 single detached homes, and 338 stacked condo units are proposed within the proposed development. The adjacent subdivision collector roads are planned to connect Shea Road and Flewellyn Road. A new local roadway is proposed to connect to Shea Road and internally to the adjacent subdivision collector roads. The anticipated build-out year is 2030 as a single phase.

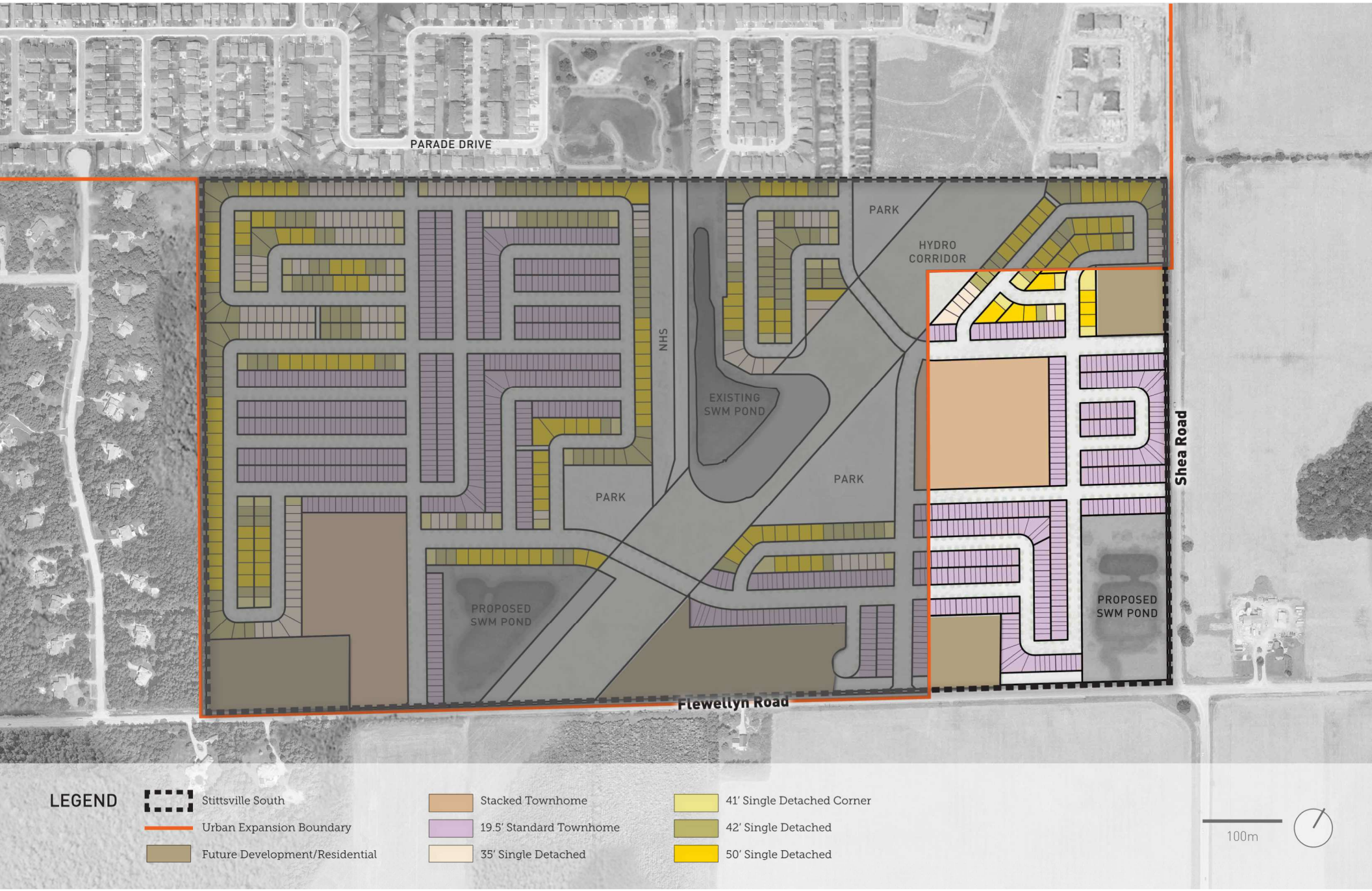
Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: October 7, 2024

Figure 2: Concept Plan



2.2 Existing Conditions

2.2.1 Area Road Network

Stittsville Main Street: Stittsville Main Street is a City of Ottawa arterial road with a rural cross-section including paved shoulders within the study area. The posted limit is 60 km/h within the study area, and the City-protected right of way is 42.5 metres. Stittsville Main Street is designated as a truck route.

Huntley Road: Huntley Road is a City of Ottawa arterial road with a two-lane rural cross-section including paved shoulders. Beyond 110 metres south of Flewellyn Road, the posted speed limit changes from 60 km/h to 70 km/h. Huntley Road is designated as a truck route. The existing right of way is 28.0 metres.

Fernbank Road: Fernbank Road is a City of Ottawa arterial road with a two-lane rural cross-section including paved shoulders. The posted speed limit is 60 km/h east of Cope Drive/Edenwylde Drive and 40 km/h between Cope Drive/Edenwylde Drive and West Ridge Drive. The City-protected right of way is 37.5 metres.

Flewellyn Road: Flewellyn Road is a City of Ottawa collector road with a two-lane rural cross-section including gravel shoulders within the study area. The posted speed limit is 80 km/h, and the existing right of way is 26.0 metres.

Shea Road: Shea Road is a City of Ottawa collector road with a two-lane rural cross-section including gravel shoulders within the study area. Approximately 270.0 metres south of Fernbank Road, the posted speed limit transitions from 60 km/h to 80 km/h. The existing right of way is 20.0 metres.

2.2.2 Existing Intersections

The key intersections within one kilometre of the site have been summarized below:

Shea Road at Fernbank Road	The intersection of Shea Road at Fernbank Road is a four-legged roundabout intersection. Each leg consists of a shared all-movement lane. Pedestrian crossovers are provided on each leg and a MUP circulates the roundabout. No turn restrictions were noted.
Shea Road at Flewellyn Road	The intersection of Shea Road and Flewellyn Road is a stop-controlled intersection on the minor approaches of Shea Road, which are offset by approximately 33.0 metres. Each leg consists of a shared all-movement lane. No turn restrictions are noted.
Stittsville Main Street/ Huntley Road at Flewellyn Road	The intersection of Stittsville Main Street/ Huntley Road at Flewellyn Road is an all-way stop-controlled intersection. The northbound, eastbound, and westbound approaches each consist of a shared all-movement lane. The southbound approach consists of a shared left-turn/through and channelized right-turn lane. No turn restrictions are noted.

2.2.3 Existing Driveways

Within 200 metres of the subdivision access, no driveways are present on Shea Road.

2.2.4 Cycling and Pedestrian Facilities

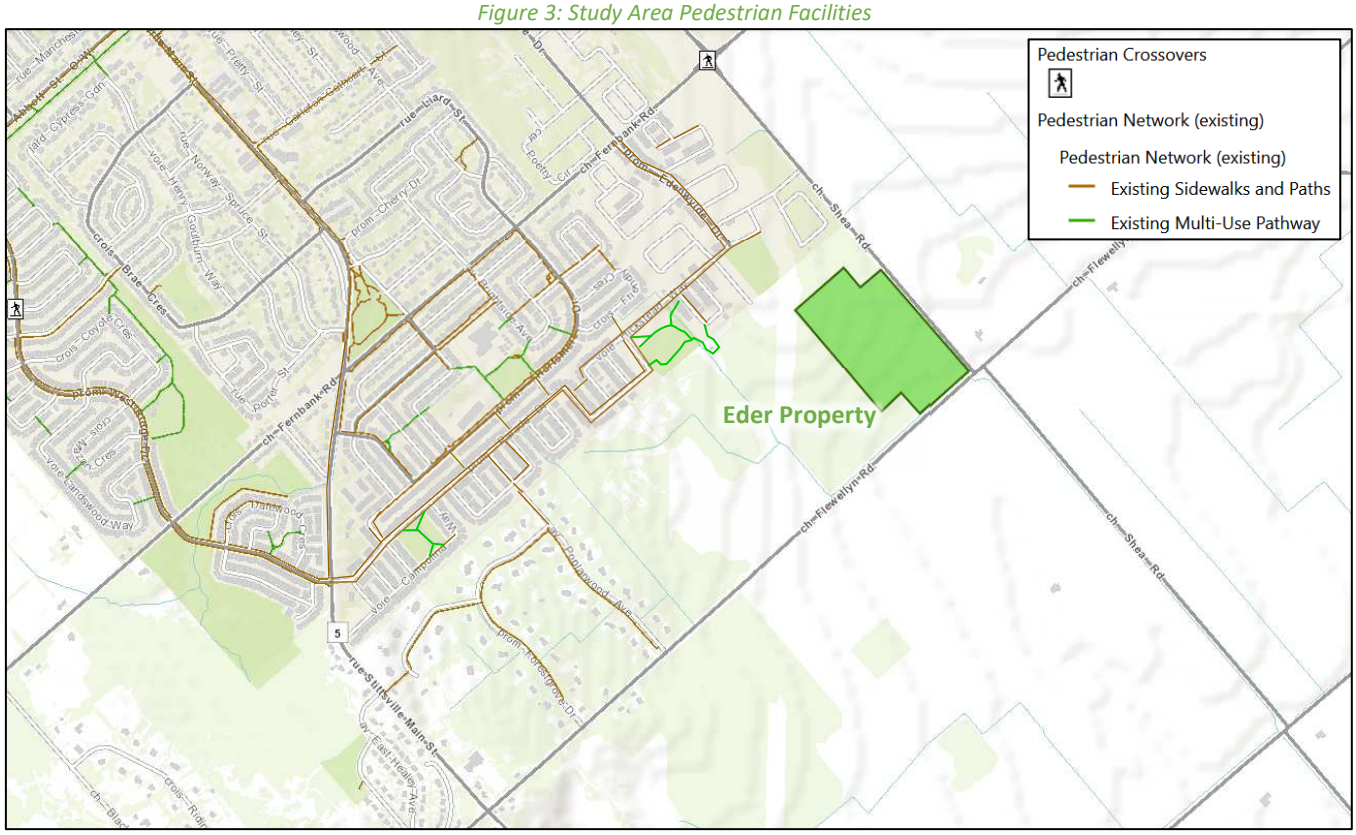
Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities. Considering the plans for other developments and the newly constructed pedestrian and cycling facilities, new community sidewalks and cycling pathways have been included in the figure despite not being formalized within the City's pedestrian network in geoOttawa.

Sidewalks are present on Stittsville Main Street north of West Ridge Drive, West Ridge Drive, Upcountry Drive, Baywood Drive, Arrowwood Drive, Brightside Avenue between Fernbank Road and Baywood Drive, Edenwylde Drive, Hartsmere Drive, Hickstead Way, and Parade Drive.

Paved shoulders are present on both sides along Stittsville Main Street south of Etta Street, Huntley Road, Fernbank Road, Shea Road north of Fernbank Road, and on the west side along Stittsville Main Street between Etta Street and Upcountry Drive. A suggested route is noted at the offset Flewellyn Road and Shea Road intersection in the geoOttawa existing cycling network.

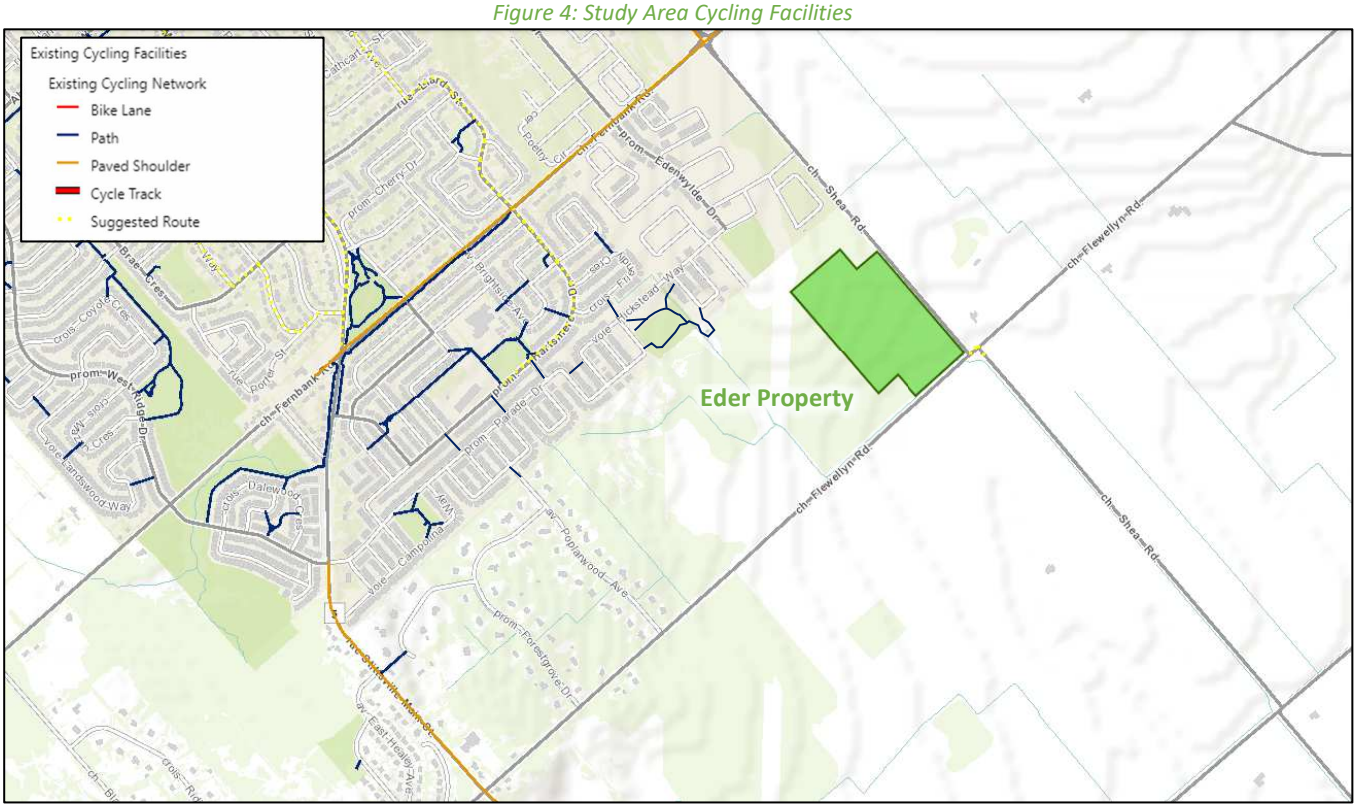
As requested by the City, it is noted that cycletracks are planned to be constructed on Cope Drive north of Fernbank Road as part of the 6041 Fernbank and 5957 & 5969 Fernbank subdivisions.

Figure 3: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: October 7, 2024

Figure 4: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: October 7, 2024

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 5 and Figure 6, respectively. The City of Ottawa notes that the active mode volumes collected in winter may be lower than summer conditions.

Figure 5: Existing Pedestrian Volumes

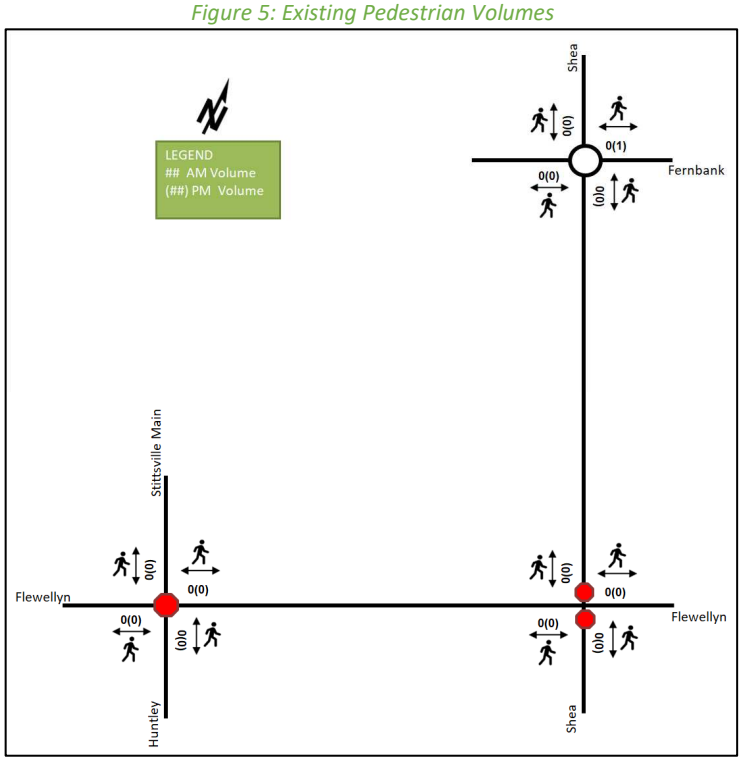
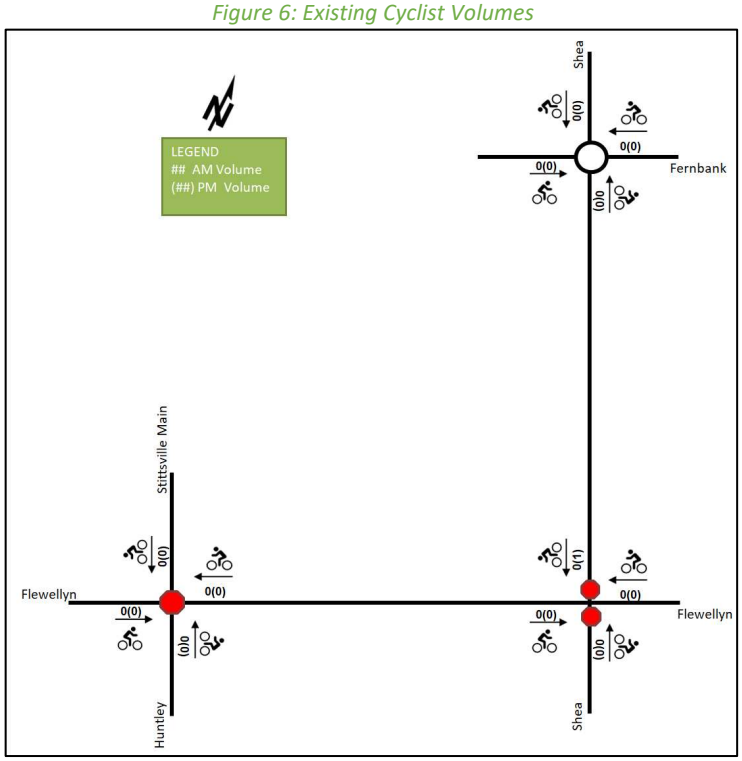


Figure 6: Existing Cyclist Volumes



2.2.5 Existing Transit

Figure 7 illustrates the transit system map in the study area and Figure 8 illustrates nearby transit stops. It is noted that no transit stops are present within 400 metres of the site.

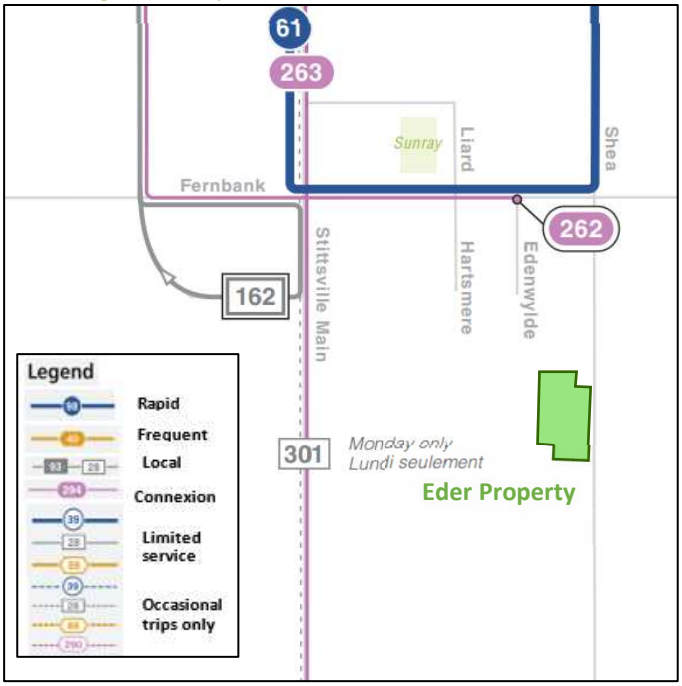
All transit information is from October 1, 2024, and is included for general information purposes and context to the surrounding area.

Route #61 currently travels along Shea Road and Fernbank Road, Stittsville Main Street, Route #162 currently travels along Stittsville Main Street, Fernbank Road, and West Ridge Drive, Route #262 currently travels along Fernbank Road and West Ridge Drive, and Routes #263 and #301 currently travel along Stittsville Main Street. All these routes continue towards the northern Stittsville area.

The frequency of routes within proximity of the site based on October 1, 2024, service levels are:

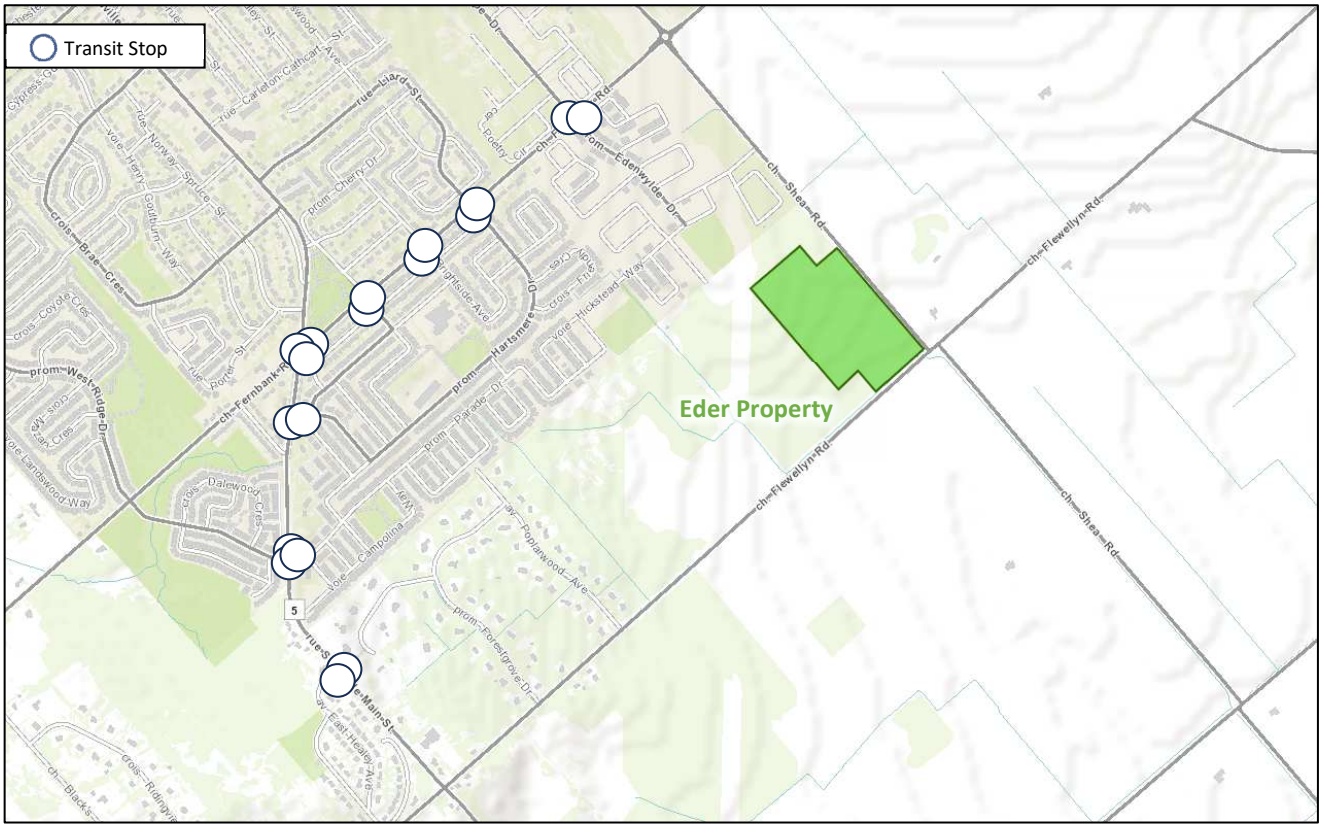
- Route # 61 – 30-minute service all day
- Route # 162 – Three afternoon buses and four evening buses per day
- Route # 262 – 30-minute service in the peak direction/period
- Route # 263 – Three morning buses and four afternoon buses per day in the peak direction
- Route #283 – One afternoon bus from Tunney's Pasture to Stittsville Main Street/ Carp Road
- Route # 301 – One morning bus and one afternoon bus on Monday in the peak direction

Figure 7: Study Area Transit Service (October 1, 2024)



Source: http://www.octranspo.com/ Accessed: October 1, 2024

Figure 8: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: October 7, 2024

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the study area.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa, and third-party counts were collected by The Traffic Specialist. Table 1 summarizes the intersection count dates and sources.

Table 1: Intersection Count Date

Intersection	Count Date	Source
Shea Road at Fernbank Road	Wednesday, March 02, 2022	City of Ottawa
Shea Road at Flewellyn Road	Wednesday, April 26, 2023	City of Ottawa
Stittsville Main Street/ Huntley Road at Flewellyn Road	Thursday, August 10, 2023	The Traffic Specialist

Figure 9 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. HCM 2010 methodology was used for unsignalized intersection operations and HCM 6 methodology was used for roundabout intersection operations. Detailed turning movement count data is included in Appendix B and the synchro and sidra worksheets are provided in Appendix C.

Figure 9: Existing Traffic Counts

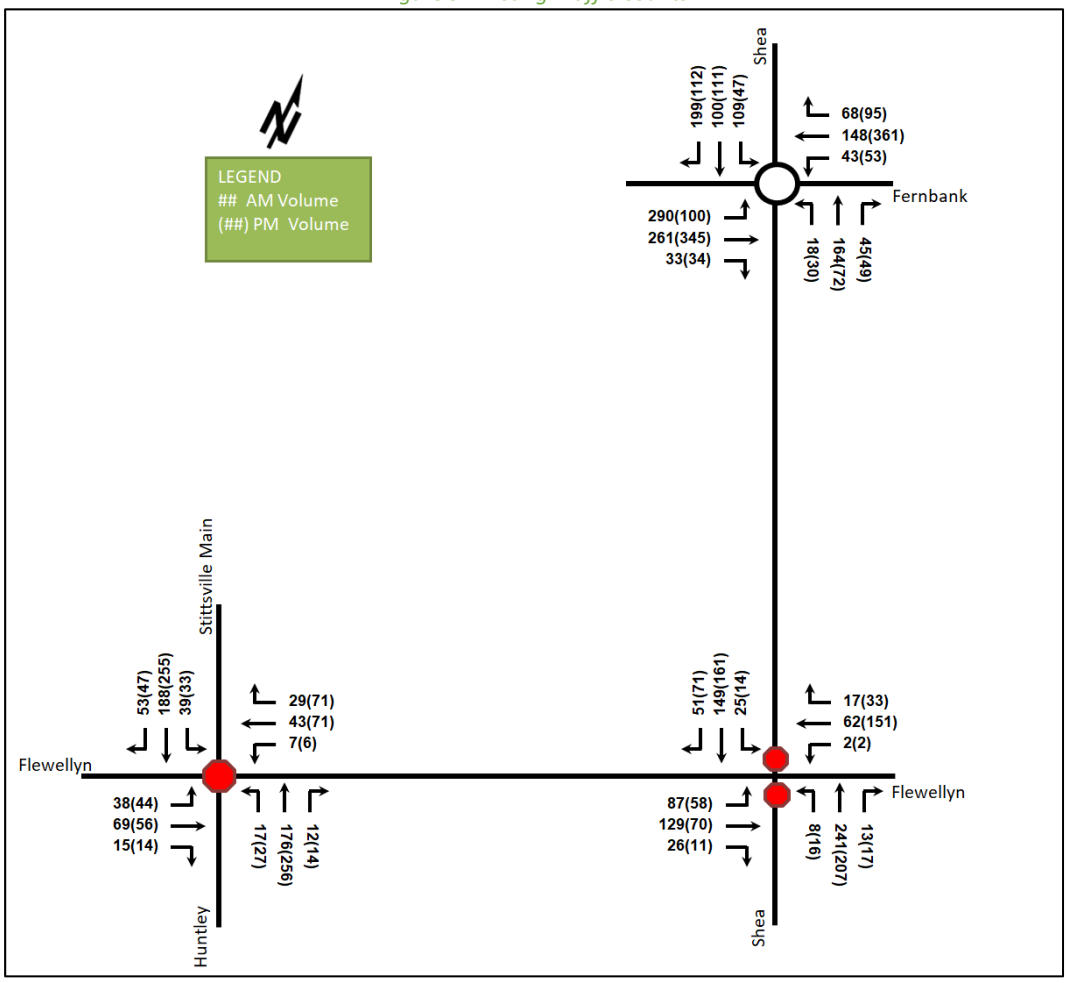


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	EB	B	0.65	10.2	42.7	A	0.50	6.7	23.7
	WB	A	0.37	8.4	13.2	A	0.53	6.2	26.0
	NB	B	0.42	10.8	15.1	A	0.22	8.1	6.8
	SB	A	0.44	6.9	18.8	A	0.38	8.2	13.7
	Overall	**A**	**0.65**	**9.0**	**42.7**	**A**	**0.53**	**7.0**	**26.0**
Shea Road at Flewellyn Road *Unsignalized*	EB	A	0.07	7.6	1.5	A	0.05	7.8	0.8
	WB	A	0.00	7.6	0.0	A	0.00	7.4	0.0
	NB	C	0.62	24.5	31.5	C	0.54	20.8	24.0
	SB	C	0.54	21.6	24.0	C	0.50	18.2	21.0
	Overall	**B**	-	**14.8**	-	**B**	-	**12.3**	-
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	A	0.21	9.8	6.0	B	0.22	10.9	6.0
	WB	A	0.13	9.1	3.0	B	0.27	10.9	8.3
	NB	B	0.33	10.7	10.5	B	0.50	13.7	21.0
	SB	B	0.42	11.1	15.0	B	0.54	14.5	24.8
	Overall	**B**	-	**10.5**	-	**B**	-	**13.2**	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90

Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections operate well. No capacity issues are noted.

All-way stop control warrant analysis was performed for the intersection of Shea Road at Flewellyn Road for the existing conditions, and Shea Road at Flewellyn Road meets the all-way stop-control warrant. Although the warrant is met at the intersection of Shea Road at Flewellyn Road, the operations are acceptable to remain as a minor stop-control condition. All-way stop control warrant calculation sheets are provided in Appendix D.

Signal warrant analysis of Justifications 1 and 2 were performed for the intersections of Shea Road at Flewellyn Road and Stittsville Main Street / Huntley Road at Flewellyn Road for the existing conditions. Shea Road at Flewellyn Road does not meet a signal warrant. The Stittsville Main Street / Huntley Road at Flewellyn Road intersection meets the Signal Justification 1, and as it has only met a single justification, it is recommended to remain as all-way stop-control. Signal warrant calculation sheets are provided in Appendix E.

The left-turn warrant analysis was performed for the intersections of Shea Road at Flewellyn Road and Stittsville Main Street / Huntley Road at Flewellyn Road for the existing conditions and none of the intersections meet a left-turn warrant for any approach. The left-turn warrant calculation sheets are provided in Appendix F.

2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study area road network. Table 3 summarizes the collision types and conditions in the study area, Figure 10 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix G.

Table 3: Study Area Collision Summary, 2018-2022

		Number	%
Total Collisions		**48**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	8	17%
	Property Damage Only	40	83%
Initial Impact Type	**Angle**	24	50%
	Rear end	8	17%
	SMV Other	15	31%
	Other	1	2%
Road Surface Condition	**Dry**	35	58%
	Wet	11	18%
	Loose Snow	4	7%
	Slush	1	2%
	Packed Snow	2	3%
	Ice	7	12%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

Figure 10: Study Area Collision Records, 2018-2022

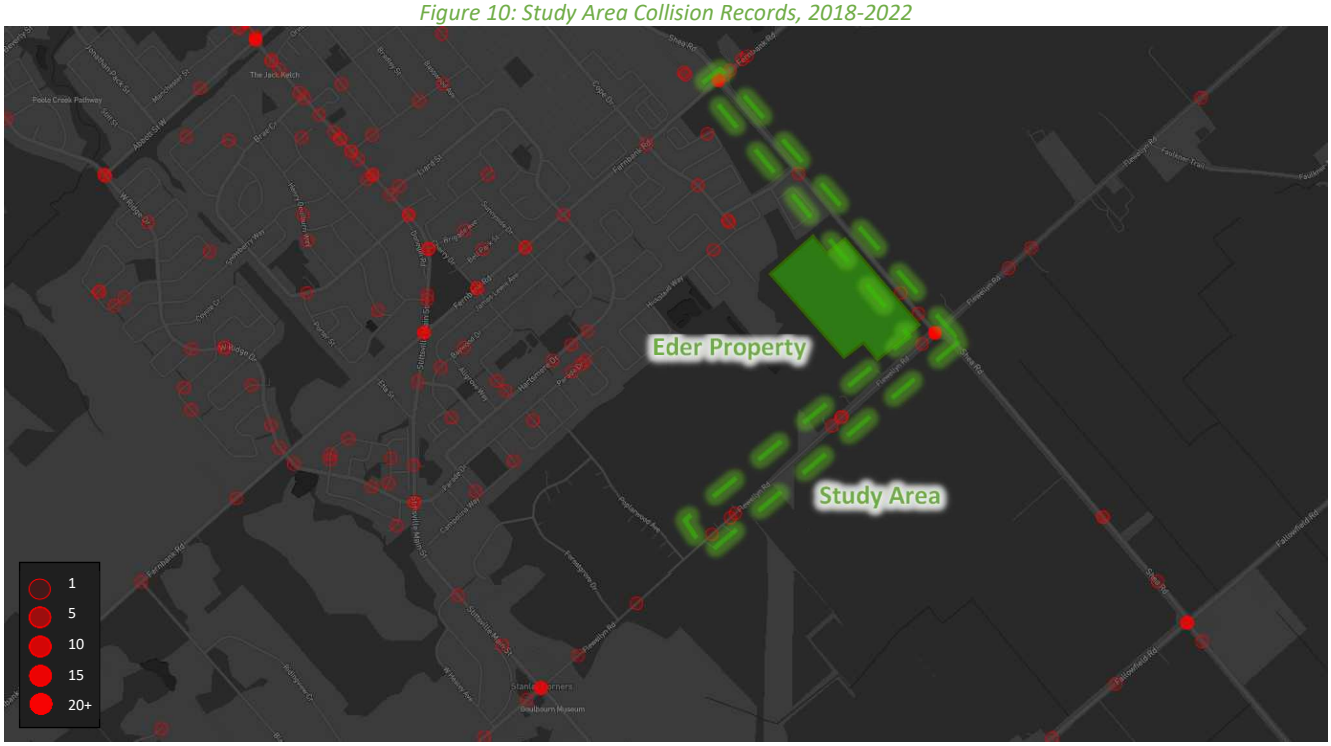


Table 4: Summary of Collision Locations, 2018-2022

	Number	%
Intersections / Segments	**48**	**100%**
Flewellyn Rd @ Shea Rd	23	48%
Fernbank Rd @ Shea Rd	15	31%
Flewellyn Rd btwn Poplarwood Ave & Shea Rd	7	15%
Shea Rd btwn Fernbank Rd & Flewellyn Rd	3	6%

Within the study area, the intersections of Flewellyn Road at Shea Road and Fernbank Road at Shea Road are noted to have experienced higher collisions than other locations listed in Table 4. Table 5 and Table 6 summarize the collision types and conditions for each location.

Table 5: Flewellyn Road at Shea Road Collision Summary, 2018-2022

		Number	%
Total Collisions		**23**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	7	30%
	Property Damage Only	16	70%
Initial Impact Type	**Angle**	17	74%
	Rear end	3	13%
	SMV Other	3	13%
Road Surface Condition	**Dry**	16	70%
	Wet	4	17%
	Loose Snow	1	4%
	Ice	2	9%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Flewellyn Road at Shea Road intersection had a total of 23 collisions during the 2018-2022 time period, with sixteen involving property damage only and the remaining seven having non-fatal injuries. The collision types are most represented by angle with 17, followed by three collisions each for the rear end and SMV other. Weather conditions do not affect collisions at this location.

The latest detailed collision records for this intersection were received from the City for the data range of 2017-2021, which is a 5-year period shifted one year earlier than the open data. From this data, a total of 20 collisions were observed, including three single motor vehicles collisions, three rear end collisions, and 14 angled collisions.

Among the 14 angled collisions recorded between 2017 and 2021, most angle collisions were noted to have occurred in a clear condition during daylight (9 out of 14). Additionally, angled collisions predominantly involved southbound vehicles conflicting with westbound vehicles (10 out of 14), with six southbound movements turning left and four traversing the offset to travel south of Flewellyn Road. Two other collisions involve left-turning southbound vehicles conflicting with eastbound vehicles and two with northbound vehicles traversing the offset conflicting with eastbound vehicles. The offset configuration of this intersection is considered the primary cause of these angled collisions. The detailed collision data are included in Appendix G.

Due to the property ownership, no ability exists for the site to re-align Shea Road. The City is currently investigating the implementation of pavement markings, flashers and signage to reduce collisions until the additional property is acquired. Any mitigation that may reduce the east-west speeds would be the primary goal, as it would allow extra ability for collision avoidance and reduce the severity should a collision occur.

Table 6: Fernbank Road at Shea Road Collision Summary, 2018-2022

		Number	%
Total Collisions		**15**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	1	7%
	Property Damage Only	14	93%
Initial Impact Type	**Angle**	7	47%
	Rear end	4	27%
	SMV Other	3	20%
	Other	1	7%
Road Surface Condition	**Dry**	9	60%
	Wet	1	7%
	Packed Snow	1	7%
	Ice	4	27%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Fernbank Road at Shea Road intersection had a total of 15 collisions during the 2018-2022 time period, with fourteen involving property damage only and the remaining one having non-fatal injuries. The collision types are most represented by angle with seven, followed by four rear end, three SMV other, and one other. It is noted that six out of 15 collisions are due to wet, packed snow, or ice surface conditions. Angle collisions mostly occurred during daylight under clear and dry conditions (5 out of 7), and all the angle collisions occurred during 2018-2019. All rear end collisions occurred under dark light conditions in the late afternoon/early evening, all occurred during fall or winter between October and March, and two of four collisions occurred during icy conditions. The surface conditions and dark conditions, despite available street lighting, appear to be contributing factors for collisions at this intersection. No further examination is required as part of this study.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

2.3.1.1 Transportation Master Plan (TMP) Update – Part 1 (2023)

Within the 2023 Transportation Master Plan – Part 1, there is a suggested route from Shea Road, located 640 metres north of Fernbank Road, to the south, and paved shoulders are proposed along Flewellyn Road. Part 2 of the Transportation Master Plan will identify the road network concept and transit network concept, including the affordable network. This is expected to be released by the end of 2024. The Transportation Master Plan (2013) is instructive to how the transportation facilities are planned and can be referenced during the interim.

The Road Network Concept diagram identifies Fernbank Road widening from two to four lanes between Stittsville Main Street and Terry Fox Drive. However, the timeline for construction is unknown at this time, and it is assumed beyond the study horizons.

2.3.1.2 Robert Grant Avenue - Between Palladium Drive and Fernbank Road

Robert Grant Avenue is a 2-lane arterial roadway between Abbott Street and Fernbank Road and is being extended to northwards from Abbott Street to Hazeldean Road. The ultimate configuration of Robert Grant Avenue will be a 4-lane roadway, supporting rapid transit, cycling facilities and pedestrian facilities between Palladium Drive and Fernbank Road. The nature of this corridor will evolve from the previously completed environmental assessment study, as City standards and guidelines have advanced during the intervening time. A transit station and park-and-ride facility are identified at the intersection of Robert Grant Avenue at Fernbank Road and Abbott Street at Hazeldean Road as part of the affordable network. The City's Affordable Network only identifies this corridor as a 2-lane roadway.

2.3.1.3 Isolated Transit Priority Measures

Transit priority measures in the Transportation Master Plan (2013) are identified in the affordable network as a loop along Fernbank Road from the future Fernbank transit station at Robert Grant Avenue to Stittsville Main Street, Hazeldean Road and back to Robert Grant Avenue.

2.3.2 Other Study Area Developments

Figure 11 illustrates all the developments noted in the larger Stittsville context and Table 7 summarizes the details of each development.

Figure 11: Area Developments

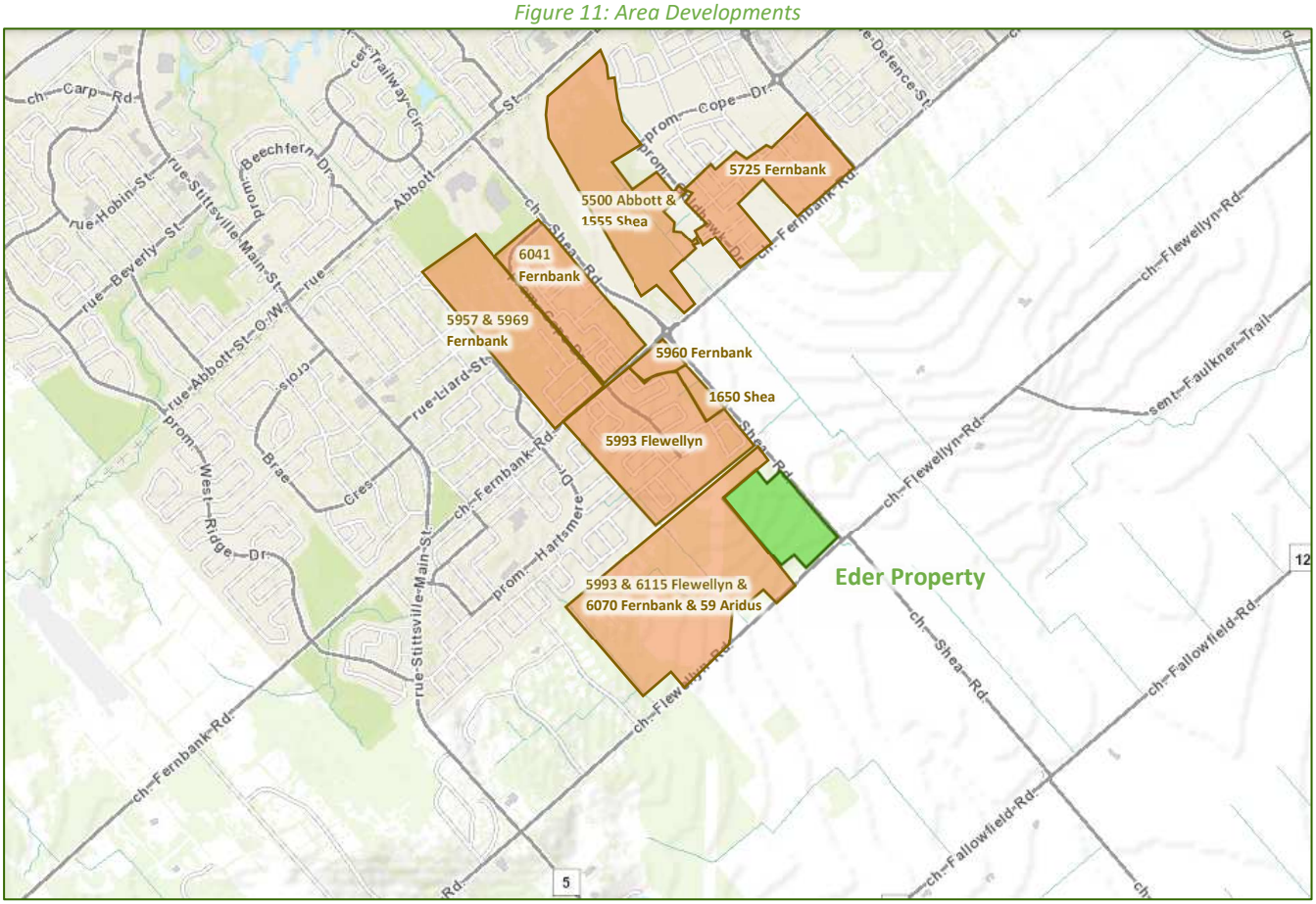


Table 7: Area Development Details

#	Address	Application Type	Size	Build-Out Date	Estimated Completion	TIA Author
1	5957 & 5969 Fernbank	• PoS • ZBA	• 98 single-family homes • 368 townhomes	2025	0%	Parsons, 2018 Addendum, 2020
2	6041 Fernbank	• PoS	• 234 single-family homes • 142 semi-detached homes • 262 townhomes	2023	0%	IBI Group, 2021
3	5993 Flewellyn (part of Area 6 lands)	• PoS	• 329 single-family homes • 230 semi-detached homes • 172 townhomes	2025	50%	IBI Group, 2015
4	1650 Shea (part of 5993 Flewellyn)	• SPA	• 13 low-rise buildings (a total of 116 units)	2024	0%	TIA is not required
5	5960 Fernbank (part of Area 6 lands)	• ZBA • SPA	• 40,000 sq. ft. grocery store • 19,250 sq. ft. retail • 5,900 sq. ft. restaurant	2024	0%	Parsons, 2016
6	5500 Abbott & 1555 Shea	• ZBA • PoS	• 286 single-family homes • 324 townhomes	2025	0%	IBI Group, 2022
7	5725 Fernbank	• ZBA • PoS	• 206 single family homes • 391 townhomes	2025	0%	IBI Group, 2021

#	Address	Application Type	Size	Build-Out Date	Estimated Completion	TIA Author
8	5993 & 6115 Flewellyn & 6070 Fernbank & 59 Aridus	• POA • ZBA • PoS	• 707 townhomes • 416 single detached homes • 336 stacked condo units	2030	0%	N/A

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Shea Road at:
  - Fernbank Road
  - Flewellyn Road
  - Street 21 (Planned collector road within adjacent subdivision)
  - Street 22 (New local road)
- Flewellyn Road at:
  - Street 19 (Planned collector road within adjacent subdivision)
  - Street 7 (Planned collector road within adjacent subdivision)
  - Stittsville Main Street/ Huntley Road

Street 19, Street 21, and Street 7 are planned collector roads within the adjacent subdivision, while Street 22 is a new proposed local road within the subdivision. These road intersections will be included in future conditions. The boundary road will be Shea Road and Flewellyn Road, and Screenline 56 is present within proximity to the proposed development.

3.2 Time Periods

As the proposed development is composed entirely of residential units the AM and PM peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2030. As a result, the full build-out plus five years horizon year is 2035.

4 Development-Generated Travel Demand

4.1 Mode Shares

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the Kanata/Stittsville and Rural Southwest districts, derived from the most recent National Capital Region Origin-Destination survey (OD Survey), the existing average district mode shares by land use have been summarized in Table 8.

Table 8: TRANS Trip Generation Manual Recommended Mode Shares – Kanata/Stittsville and Rural Southwest

Travel Mode	Kanata/Stittsville				Rural Southwest			
	Single Detached		Multi-Unit (Low-Rise)		Single Detached		Multi-Unit (Low-Rise)	
	AM	PM	AM	PM	AM	PM	AM	PM
Auto Driver	52%	56%	52%	58%	60%	67%	66%	62%
Auto Passenger	15%	19%	14%	17%	14%	17%	13%	19%
Transit	20%	14%	22%	17%	24%	14%	21%	16%

Travel Mode	Kanata/Stittsville				Rural Southwest			
	Single Detached		Multi-Unit (Low-Rise)		Single Detached		Multi-Unit (Low-Rise)	
	AM	PM	AM	PM	AM	PM	AM	PM
Cycling	1%	1%	0%	0%	2%	2%	1%	3%
Walking	12%	9%	11%	8%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Examining the above mode shares for the adjacent districts, a combined modal share for the subject development has been developed as a baseline for the expected travel modes of the development. Table 9 summarizes the expected modes shares for the development area.

Table 9: Expected Development Baseline Mode Shares

Travel Mode	Single Detached		Multi-Unit (Low-Rise)	
	AM	PM	AM	PM
Auto Driver	51%	59%	55%	58%
Auto Passenger	15%	19%	15%	19%
Transit	24%	14%	21%	16%
Cycling	2%	2%	2%	2%
Walking	8%	6%	7%	5%
Total	**100%**	**100%**	**100%**	**100%**

4.2 Trip Generation

This TIA has been prepared using the person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020). Table 10 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 10: Trip Generation Person Trip Rates by Peak Period

Land Use	Land Use Code	Peak Period	Person Trip Rates
Single-Detached	210 (TRANS)	AM	2.05
		PM	2.48
Multi-Unit (Low-Rise)	220 (TRANS)	AM	1.35
		PM	1.58

Using the above person trip rates, the total person trip generation has been estimated. Table 11 summarizes the total person trip generation for the residential land uses.

Table 11: Total Residential Person Trip Generation by Peak Period

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Single-Detached	63	39	90	129	97	59	156
Multi-Unit (Low-Rise)	622	252	588	840	550	433	983

Using the above mode share targets and the person trip rates, the person trips by mode have been projected. Trip generation by peak hour has been forecasted using the prescribed peak period conversion factors presented in the TRANS Trip Generation Manual (2020) for the residential component. Table 12 summarizes the residential trip generation.

Table 12: Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Single-Detached	Auto Driver	**51%**	10	22	32	**59%**	25	15	40
	Auto Passenger	**15%**	3	6	9	**19%**	8	5	13
	Transit	**24%**	5	12	17	**14%**	6	4	10
	Cycling	**2%**	1	1	2	**2%**	1	0	1
	Walking	**8%**	2	4	6	**6%**	3	2	5
	Total	**100%**	**21**	**45**	**66**	**100%**	**43**	**26**	**69**
Multi-Unit (Low-Rise)	Auto Driver	**55%**	67	155	222	**58%**	141	110	251
	Auto Passenger	**15%**	18	42	60	**19%**	46	36	82
	Transit	**21%**	29	68	97	**16%**	41	33	74
	Cycling	**2%**	3	7	10	**2%**	6	4	10
	Walking	**7%**	10	24	34	**5%**	14	11	25
	Total	**100%**	**127**	**296**	**423**	**100%**	**248**	**194**	**442**
Total	Auto Driver	-	77	177	254	-	166	125	291
	Auto Passenger	-	21	48	69	-	54	41	95
	Transit	-	34	80	114	-	47	37	84
	Cycling	-	4	8	12	-	7	4	11
	Walking	-	12	28	40	-	17	13	30
	Total	-	**148**	**341**	**489**	-	**291**	**220**	**511**

As shown above, a total of 254 AM and 291 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

4.3 Trip Distribution

To understand the travel for the subject development, the OD Survey has been reviewed to determine the travel patterns for the Kanata/Stittsville and Rural Southwest districts. Based on the screenline review in Section 12, Fernbank Road is expected to be over the TRANS capacity in the future background conditions, therefore, no trip assignments are anticipated through Fernbank Road. Table 13 below summarizes the expected distribution of trips from the proposed subdivision lands. While not explicitly detailed, it is expected that an amount of cut-through travel between the existing subdivision area and the proposed subdivision will occur, and it is assumed that the interaction of those trips on the area road network will balance through the proposed subdivision.

Table 13: OD Survey Distribution

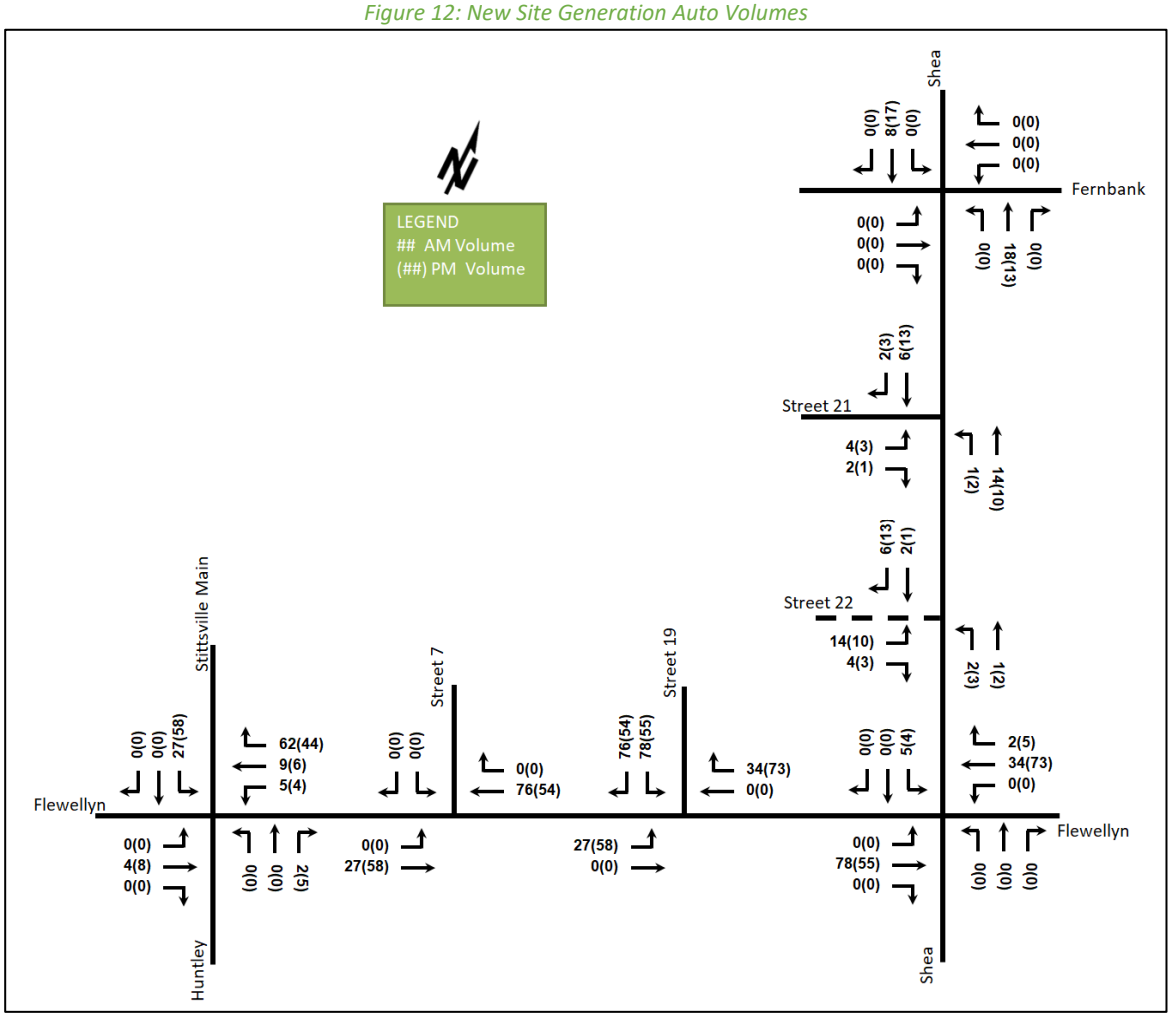
To/From	Residential % of Trips	Via
North	80%	35% via Flewellyn to Stittsville Main north 10% via Shea north 35% via Flewellyn east
South	3%	3% via Flewellyn to Huntley
East	12%	12% via Flewellyn
West	5%	5% via Flewellyn
Total	100%	100%

4.4 Trip Assignment

Using the distribution outlined in Section 4.3, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. The assignment has also been based on the Section 12 Network Concept review and screenline capacities. Of note, Fernbank Road

is projected to be near or above capacity in the future horizons and no site generated trips have been assigned to Fernbank Road. Figure 12 illustrates the new site-generated volumes.

Figure 12: New Site Generation Auto Volumes



5 Exemption Review

Table 14 summarizes the exemptions for this TIA.

Table 14: Exemption Review

Module	Element	Explanation	Exempt/Required
Site Design and TDM			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plan and zoning by-law applications	Exempt
	4.1.3 New Street Networks	Only required for plans of subdivision	Required
4.2 Parking	4.2.1 Parking Supply	Only required for site plan and zoning by-law applications	Exempt
4.3 Boundary Street Design		All applications	Required
4.5 Transportation Demand Management	All Elements	Only required when the development generates more than 60 person-trips	Required

Module	Element	Explanation	Exempt/Required
Network Impact			
3.2 Background Network Travel Demand	All Elements	Only required when one or more other Network Impact Modules are triggered	Required
3.3 Demand Rationalization		Only required when one or more other Network Impact Modules are triggered	Required
4.6 Neighbourhood Traffic Calming	4.6.1 Adjacent Neighbourhoods	If the development meets all of the following criteria along the route(s) site generated traffic is expected to utilize between an arterial road and the site's access: 1. Access to Collector or Local; 2. "Significant sensitive land use presence" exists, where there is at least two of the following adjacent to the subject street segment: • School (within 250m walking distance); • Park; • Retirement / Older Adult Facility (i.e. long-term care and retirement homes); • Licenced Child Care Centre; • Community Centre; or • 50%, or greater, of adjacent property along the route(s) is occupied by residential • lands and a minimum of 10 occupied residential units are present on the route. 3. Application is for Zoning By-Law Amendment or Draft Plan of Subdivision; 4. At least 75 site-generated auto trips; 5. Site Trip Infiltration is expected. Site traffic will increase peak hour vehicle volumes along the route by 50% or more.	Exempt
4.7 Transit	4.7.1 Transit Route Capacity	Only required when the development generates more than 75 transit trips	Required
	4.7.2 Transit Priority Requirements	Only required when the development generates more than 75 auto trips	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Required
4.9 Intersection Design	4.9.1 Intersection Control	Only required when the development generates more than 75 auto trips	Required

Module	Element	Explanation	Exempt/Required
	4.9.2 Intersection Design	Only required when the development generates more than 75 auto trips	Required

6 Development Design

6.1 Design for Sustainable Modes

The proposed development is a residential subdivision featuring driveways for each dwelling, garages for typical townhomes, and surface parking for the stacked condo units. Bicycle parking is assumed to be within the individual units. The new local road (Street 22) is proposed with a sidewalk on one side.

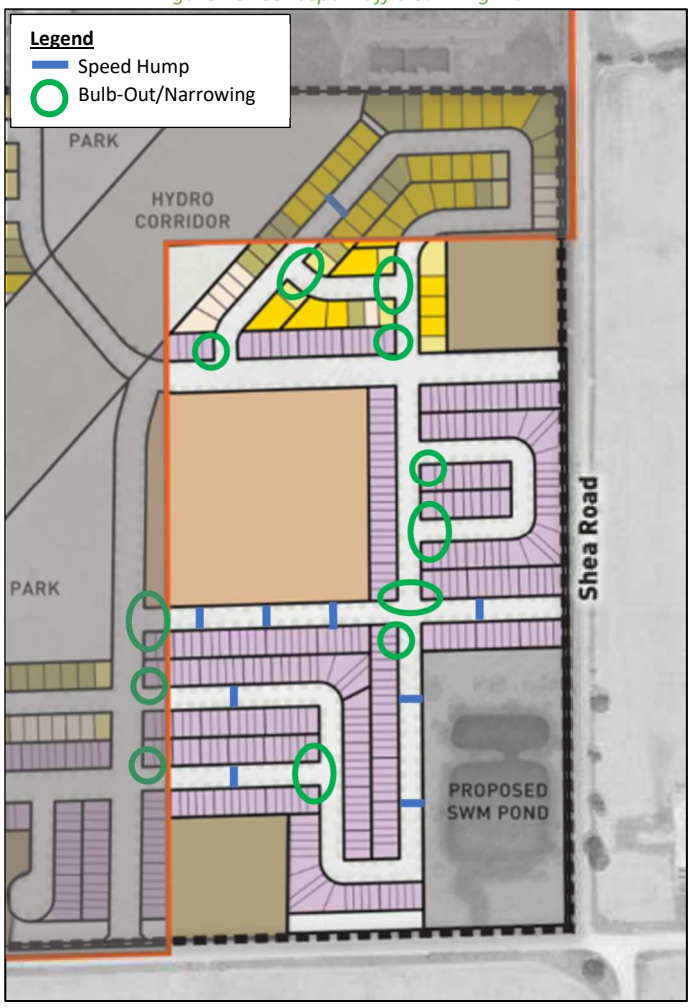
Transit services are planned for the adjacent subdivision, and the proposed pedestrian facilities within the subdivision will connect to both the planned pedestrian facilities and future transit services within the adjacent subdivision.

6.2 New Street Networks

The new local roadway (Street 22) is 18.0-metre-wide with 2.0-metre-wide sidewalks on one side. The new local road is proposed to connect to the collector roads (Street 21 and Street 19), which are planned within the adjacent subdivision. The proposed speed limit of the new local roadway will be 30 km/h.

To support the pedestrian and cycling connectivity within the subdivision, traffic calming elements are recommended at the internal intersections and on the internal roadways, including bulb-outs to narrow approaches to intersections (e.g. reduced crossing distance) and speed humps to reduce vehicle speeds. Traffic calming elements for connections to the existing roadways will be coordinated with the adjacent existing roadway during the detailed design phase. Figure 13 Illustrates the conceptual traffic calming plan.

Figure 13: Concept Traffic Calming Plan



7 Boundary Street Design

Table 15 summarizes the MMLOS analysis for the boundary streets of Shea Road and Flewellyn Road, and the internal roads of new local road. As Shea Road Flewellyn Road are within "General Rural Area", no MMLOS targets for the existing conditions. It is expected all roadways will be within the "General Urban Area", and the MMLOS targets are present for future conditions. The MMLOS worksheets have been provided in Appendix H.

Table 15: Boundary Street MMLOS Analysis

	Segment	Condition	Pedestrian LOS		Bicycle LOS	
			PLOS	Target	BLOS	Target
Boundary Roadways	Shea Road	Existing	F	No target	F	No target
		Future	**F**	C	**F**	D
	Flewellyn Road	Existing	F	No target	F	No target
		Future	**F**	C	**F**	D
Internal Roadways	New local road	Future	A	C	B	D

Both boundary roads of Shea Road and Flewellyn Road have LOS of F for pedestrian and bicycle LOS, and both boundary roads will not meet the MMLOS targets in future conditions.

To meet the theoretical pedestrian LOS (PLOS) target on Shea Road and Flewellyn Road, at least 2.0 metres sidewalks and less than 50 km/h of operating speed would be needed.

To meet the theoretical bicycle LOS (BLOS) target on Shea Road and Flewellyn Road, physically separated cycling facilities or operating speed lower or equal to 40 km/h would be needed.

The new internal local roads will have an LOS of A for pedestrian and LOS B for bicycle. It is expected that the internal local road will meet the MMLOS targets.

The transit LOS and truck LOS are not applicable for the boundary roads and internal roadways, per the application of the MMLOS Guidelines.

8 Transportation Demand Management

8.1 Context for TDM

The mode shares used within the TIA represent the unmodified district mode shares for a combined modal share of the Kanata/Stittsville and Rural Southwest districts. These mode shares include a maximum of 24% for transit, 2% for cycling, and 8% for walking. Considering the context of the proposed development, post-occupancy TDM measures will be recommended to support achieving the mode share targets for the proposed development.

8.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel, followed by transit, walking, and cycling, and those assumptions have been carried through the analysis. Although most intersections in the study area are anticipated to have residual capacity, Fernbank Road is expected to exceed capacity, and Shea Road is expected to be closer or over 90% of its capacity in the future background conditions reviewed in Section 12. It is anticipated that future pedestrian facilities, cycling facilities provided within the adjacent subdivision to connect to northern communities, along with transit service within the adjacent subdivision will be providing local service through the subject site will be the primary methods of supporting the community. Supporting TDM measures are recommended to encourage shifts toward sustainable modes and mitigate the risks associated with failing to meet mode share targets.

8.3 TDM Program

The “suite of post occupancy TDM measures” has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix I. The key TDM measures recommended include:

- Provide a multimodal travel option information package to new residents
- Provide transit incentives for new residents
- Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels

9 Background Network Travel Demands

9.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3 and will be considered in the analysis.

9.2 Background Growth

A review of the background projections from the City’s TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways. The background TRANS model growth rates are summarized in Table 16 and the TRANS model plots are provided in Appendix J.

Table 16: TRANS Regional Model Projections – Study Area Growth Rates – AM Peak Hour

Street	TRANS 2011 to 2031	
	Eastbound	Westbound
Flewellyn Rd	-	-
Fernbank Rd	-0.88%	1.47%
	Northbound	**Southbound**
Shea Rd	2.36%	4.84%
Stittsville Main St	0.56%	0.54%
Huntley Rd	0.56%	0.56%

The volumes along Fernbank Road and Shea Road are noted to be underestimated when compared to traffic existing counts. The explicit developments identified within this report would form the primary local growth for the existing volumes and the background growth rates would be subject to regional travel through the area. This background growth would be related to rural development and planned development in Richmond Village. Given these factors, Table 17 summarizes the suggested growth rates applied for the background road network. It is noted that no TRANS Rates are provided for Flewellyn Road, and the growth rates are assumed to be the same as Fernbank Road.

Table 17: Recommended Area Growth Rates

Street	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Flewellyn Rd	0%	2%	2%	0%
Fernbank Rd	0%	2%	2%	0%
	Northbound	**Southbound**	**Northbound**	**Southbound**
Shea Rd	2.5%	4.75%	4.75%	2.5%
Stittsville Main St	0.5%	0.5%	0.5%	0.5%
Huntley Rd	0.5%	0.5%	0.5%	0.5%

9.3 Other Developments

The background developments explicitly considered in the background conditions (Section 9.2) include:

- 5957 & 5969 Fernbank Road
- 6041 Fernbank Road
- 5993 Flewellyn Road
- 5960 Fernbank Road
- 5500 Abbott Street & 1555 Shea Road
- 5725 Fernbank Road
- 5993 & 6115 Flewellyn Road & 6070 Fernbank Road & 59 Aridus Crescent

The total background development volumes and the development volumes for each development within the study area have been provided in Appendix K. The developments at 5957 & 5969 Fernbank Road, 6041 Fernbank Road, and 5993 Flewellyn Road trip generation are noted to be updated to the TRANS 2020 methodology.

10 Demand Rationalization

10.1 2030 Future Background Intersection Operations

The intersections of Shea Road at Street 21, Flewellyn Road at Street 19 and at Street 7 are planned intersections within adjacent subdivision. These intersections are planned as stop-controlled on the minor approach, allowing

for full movements. The intersections of Shea Road at Street 21 and Flewellyn Road at Street 19 and Street 7 each consists of a shared all-movement lane on each leg.

Figure 14 illustrates the 2030 background volumes and Table 18 summarizes the 2030 background intersection operations. Volumes have been balanced along the study area roadways. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. HCM 2010 methodology was used for unsignalized intersection operations and HCM 6 methodology was used for roundabout intersection operations. The synchro and sidra worksheets for the 2030 future background horizon are provided in Appendix L.

Figure 14: 2030 Future Background Volumes

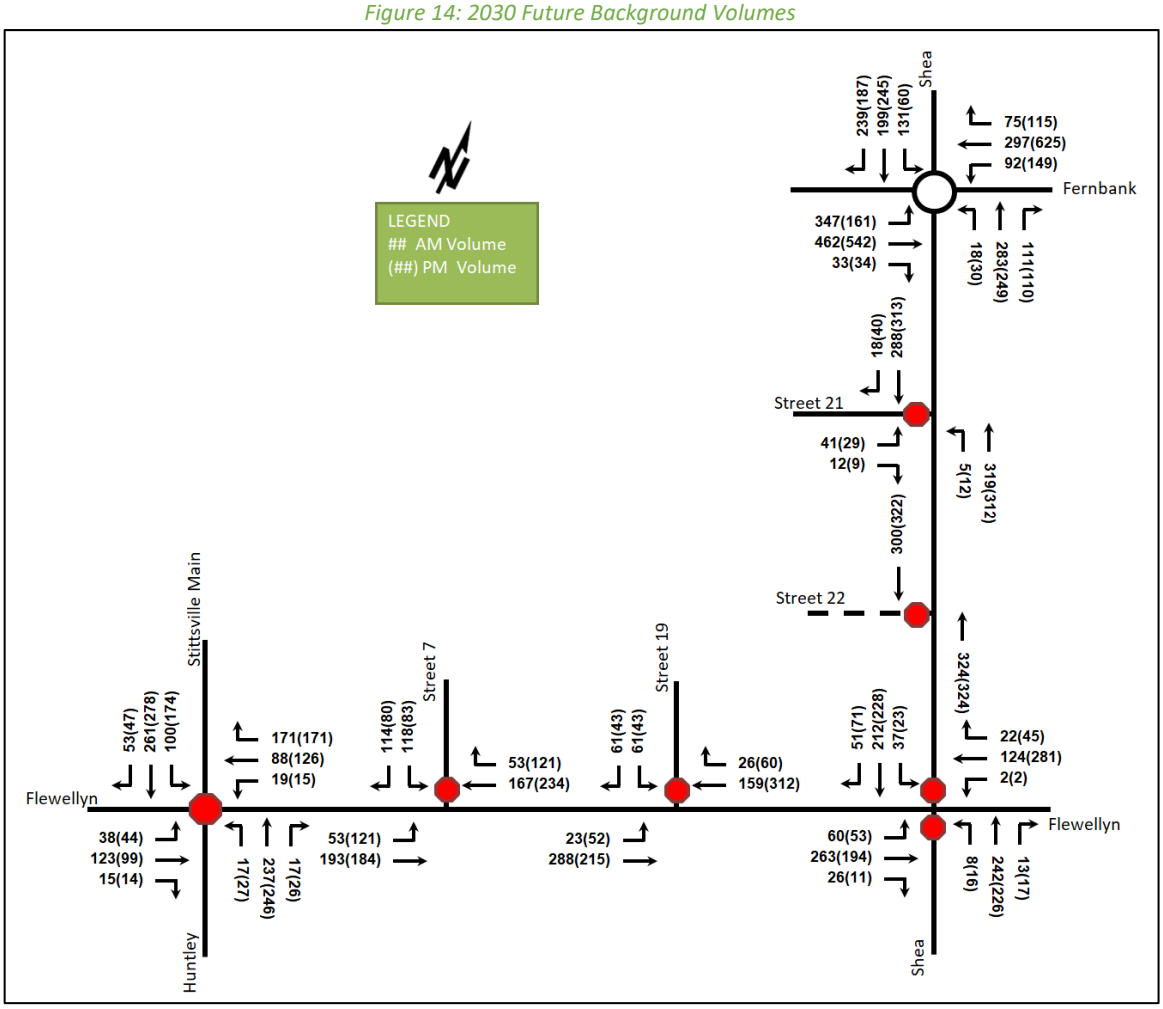


Table 18: 2030 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	EB	E	0.98	37.3	214.3	C	0.88	18.8	102.4
	WB	B	0.69	14.2	39.2	**F**	**1.05**	**75.7**	**380.6**
	NB	D	0.87	28.7	63.3	B	0.65	14.2	32.1
	SB	B	0.66	10.8	42.2	C	0.84	21.5	62.0
	Overall	**C**	**0.98**	**24.4**	**214.3**	**E**	**1.05**	**38.8**	**380.6**
Shea Road at Flewellyn Road *Unsignalized*	EB	A	0.04	7.7	0.8	A	0.04	8.1	0.8
	WB	A	0.00	7.9	0.0	A	0.00	7.7	0.0
	NB	D	0.65	29.1	33.8	E	0.75	41.3	44.3
	SB	E	0.78	39.9	48.8	**F**	**0.85**	**50.6**	**60.8**
	Overall	**B**	**-**	**19.0**	**-**	**D**	**-**	**23.5**	**-**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	B	0.33	13.1	10.5	B	0.33	14.1	10.5
	WB	B	0.48	14.7	18.8	C	0.58	18.2	27.0
	NB	C	0.49	15.7	20.3	C	0.56	18.2	26.3
	SB	C	0.69	21.3	40.5	E	0.87	37.7	72.8
	Overall	**C**	**-**	**17.1**	**-**	**D**	**-**	**25.4**	**-**
Shea Road at Street 21 *Unsignalized*	EBL/R	B	0.11	13.4	3.0	B	0.08	13.7	2.3
	NBL/T	A	0.00	7.9	0.0	A	0.01	8.0	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.1**	**-**	**A**	**-**	**0.9**	**-**
Flewellyn Road at Street 19 *Unsignalized*	EBL/T	A	0.02	7.7	0.8	A	0.04	8.2	0.8
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.19	12.0	5.3	B	0.17	13.6	4.5
	Overall	**A**	**-**	**2.7**	**-**	**A**	**-**	**2.2**	**-**
Flewellyn Road at Street 7 *Unsignalized*	EBL/T	A	0.04	7.8	0.8	A	0.10	8.4	2.3
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.37	14.2	12.8	C	0.35	16.9	12.0
	Overall	**A**	**-**	**5.3**	**-**	**A**	**-**	**4.6**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections are anticipated to operate well during both peak hours except for the westbound movement at Shea Road at Fernbank Road and the southbound movement at Shea Road at Flewellyn Road intersections during the PM peak hour.

At Shea Road at Fernbank Road intersection, the westbound movement during the PM peak hour may be subject to high delays and extended queues. As noted in Section 4.4, Fernbank Road is projected to be near or above capacity in the future horizons, and these constrains are a result of background growths and approved development volumes.

Neither the Shea Road at Flewellyn Road intersection nor the Stittsville Main Street / Huntley Road at Flewellyn Road intersection will meet Signal Justification 7 in the 2030 future background conditions. Signal warrant calculation sheets are provided in Appendix E.

The left-turn warrant analysis was performed for the Stittsville Main Street / Huntley Road and Flewellyn Road intersection, and southbound left turns will be met for consideration during both peak hours at this intersection. Operationally, the turn lane is not required. The lane currently is a shared left-turn/through movement, and the

existing property on the south side of the intersection constrains the implementation of a left-turn lane. The left-turn warrant calculation sheets are provided in Appendix F.

The intersections of Shea Road at Street 21, Flewellyn Road at Street 19, and Flewellyn Road at Street 7 are anticipated to meet all-way stop-control warrants for consideration. Although the warrant will be met, the operations are acceptable as a minor stop-control condition from an operational perspective. All-way stop control warrant calculation sheets are provided in Appendix D.

At Shea Road at Flewellyn Road intersection, the southbound movement during the PM peak hour may be subject to high delays. As noted in the existing conditions, Shea Road at Flewellyn Road meets the warrants for consideration for an all-way stop control. Given the decreasing operations upon full build-out of the subdivision, it is recommended that the City expedite the acquisition of land to facilitate intersection improvements and a higher order of intersection control. At minimum, an all-way stop-control would meet the operational requirements for the intersection.

Table 19 summarizes the 2030 future background operations for the intersection of Shea Road at Flewellyn Road with all-way stop control and the Synchro worksheets are provided in Appendix M.

Table 19: 2030 Future Background Shea Road at Flewellyn Road Operations – All-Way Stop Control (AWSC)

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Flewellyn Road *Unsignalized*	EB	C	0.59	17.6	29.3	C	0.48	15.9	19.5
	WB	B	0.26	11.7	7.5	C	0.59	18.1	27.8
	NB	B	0.46	14.6	18.0	C	0.48	15.8	19.5
	SB	B	0.50	14.9	21.0	C	0.57	17.7	27.0
	Overall	**C**	-	**15.3**	-	**C**	-	**17.0**	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

Beyond the intersection control, the left-turn lane warrants will also be met for consideration on the eastbound left-turn during both peak hours at Shea Road and Flewellyn Road intersection. Given the geometric offset at the intersection, left-turn lanes are not recommended until the offset is removed at the intersection.

10.2 2035 Future Background Intersection Operations

As noted in the 2030 future background conditions, the intersection of Shea Road and Flewellyn Road is recommended to be an all-way stop-controlled intersection, and it will be analyzed as such in the 2035 future background conditions. Other intersections will remain the same as the 2030 future background conditions.

Figure 15 illustrates the 2035 background volumes and Table 20 summarizes the 2035 background intersection operations. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. HCM 2010 methodology was used for unsignalized intersection operations and HCM 6 methodology was used for roundabout intersection operations. The synchro worksheets have been provided in Appendix N.

Figure 15: 2035 Future Background Volumes

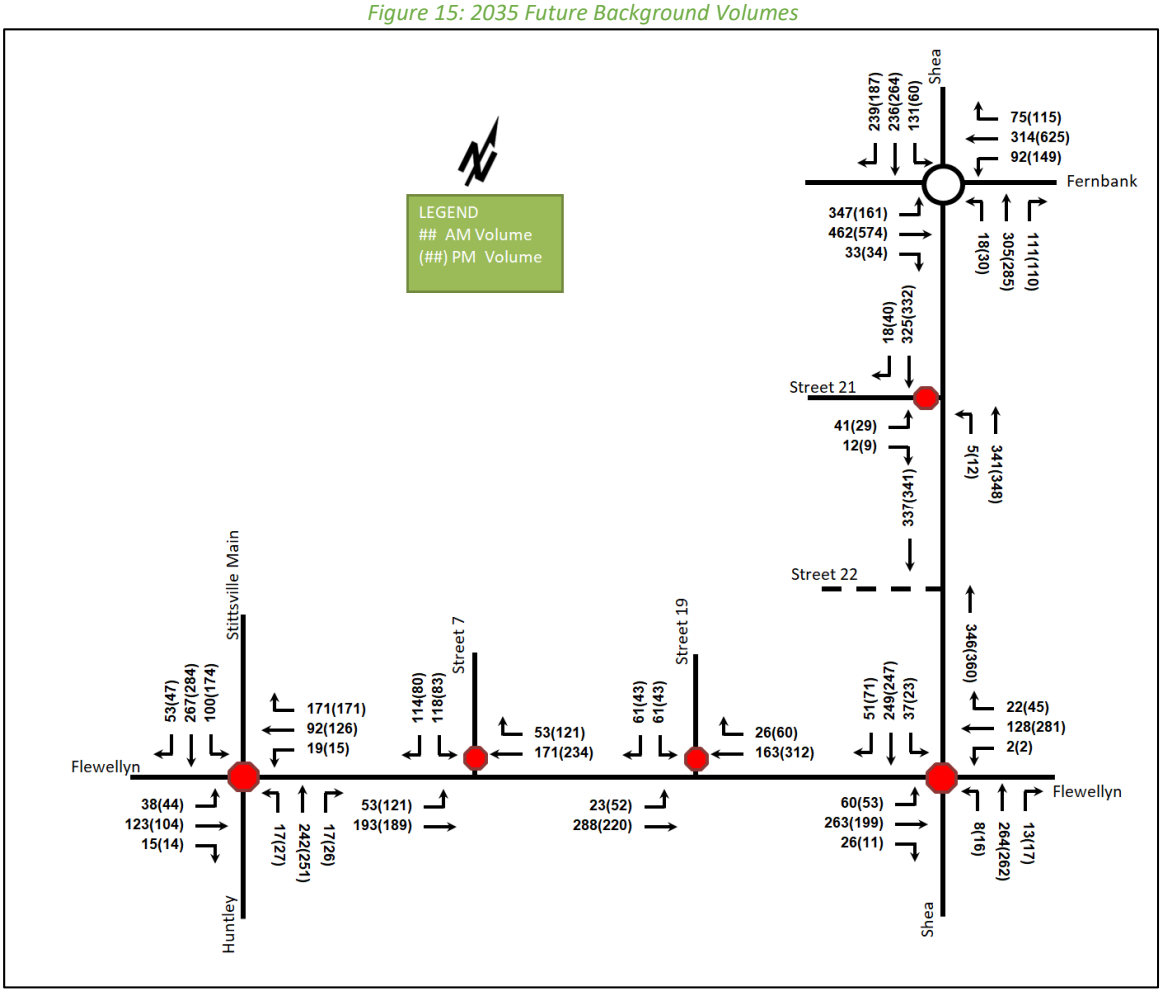


Table 20: 2035 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	EB	**F**	**1.02**	**56.7**	**286.4**	C	0.93	24.8	138.3
	WB	C	0.73	15.3	44.1	**F**	**1.09**	**107.7**	**486.8**
	NB	D	0.90	32.2	75.3	C	0.74	16.8	41.4
	SB	B	0.72	12.0	51.6	C	0.84	21.3	65.1
	Overall	**D**	**1.02**	**32.3**	**286.4**	**F**	**1.09**	**51.2**	**486.8**
Shea Road at Flewellyn Road *Unsignalized*	EB	C	0.61	19.1	31.5	C	0.52	17.7	22.5
	WB	B	0.28	12.4	9.0	C	0.62	20.4	31.5
	NB	C	0.52	16.3	21.8	C	0.57	19.0	26.3
	SB	C	0.58	17.4	27.8	C	0.64	20.8	33.0
	Overall	**C**	-	**17.0**	-	**C**	-	**19.6**	-
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	B	0.34	13.3	10.5	B	0.34	14.6	11.3
	WB	B	0.49	15.0	19.5	C	0.58	19.1	28.5
	NB	C	0.51	16.1	21.0	C	0.58	18.9	27.0
	SB	C	0.71	22.3	42.8	E	0.89	43.3	81.0
	Overall	**C**	-	**17.7**	-	**D**	-	**28.0**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Street 21 ***Unsignalized***	EBL/R	B	0.12	14.2	3.0	B	0.09	14.3	2.3
	NBL/T	A	0.00	8.0	0.0	A	0.01	8.1	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.1**	**-**	**A**	**-**	**0.8**	**-**
Flewellyn Road at Street 19 ***Unsignalized***	EBL/T	A	0.02	7.7	0.8	A	0.04	8.2	0.8
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.19	12.1	5.3	B	0.17	13.6	4.5
	Overall	**A**	**-**	**2.7**	**-**	**A**	**-**	**2.2**	**-**
Flewellyn Road at Street 7 ***Unsignalized***	EBL/T	A	0.04	7.8	0.8	A	0.10	8.4	2.3
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.38	14.3	12.8	C	0.35	17.0	12.0
	Overall	**A**	**-**	**5.3**	**-**	**A**	**-**	**4.6**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The intersection of Shea Road at Fernbank Road will see an increased delay of 19.4 seconds and increase queuing of approximately 72.1 metres for the eastbound approach during the AM peak hour and the westbound movement during the PM peak hour delay will increase by 32.0 seconds and the queues will increase by 106.2 metres. As previously noted, these constrains are a result of background growth and approved development volumes.

Other the study area intersections are anticipated to operate well during both peak hours.

A southbound left-turn lane during the AM peak hour will meet the warrant for consideration at the Shea Road at Flewellyn Road intersection although this is not recommended until the intersection can be re-aligned. The remaining signalization and left-turn lane warrants and conclusions remain the same as noted in the 2030 future background conditions.

10.3 Network Rationalization

The intersection of Shea Road and Flewellyn Road is recommended to be improved by the City, either increased intersection control or other safety improvements.

Section 12 documents the screenline review for Fernbank Road, east of Shea Road is expected to be over capacity in the future conditions, with residual capacity on the other area roadways to support future development. High delays and extended queues are noted at the intersection of Shea Road at Fernbank Road in the future background conditions; however, these are a result of background growth and approved development volumes, and no site-generated trips have been assigned to Fernbank Road.

11 Transit

11.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 21 summarizes the transit trip generation.

Table 21: Trip Generation by Transit Mode

Travel Mode	Mode Share AM (PM)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Transit	Varies	34	80	114	47	37	84

The proposed development is anticipated to generate 114 AM and 84 PM peak hour two-way transit trips. From the trip distribution found in Section 6.3 and given existing bus routing to the north and east of the site, these values were split to the north and east relative to the site. Table 22 summarizes the forecasted site-generated transit ridership trips by direction relative to the site and provides equivalent bus loads based on this ridership. It is noted that future transit stops are planned within the adjacent subdivision, which will be the primary bus stops for the residents for the proposed subdivision. Ultimately, future routes are expected to form local service extending from the BRT station at Fernbank and Robert Grant Avenue.

Table 22: Forecasted Site-Generated Transit Ridership

General Destination To/From (relative to the site)	AM Peak Hour		PM Peak Hour		Service Type	Approximate Equivalent Peak Hour/Peak Direction Bus Loads
	In	Out	In	Out		
North	30	70	41	32	Bus	one and a quarter standard bus loads
East	4	10	6	15	Bus	one-fourth of a standard bus load

In total, a 10-15-minute AM peak hour service level is estimated to be required for the proposed lands to meet the transit demand, and a 20-minute PM peak hour service level.

11.2 Transit Priority

Transit priority measures are identified in a loop along Fernbank Road from the Fernbank transit station to Stittsville Main Street to Hazeldean Road and back to the Robert Grant Avenue transit corridor. The subject site is expected to pose a limited impact on Fernbank Road overall, and no further transit priority measures are recommended beyond the City's Ultimate Transit Network.

12 Network Concept

A high-level review of the key roadway lane capacities and utilizations was completed to assess the networks' ability to accommodate additional growth. The lane capacity estimates are assembled from a review of the TRANS Regional Model and Screenline 44, which is located between Stittsville and Kanata from Richardson Side to Flewellyn Road in a north-south direction.

To assess the capacity of the area network, a local screenline was created around the study area and has been illustrated in Figure 16. Table 23 summarizes the high-level capacity, existing and future volumes, and utilization of the roadway corridors in the immediate study area, and the existing volumes are included in Appendix B.

Figure 16: Local Screenline

Source: http://maps.ottawa.ca/geoOttawa/ Accessed: May 14, 2024

Table 23: Local Area Screenline Road Capacity

Horizon	Roadway	Classification	Estimated Lane Capacity	Volumes	Percent Utilization
Existing	**Stittsville Main Street**	Arterial	1000 cars/hour	270-440	27-44%
	Shea Road	Collector	800 cars/hour	265-525	33-67%
	Fernbank Road	Arterial	800 cars/hour	255-510	31-64%
	Flewellyn Road	Collector	800 cars/hour	80-190	10-24%
2030 Future Background	**Stittsville Main Street**	Arterial	1000 cars/hour	340-610	34-61%
	Shea Road	Collector	800 cars/hour	490-705	61-89%
	Fernbank Road	Arterial	800 cars/hour	460-890	57-**112%**
	Flewellyn Road	Collector	800 cars/hour	145-330	18-42%
2035 Future Background	**Stittsville Main Street**	Arterial	1000 cars/hour	345-620	34-62%
	Shea Road	Collector	800 cars/hour	510-730	63-92%
	Fernbank Road	Arterial	800 cars/hour	480-890	60-**112%**
	Flewellyn Road	Collector	800 cars/hour	150-330	18-42%
2030 Future Total	**Stittsville Main Street**	Arterial	1000 cars/hour	360-670	36-67%
	Shea Road	Collector	800 cars/hour	505-725	63-91%
	Fernbank Road	Arterial	800 cars/hour	460-890	57-**112%**
	Flewellyn Road	Collector	800 cars/hour	180-410	22-52%
2035 Future Total	**Stittsville Main Street**	Arterial	1000 cars/hour	370-675	37-68%
	Shea Road	Collector	800 cars/hour	525-745	65-94%
	Fernbank Road	Arterial	800 cars/hour	480-890	60-**112%**
	Flewellyn Road	Collector	800 cars/hour	185-410	23-52%

Horizon	Roadway	Classification	Estimated Lane Capacity	Volumes	Percent Utilization
2035 Future Total	**Stittsville Main Street**	Arterial	1000 cars/hour	370-675	37-68%
	Shea Road	Collector	800 cars/hour	525-745	65-94%
	Fernbank Road	Arterial	800 cars/hour	480-890	60-**112%**
	Flewellyn Road	Collector	800 cars/hour	185-410	23-52%

Notes:
Lane Capacity = single lane estimate
Volumes = directional volume range during AM or PM peak hours
Percent Utilization = utilization range based on Volume for lane

Based on the percent utilization, Stittsville Main Street, Shea Road, and Flewellyn Road have the residual capacity in both the background and total conditions, therefore, site traffic can be accommodated from a regional network perspective. Although Shea Road has the residual capacity in both the existing and future conditions, Shea Road is noted to be closer or over 90% of its capacity in the future background and future total conditions.

Fernbank Road, east of Shea Road, is expected to operate 12% over the TRANS capacity during the PM peak hour in the westbound direction in all of the future conditions. Based on the capacity review, no site-generated trips have been assigned to travel via Fernbank Road east of Shea Road. The background constraints on Fernbank Road may require localized improvements by 2030 and should be monitored by the City. Ultimately, the widening of Fernbank Road will address the capacity issue.

13 Intersection Design

13.1 Intersection Control

The new roadway intersection from the subdivision to Shea Road (Street 22 at Shea Road) is proposed as stop-controlled on the minor approach, allowing for full movements. Internal road intersections are recommended to be stop-controlled on the minor approaches.

13.2 Intersection Design

13.2.1 2030 Future Total Intersection Operations

As noted in the 2030 future background conditions, the intersection of Shea Road and Flewellyn Road is recommended to be an all-way stop-controlled intersection, and it will be analyzed as such in the 2035 future background conditions. Other intersections will remain the same as the 2030 future background conditions.

The 2030 future total intersection volumes are illustrated in Figure 17 and the intersection operations are summarized below in Table 24. As noted in the 2030 future background conditions, the intersection of Shea Road and Flewellyn Road is recommended to be an all-way stop-controlled intersection, and it will be analyzed as such in the 2030 future total conditions. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. HCM 2010 methodology was used for unsignalized intersection operations and HCM 6 methodology was used for roundabout intersection operations. The synchro worksheets have been provided in Appendix O.

Figure 17: 2030 Future Total Volumes

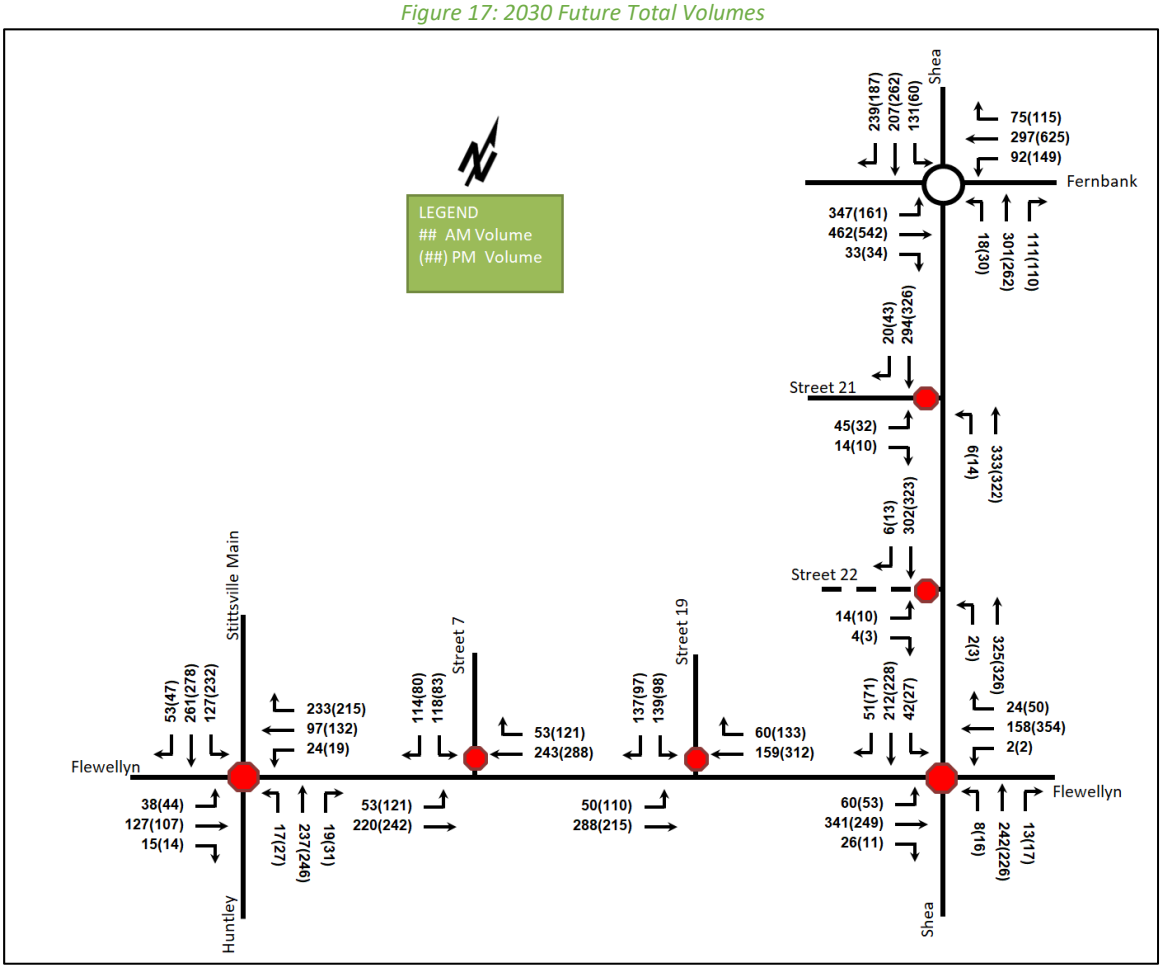


Table 24: 2030 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	EB	E	0.99	40.7	228.3	D	0.93	25.1	139.5
	WB	B	0.70	14.7	40.5	**F**	**1.07**	**86.7**	**417.5**
	NB	D	0.91	33.8	77.4	C	0.70	15.7	36.3
	SB	B	0.67	10.9	43.7	C	0.86	22.7	68.1
	Overall	**C**	**0.99**	**26.8**	**228.3**	**E**	**1.07**	**57.8**	**417.5**
Shea Road at Flewellyn Road *Unsignalized*	EB	D	0.76	26.7	50.3	C	0.64	22.8	33.0
	WB	B	0.35	13.6	12.0	D	0.79	31.4	54.0
	NB	C	0.51	16.8	21.0	C	0.55	19.6	24.0
	SB	C	0.56	17.6	25.5	C	0.66	23.2	35.3
	Overall	**C**	-	**20.1**	-	**C**	-	**24.9**	-
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	B	0.37	14.7	12.8	C	0.38	15.9	12.0
	WB	C	0.64	20.6	33.8	D	0.72	25.4	41.3
	NB	C	0.54	18.4	24.0	C	0.63	21.3	30.0
	SB	D	0.79	31.0	57.8	**F**	**1.04**	**76.9**	**119.3**
	Overall	**C**	-	**22.9**	-	**E**	-	**44.0**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Street 21 ***Unsignalized***	EBL/R	B	0.13	13.8	3.0	B	0.10	14.1	2.3
	NBL/T	A	0.01	7.9	0.0	A	0.01	8.1	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**0.9**	**-**
Shea Road at Street 22 ***Unsignalized***	EBL/R	B	0.04	12.7	0.8	B	0.03	12.9	0.8
	NBL/T	A	0.00	7.9	0.0	A	0.00	8.0	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.4**	**-**	**A**	**-**	**0.3**	**-**
Flewellyn Road at Street 19 ***Unsignalized***	EBL/T	A	0.04	7.8	0.8	A	0.10	8.6	2.3
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.48	16.7	18.8	C	0.47	21.3	18.8
	Overall	**A**	**-**	**6.0**	**-**	**A**	**-**	**5.3**	**-**
Flewellyn Road at Street 7 ***Unsignalized***	EBL/T	A	0.04	8.0	0.8	A	0.11	8.5	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.42	16.3	15.8	C	0.40	19.7	14.3
	Overall	**A**	**-**	**5.3**	**-**	**A**	**-**	**4.5**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

Similar to the 2030 future background conditions, high delays and extended queues are noted on the westbound movement at Shea Road at Fernbank Road during the PM peak hour with delay increase by 11.0 seconds and extend the queues by 36.9 metres. As previously noted, these constrains are a result of background growths and approved development volumes as no site-generated trips have been assigned to Fernbank Road.

With site-generated volumes, high delay has been noted on the southbound movement at Stittsville Main Street / Huntley Road at Flewellyn Road during the PM peak hour. At the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road, the southbound movement during the PM peak hour will increase the delay by 39.2 seconds and queues by 46.5 metres.

Other study area intersections are anticipated to operate well during both the AM and PM peak hours.

The intersection of Flewellyn Road at Street 22 is anticipated to meet all-way stop-control warrants for consideration. Although the warrant will be met, the operations are acceptable as a minor stop-control condition from an operational perspective. All-way stop control warrant calculation sheets are provided in Appendix D.

As noted in the 2030 future background conditions, the southbound left-turn lane at Stittsville Main Street / Huntley Road and Flewellyn Road intersection has met the warrant during both peak hours. The implementation of the left-turn lane is recommended to be explored by the City to mitigate the future conditions, which require a property review and likely acquisition to complete.

The required storage lengths for the potential southbound left-turn lane were calculated using the Geometric Design Guide for Canadian Roads (TAC, 2017) equation 9.14.1. Given the PM peak hour volumes, it is estimated that a 55-metre storage length would be required. To illustrate the effect of the southbound left-turn lane, Table 25 summarizes the 2030 future total operations for the intersection of Stittsville Main Street / Huntley Road and Flewellyn Road with a southbound left-turn lane. The Synchro worksheets are provided in Appendix P.

Table 25: 2030 Future Total - Stittsville Main Street / Huntley Road at Flewellyn Road Operations with SBL Lane

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Stittsville Main Street / Huntley Road at Flewellyn Road ***Unsignalized***	EB	B	0.36	14.0	12.0	B	0.35	14.6	11.3
	WB	C	0.61	18.8	30.8	C	0.67	22.1	37.5
	NB	C	0.53	17.8	23.3	C	0.59	19.8	28.5
	SBL	B	0.26	12.8	7.5	C	0.49	17.5	19.5
	SBT/R	C	0.60	19.3	29.3	C	0.63	21.0	32.3
	Overall	**C**	**-**	**17.4**	**-**	**C**	**-**	**19.7**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The intersection of Stittsville Main Street / Huntley Road at Flewellyn Road is anticipated to operate well with a southbound left-turn lane in the 2030 future total conditions.

13.2.2 2035 Future Total Intersection Operations

As noted in the 2030 future total conditions, the southbound left-turn lane at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road is recommended, and it will be included in the 2035 future total conditions. Other intersections will remain the same as the 2035 future background conditions.

The 2035 future total intersection volumes are illustrated in Figure 18 and the intersection operations are summarized below in Table 26. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. HCM 2010 methodology was used for unsignalized intersection operations and HCM 6 methodology was used for roundabout intersection operations. The synchro worksheets have been provided in Appendix Q.

Figure 18: 2035 Future Total Volumes

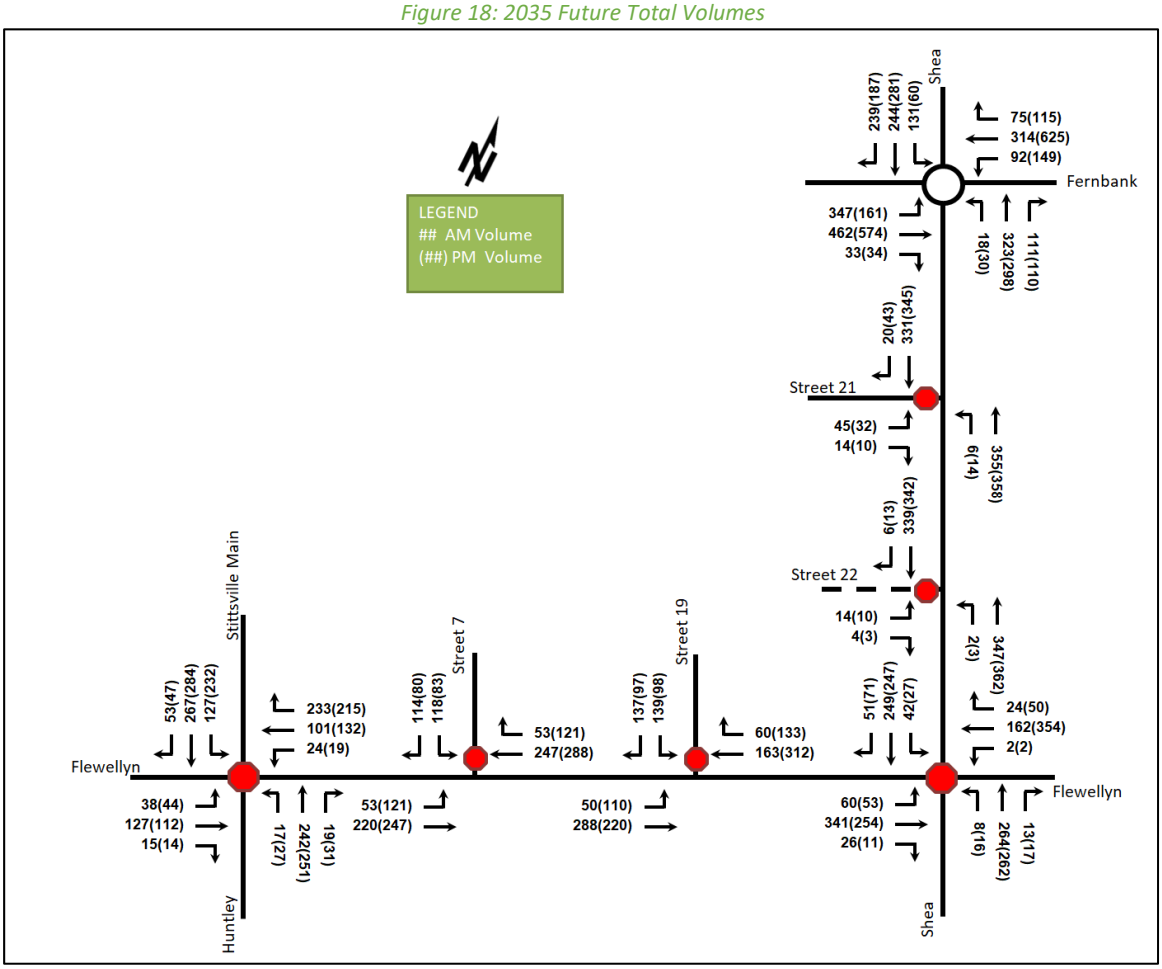


Table 26: 2035 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	EB	**F**	**1.03**	**62.1**	**304.6**	D	0.94	27.9	151.4
	WB	C	0.74	15.9	45.5	**F**	**1.11**	**120.3**	**527.4**
	NB	E	0.93	37.4	90.8	C	0.76	17.6	44.8
	SB	B	0.73	12.2	53.6	C	0.86	22.5	71.4
	Overall	**E**	**1.03**	**35.3**	**304.6**	**F**	**1.11**	**56.4**	**527.4**
Shea Road at Flewellyn Road *Unsignalized*	EB	D	0.80	32.5	58.5	D	0.70	28.0	40.5
	WB	B	0.38	14.9	13.5	E	0.85	40.7	64.5
	NB	C	0.57	19.6	26.3	D	0.66	25.7	35.3
	SB	C	0.65	22.0	35.3	D	0.74	30.2	45.8
	Overall	**C**	-	**24.0**	-	**D**	-	**31.8**	-
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	B	0.36	14.2	12.0	B	0.36	15.0	12.0
	WB	C	0.63	19.5	32.3	C	0.68	22.6	38.3
	NB	C	0.55	18.3	24.0	C	0.61	20.6	30.0
	SBL	B	0.27	12.9	8.3	C	0.50	17.7	20.3
	SBT/R	C	0.61	20.0	30.8	C	0.65	22.0	34.5
	Overall	**C**	-	**17.9**	-	**C**	-	**20.3**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Street 21 ***Unsignalized***	EBL/R	B	0.14	14.6	3.8	B	0.10	14.8	2.3
	NBL/T	A	0.01	8.0	0.0	A	0.01	8.1	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**0.9**	**-**
Shea Road at Street 22 ***Unsignalized***	EBL/R	B	0.04	13.3	0.8	B	0.03	13.5	0.8
	NBL/T	A	0.00	8.0	0.0	A	0.00	8.0	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.3**	**-**	**A**	**-**	**0.3**	**-**
Flewellyn Road at Street 19 ***Unsignalized***	EBL/T	A	0.04	7.8	0.8	A	0.10	8.6	2.3
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.48	16.8	19.5	C	0.48	21.5	18.8
	Overall	**A**	**-**	**6.0**	**-**	**A**	**-**	**5.3**	**-**
Flewellyn Road at Street 7 ***Unsignalized***	EBL/T	A	0.04	8.0	0.8	A	0.11	8.5	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.43	16.4	15.8	C	0.40	19.9	14.3
	Overall	**A**	**-**	**5.3**	**-**	**A**	**-**	**4.5**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

Similar to the 2035 future background conditions, high delays and extended queues are noted at Shea Road at Fernbank Road on the eastbound movement during the AM peak hour and westbound movements during the PM peak hour. The eastbound movement during the AM peak hour delay will increase by 5.4 seconds and extend the queues by 18.2 metres, and the westbound movement during the PM peak hour delay will increase by 12.6 seconds and extend the queues by 40.8 metres. As previously noted, these constrains are a result of background growths and approved development volumes as no site-generated trips have been assigned to Fernbank Road.

Other study area intersections are anticipated to operate well during both the AM and PM peak hours.

13.2.3 Recommended Design Elements

It is recommended that the intersection of Shea Road at Flewellyn Road be realigned by the City to provide a higher order intersection control and the City explore the possible implementation of a southbound left-turn lane at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road.

The context of Shea Road at Flewellyn Road will be evolving as the adjacent lands are developed. The City should explore potential speed limit reductions for more appropriate travel adjacent residential lands and supportive of cycling routes along Flewellyn Road. The speed reductions for Shea Road may be dependent on intersection alignment at Flewellyn Road, and Flewellyn Road reductions may be paired with the interim safety improvements at this intersection.

14 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposed site includes 284 townhomes, 63 single detached homes, and 338 stacked condo units
- A new local roadway is proposed to connect to Shea Road and internally to the adjacent subdivision collector roads

- The anticipated build-out year is 2030 with construction occurring in a single phase

TIA Screening and Exemptions

- The TIA Screening form indicated a full TIA was required due to trip generation and safety triggers
- The exemption review for the TIA did not require parking and neighbourhood traffic calming

Existing Conditions

- Stittsville Main Street, Huntley Road, and Fernbank Road are arterial roads, Shea Road is a collector road in the study area, and Painted Sky Way, Parade Drive, and Hickstead Way are local roads
- Sidewalks are present on Stittsville Main Street north of West Ridge Drive, West Ridge Drive, Upcountry Drive, Baywood Drive, Arrowwood Drive, Brightside Avenue between Fernbank Road and Baywood Drive, Edenwylde Drive, Hartsmere Drive, Hickstead Way, and Parade Drive
- Paved shoulders are present on both sides along Stittsville Main Street south of Etta Street, Huntley Road, Fernbank Road, Shea Road north of Fernbank Road, and on the west side along Stittsville Main Street between Etta Street and Upcountry Drive
- No transit stops are present within 400 metres of the proposed site
- During both the AM and PM peak hours, the study area intersections operate well
- Shea Road at Flewellyn Road meets the all-way stop-control warrant, and the operations are acceptable to remain as a minor stop-control condition
- The Stittsville Main Street / Huntley Road at Flewellyn Road intersection meets the Signal Justification 1, and as it has only met a single justification, it is recommended to remain as all-way stop-control
- Within the study area, the intersections of Flewellyn Road at Shea Road and Fernbank Road at Shea Road are noted to have experienced higher collisions than other locations
- The offset configuration of Flewellyn Road at Shea Road intersection is considered the primary cause of the angled collisions, and the surface conditions and dark conditions are likely to cause the collisions at Fernbank Road at Shea Road intersection
- The City is currently investigating the implementation of pavement markings, flashers and signage to reduce collisions at Flewellyn Road at Shea Road intersection until the additional property is acquired. Any mitigation that may reduce the east-west speeds would be the primary goal, as it would allow extra ability for collision avoidance and reduce the severity should a collision occur

Planned Conditions

- Within the 2023 Transportation Master Plan – Part 1, there is a suggested route from Shea Road, located 640 metres north of Fernbank Road, to the south, and paved shoulders are proposed along Flewellyn Road
- Fernbank Road widening project is within the TMP's Road Network Concept (2013), and it is assumed beyond the study horizons
- Robert Grant Avenue is a 2-lane arterial roadway between Abbott Street and Fernbank Road and is being extended northwards from Abbott Street to Hazeldean Road
- Transit priority measures in the Transportation Master Plan (2013) are identified as a loop along Fernbank Road from the future Fernbank transit station at Robert Grant Avenue to Stittsville Main Street, Hazeldean Road, and back to Robert Grant Avenue

Development Generated Travel Demand

- The proposed development is forecasted to produce 489 two-way people trips during the AM peak hour and 511 two-way people trips during the PM peak hour
- Of the forecasted people trips, 254 two-way trips will be vehicle trips during the AM peak hour and 291 two-way trips will be vehicle trips during the PM peak hour
- Of the forecasted people trips, 114 two-way trips will be transit trips during the AM peak hour and 84 two-way trips will be transit trips during the PM peak hour
- Of the forecasted trips, 80 % are anticipated to travel north, 3 % to the south, 12% to the east, and 5 % to the west

Development Design

- The proposed development is a residential subdivision featuring driveways for each dwelling, garages for typical townhomes, and surface parking for the stacked condo units
- Bicycle parking is assumed to be within the individual units
- The new local road will have a sidewalk on one side
- Transit services are planned for the adjacent subdivision, and the proposed pedestrian facilities within the subdivision will connect to both the planned pedestrian facilities and future transit services within the adjacent subdivision

New Street Networks

- The new local roadway (Street 22) is 18.0 metres wide and with 2.0-metre-wide sidewalk on one side
- The proposed speed limit for the new local roadway will be 30 km/h
- Traffic calming elements are recommended at the internal intersections and on the internal roadways

Boundary Street Design

- Both boundary roads of Shea Road and Flewellyn Road will have a LOS of F for pedestrian and bicycle LOS
- At least 2.0 metres sidewalks and less than 50 km/h of operating speed would be needed to meet the future theoretical PLOS target on Shea Road and Flewellyn Road
- Physically separated cycling facilities or operating speed lower or equal to 40 km/h would be needed to meet the future theoretical BLOS target on Shea Road and Flewellyn Road
- The internal local roads are expected to meet the MMLOS targets

TDM

- Supportive TDM measures to be included within the proposed development should include:
  - Provide a multimodal travel option information package to new residents
  - Provide transit incentives for new residents
  - Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels

Background Conditions

- The background developments were explicitly included in the background conditions, along with background growth applied on study area roadways along the mainline volumes

- During both the AM and PM peak hours, the study area intersections are anticipated to operate well during both peak hours except for the westbound movement at Shea Road at Fernbank Road and the southbound movement at Shea Road at Flewellyn Road intersections during the PM peak hour
- The intersection of Shea Road and Flewellyn Road is recommended to be improved by the City, either increased intersection control or other safety improvements
- High delays and extended queues are noted at the intersection of Shea Road at Fernbank Road in the future background conditions; however, these are a result of background growth and approved development volumes, and no site-generated trips have been assigned to Fernbank Road
- Fernbank Road, east of Shea Road is expected to be over capacity in the future conditions, with residual capacity on the other area roadways to support future development

Transit

- The proposed development is anticipated to generate an additional 114 AM and 84 PM peak hour two-way transit trips
- It is noted that future transit stops are planned within the adjacent subdivision, which will be the primary bus stops for the residents for the proposed subdivision
- In total, a 10-15-minute AM peak hour service level is estimated to be required for the proposed lands to meet the transit demand, and a 20-minute PM peak hour service level
- The subject site is expected to pose a limited impact on Fernbank Road overall, and no further transit priority measures are recommended beyond the City's Ultimate Transit Network

Network Concept

- Stittsville Main Street, Shea Road, Flewellyn Road have the residual capacity in both the background and total conditions based on the percent utilization, therefore, site traffic can be accommodated from a regional network perspective
- Shea Road is noted to be closer or over 90% of its capacity in the future background conditions
- Fernbank Road, east of Shea Road, is expected to operate 12% over the TRANS capacity during the PM peak hour in the westbound direction in all of the future conditions
- No site-generated trips have been assigned to travel via Fernbank Road east of Shea Road based on the capacity review
- The background constraints on Fernbank Road may require localized improvements by 2030 and should be monitored by the City. Ultimately, the widening of Fernbank Road will address the capacity issue

Intersection Design

- The new roadway intersection from the subdivision to Shea Road (Street 22 at Shea Road) is proposed as stop-controlled on the minor approach, allowing for full movements
- Internal road intersections are recommended to be stop-controlled on the minor approaches
- A southbound left-turn lane at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road is recommended in the 2030 future total conditions
- As noted in the future background and total conditions, high delays and extended queues are noted at Shea Road at Fernbank Road on the eastbound movement during the AM peak hour and westbound movements during the PM peak hour, and these constrains are a result of background growths and approved development volumes as no site-generated trips have been assigned to Fernbank Road

- It is recommended that the intersection of Shea Road at Flewellyn Road be realigned by the City to provide a higher order intersection control and the City explore the possible implementation of a southbound left-turn lane at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road
- The City should explore potential speed limit reductions for more appropriate travel adjacent residential lands and supportive of cycling routes along Flewellyn Road. The speed reductions for Shea Road may be dependent on intersection alignment at Flewellyn Road, and Flewellyn Road reductions may be paired with the interim safety improvements at this intersection

15 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:

Yu-Chu Chen
Transportation Engineering-Intern

Reviewed By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

6 Plaza Court
Ottawa, ON K2H 7W1

City of Ottawa 2023 Revisions to 2017 TIA Guidelines
Step 1 - Screening Form

Date: 7-Oct-24
Project Number: 2024-137
Project Reference: Eder Property

1.1 Description of Proposed Development	
Municipal Address	N/A
Description of Location	Part Lot 25, Concession 9 (Goulbourn). Bounded by Shea Road, Flewellyn Road, and the existing community south of Maverick Crescen
Land Use Classification	Rural (RU)
Development Size	A total of 284 townhomes, 63 single detached homes, and 338 stacked condo units
Accesses	A new local roadway is proposed to connect to Shea Road and internally to the adjacent subdivision collector roads
Phase of Development	Single
Buildout Year	2030
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Multi-Family (Low-Rise)	
Development Size	622	Units
Trip Generation Trigger	Yes	

1.3 Location Triggers		
Does the development propose a new driveway to a boundary street that is designated as part of the Transit Priority Network, Rapid Transit network or Cross-Town Bikeways?	No	
Is the development in a Hub, a Protected Major Transit Station Area (PMTSA), or a Design Priority Area (DPA)?	No	
Location Trigger	No	

1.4. Safety Triggers		
Are posted speed limits on a boundary street 80 km/hr or greater?	Yes	
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No	
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	No	
Is the proposed driveway within auxiliary lanes of an intersection?	No	
Does the proposed driveway make use of an existing median break that serves an existing site?	No	
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No	High angle collisions (17) at Flewellyn Road and Shea Road intersection
Does the development include a drive-thru facility?	No	
Safety Trigger	Yes	

Certification Form for TIA Study PM

TIA Plan Reports

On April 14, 2022, the Province's Bill 109 received Royal Assent providing legislative direction to implement the More Homes for Everyone Act, 2022 aiming to increase the supply of a range of housing options to make housing more affordable. Revisions have been made to the TIA guidelines to comply with Bill 109 and streamline the process for applicants and staff.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that they meet the four criteria listed below.

CERTIFICATION

- ☑ I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines; (Update effective July 2023)
- ☑ I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
- ☑ I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
- ☑ I am either a licensed or registered[1] professional in good standing, whose field of expertise
  - ☑ is either transportation engineering
  - ☐ or transportation planning.

[1] License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

City Of Ottawa
Planning, Real Estate and Economic Development
110 Laurier Avenue West, 4th fl.
Ottawa, ON
K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Revision Date: June 2023

Dated at Ottawa (City) this 17 day of August , 20 23 .

Name : Andrew Harte

Professional title: Senior Transportation Engineer / Vice-President Ottawa

Signature of individual certifier that s/he/they meet the above criteria

Office Contact Information (Please Print)
Address: 6 Plaza Court
City / Postal Code: Ottawa, K2H 7W1
Telephone / Extension: 613-697-3797
Email Address: andrew.harte@cghtransportation.com

Stamp

LICENSED PROFESSIONAL ENGINEER
A. J. HARTE
100149314
PROVINCE OF ONTARIO

Revision Date: June 2023

Appendix B

Turning Movement Counts

Transportation Services - Traffic Services

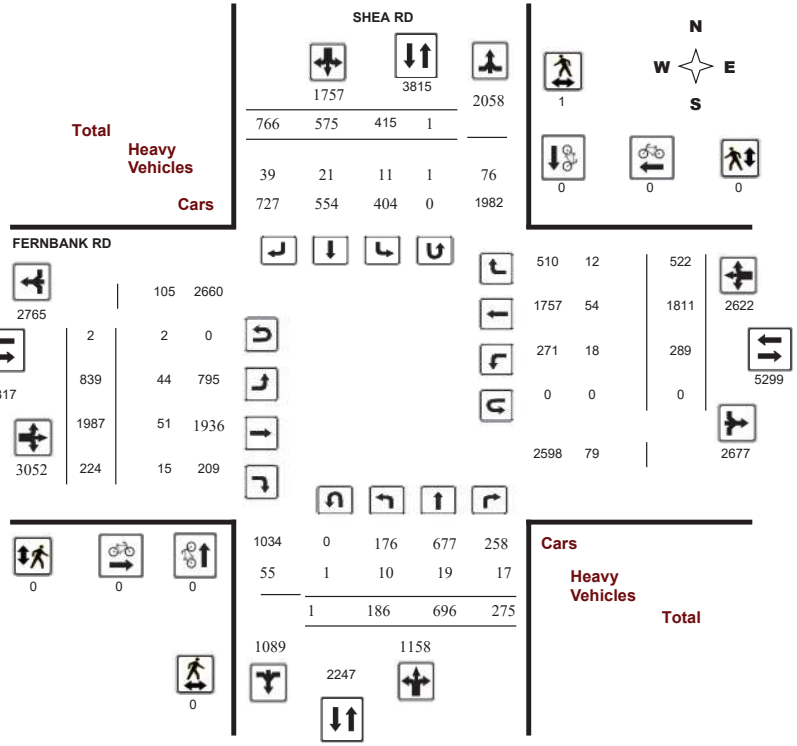
Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

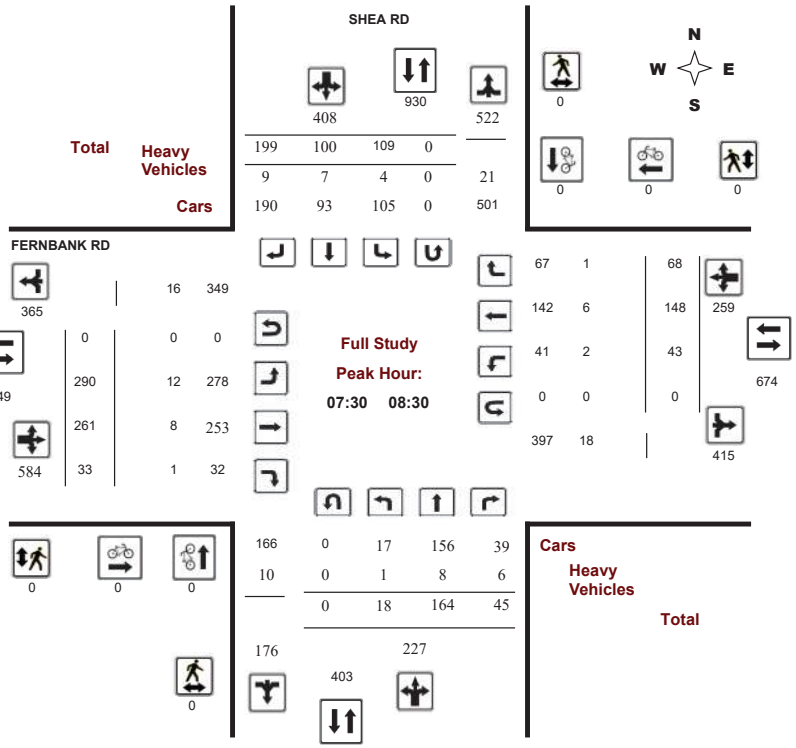
Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



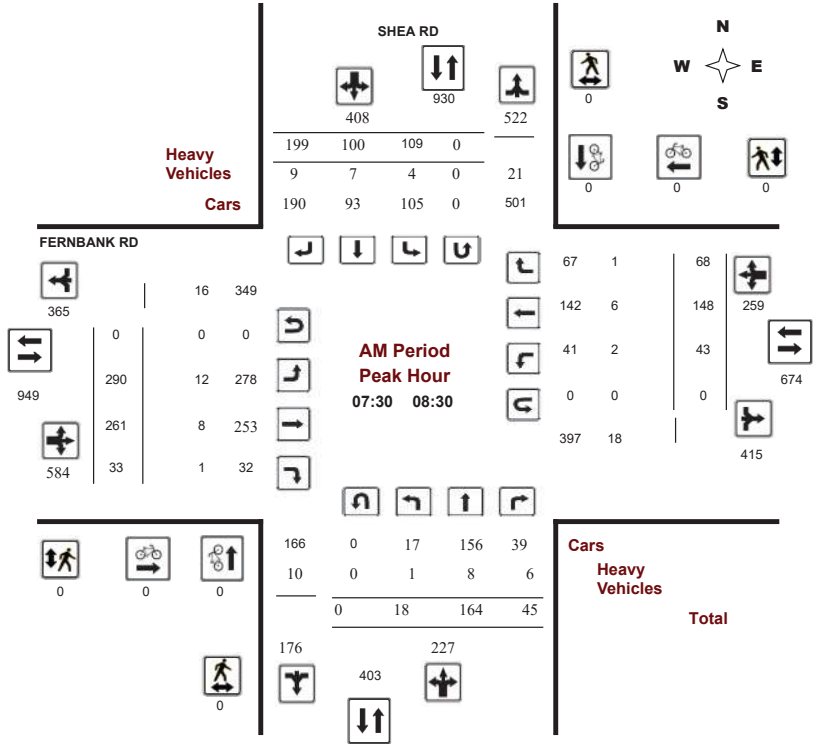
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision



Comments

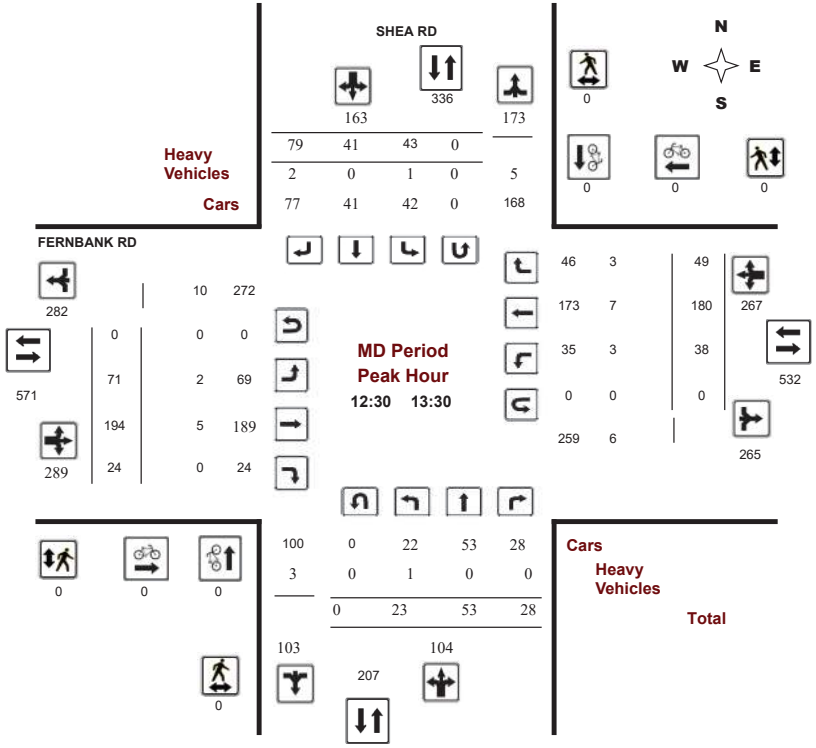
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision



Comments

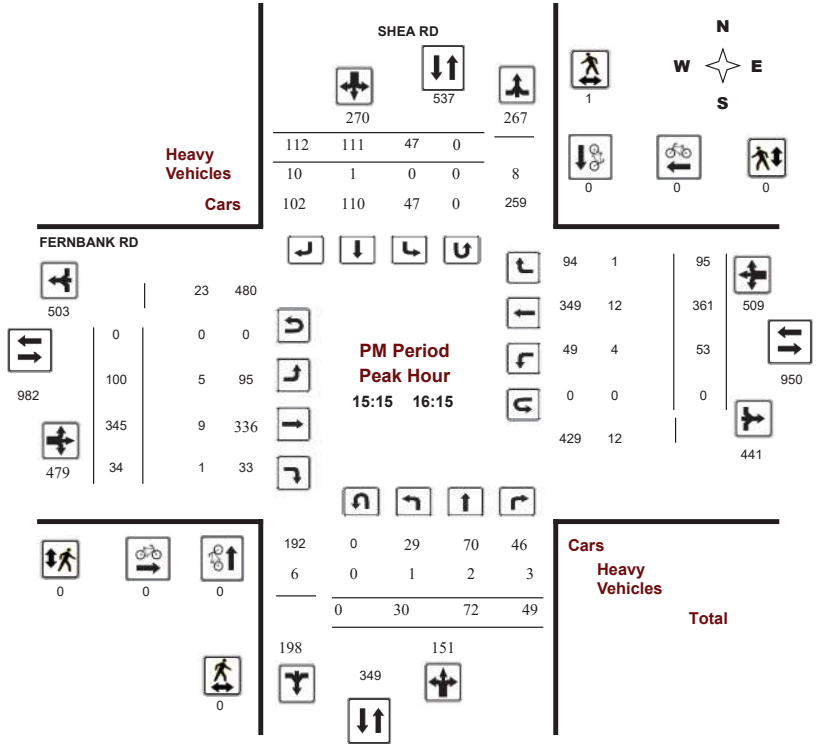
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, March 02, 2022

Total Observed U-Turns

Northbound: 1 Southbound: 1

Eastbound: 2 Westbound: 0

AADT Factor 1.00

	SHEA RD								FERNBANK RD									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	8	158	44	**210**	79	80	102	**261**	**471**	242	221	35	**498**	41	101	60	**202**	**700**	**1171**
08:00 09:00	20	109	39	**168**	68	66	143	**277**	**445**	115	254	25	**394**	26	219	51	**296**	**690**	**1135**
09:00 10:00	29	72	18	**119**	41	57	56	**154**	**273**	77	307	26	**410**	29	216	52	**297**	**707**	**980**
11:30 12:30	23	50	27	**100**	37	51	65	**153**	**253**	47	217	28	**292**	24	186	54	**264**	**556**	**809**
12:30 13:30	23	53	28	**104**	43	41	79	**163**	**267**	71	194	24	**289**	38	180	49	**267**	**556**	**823**
15:00 16:00	22	71	46	**139**	48	107	106	**261**	**400**	97	291	27	**415**	48	342	91	**481**	**896**	**1296**
16:00 17:00	27	102	47	**176**	46	89	109	**244**	**420**	101	272	39	**412**	45	297	83	**425**	**837**	**1257**
17:00 18:00	34	81	26	**141**	53	84	106	**243**	**384**	89	231	20	**340**	38	270	82	**390**	**730**	**1114**
Sub Total	186	696	275	**1157**	415	575	766	**1756**	**2913**	839	1987	224	**3050**	289	1811	522	**2622**	**5672**	**8585**
U Turns				**1**				**1**	**2**				**2**				**0**	**2**	**4**
Total	186	696	275	**1158**	415	575	766	**1757**	**2915**	839	1987	224	**3052**	289	1811	522	**2622**	**5674**	**8589**
EQ 12Hr	259	967	382	**1610**	577	799	1065	**2442**	**4052**	1166	2762	311	**4242**	402	2517	726	**3645**	**7887**	**11939**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	259	967	382	**1610**	577	1047	1395	**2442**	**4052**	1166	2762	311	**4242**	402	2517	726	**3645**	**7887**	**11939**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1.00**					
AVG 24Hr	339	1267	500	**2109**	756	1372	1827	**3199**	**5308**	1527	3618	407	**5557**	527	3297	951	**4775**	**10332**	**15640**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		SHEA RD									FERNBANK RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	1	16	11	28	14	10	4	28	56	10	34	7	51	1	19	7	27	78	134
07:15	07:30	2	29	6	37	0	15	6	21	58	12	65	7	84	8	25	10	43	127	185
07:30	07:45	2	52	13	67	28	24	19	71	138	79	61	12	152	21	28	18	67	219	357
07:45	08:00	3	61	14	78	37	31	73	141	219	141	61	9	211	11	29	25	65	276	495
08:00	08:15	9	23	9	41	30	26	84	140	181	53	63	8	124	7	50	16	73	197	378
08:15	08:30	4	28	9	41	14	19	23	56	97	17	76	4	97	4	41	9	54	151	248
08:30	08:45	1	25	9	35	6	11	19	37	72	16	59	9	84	7	54	14	75	159	231
08:45	09:00	6	33	12	51	18	10	17	45	96	29	56	4	89	8	74	12	94	183	279
09:00	09:15	10	15	6	31	9	18	16	43	74	25	94	10	130	8	99	23	130	260	334
09:15	09:30	3	17	4	24	11	11	10	32	56	20	107	8	135	5	36	12	53	188	244
09:30	09:45	5	20	3	28	9	22	12	43	71	16	60	4	80	8	49	8	65	145	216
09:45	10:00	11	20	5	36	12	6	18	36	72	16	46	4	66	8	32	9	49	115	187
11:30	11:45	3	12	8	23	13	10	14	37	60	9	53	12	74	4	38	9	51	125	185
11:45	12:00	10	15	6	31	10	14	18	42	73	16	65	7	88	6	49	18	73	161	234
12:00	12:15	3	8	5	16	5	10	16	31	47	16	48	7	71	8	39	6	53	124	171
12:15	12:30	7	15	8	30	9	17	17	43	73	6	51	2	59	6	60	21	87	146	219
12:30	12:45	4	15	5	24	5	10	14	29	53	9	54	1	64	12	38	12	62	126	179
12:45	13:00	3	7	9	19	10	10	11	31	50	11	52	10	73	10	57	15	82	155	205
13:00	13:15	11	16	8	35	12	7	16	35	70	21	42	7	70	6	42	12	60	130	200
13:15	13:30	5	15	6	26	16	14	38	68	94	30	46	6	82	10	43	10	63	145	239
15:00	15:15	3	13	9	25	14	30	21	65	90	26	54	5	85	5	58	14	77	162	252
15:15	15:30	6	16	8	30	17	31	29	77	107	18	41	8	67	11	100	20	131	198	305
15:30	15:45	6	23	17	46	5	21	33	59	105	21	68	4	93	17	105	30	152	245	350
15:45	16:00	7	19	12	38	12	25	23	60	98	32	128	10	170	15	79	27	121	291	389
16:00	16:15	11	14	12	37	13	34	27	74	111	29	108	12	149	10	77	18	105	254	365
16:15	16:30	7	23	11	41	10	14	26	50	91	22	64	11	97	12	70	23	105	202	293
16:30	16:45	6	26	14	46	13	25	25	63	109	20	49	8	77	13	72	19	104	181	290
16:45	17:00	3	39	10	52	10	16	31	57	109	30	51	8	89	10	78	23	111	200	309
17:00	17:15	12	21	6	39	17	25	31	73	112	20	62	7	89	12	80	13	105	194	306
17:15	17:30	8	19	7	34	12	27	29	68	102	21	58	3	82	12	85	22	119	201	303
17:30	17:45	8	18	7	34	15	18	27	60	94	21	54	5	80	8	58	16	82	162	256
17:45	18:00	6	23	6	35	9	14	19	42	77	27	57	5	90	6	47	31	84	174	251
Total:		186	696	275	1158	415	575	766	1757	2915	839	1987	224	3052	289	1811	522	2622	5674	8,589

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

		SHEA RD			FERNBANK RD			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		0	0	**0**	0	0	0	0

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

		SHEA RD			FERNBANK RD			
Time Period		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00	07:15	0	0	**0**	0	0	**0**	**0**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	0	0	**0**	0	0	**0**	**0**
08:30	08:45	0	0	**0**	0	0	**0**	**0**
08:45	09:00	0	0	**0**	0	0	**0**	**0**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	0	**0**	0	0	**0**	**0**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	0	**0**	0	0	**0**	**0**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	1	**1**	0	0	**0**	**1**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	0	**0**	0	0	**0**	**0**
16:15	16:30	0	0	**0**	0	0	**0**	**0**
16:30	16:45	0	0	**0**	0	0	**0**	**0**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	0	**0**	0	0	**0**	**0**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
Total	.....	0	1	**1**	0	0	**0**	**1**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		SHEA RD									FERNBANK RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	1	4	**8**	1	0	0	**4**	**12**	1	1	3	**6**	0	1	1	**8**	**14**	**13**
07:15	07:30	0	1	0	**4**	0	2	3	**6**	**10**	0	1	0	**7**	1	3	0	**5**	**12**	**11**
07:30	07:45	0	1	0	**4**	0	2	2	**12**	**16**	7	4	1	**15**	0	1	0	**5**	**20**	**18**
07:45	08:00	0	6	4	**12**	2	2	2	**13**	**25**	1	2	0	**6**	0	1	0	**9**	**15**	**20**
08:00	08:15	0	0	1	**2**	2	0	2	**8**	**10**	3	2	0	**9**	1	2	1	**9**	**18**	**14**
08:15	08:30	1	1	1	**7**	0	3	3	**8**	**15**	1	0	0	**7**	1	2	0	**4**	**11**	**13**
08:30	08:45	0	1	0	**2**	0	1	4	**10**	**12**	1	0	0	**5**	0	0	1	**1**	**6**	**9**
08:45	09:00	0	1	1	**3**	0	0	1	**4**	**7**	1	4	0	**9**	1	3	1	**10**	**19**	**13**
09:00	09:15	2	0	0	**6**	0	2	1	**8**	**14**	4	0	2	**17**	0	6	1	**7**	**24**	**19**
09:15	09:30	0	0	0	**1**	1	1	1	**4**	**5**	1	3	0	**7**	0	2	0	**6**	**13**	**9**
09:30	09:45	0	1	0	**3**	0	2	0	**4**	**7**	1	2	0	**6**	0	3	0	**5**	**11**	**9**
09:45	10:00	0	0	1	**2**	0	0	1	**1**	**3**	0	0	0	**1**	1	0	0	**2**	**3**	**3**
11:30	11:45	0	0	0	**2**	0	0	0	**1**	**3**	1	3	1	**6**	1	1	0	**5**	**11**	**7**
11:45	12:00	3	1	0	**6**	0	0	2	**3**	**9**	0	1	2	**9**	0	1	0	**2**	**11**	**10**
12:00	12:15	1	0	0	**4**	0	0	0	**1**	**5**	1	0	2	**8**	1	4	0	**5**	**13**	**9**
12:15	12:30	1	0	1	**2**	0	0	1	**2**	**4**	0	2	0	**4**	0	0	1	**4**	**8**	**6**
12:30	12:45	0	0	0	**1**	0	0	0	**2**	**3**	1	0	0	**1**	1	0	1	**2**	**3**	**3**
12:45	13:00	0	0	0	**1**	0	0	1	**1**	**2**	0	1	0	**5**	1	3	0	**5**	**10**	**6**
13:00	13:15	1	0	0	**2**	0	0	0	**3**	**5**	1	2	0	**6**	1	2	2	**7**	**13**	**9**
13:15	13:30	0	0	0	**0**	1	0	1	**2**	**2**	0	2	0	**5**	0	2	0	**5**	**10**	**6**
15:00	15:15	0	0	1	**2**	1	1	0	**4**	**6**	2	4	0	**8**	0	2	0	**8**	**16**	**11**
15:15	15:30	0	0	0	**0**	0	0	1	**1**	**1**	0	2	0	**4**	0	1	0	**3**	**7**	**4**
15:30	15:45	0	1	0	**1**	0	0	7	**11**	**12**	3	0	0	**13**	0	3	0	**3**	**16**	**14**
15:45	16:00	0	1	2	**6**	0	0	2	**4**	**10**	0	1	0	**9**	3	6	1	**13**	**22**	**16**
16:00	16:15	1	0	1	**5**	0	1	0	**3**	**8**	2	6	1	**12**	1	2	0	**10**	**22**	**15**
16:15	16:30	0	0	0	**4**	0	1	1	**6**	**10**	3	4	2	**10**	1	0	1	**6**	**16**	**13**
16:30	16:45	0	2	0	**4**	0	1	1	**5**	**9**	1	0	0	**3**	1	1	0	**2**	**5**	**7**
16:45	17:00	0	1	0	**3**	1	0	1	**5**	**8**	2	1	0	**4**	2	0	0	**4**	**8**	**8**
17:00	17:15	0	0	0	**1**	0	0	0	**1**	**2**	1	0	1	**2**	0	0	0	**0**	**2**	**2**
17:15	17:30	0	0	0	**2**	0	2	0	**4**	**6**	2	0	0	**3**	0	1	0	**1**	**4**	**5**
17:30	17:45	0	0	0	**2**	2	0	1	**5**	**7**	1	0	0	**2**	0	0	1	**3**	**5**	**6**
17:45	18:00	0	0	0	**0**	0	0	0	**2**	**2**	2	3	0	**8**	0	1	0	**4**	**12**	**7**
Total:	None	10	19	17	**102**	11	21	39	**148**	**250**	44	51	15	**217**	18	54	12	**163**	**380**	**315**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

Time Period		SHEA RD Northbound U-Turn Total	SHEA RD Southbound U-Turn Total	FERNBANK RD Eastbound U-Turn Total	FERNBANK RD Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	1	0	0	1
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	1	0	1
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	1	0	0	0	1
17:45	18:00	0	0	1	0	1
Total		1	1	2	0	4

Transportation Services - Traffic Services

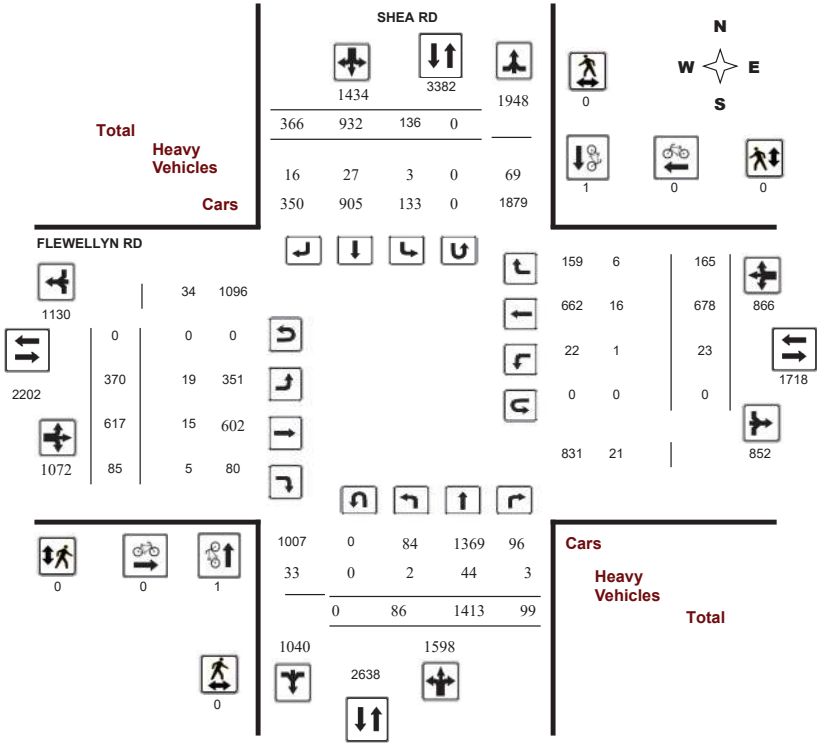
Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

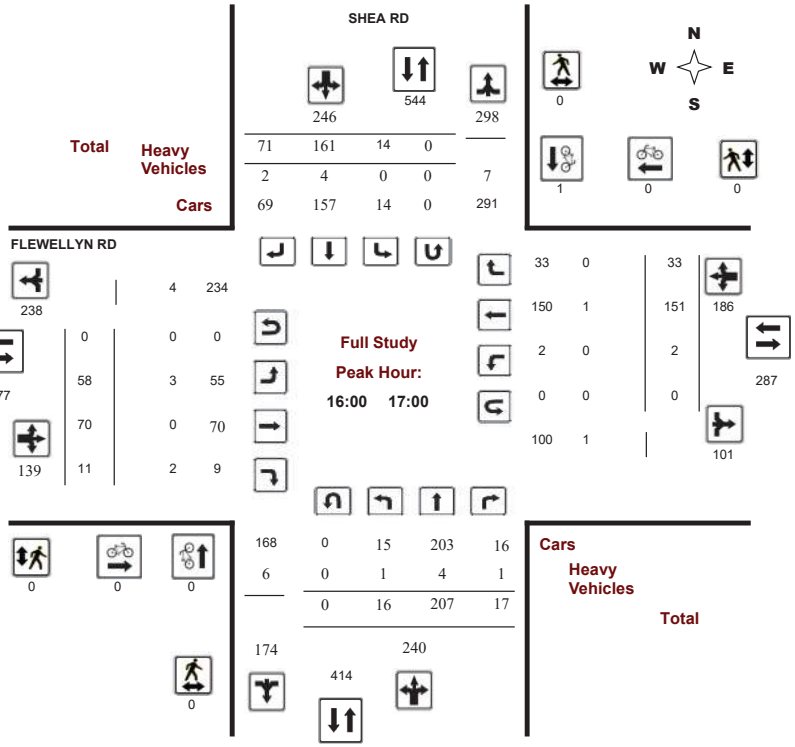
Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



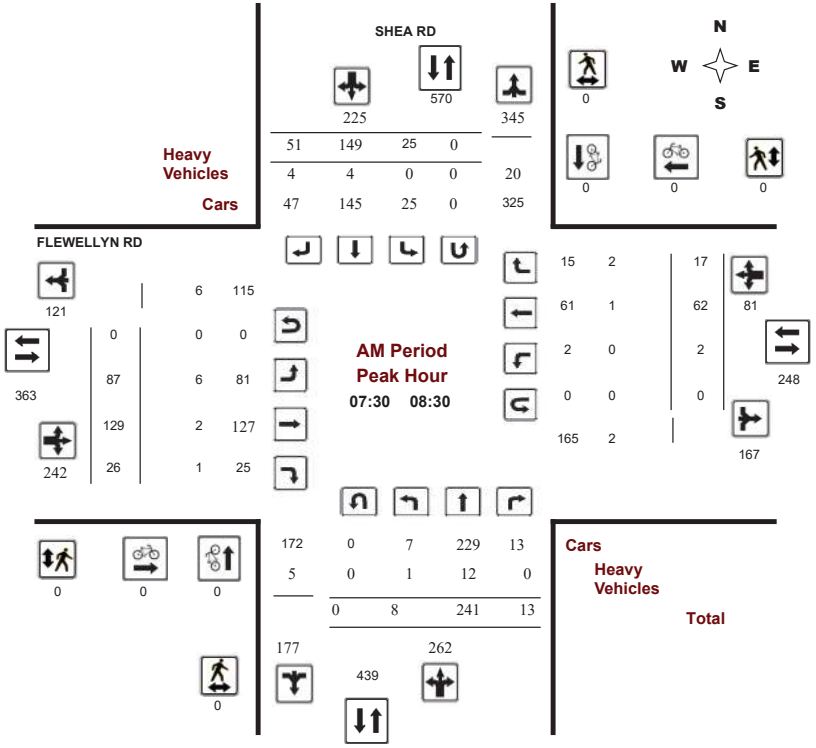
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision



Comments

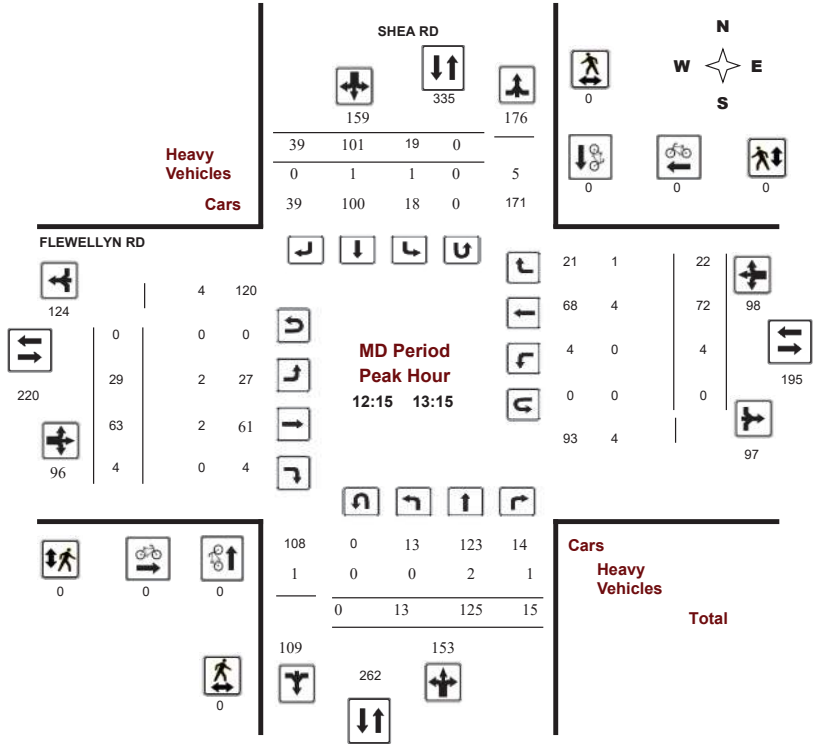
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision



Comments

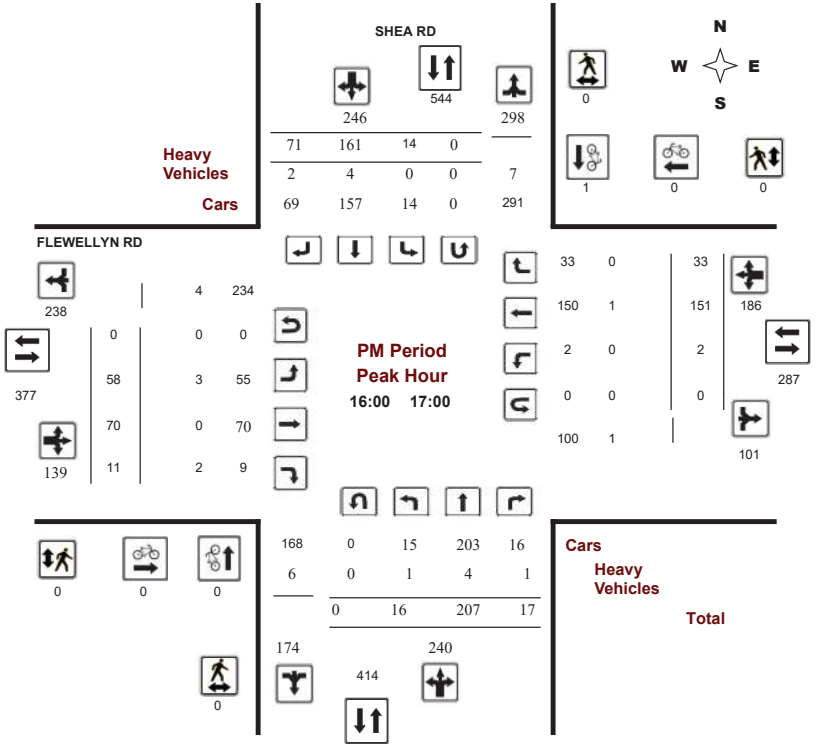
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, April 26, 2023

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

	SHEA RD								FLEWELLYN RD									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	9	214	12	**235**	21	116	42	**179**	**414**	76	118	26	**220**	3	59	17	**79**	**299**	**713**
08:00 09:00	7	206	15	**228**	26	140	47	**213**	**441**	58	100	14	**172**	1	60	16	**77**	**249**	**690**
09:00 10:00	6	179	14	**199**	14	73	30	**117**	**316**	38	89	6	**133**	0	49	17	**66**	**199**	**515**
11:30 12:30	11	123	16	**150**	16	66	25	**107**	**257**	26	54	3	**83**	7	56	16	**79**	**162**	**419**
12:30 13:30	12	121	12	**145**	16	94	39	**149**	**294**	31	52	5	**88**	1	78	22	**101**	**189**	**483**
15:00 16:00	11	185	7	**203**	16	129	60	**205**	**408**	46	64	14	**124**	4	110	12	**126**	**250**	**658**
16:00 17:00	16	207	17	**240**	14	161	71	**246**	**486**	58	70	11	**139**	2	151	33	**186**	**325**	**811**
17:00 18:00	14	178	6	**198**	13	153	52	**218**	**416**	37	70	6	**113**	5	115	32	**152**	**265**	**681**
Sub Total	86	1413	99	**1598**	136	932	366	**1434**	**3032**	370	617	85	**1072**	23	678	165	**866**	**1938**	**4970**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	86	1413	99	**1598**	136	932	366	**1434**	**3032**	370	617	85	**1072**	23	678	165	**866**	**1938**	**4970**
EQ 12Hr	120	1964	138	**2221**	189	1295	509	**1993**	**4214**	514	858	118	**1490**	32	942	229	**1204**	**2694**	**6908**

Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**

AVG 12Hr	108	1768	124	**1999**	170	1527	600	**1794**	**3793**	463	772	106	**1341**	29	848	206	**1084**	**2425**	**6217**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**

AVG 24Hr	141	2316	162	**2619**	223	2000	786	**2350**	**4969**	607	1011	139	**1757**	38	1111	270	**1420**	**3177**	**8144**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		SHEA RD								FLEWELLYN RD									
		Northbound				Southbound				Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	2	30	7	39	4	19	8	31	70	10	25	4	39	1	11	5	17	56	126
07:15	07:30	2	45	1	48	5	29	8	42	90	10	26	7	43	0	16	2	18	61	151
07:30	07:45	2	58	4	64	6	31	9	46	110	23	30	8	61	1	14	4	19	80	190
07:45	08:00	3	81	0	84	6	37	17	60	144	33	37	7	77	1	18	6	25	102	246
08:00	08:15	2	53	6	61	7	42	12	61	122	15	31	6	52	0	13	5	18	70	192
08:15	08:30	1	49	3	53	6	39	13	58	111	16	31	5	52	0	17	2	19	71	182
08:30	08:45	4	45	2	51	6	29	14	49	100	13	22	1	36	0	16	4	20	56	156
08:45	09:00	0	59	4	63	7	30	8	45	108	14	16	2	32	1	14	5	20	52	160
09:00	09:15	1	50	5	56	3	12	9	24	80	14	23	2	39	0	17	5	22	61	141
09:15	09:30	3	50	3	56	2	21	11	34	90	12	21	0	33	0	15	5	20	53	143
09:30	09:45	0	48	3	51	5	20	7	32	83	8	24	2	34	0	12	3	15	49	132
09:45	10:00	2	31	3	36	4	20	3	27	63	4	21	2	27	0	5	4	9	36	99
11:30	11:45	2	32	3	37	2	19	3	24	61	7	14	2	23	1	15	3	19	42	103
11:45	12:00	3	32	3	38	5	18	6	29	67	9	13	0	22	2	14	3	19	41	108
12:00	12:15	2	22	2	26	2	9	8	19	45	5	10	0	15	1	15	5	21	36	81
12:15	12:30	4	37	8	49	7	20	8	35	84	5	17	1	23	3	12	5	20	43	127
12:30	12:45	3	29	1	33	7	25	8	40	73	6	17	2	25	0	23	8	31	56	129
12:45	13:00	1	23	3	27	2	25	13	40	67	10	15	0	25	1	13	5	19	44	111
13:00	13:15	5	36	3	44	3	31	10	44	88	8	14	1	23	0	24	4	28	51	139
13:15	13:30	3	33	5	41	4	13	8	25	66	7	6	2	15	0	18	5	23	38	104
15:00	15:15	4	31	2	37	0	28	8	36	73	19	21	6	46	0	20	2	22	68	141
15:15	15:30	3	47	3	53	8	28	16	52	105	9	15	4	28	2	18	1	21	49	154
15:30	15:45	2	44	1	47	4	38	16	58	105	8	15	0	23	1	37	2	40	63	168
15:45	16:00	2	63	1	66	4	35	20	59	125	10	13	4	27	1	35	7	43	70	195
16:00	16:15	3	46	3	52	4	38	19	61	113	9	16	4	29	0	43	8	51	80	193
16:15	16:30	3	55	2	60	3	56	22	81	141	18	13	2	33	0	32	5	37	70	211
16:30	16:45	4	46	5	55	6	32	11	49	104	12	22	3	37	1	38	10	49	86	190
16:45	17:00	6	60	7	73	1	35	19	55	128	19	19	2	40	1	38	10	49	89	217
17:00	17:15	5	46	0	51	4	36	18	58	109	8	23	4	35	2	32	6	40	75	184
17:15	17:30	2	46	2	50	3	52	7	62	112	14	21	1	36	1	44	12	57	93	205
17:30	17:45	4	39	2	45	3	35	20	58	103	6	11	1	18	1	19	7	27	45	148
17:45	18:00	3	47	2	52	3	30	7	40	92	9	15	0	24	1	20	7	28	52	144
Total:		86	1413	99	1598	136	932	366	1434	3032	370	617	85	1072	23	678	165	866	1938	4,970

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		SHEA RD Northbound	SHEA RD Southbound	SHEA RD Street Total	FLEWELLYN RD Eastbound	FLEWELLYN RD Westbound	FLEWELLYN RD Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	1	0	1	0	0	0	1
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	1	1	0	0	0	1
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		1	1	**2**	0	0	0	2

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

Time Period		SHEA RD NB Approach (E or W Crossing)	SHEA RD SB Approach (E or W Crossing)	SHEA RD Total	FLEWELLYN RD EB Approach (N or S Crossing)	FLEWELLYN RD WB Approach (N or S Crossing)	FLEWELLYN RD Total	Grand Total
07:00	07:15	0	0	**0**	0	0	**0**	**0**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	0	0	**0**	0	0	**0**	**0**
08:30	08:45	0	0	**0**	0	0	**0**	**0**
08:45	09:00	0	0	**0**	0	0	**0**	**0**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	0	**0**	0	0	**0**	**0**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	0	**0**	0	0	**0**	**0**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	0	**0**	0	0	**0**	**0**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	0	**0**	0	0	**0**	**0**
16:15	16:30	0	0	**0**	0	0	**0**	**0**
16:30	16:45	0	0	**0**	0	0	**0**	**0**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	0	**0**	0	0	**0**	**0**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
Total	.....	0	0	**0**	0	0	**0**	**0**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		SHEA RD									FLEWELLYN RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	1	1	**3**	0	1	1	**5**	**8**	2	0	0	**4**	0	1	0	**2**	**6**	**7**
07:15	07:30	0	2	0	**3**	0	1	0	**3**	**6**	0	0	0	**1**	0	1	0	**1**	**2**	**4**
07:30	07:45	0	2	0	**5**	0	3	0	**8**	**13**	3	0	0	**3**	0	0	0	**0**	**3**	**8**
07:45	08:00	0	8	0	**8**	0	0	1	**13**	**21**	3	0	0	**4**	0	0	1	**1**	**5**	**13**
08:00	08:15	1	0	0	**2**	0	0	3	**3**	**5**	0	1	1	**6**	0	0	0	**1**	**7**	**6**
08:15	08:30	0	2	0	**3**	0	1	0	**4**	**7**	0	1	0	**2**	0	1	1	**3**	**5**	**6**
08:30	08:45	0	3	0	**5**	0	2	0	**5**	**10**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
08:45	09:00	0	2	0	**4**	0	2	0	**5**	**9**	1	2	0	**3**	0	0	0	**2**	**5**	**7**
09:00	09:15	0	1	0	**1**	0	0	2	**4**	**5**	1	0	0	**3**	0	0	0	**0**	**3**	**4**
09:15	09:30	0	3	0	**4**	0	1	1	**6**	**10**	1	2	0	**4**	0	0	0	**2**	**6**	**8**
09:30	09:45	0	2	0	**3**	0	1	0	**4**	**7**	0	0	0	**0**	0	0	1	**1**	**1**	**4**
09:45	10:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**1**	0	1	0	**1**	**2**	**1**
11:30	11:45	0	1	0	**2**	1	0	1	**3**	**5**	0	0	1	**5**	0	3	0	**4**	**9**	**7**
11:45	12:00	0	2	0	**3**	0	1	0	**3**	**6**	0	1	0	**1**	0	0	0	**1**	**2**	**4**
12:00	12:15	0	1	0	**1**	0	0	0	**2**	**3**	0	1	0	**1**	0	0	1	**2**	**3**	**3**
12:15	12:30	0	1	1	**2**	1	0	0	**2**	**4**	0	0	0	**0**	0	0	0	**2**	**2**	**3**
12:30	12:45	0	0	0	**0**	0	0	0	**1**	**1**	1	0	0	**4**	0	3	0	**3**	**7**	**4**
12:45	13:00	0	1	0	**2**	0	1	0	**3**	**5**	0	0	0	**1**	0	1	1	**2**	**3**	**4**
13:00	13:15	0	0	0	**0**	0	0	0	**1**	**1**	1	2	0	**3**	0	0	0	**2**	**5**	**3**
13:15	13:30	0	3	0	**4**	0	1	0	**7**	**11**	2	1	0	**3**	0	0	1	**2**	**5**	**8**
15:00	15:15	0	1	0	**2**	0	1	0	**2**	**4**	0	1	0	**1**	0	0	0	**1**	**2**	**3**
15:15	15:30	0	1	0	**4**	0	2	1	**5**	**9**	1	0	1	**3**	0	0	0	**0**	**3**	**6**
15:30	15:45	0	1	0	**1**	1	0	1	**3**	**4**	0	0	0	**2**	0	1	0	**2**	**4**	**4**
15:45	16:00	0	2	0	**3**	0	1	2	**5**	**8**	0	0	0	**4**	0	2	0	**2**	**6**	**7**
16:00	16:15	1	1	0	**4**	0	0	0	**3**	**7**	2	0	2	**5**	0	0	0	**0**	**5**	**6**
16:15	16:30	0	1	0	**3**	0	2	1	**5**	**8**	1	0	0	**3**	0	1	0	**1**	**4**	**6**
16:30	16:45	0	2	0	**4**	0	2	1	**5**	**9**	0	0	0	**1**	0	0	0	**0**	**1**	**5**
16:45	17:00	0	0	1	**1**	0	0	0	**0**	**1**	0	0	0	**0**	0	0	0	**1**	**1**	**1**
17:00	17:15	0	0	0	**0**	0	0	1	**1**	**1**	0	0	0	**1**	0	0	0	**0**	**1**	**1**
17:15	17:30	0	0	0	**5**	0	4	0	**4**	**9**	0	2	0	**2**	1	0	0	**3**	**5**	**7**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**2**	0	1	0	**2**	**4**	**2**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
Total:	None	2	44	3	**82**	3	27	16	**115**	**197**	19	15	5	**73**	1	16	6	**44**	**117**	**157**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		SHEA RD	FLEWELLYN RD			
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

Turning Movement Count
Summary Report Including Peak Hours, AADT and Expansion Factors
All Vehicles Except Bicycles

Flewellyn Road & Huntley Road/Stittsville Main Street — Stittsville, ON

Survey Date: Thursday, August 10, 2023 **Start Time:** 0700 **AADT Factor:** 0.9
Weather AM: Mostly Cloudy 18° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0700-1000, 1130-1330 & 1500-1800
Weather PM: Light/Moderate Rain 18° C **Surveyor(s):** T. Carmody

	Flewellyn Rd.					Flewellyn Rd.						Huntley Rd.					Stittsville Main St.					
	Eastbound					Westbound						Northbound					Southbound					
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	29	72	20	0	121	7	48	16	0	71	192	6	145	7	0	158	52	130	25	0	207	365	557
0800-0900	38	69	15	0	122	7	43	29	0	79	201	17	176	12	0	205	39	188	53	0	280	485	686
0900-1000	36	69	8	0	113	4	38	26	0	68	181	14	170	10	0	194	29	171	37	0	237	431	612
1130-1230	41	46	15	0	102	5	43	32	0	80	182	18	202	16	0	236	31	241	50	0	322	558	740
1230-1330	35	63	13	0	111	5	51	29	0	85	196	13	158	10	0	181	27	212	51	0	290	471	667
1500-1600	28	66	15	0	109	8	63	43	0	114	223	24	195	9	0	228	37	203	55	0	295	523	746
1600-1700	39	50	10	0	99	7	72	66	0	145	244	21	248	12	0	281	31	263	46	0	340	621	865
1700-1800	39	50	19	0	108	6	69	41	0	116	224	13	180	13	0	206	43	200	64	0	307	513	737
Totals	285	485	115	0	885	49	427	282	0	758	1643	126	1474	89	0	1689	289	1608	381	0	2278	3967	5610

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor
Applicable to the Day and Month of the Turning Movement Count
Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 ➡12 expansion factor of 1.39

Equ. 12 Hr	396	674	160	0	1230	68	594	392	0	1054	2284	175	2049	124	0	2348	402	2235	530	0	3166	5514	7798

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9

AADT 12-hr	357	607	144	0	1107	61	534	353	0	948	2055	158	1844	111	0	2113	362	2012	477	0	2850	4963	7018

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 ➡24 expansion factor of 1.31

AADT 24 Hr	467	795	188	0	1450	80	700	462	0	1242	2693	206	2416	146	0	2768	474	2635	624	0	3733	6501	9194

AADT and expansion factors provided by the City of Ottawa

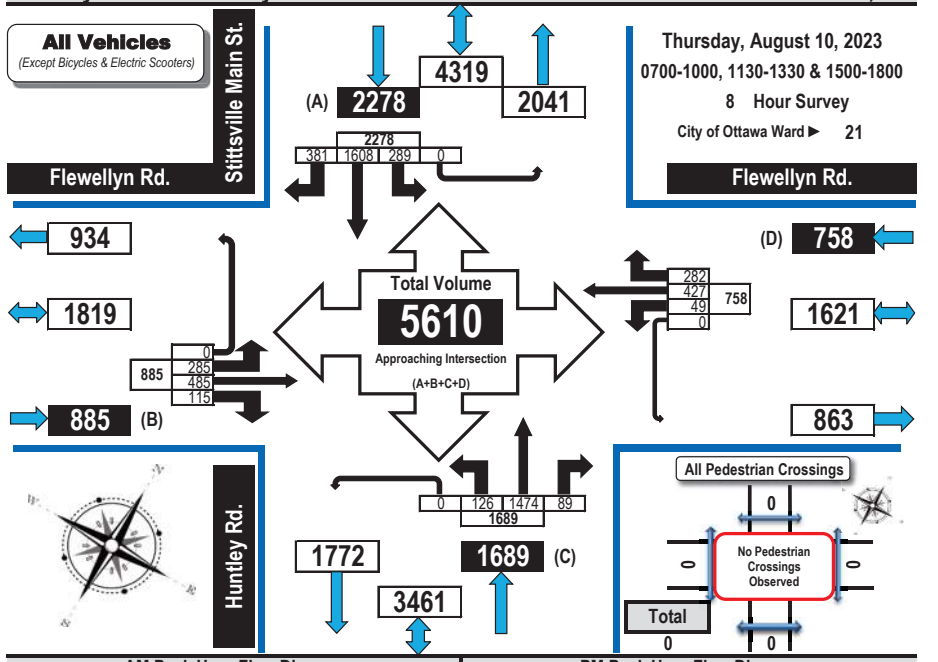
AM Peak Hour Factor ➡ 0.86												Highest Hourly Vehicle Volume Between 0700h & 1000h										
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0800-0900	38	69	15	0	122	7	43	29	0	79	201	17	176	12	0	205	39	188	53	0	280	485	686
OFF Peak Hour Factor ➡ 0.92												Highest Hourly Vehicle Volume Between 1130h & 1330h										
OFF Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1145-1245	39	50	15	0	104	3	42	27	0	72	176	16	201	17	0	234	33	250	51	0	334	568	744
PM Peak Hour Factor ➡ 0.91												Highest Hourly Vehicle Volume Between 1500h & 1800h										
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1545-1645	44	56	14	0	114	6	71	71	0	148	262	27	256	14	0	297	33	255	47	0	335	632	894

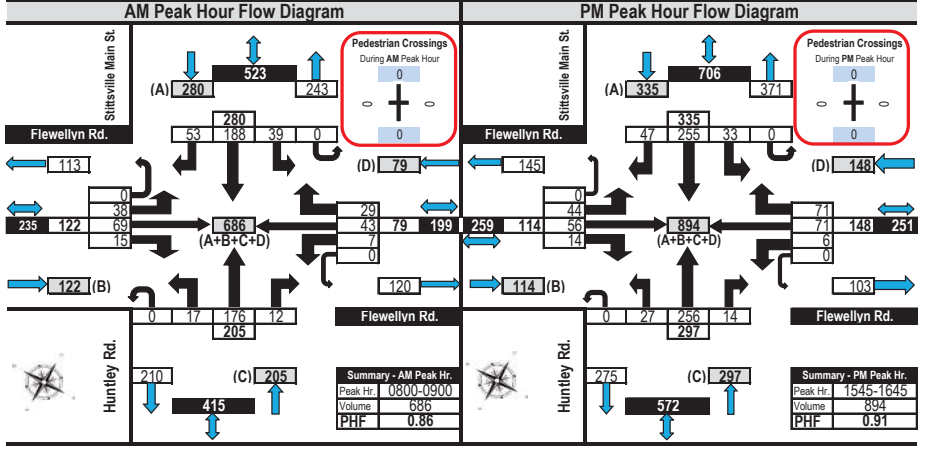
Comments:
OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Notes:
1. Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams
All Vehicles Except Bicycles

Flewellyn Road & Huntley Road/Stittsville Main Street — Stittsville, ON



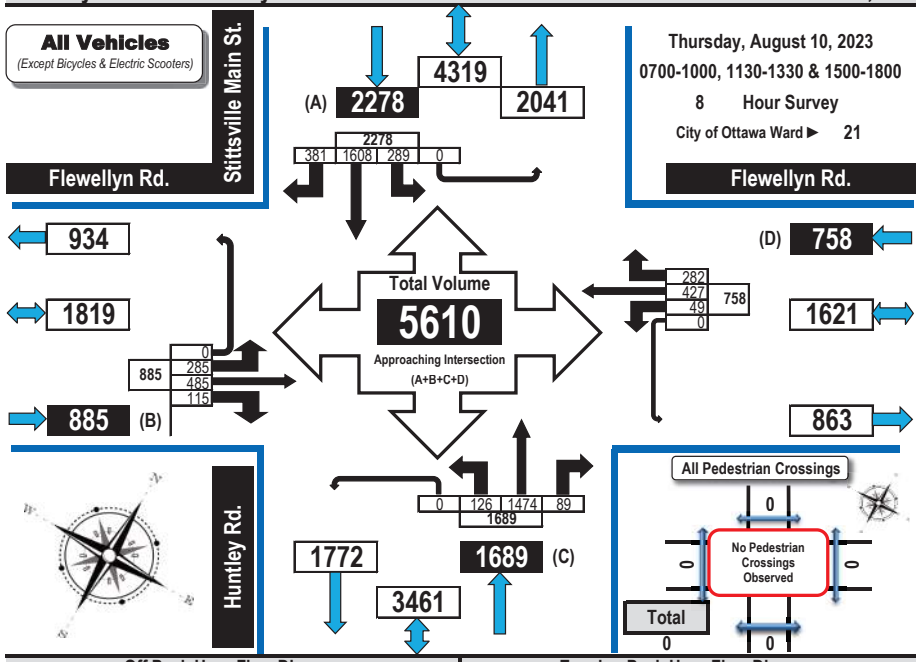


Turning Movement Count
Summary, OFF and EVENING Peak Hour Flow Diagrams
All Vehicles Except Bicycles

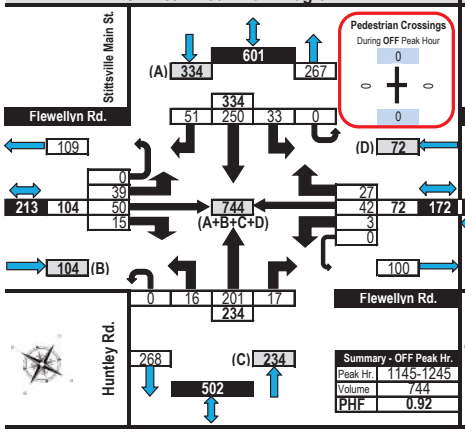
Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**

All Vehicles
(Except Bicycles & Electric Scooters)

Thursday, August 10, 2023
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 21

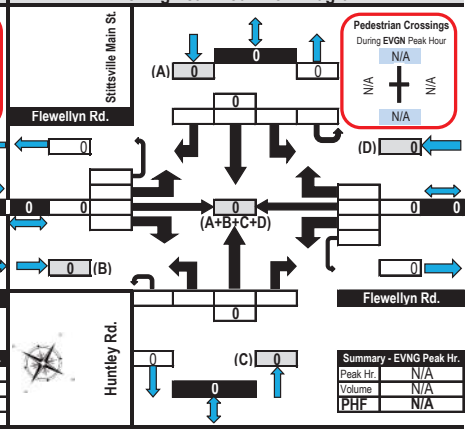


Off Peak Hour Flow Diagram



Summary - OFF Peak Hr.	
Peak Hr.	1145-1245
Volume	744
PHF	0.92

Evening Peak Hour Flow Diagram



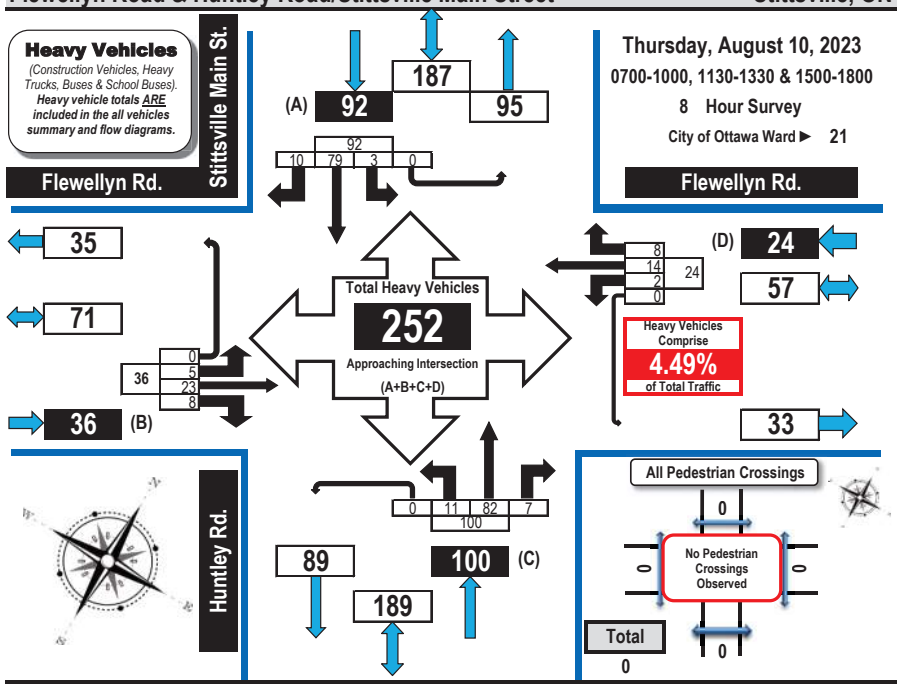
Summary - EVNG Peak Hr.	
Peak Hr.	N/A
Volume	N/A
PHF	N/A

Turning Movement Count
Heavy Vehicle Summary (FHWA Class 4-13)
Flow Diagram

Flewellyn Road & Huntley Road/Stittsville Main St. — **Stittsville, ON**

Heavy Vehicles
(Construction Vehicles, Heavy Trucks, Buses & School Buses).
Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

Thursday, August 10, 2023
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 21

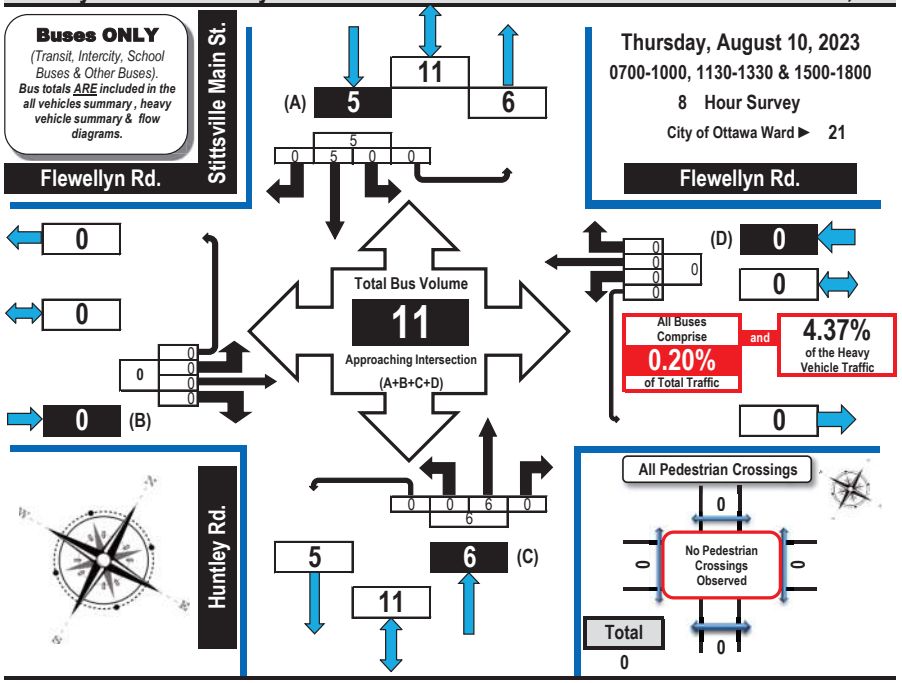


	Flewellyn Rd. Eastbound					Flewellyn Rd. Westbound					Huntley Rd. Northbound					Stittsville Main St. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	3	0	0	3	1	2	1	0	4	2	12	0	0	14	0	6	1	0	7	28
0800-0900	0	3	0	0	3	0	0	1	0	1	3	18	0	0	21	1	10	1	0	12	37
0900-1000	1	7	2	0	10	1	0	1	0	2	0	15	0	0	15	0	10	0	0	10	37
1130-1230	1	2	1	0	4	0	1	3	0	4	2	12	4	0	18	0	19	5	0	24	50
1230-1330	1	3	3	0	7	0	6	1	0	7	1	10	1	0	12	2	15	2	0	19	45
1500-1600	2	4	0	0	6	0	3	0	0	3	2	8	0	0	10	0	11	1	0	12	31
1600-1700	0	1	1	0	2	0	1	1	0	2	1	5	1	0	7	0	5	0	0	5	16
1700-1800	0	0	1	0	1	0	1	0	0	1	0	2	1	0	3	0	3	0	0	3	8
Totals	5	23	8	0	36	2	14	8	0	24	11	82	7	0	100	3	79	10	0	92	252

Comments:
OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Turning Movement Count
All Buses Summary (FHWA Class 4 ONLY)
Flow Diagram

Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**



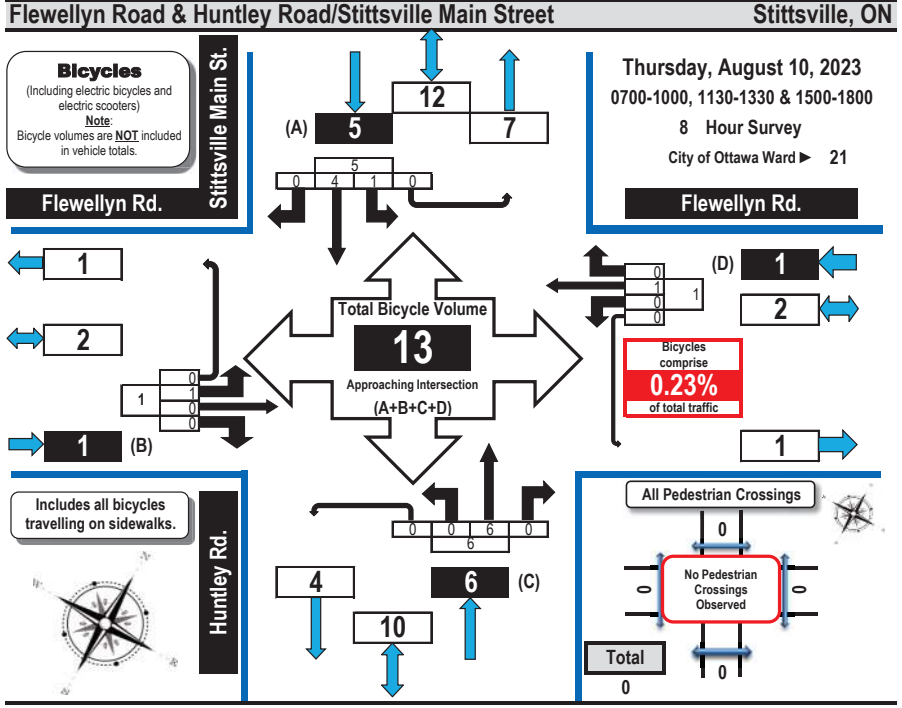
	Flewellyn Rd. Eastbound					Flewellyn Rd. Westbound					Huntley Rd. Northbound					Stittsville Main St. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
0800-0900	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
0900-1000	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
1130-1230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1230-1330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500-1600	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
1600-1700	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
Totals	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	5	0	0	5	11

Comments:

OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Turning Movement Count
Bicycle Summary
Flow Diagram

Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**



	Flewellyn Rd. Eastbound					Flewellyn Rd. Westbound					Huntley Rd. Northbound					Stittsville Main St. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0800-0900	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	3
0900-1000	0	0	0	0	0	0	1	0	0	1	0	3	0	0	3	1	1	0	0	2	6
1130-1230	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
1230-1330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
1500-1600	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	1	0	0	0	1	0	1	0	0	1	0	6	0	0	6	1	4	0	0	5	13

Comments:

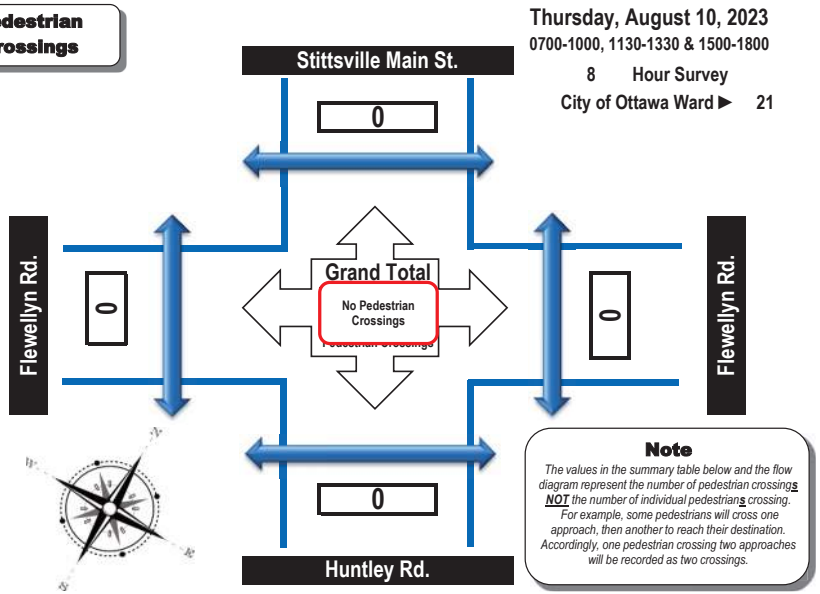
OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Turning Movement Count
Pedestrian Crossings Summary and Flow Diagram

Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**

Pedestrian Crossings

Thursday, August 10, 2023
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ▶ 21



Note
*The values in the summary table below and the flow diagram represent the number of pedestrian crossings **NOT** the number of individual pedestrians crossing. For example, some pedestrians will cross one approach, then another to reach their destination. Accordingly, one pedestrian crossing two approaches will be recorded as two crossings.*

Time Period	West Side Crossing Flewellyn Rd.	East Side Crossing Flewellyn Rd.	Street Total	South Side Crossing Huntley Rd.	North Side Crossing Stittsville Main St.	Street Total	Grand Total
0700-0800	0	0	0	0	0	0	0
0800-0900	0	0	0	0	0	0	0
0900-1000	0	0	0	0	0	0	0
1130-1230	0	0	0	0	0	0	0
1230-1330	0	0	0	0	0	0	0
1500-1600	0	0	0	0	0	0	0
1600-1700	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0
Totals	**0**	**0**	**0**	**0**	**0**	**0**	**0**

No Pedestrian Crossings

Comments:
OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	69	15	7	43	29	17	176	12	39	188	53
Future Vol, veh/h	38	69	15	7	43	29	17	176	12	39	188	53
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	42	77	17	8	48	32	19	196	13	43	209	59
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.8	9.1	10.7	11.1
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	31%	9%	14%
Vol Thru, %	86%	57%	54%	67%
Vol Right, %	6%	12%	37%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	122	79	280
LT Vol	17	38	7	39
Through Vol	176	69	43	188
RT Vol	12	15	29	53
Lane Flow Rate	228	136	88	311
Geometry Grp	1	1	1	1
Degree of Util (X)	0.325	0.205	0.13	0.41
Departure Headway (Hd)	5.142	5.438	5.335	4.74
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	690	664	676	750
Service Time	3.24	3.438	3.34	2.83
HCM Lane V/C Ratio	0.33	0.205	0.13	0.415
HCM Control Delay	10.7	9.8	9.1	11.1
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	1.4	0.8	0.4	2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	261	33	43	148	68	18	164	45	109	100	199
Future Volume (vph)	290	261	33	43	148	68	18	164	45	109	100	199
Satd. Flow (prot)	0	1665	0	0	1642	0	0	1617	0	0	1559	0
Flt Permitted		0.976			0.992			0.996			0.987	
Satd. Flow (perm)	0	1665	0	0	1642	0	0	1617	0	0	1559	0
Lane Group Flow (vph)	0	649	0	0	288	0	0	252	0	0	453	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Control Type: Roundabout	
Intersection Capacity Utilization 99.8%	ICU Level of Service F
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	14.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	87	129	26	2	62	17	8	241	13	25	149	51
Future Vol, veh/h	87	129	26	2	62	17	8	241	13	25	149	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	7	2	4	2	2	12	13	5	2	2	3	8
Mvmt Flow	97	143	29	2	69	19	9	268	14	28	166	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	88	0	0	172	0	0	546	444	158	576	449	79
Stage 1	-	-	-	-	-	-	352	352	-	83	83	-
Stage 2	-	-	-	-	-	-	194	92	-	493	366	-
Critical Hdwy	4.17	-	-	4.12	-	-	7.23	6.55	6.22	7.12	6.53	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.617	4.045	3.318	3.518	4.027	3.372
Pot Cap-1 Maneuver	1477	-	-	1405	-	-	432	504	887	428	504	965
Stage 1	-	-	-	-	-	-	643	626	-	925	824	-
Stage 2	-	-	-	-	-	-	783	813	-	558	621	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1477	-	-	1405	-	-	279	467	887	218	467	965
Mov Cap-2 Maneuver	-	-	-	-	-	-	279	467	-	218	467	-
Stage 1	-	-	-	-	-	-	596	580	-	857	823	-
Stage 2	-	-	-	-	-	-	588	812	-	274	576	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	0.2	24.5	21.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	468	1477	-	-	1405	-	-	462
HCM Lane V/C Ratio	0.622	0.065	-	-	0.002	-	-	0.541
HCM Control Delay (s)	24.5	7.6	0	-	7.6	0	-	21.6
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	4.2	0.2	-	-	0	-	-	3.2

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	20	6.0	20	6.0	0.423	15.4	LOS C	2.0	15.1	0.73	0.83	0.88	49.5
2	T1	All MCs	182	5.0	182	5.0	0.423	10.2	LOS B	2.0	15.1	0.73	0.83	0.88	50.4
3	R2	All MCs	50	13.0	50	13.0	0.423	10.8	LOS B	2.0	15.1	0.73	0.83	0.88	49.8
Approach			252	6.7	252	6.7	0.423	10.8	LOS B	2.0	15.1	0.73	0.83	0.88	50.2
East: Fernbank															
4	L2	All MCs	48	5.0	48	5.0	0.373	12.7	LOS B	1.8	13.2	0.66	0.71	0.68	50.9
5	T1	All MCs	164	4.0	164	4.0	0.373	7.6	LOS A	1.8	13.2	0.66	0.71	0.68	51.9
6	R2	All MCs	76	2.0	76	2.0	0.373	7.3	LOS A	1.8	13.2	0.66	0.71	0.68	51.6
Approach			288	3.6	288	3.6	0.373	8.4	LOS A	1.8	13.2	0.66	0.71	0.68	51.7
North: Shea															
7	L2	All MCs	121	4.0	121	4.0	0.435	10.6	LOS B	2.6	18.8	0.53	0.57	0.53	51.7
8	T1	All MCs	111	7.0	111	7.0	0.435	5.6	LOS A	2.6	18.8	0.53	0.57	0.53	52.6
9	R2	All MCs	221	5.0	221	5.0	0.435	5.4	LOS A	2.6	18.8	0.53	0.57	0.53	52.2
Approach			453	5.2	453	5.2	0.435	6.9	LOS A	2.6	18.8	0.53	0.57	0.53	52.2
West: Fernbank															
10	L2	All MCs	322	4.0	322	4.0	0.647	12.8	LOS B	5.9	42.7	0.75	0.68	0.86	49.7
11	T1	All MCs	290	3.0	290	3.0	0.647	7.6	LOS A	5.9	42.7	0.75	0.68	0.86	50.6
12	R2	All MCs	37	3.0	37	3.0	0.647	7.5	LOS A	5.9	42.7	0.75	0.68	0.86	50.3
Approach			649	3.5	649	3.5	0.647	10.2	LOS B	5.9	42.7	0.75	0.68	0.86	50.2
All Vehicles			1642	4.5	1642	4.5	0.647	9.0	LOS A	5.9	42.7	0.67	0.68	0.74	51.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	13.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	56	14	6	71	71	27	256	14	33	255	47
Future Vol, veh/h	44	56	14	6	71	71	27	256	14	33	255	47
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	49	62	16	7	79	79	30	284	16	37	283	52
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.9	10.9	13.7	14.5
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	39%	4%	10%
Vol Thru, %	86%	49%	48%	76%
Vol Right, %	5%	12%	48%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	297	114	148	335
LT Vol	27	44	6	33
Through Vol	256	56	71	255
RT Vol	14	14	71	47
Lane Flow Rate	330	127	164	372
Geometry Grp	1	1	1	1
Degree of Util (X)	0.495	0.215	0.263	0.544
Departure Headway (Hd)	5.401	6.124	5.765	5.259
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	667	583	620	685
Service Time	3.453	4.195	3.832	3.309
HCM Lane V/C Ratio	0.495	0.218	0.265	0.543
HCM Control Delay	13.7	10.9	10.9	14.5
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.8	0.8	1.1	3.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	345	34	53	361	95	30	72	49	47	111	112
Future Volume (vph)	100	345	34	53	361	95	30	72	49	47	111	112
Satd. Flow (prot)	0	1687	0	0	1671	0	0	1620	0	0	1587	0
Flt Permitted		0.990			0.995			0.990			0.991	
Satd. Flow (perm)	0	1687	0	0	1671	0	0	1620	0	0	1587	0
Lane Group Flow (vph)	0	532	0	0	566	0	0	167	0	0	299	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Control Type: Roundabout	
Intersection Capacity Utilization 74.6%	ICU Level of Service D
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	12.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	58	70	11	2	151	33	16	207	17	14	161	71
Future Vol, veh/h	58	70	11	2	151	33	16	207	17	14	161	71
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	5	2	18	2	2	2	6	2	6	2	2	3
Mvmt Flow	64	78	12	2	168	37	18	230	19	16	179	79

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	205	0	0	90	0	0	532	421	84	528	409	187
Stage 1	-	-	-	-	-	-	212	212	-	191	191	-
Stage 2	-	-	-	-	-	-	320	209	-	337	218	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.16	6.52	6.26	7.12	6.52	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.554	4.018	3.354	3.518	4.018	3.327
Pot Cap-1 Maneuver	1349	-	-	1505	-	-	452	524	964	461	532	852
Stage 1	-	-	-	-	-	-	781	727	-	811	742	-
Stage 2	-	-	-	-	-	-	683	729	-	677	723	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1349	-	-	1505	-	-	286	497	964	278	504	852
Mov Cap-2 Maneuver	-	-	-	-	-	-	286	497	-	278	504	-
Stage 1	-	-	-	-	-	-	742	691	-	770	741	-
Stage 2	-	-	-	-	-	-	469	728	-	421	687	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.3	0.1	20.8	18.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	490	1349	-	-	1505	-	-	543
HCM Lane V/C Ratio	0.544	0.048	-	-	0.001	-	-	0.503
HCM Control Delay (s)	20.8	7.8	0	-	7.4	0	-	18.2
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	3.2	0.1	-	-	0	-	-	2.8

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	33	3.0	33	3.0	0.223	12.2	LOS B	0.9	6.8	0.60	0.69	0.60	51.2
2	T1	All MCs	80	3.0	80	3.0	0.223	7.1	LOS A	0.9	6.8	0.60	0.69	0.60	52.1
3	R2	All MCs	54	6.0	54	6.0	0.223	7.1	LOS A	0.9	6.8	0.60	0.69	0.60	51.7
Approach			168	4.0	168	4.0	0.223	8.1	LOS A	0.9	6.8	0.60	0.69	0.60	51.8
East: Fernbank															
4	L2	All MCs	59	8.0	59	8.0	0.530	10.9	LOS B	3.6	26.0	0.59	0.54	0.59	51.5
5	T1	All MCs	401	3.0	401	3.0	0.530	5.7	LOS A	3.6	26.0	0.59	0.54	0.59	52.6
6	R2	All MCs	106	2.0	106	2.0	0.530	5.5	LOS A	3.6	26.0	0.59	0.54	0.59	52.3
Approach			566	3.3	566	3.3	0.530	6.2	LOS A	3.6	26.0	0.59	0.54	0.59	52.4
North: Shea															
7	L2	All MCs	52	2.0	52	2.0	0.380	12.3	LOS B	1.9	13.7	0.65	0.70	0.67	51.1
8	T1	All MCs	123	2.0	123	2.0	0.380	7.2	LOS A	1.9	13.7	0.65	0.70	0.67	52.0
9	R2	All MCs	124	9.0	124	9.0	0.380	7.5	LOS A	1.9	13.7	0.65	0.70	0.67	51.5
Approach			300	4.9	300	4.9	0.380	8.2	LOS A	1.9	13.7	0.65	0.70	0.67	51.6
West: Fernbank															
10	L2	All MCs	111	5.0	111	5.0	0.504	10.8	LOS B	3.3	23.7	0.58	0.55	0.58	51.3
11	T1	All MCs	383	3.0	383	3.0	0.504	5.7	LOS A	3.3	23.7	0.58	0.55	0.58	52.3
12	R2	All MCs	38	3.0	38	3.0	0.504	5.5	LOS A	3.3	23.7	0.58	0.55	0.58	52.0
Approach			532	3.4	532	3.4	0.504	6.7	LOS A	3.3	23.7	0.58	0.55	0.58	52.1
All Vehicles			1566	3.7	1566	3.7	0.530	7.0	LOS A	3.6	26.0	0.60	0.59	0.60	52.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix D

All-Way Stop-Control Warrant Calculation

CGH TRANSPORTATION

Warrant for AWSC at Shea Road at Flewellyn Road (Existing)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
3032	1938	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	YES	YES

Warrant for AWSC at Fewlellyn Road at Street#7 (FB2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
3401	1169	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	YES	NO

Warrant for AWSC at Fewlellyn Road at Street#7 (FB2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
3428	1169	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	YES	NO

Warrant for AWSC at Fewlellyn Road at Street#19 (FB2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
3419	616	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Fewlellyn Road at Street#19 (FB2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
3446	616	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Fewlellyn Road at Street#19 (FT2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4005	1394	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	YES	NO

Warrant for AWSC at Fewlellyn Road at Street#19 (FT2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4033	1394	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	YES	NO

Warrant for AWSC at Shea Road at Street#21 (FB2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4082	281	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Street#21 (FB2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4436	281	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Street#21 (FT2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4242	312	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Street#21 (FT2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4596	312	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Street#22 (FT2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4057	96	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Street#22 (FT2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4411	96	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Appendix E

Signal Warrant Calculation

CGH TRANSPORTATION

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Flewellyn Road & Huntley Road/Stittsville Main Street

What is the direction of the Main Road street? North-South

When was the data collected? 2023-08-10

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Rural **Population < 10,000 AND Speed >= 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	6	145	7	29	72	20	52	130	25	7	48	16	0
8:00	17	176	12	38	69	15	39	188	53	7	43	29	0
9:00	14	170	10	36	69	8	29	171	37	4	38	26	0
10:00	18	202	16	41	46	15	31	241	50	5	43	32	0
15:00	13	158	10	35	63	13	27	212	51	5	51	29	0
16:00	24	195	9	28	66	15	37	203	55	8	63	43	0
17:00	21	248	12	39	50	10	31	263	46	7	72	66	0
18:00	13	180	13	39	50	19	43	200	64	6	69	41	0
Total	**126**	**1,474**	**89**	**285**	**485**	**115**	**289**	**1,608**	**381**	**49**	**427**	**282**	**0**

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Flewellyn Road & Huntley Road/Stittsville Main Street Count Date: 2023-08-10

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
1A	480	720	600	900	557	686	612	740	667	746	865	737		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	120	170	120	170	192	201	181	182	196	223	244	224		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100

Free Flow
Signal Justification 1:

Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☑ No ☐

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☑ No ☐

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
2A	480	720	600	900	365	485	431	558	471	523	621	513		
	COMPLIANCE %				76	100	90	100	98	100	100	100	764	95
2B	50	75	50	75	108	114	109	92	103	102	118	114		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100

Free Flow
Signal Justification 2:

Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☑ No ☐

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Flewellyn Road & Huntley Road/Stittsville Main Stree | Count Date: 2023-08-10

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	100	%	☑	☐
	B	Crossing Volume	100	%		
2. Delay to Cross Traffic	A	Main Road	95	%	☐	☑
	B	Crossing Road	100	%		

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Flewellyn Road & Shea Road

What is the direction of the Main Road street? North-South

When was the data collected? 2023-04-26

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Rural **Population < 10,000 AND Speed >= 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	9	214	12	76	118	26	21	116	42	3	59	17	0
8:00	7	206	15	58	100	14	26	140	47	1	60	16	0
9:00	6	179	14	38	89	6	14	73	30	0	49	17	0
10:00	11	123	16	26	54	3	16	66	25	7	56	16	0
15:00	12	121	12	31	52	5	16	94	39	1	78	22	0
16:00	11	185	7	46	64	14	16	129	60	4	110	12	0
17:00	16	207	17	58	70	11	14	161	71	2	151	33	0
18:00	14	178	6	37	70	6	13	153	52	5	115	32	0
Total	**86**	**1,413**	**99**	**370**	**617**	**85**	**136**	**932**	**366**	**23**	**678**	**165**	**0**

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Flewellyn Road & Shea Road

Count Date: 2023-04-26

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
1A	480	720	600	900	713	690	515	419	483	658	811	681		
	COMPLIANCE %				100	100	100	87	100	100	100	100	787	98
1B	120	170	120	170	299	249	199	162	189	250	325	265		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100

Free Flow

Signal Justification 1:

Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☑ No ☐

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
2A	480	720	600	900	414	441	316	257	294	408	486	416		
	COMPLIANCE %				86	92	66	54	61	85	100	87	630	79
2B	50	75	50	75	197	159	127	89	110	160	211	157		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100

Free Flow

Signal Justification 2:

Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Flewellyn Road & Shea Road

Count Date: 2023-04-26

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	98	%	☐	☑
	B	Crossing Volume	100	%		
2. Delay to Cross Traffic	A	Main Road	79	%	☐	☑
	B	Crossing Road	100	%		

Shea Road at Flewellyn Road
FB 2030

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	557	77%	77%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	271	159%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	286	40%	40%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	144	191%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Stittsville Main Street/ Huntley Road at Flewellyn Road
FB 2030

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	602	84%	84%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	231	136%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	371	51%	51%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	85	113%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Shea Road at Flewellyn Road
FB 2035

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	588	82%	82%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	273	161%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	315	44%	44%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	145	193%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Stittsville Main Street/ Huntley Road at Flewellyn Road
FB 2035

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	609	85%	85%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	233	137%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	376	52%	52%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	86	114%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Shea Road at Flewellyn Road
FT 2030

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	621	86%	86%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	333	196%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	288	40%	40%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	177	236%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Stittsville Main Street/ Huntley Road at Flewellyn Road
FT 2030

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	660	92%	92%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	266	157%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	394	55%	55%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	90	120%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Shea Road at Flewellyn Road
FT 2035

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	652	90%	90%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	335	197%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	317	44%	44%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	178	237%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Stittsville Main Street/ Huntley Road at Flewellyn Road
FT 2035

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	668	93%	93%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	269	158%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	399	55%	55%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	91	121%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Appendix F

Left-Turn Warrant Calculation

Shea Road at Flewellyn Road

Existing

Design Speed: Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	87	129	26	2	62	17	8	241	13	25	149	51	36.0%	242	81
PM	58	70	11	2	151	33	16	207	17	14	161	71	41.7%	139	186

Future Background 2030

Design Speed: Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	263	26	2	124	22	8	242	13	37	212	51	17.2%	349	148
PM	53	194	11	2	281	45	16	226	17	23	228	71	20.5%	258	328

Future Background 2035

Design Speed: Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	263	26	2	128	22	8	264	13	37	249	51	17.2%	349	152
PM	53	199	11	2	281	45	16	262	17	23	247	71	20.2%	263	328

Future Total 2030

Design Speed: Yes

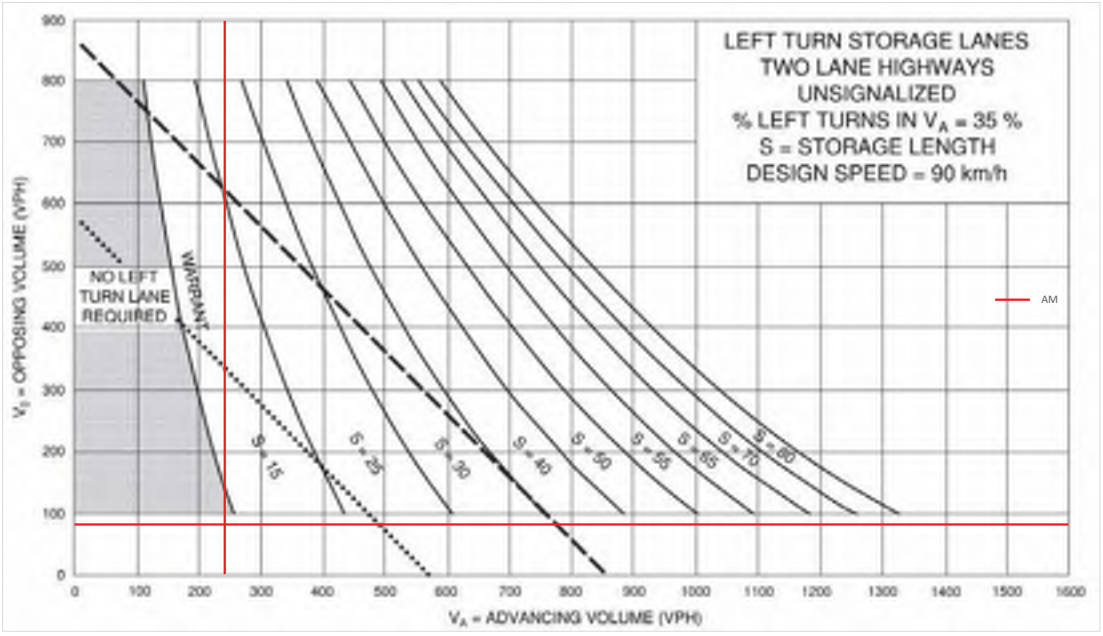
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	341	26	2	158	24	8	242	13	42	212	51	14.1%	427	184
PM	53	249	11	2	354	50	16	226	17	27	228	71	16.9%	313	406

Future Total 2035

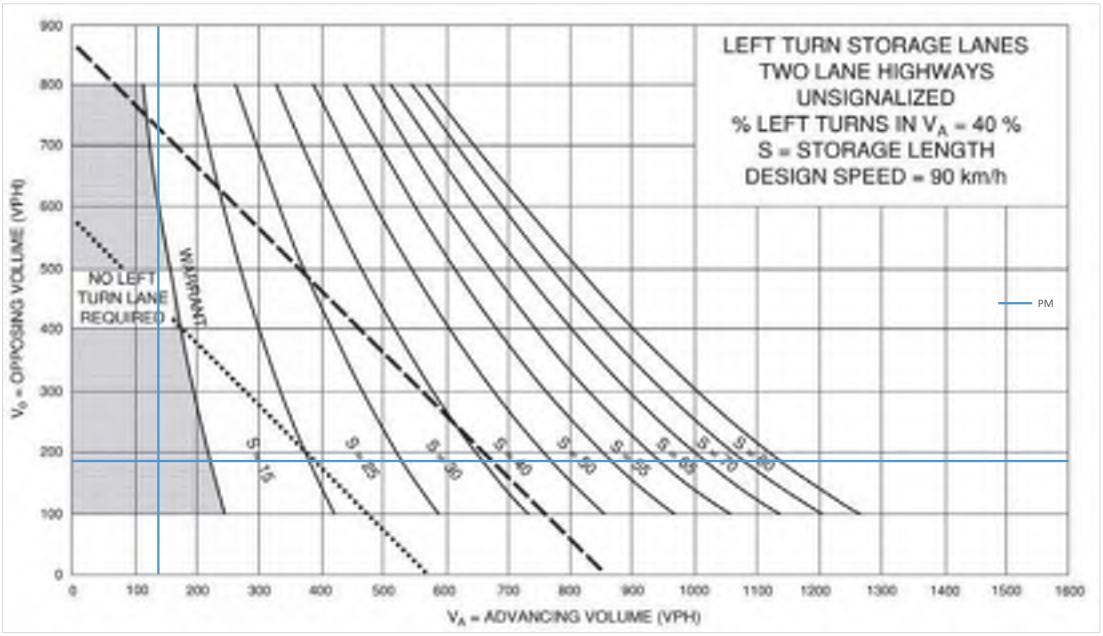
Design Speed: Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	341	26	2	162	24	8	264	13	42	249	51	14.1%	427	188
PM	53	254	11	2	354	50	16	262	17	27	247	71	16.7%	318	406

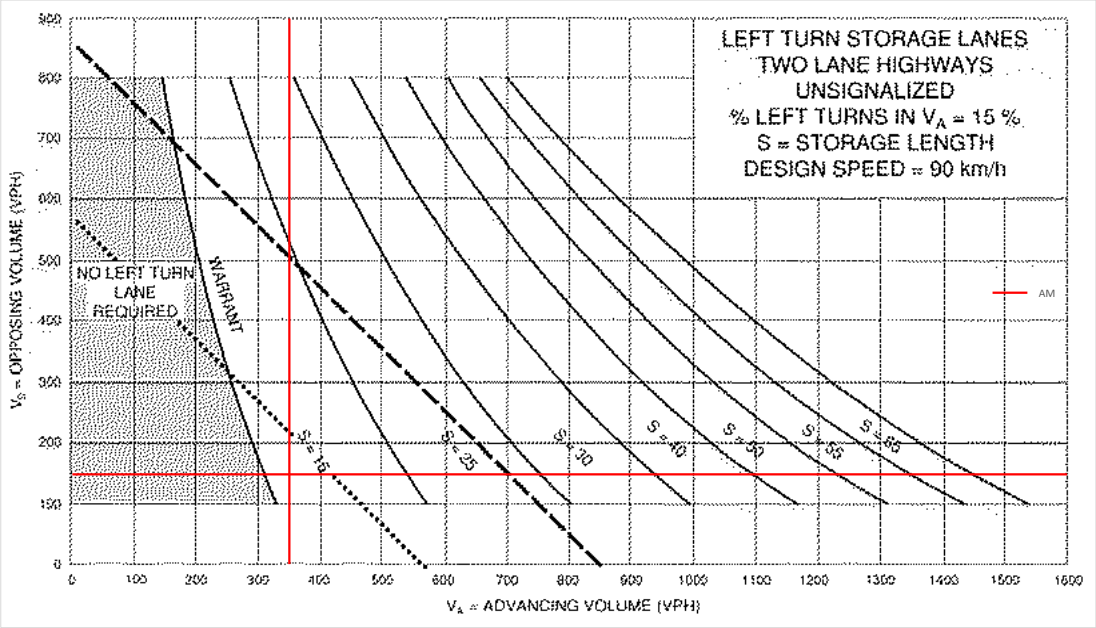
Existing - Eastbound Left



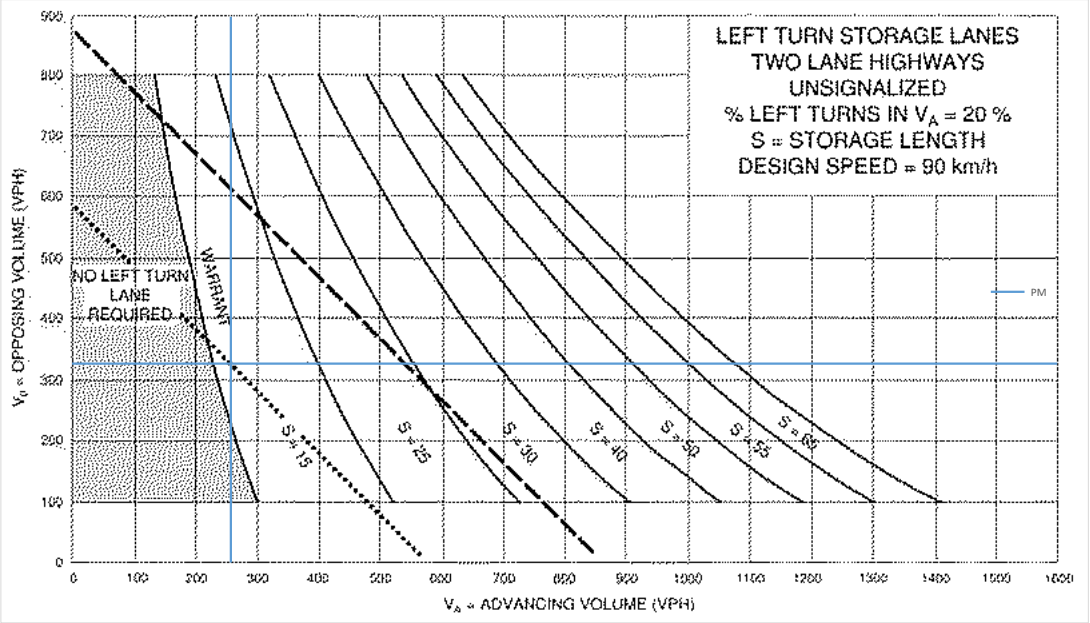
Existing - Eastbound Left



Future Background 2030 - Eastbound Left



Future Background 2030 - Eastbound Left



Shea Road at Flewellyn Road

Existing

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	87	129	26	2	62	17	8	241	13	25	149	51	2.5%	81	242
	PM	58	70	11	2	151	33	16	207	17	14	161	71	1.1%	186	139

Future Background 2030

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	60	263	26	2	124	22	8	242	13	37	212	51	1.4%	148	349
	PM	53	194	11	2	281	45	16	226	17	23	228	71	0.6%	328	258

Future Background 2035

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	60	263	26	2	128	22	8	264	13	37	249	51	1.3%	152	349
	PM	53	199	11	2	281	45	16	262	17	23	247	71	0.6%	328	263

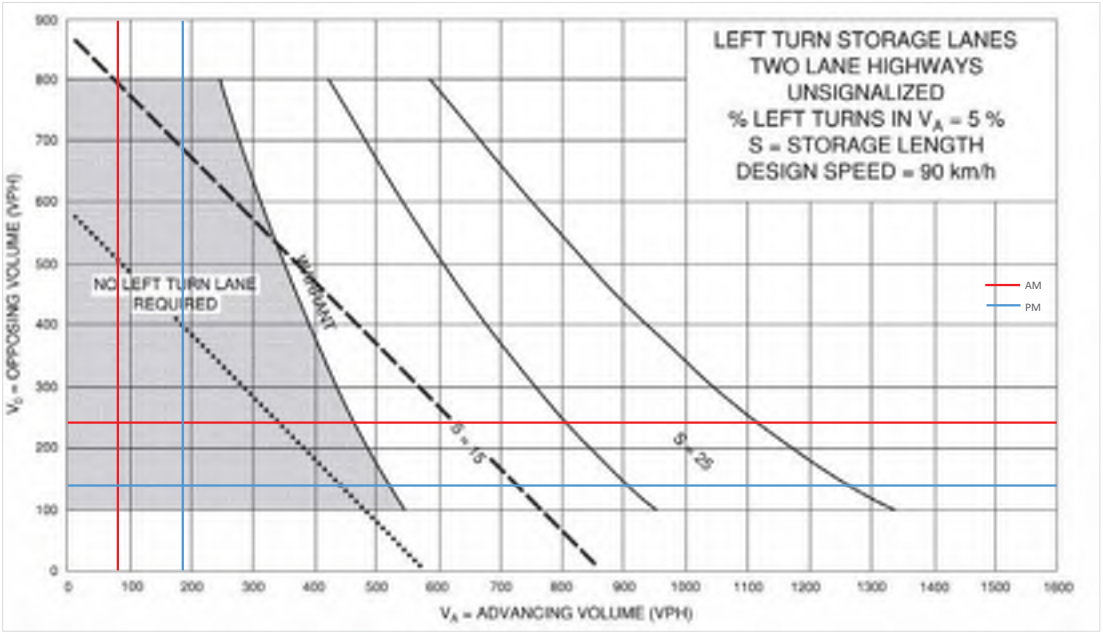
Future Total 2030

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	60	341	26	2	158	24	8	242	13	42	212	51	1.1%	184	427
	PM	53	249	11	2	354	50	16	226	17	27	228	71	0.5%	406	313

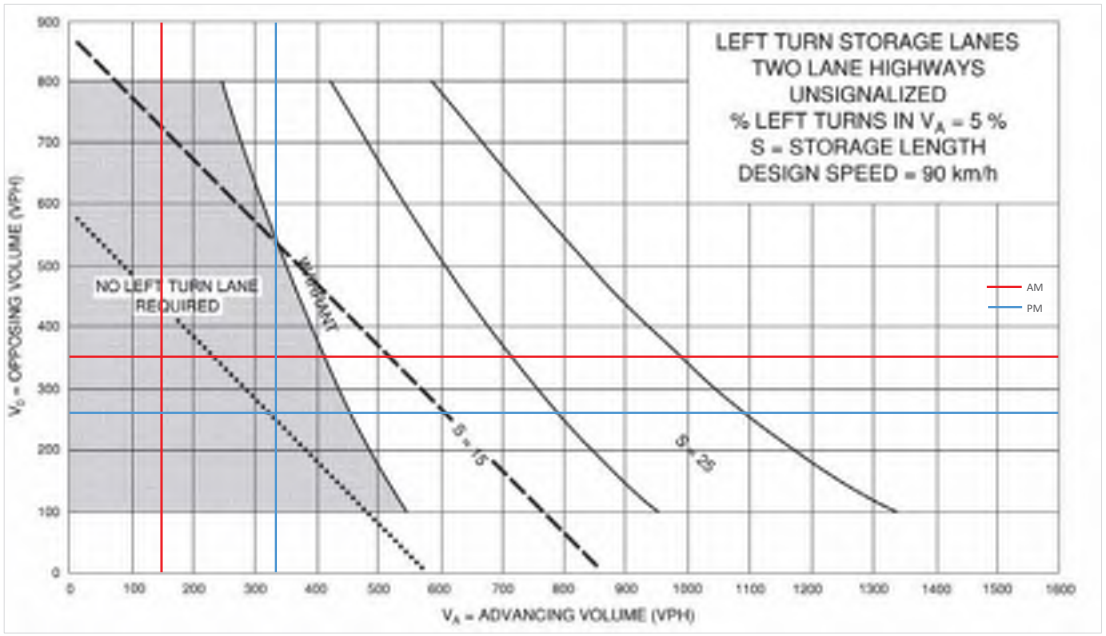
Future Total 2035

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	60	341	26	2	162	24	8	264	13	42	249	51	1.1%	188	427
	PM	53	254	11	2	354	50	16	262	17	27	247	71	0.5%	406	318

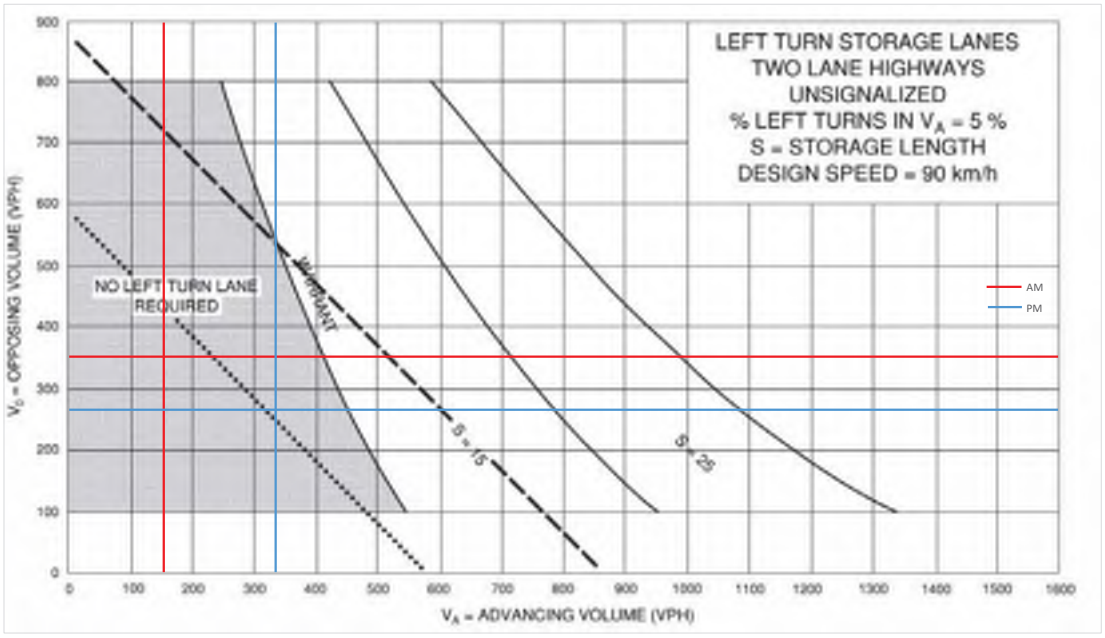
Existing - Westbound Left



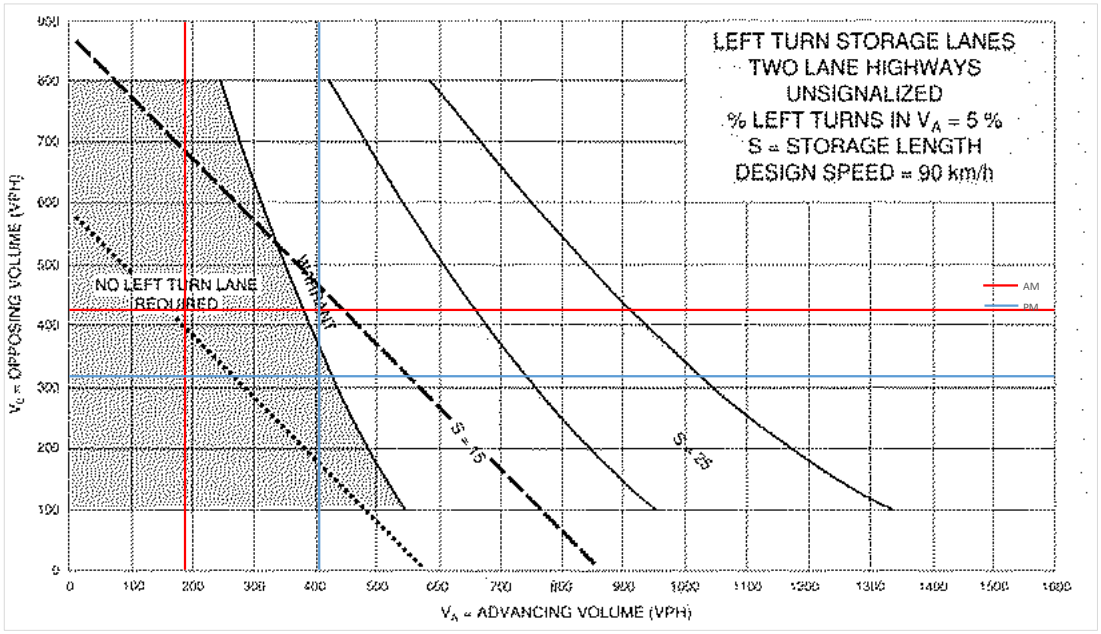
Future Background 2030 - Westbound Left



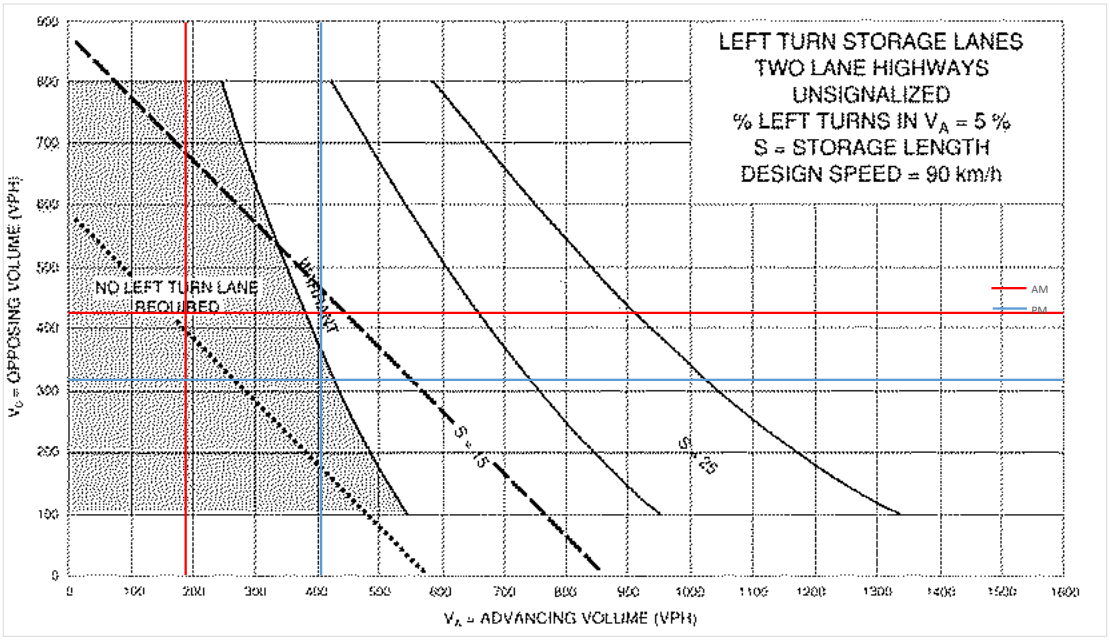
Future Background 2035 - Westbound Left



Future Total 2030 - Westbound Left



Future Total 2035 - Westbound Left



Shea Road at Flewellyn Road

Existing

Design Speed																	
								Yes									
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	87	129	26	2	62	17	8	241	13	25	149	51	3.1%	262	225		
PM	58	70	11	2	151	33	16	207	17	14	161	71	6.7%	240	246		

Future Background 2030

Design Speed																	
								Yes									
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	60	263	26	2	124	22	8	242	13	37	212	51	3.0%	263	300		
PM	53	194	11	2	281	45	16	226	17	23	228	71	6.2%	259	322		

Future Background 2035

Design Speed																	
								Yes									
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	60	263	26	2	128	22	8	264	13	37	249	51	2.8%	285	337		
PM	53	199	11	2	281	45	16	262	17	23	247	71	5.4%	295	341		

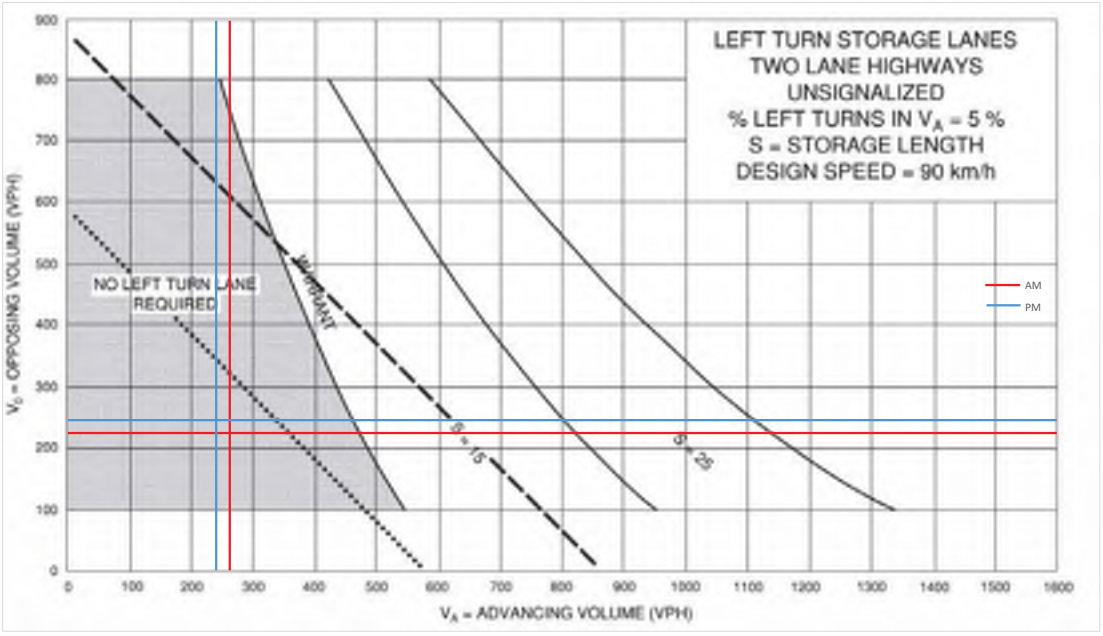
Future Total 2030

Design Speed																	
								Yes									
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	60	341	26	2	158	24	8	242	13	42	212	51	3.0%	263	305		
PM	53	249	11	2	354	50	16	226	17	27	228	71	6.2%	259	326		

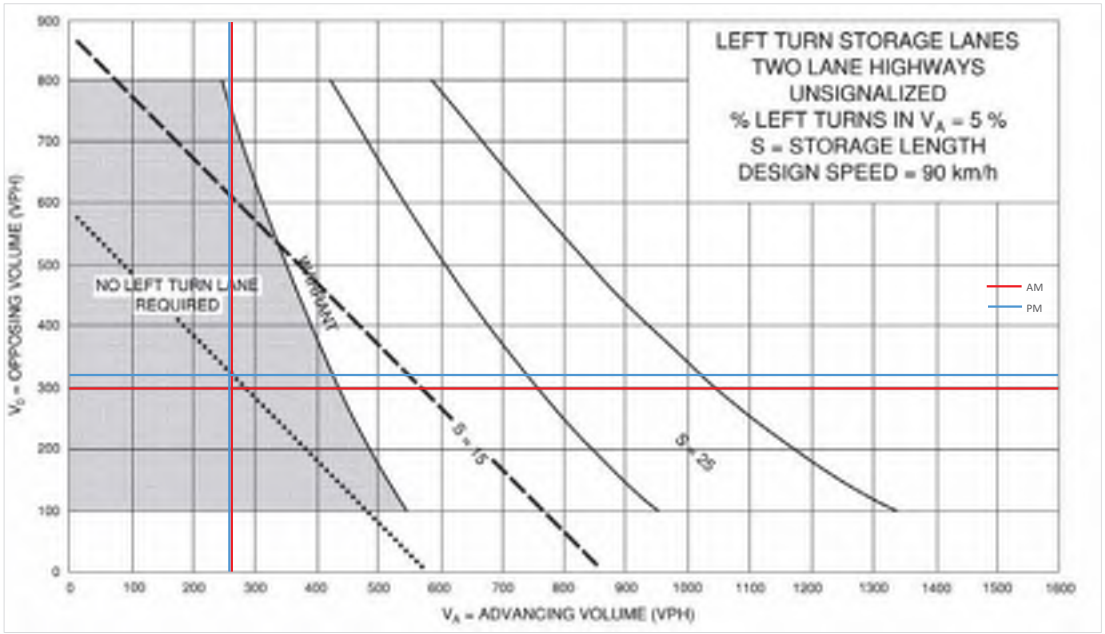
Future Total 2035

Design Speed																	
								Yes									
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	60	341	26	2	162	24	8	264	13	42	249	51	2.8%	285	342		
PM	53	254	11	2	354	50	16	262	17	27	247	71	5.4%	295	345		

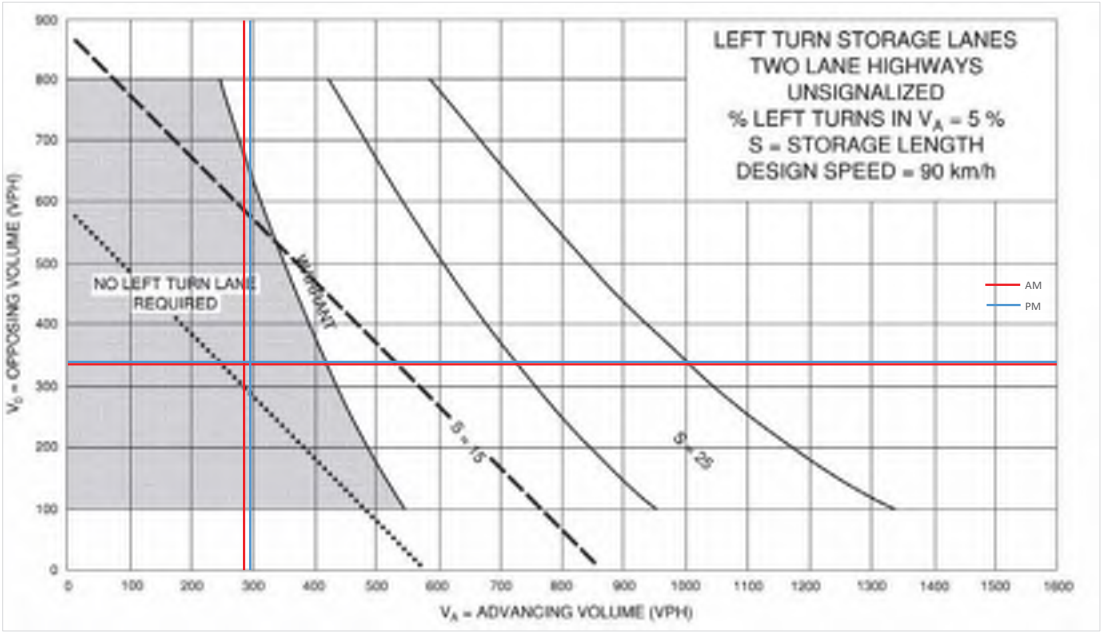
Existing - Northbound Left



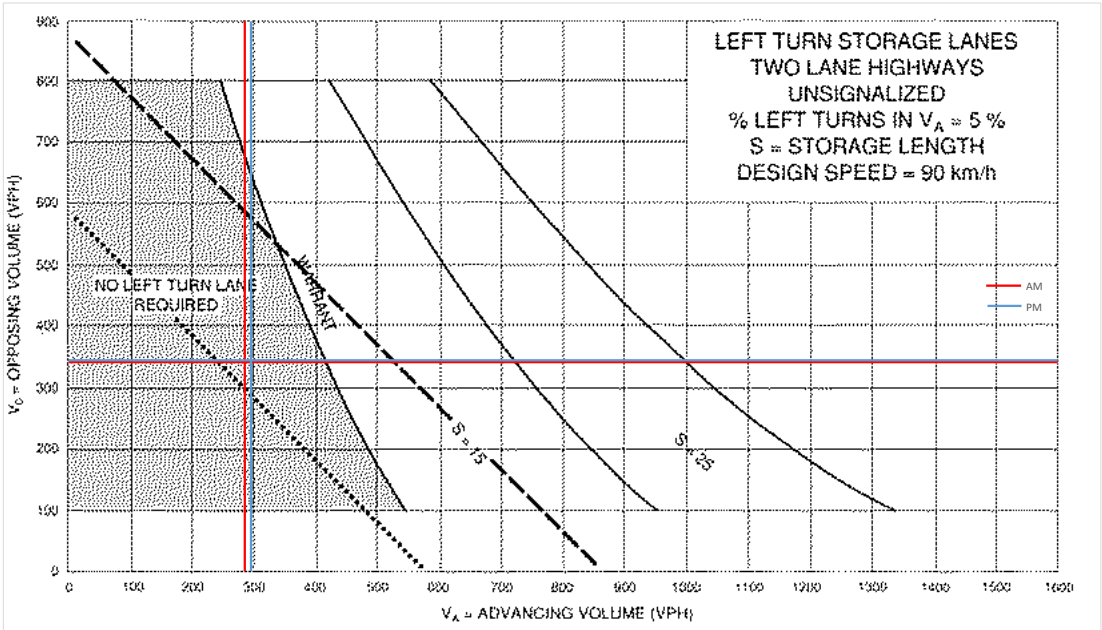
Future Background 2030 - Northbound Left



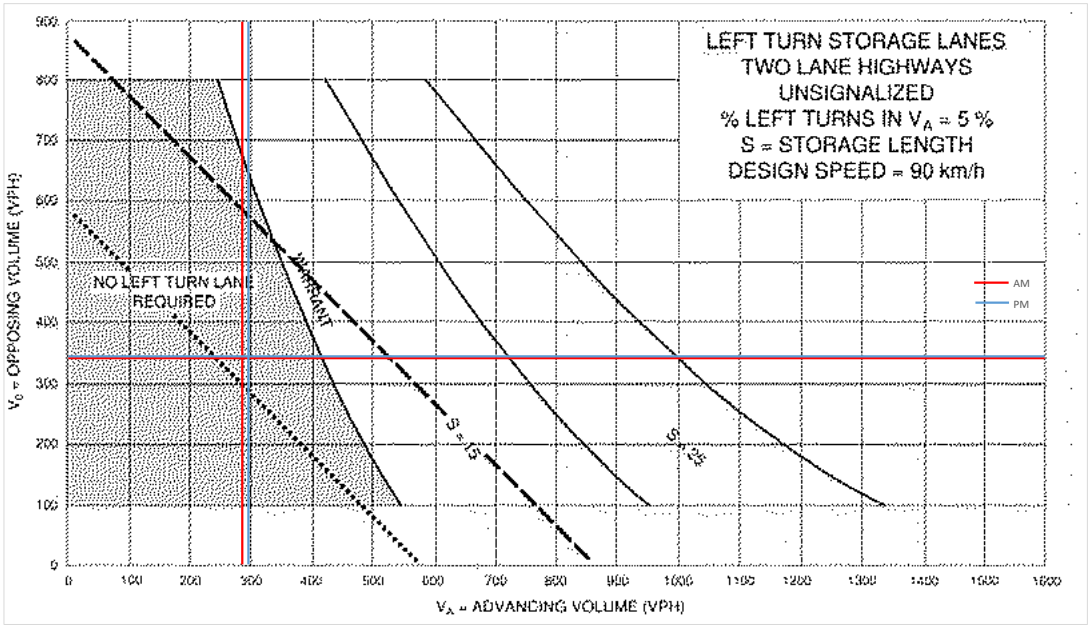
Future Background 2035 - Northbound Left



Future Total 2030 - Northbound Left



Future Total 2035 - Northbound Left



Shea Road at Flewellyn Road

Existing

Design Speed — Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	87	129	26	2	62	17	8	241	13	25	149	51	11.1%	225	262
PM	58	70	11	2	151	33	16	207	17	14	161	71	5.7%	246	240

Future Background 2030

Design Speed — Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	84	26	2	47	17	8	242	13	25	212	51	8.7%	288	263
PM	53	68	11	2	104	33	16	226	17	14	228	71	4.5%	313	259

Future Background 2035

Design Speed — Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	84	26	2	51	17	8	264	13	25	249	51	7.7%	325	285
PM	53	73	11	2	104	33	16	262	17	14	247	71	4.2%	332	295

Future Total 2030

Design Speed — Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	263	26	2	124	22	8	242	13	37	212	51	12.3%	300	263
PM	53	194	11	2	281	45	16	226	17	23	228	71	7.1%	322	259

Future Total 2035

Design Speed — Yes

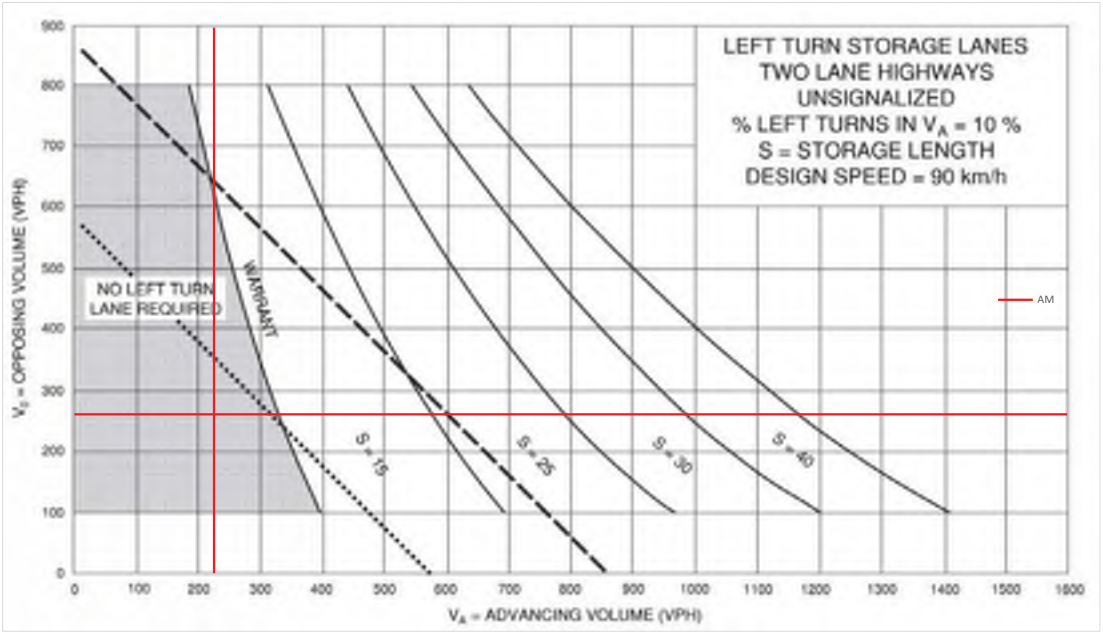
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	263	26	2	128	22	8	264	13	37	249	51	11.0%	337	285
PM	53	199	11	2	281	45	16	262	17	23	247	71	6.7%	341	295

Future Total 2035 Sensitivity

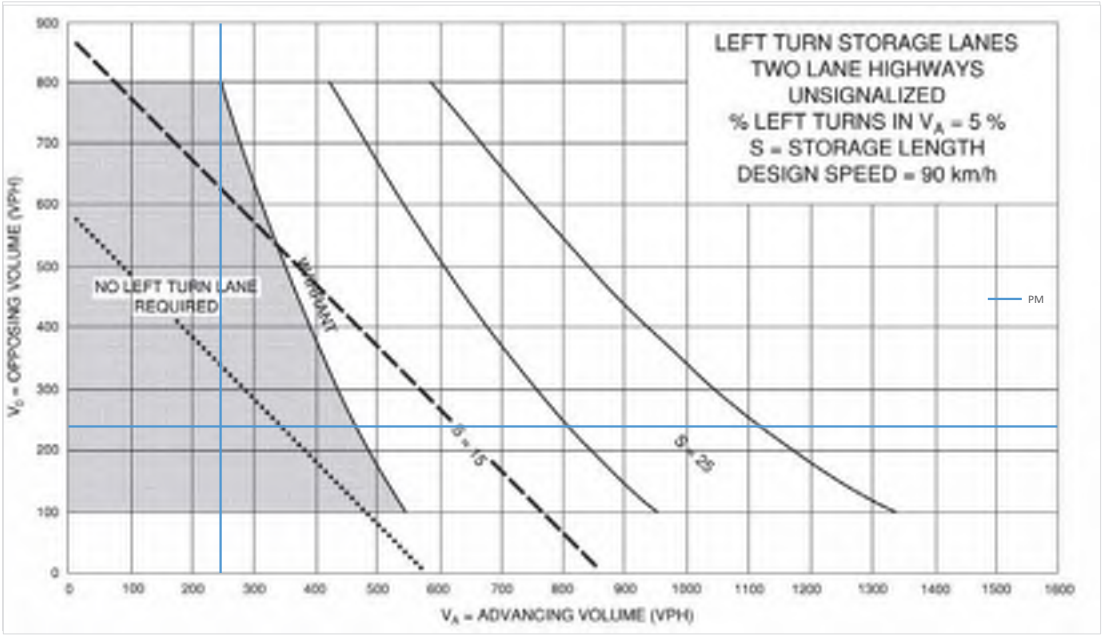
Design Speed — Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	341	26	2	162	24	8	264	13	42	249	51	12.3%	342	285
PM	53	254	11	2	354	50	16	262	17	27	247	71	7.8%	345	295

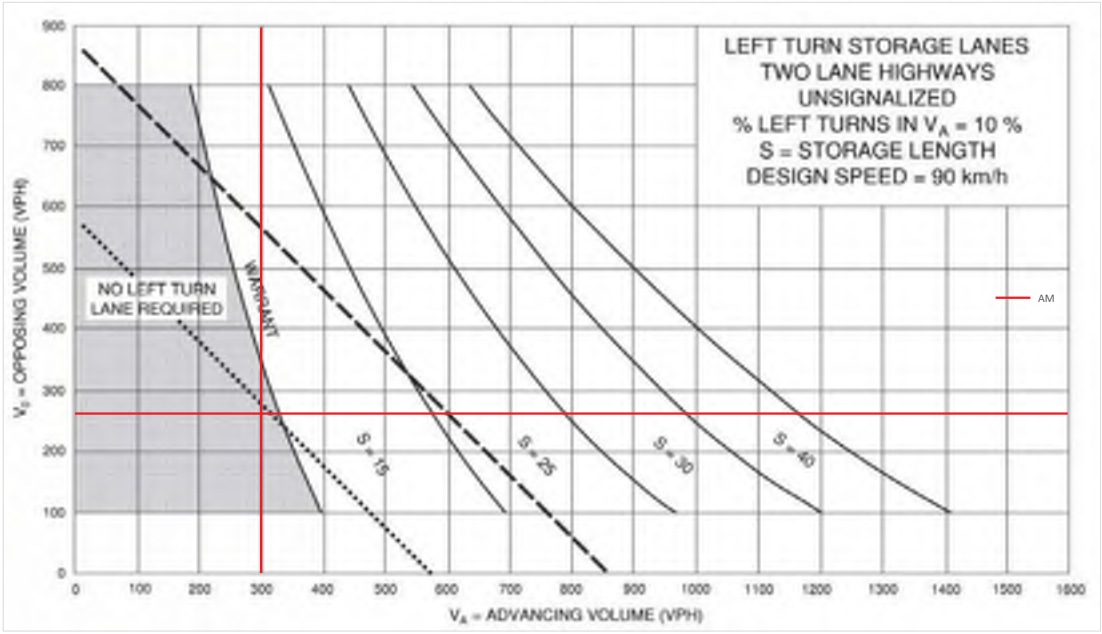
Existing - Southbound Left



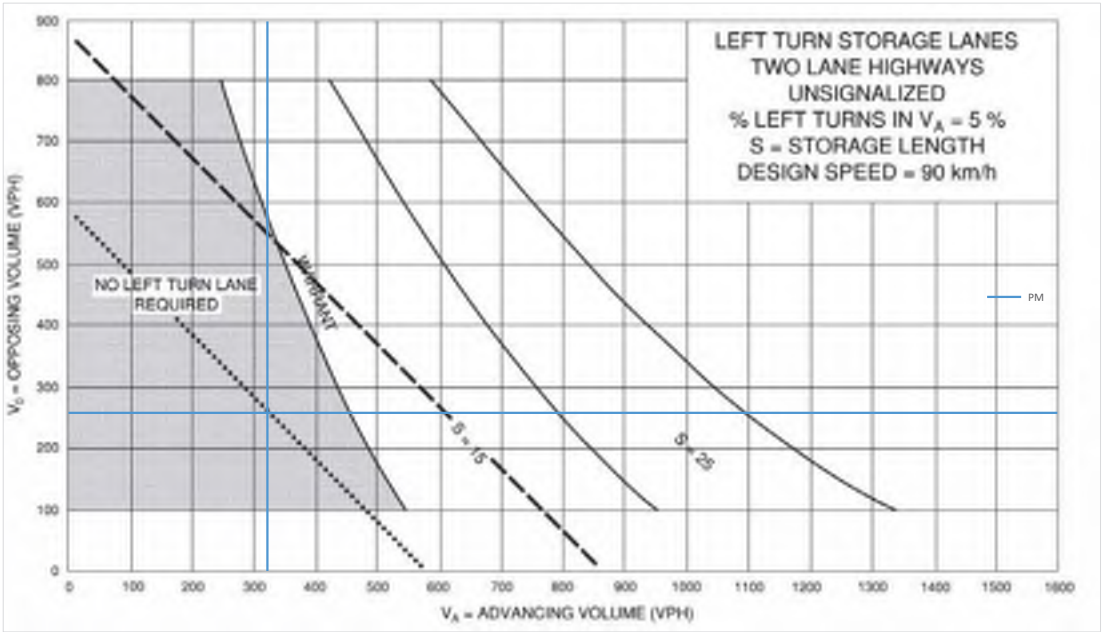
Existing - Southbound Left



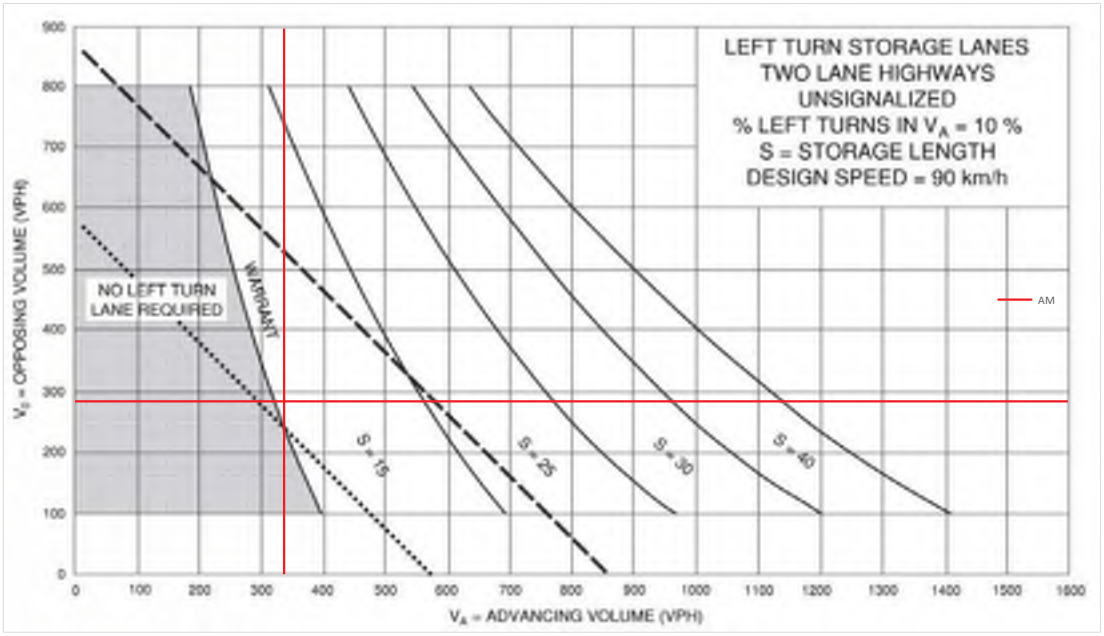
Future Background 2030 - Southbound Left



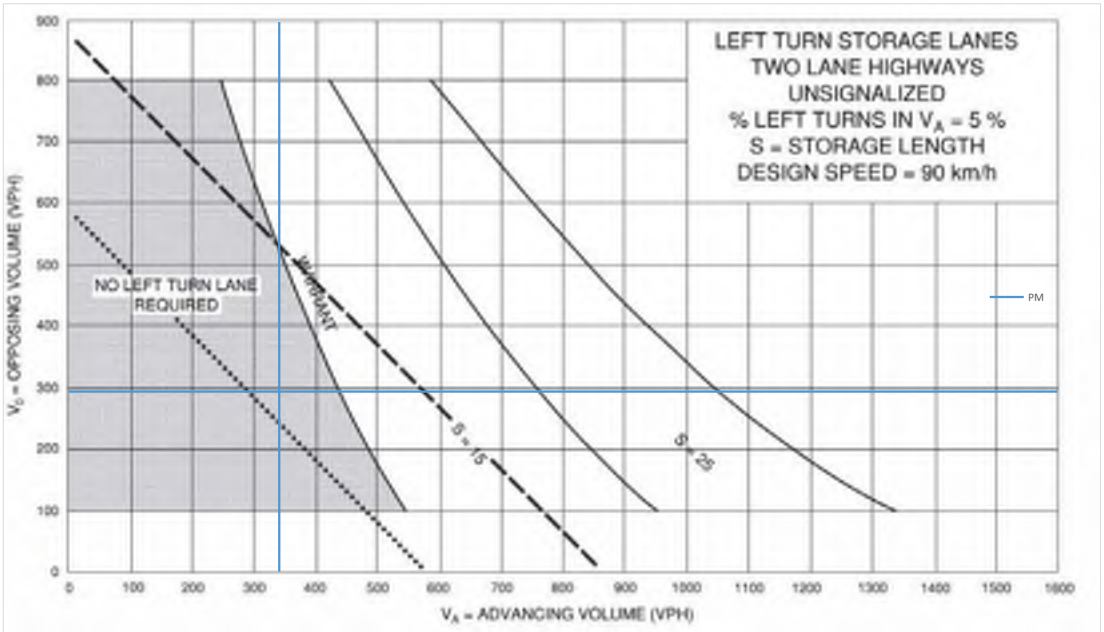
Future Background 2030 - Southbound Left



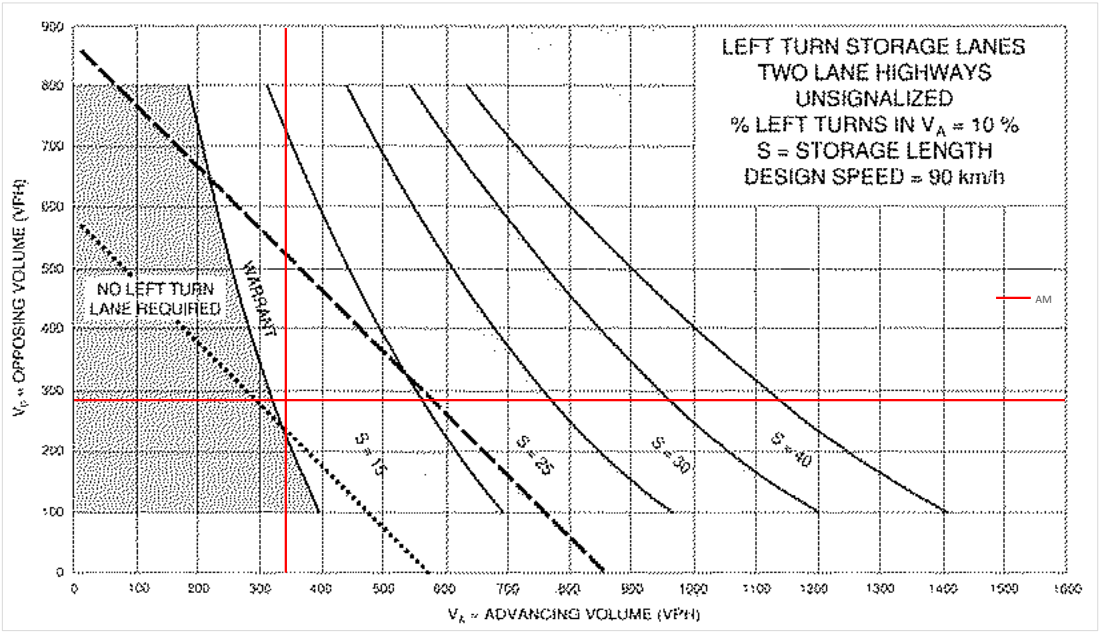
Future Background 2035 - Southbound Left



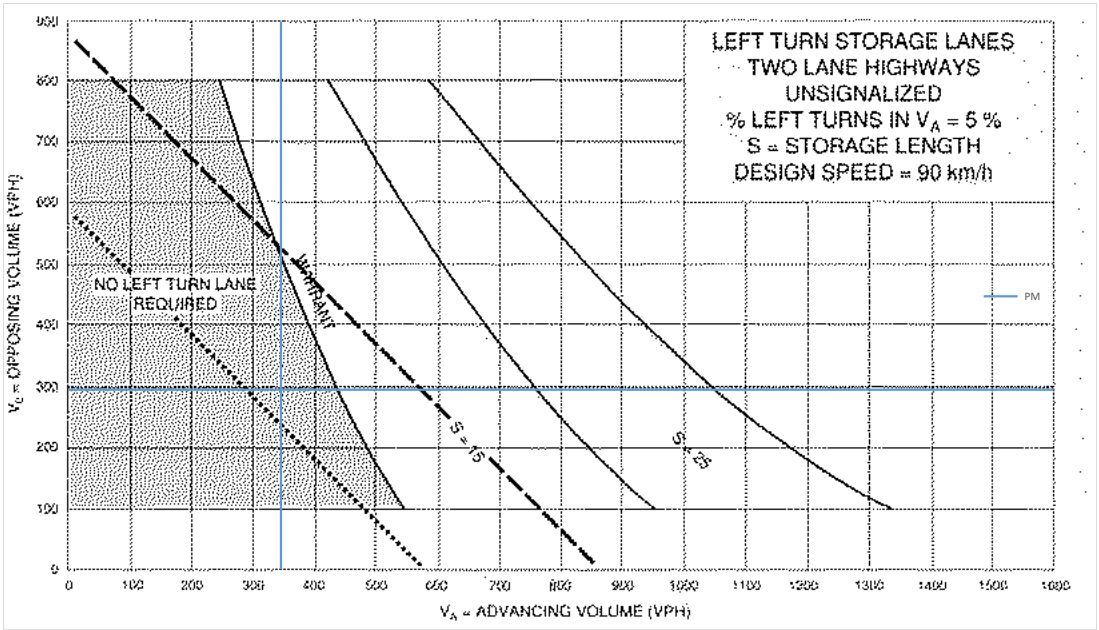
Future Background 2035 - Southbound Left



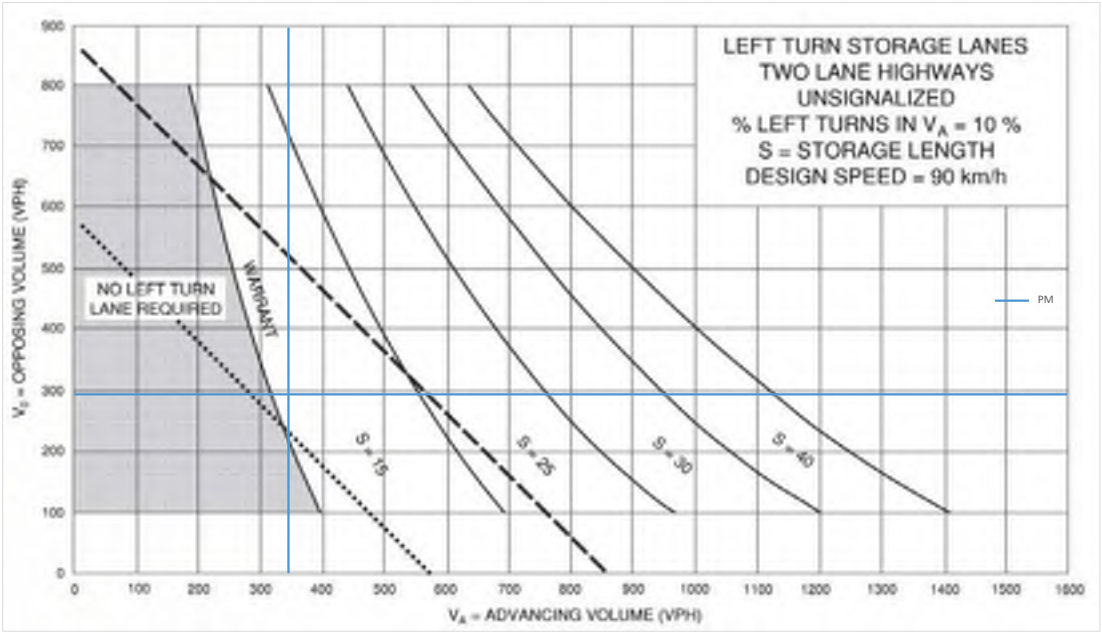
Future Total 2030 - Southbound Left



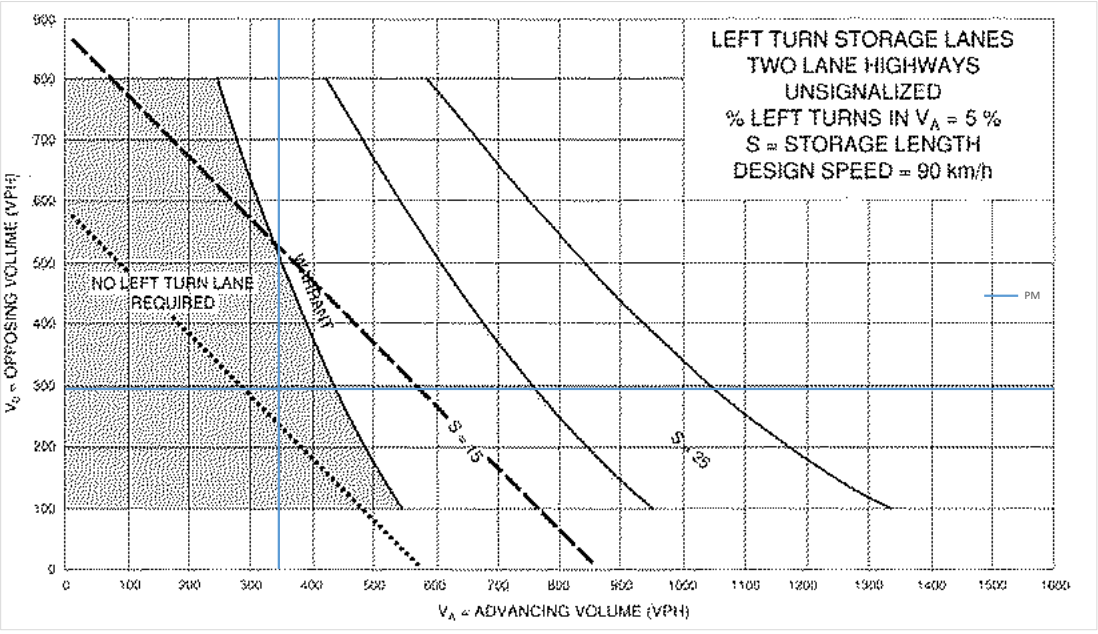
Future Total 2030 - Southbound Left



Future Total 2035 - Southbound Left



Future Total 2035 - Southbound Left



Stittsville Main Street / Huntley Road at Flewellyn Road

Existing

Design Speed: Yes

90 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	69	15	7	43	29	17	176	12	39	188	53	31.1%	122	79
PM	44	56	14	6	71	71	27	256	14	33	255	47	38.6%	114	148

Future Background 2030

Design Speed: Yes

90 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	123	15	19	88	171	17	237	17	100	261	53	21.6%	176	278
PM	44	99	14	15	126	171	27	246	26	174	278	47	28.0%	157	312

Future Background 2035

Design Speed: Yes

90 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	123	15	19	92	171	17	242	17	100	267	53	21.6%	176	282
PM	44	104	14	15	126	171	27	251	26	174	284	47	27.2%	162	312

Future Total 2030

Design Speed: Yes

90 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	127	15	24	97	233	17	237	19	127	261	53	21.1%	180	354
PM	44	107	14	19	132	215	27	246	31	232	278	47	26.7%	165	366

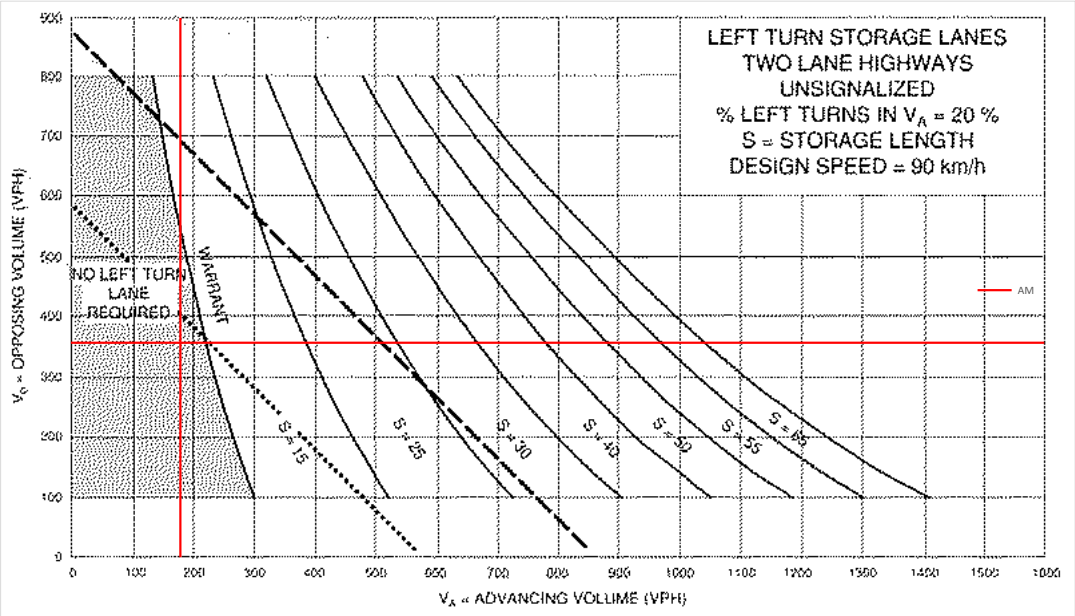
Future Total 2035

Design Speed: Yes

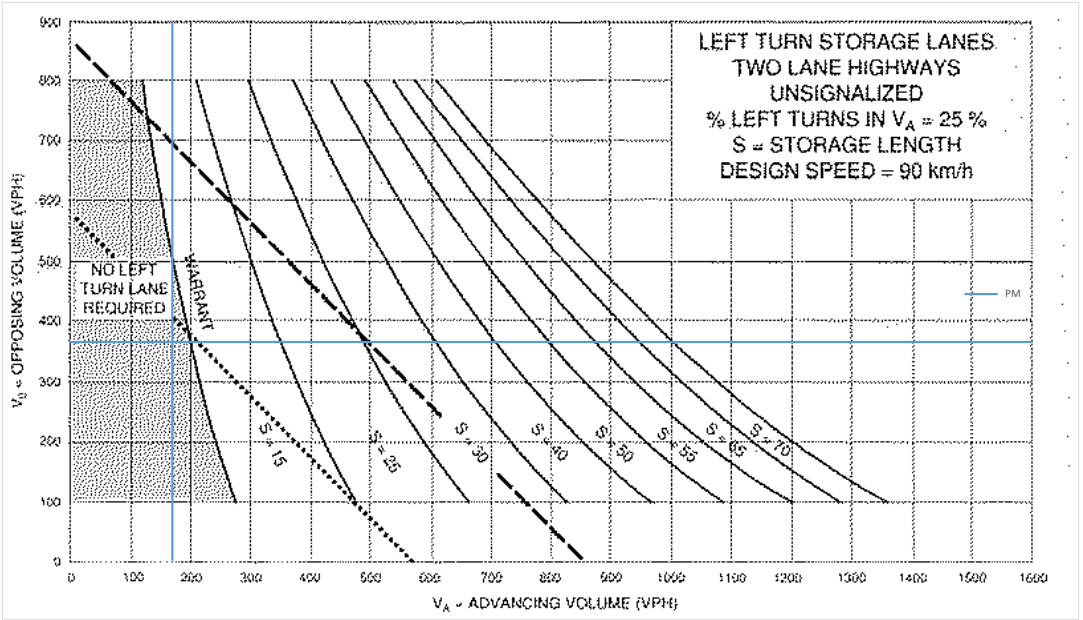
90 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	127	15	24	101	233	17	242	19	127	267	53	21.1%	180	358
PM	44	112	14	19	132	215	27	251	31	232	284	47	25.9%	170	366

Future Total 2035 - Eastbound Left



Future Total 2035 - Eastbound Left



Stittsville Main Street / Huntley Road at Flewellyn Road

Existing

Design Speed																	
					Yes												
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	69	15	7	43	29	17	176	12	39	188	53	8.9%	79	122		
PM	44	56	14	6	71	71	27	256	14	33	255	47	4.1%	148	114		

Future Background 2030

Design Speed																	
					Yes												
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	123	15	19	88	171	17	237	17	100	261	53	6.8%	278	176		
PM	44	99	14	15	126	171	27	246	26	174	278	47	4.8%	312	157		

Future Background 2035

Design Speed																	
					Yes												
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	123	15	19	92	171	17	242	17	100	267	53	6.7%	282	176		
PM	44	104	14	15	126	171	27	251	26	174	284	47	4.8%	312	162		

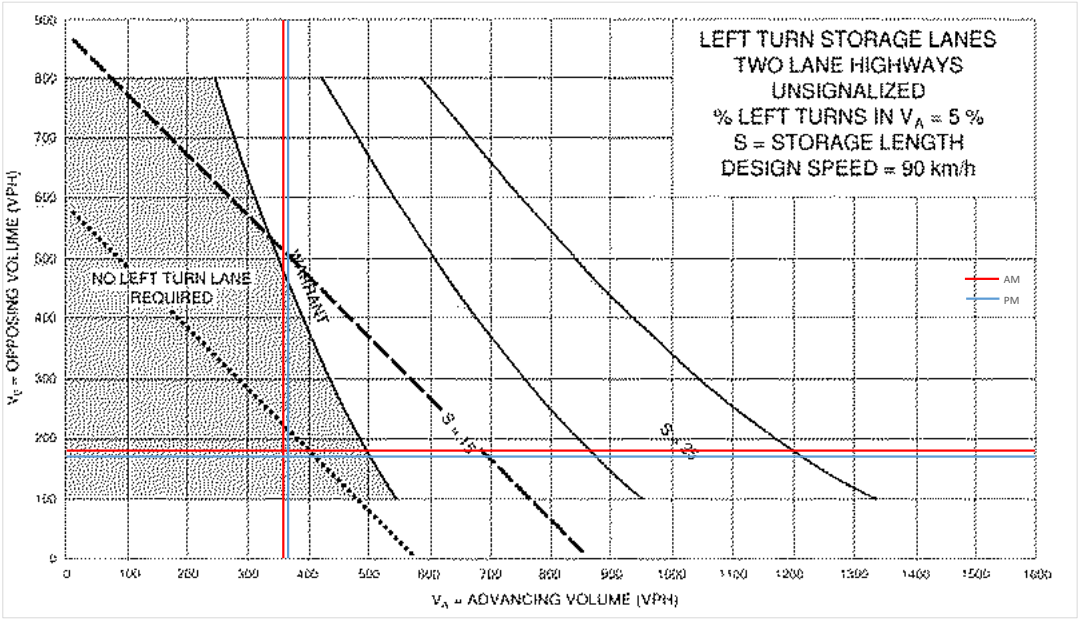
Future Total 2030

Design Speed																	
					Yes												
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	127	15	24	97	233	17	237	19	127	261	53	6.8%	354	180		
PM	44	107	14	19	132	215	27	246	31	232	278	47	5.2%	366	165		

Future Total 2035

Design Speed																	
					Yes												
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	127	15	24	101	233	17	242	19	127	267	53	6.7%	358	180		
PM	44	112	14	19	132	215	27	251	31	232	284	47	5.2%	366	170		

Future Total 2035 - Westbound Left



Stittsville Main Street / Huntley Road at Flewellyn Road

Existing

Design Speed																		
								Yes										
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	38	69	15	7	43	29	17	176	12	39	188	53	8.3%	205	280		
	PM	44	56	14	6	71	71	27	256	14	33	255	47	9.1%	297	335		

Future Background 2030

Design Speed																		
								Yes										
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	38	123	15	19	88	171	17	237	17	100	261	53	6.3%	271	414		
	PM	44	99	14	15	126	171	27	246	26	174	278	47	9.0%	299	499		

Future Background 2035

Design Speed																		
								Yes										
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	38	123	15	19	92	171	17	242	17	100	267	53	6.2%	276	420		
	PM	44	104	14	15	126	171	27	251	26	174	284	47	8.9%	304	505		

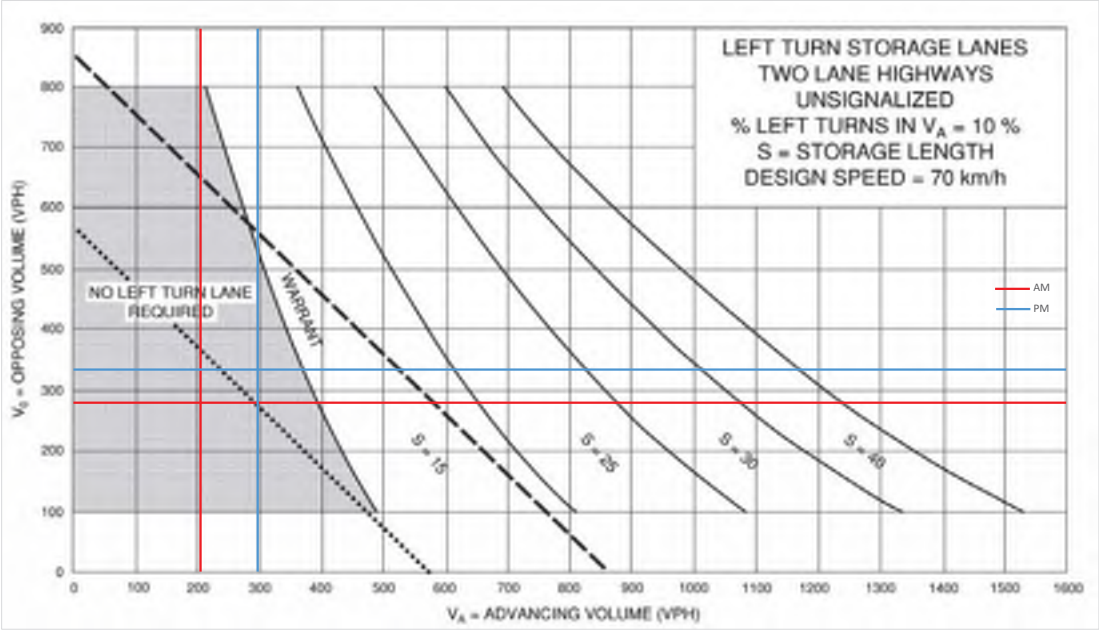
Future Total 2030

Design Speed																		
								Yes										
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	38	127	15	24	97	233	17	237	19	127	261	53	6.2%	273	441		
	PM	44	107	14	19	132	215	27	246	31	232	278	47	8.9%	304	557		

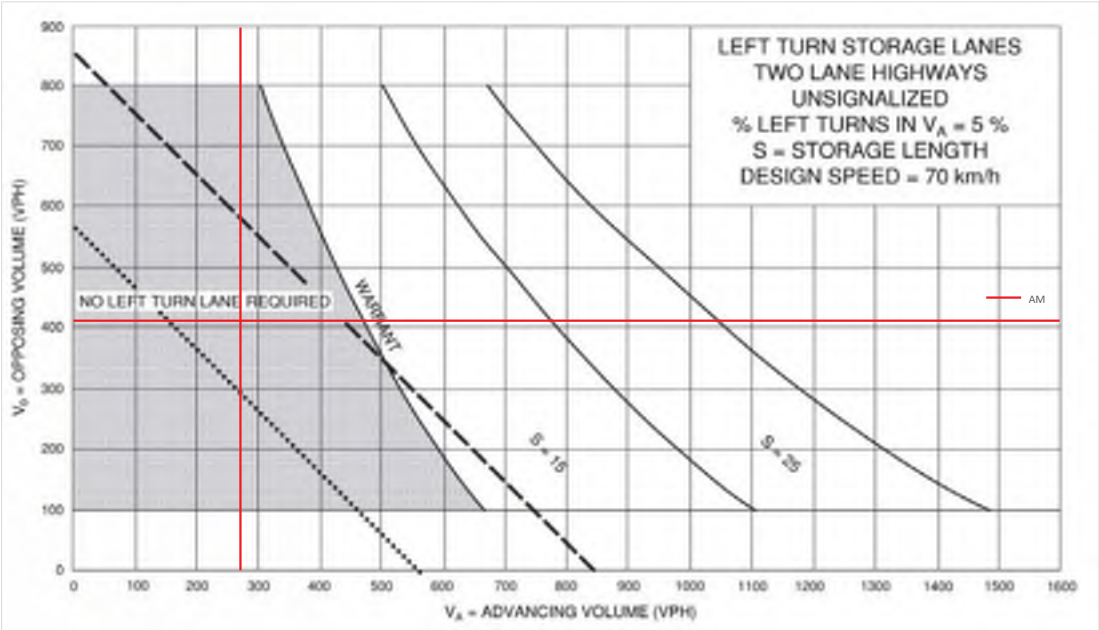
Future Total 2035

Design Speed																		
								Yes										
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	38	127	15	24	101	233	17	242	19	127	267	53	6.1%	278	447		
	PM	44	112	14	19	132	215	27	251	31	232	284	47	8.7%	309	563		

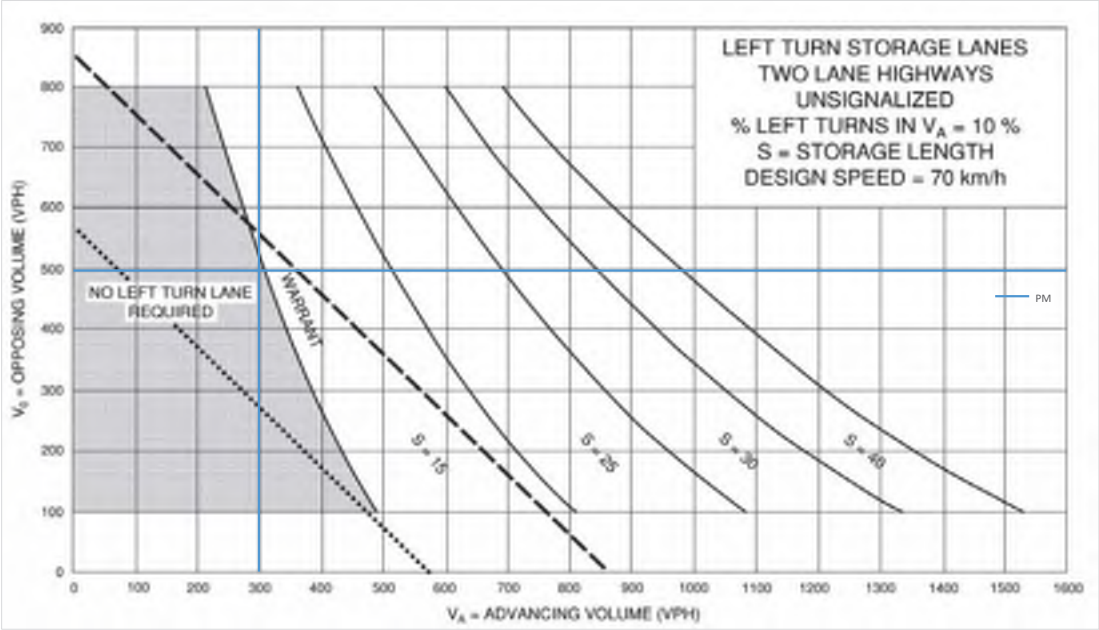
Existing - Northbound Left



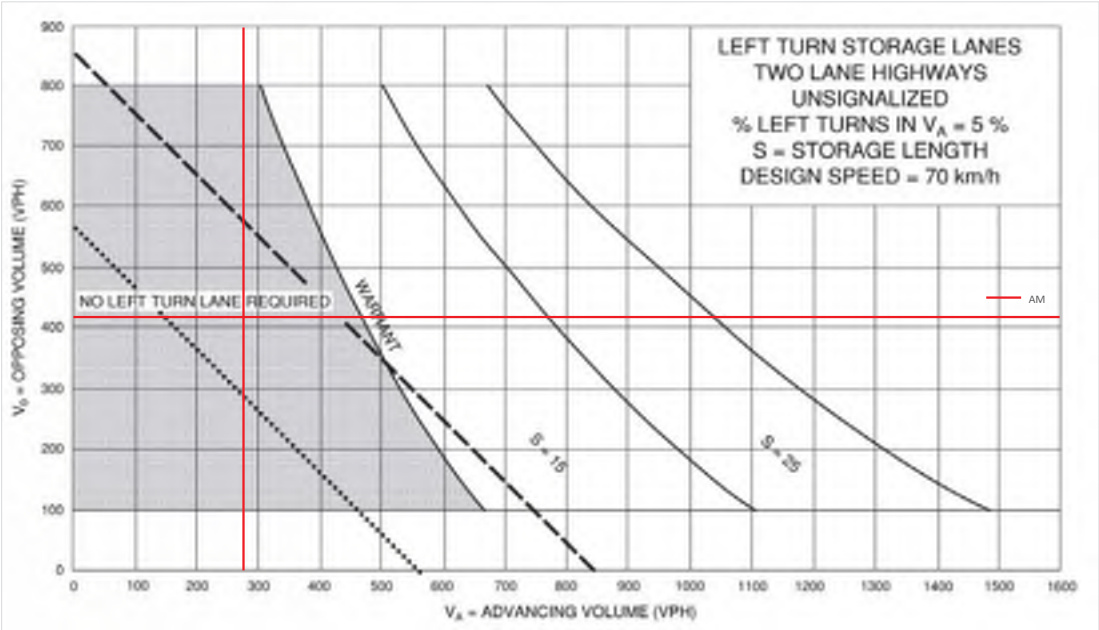
Future Background 2030 - Northbound Left



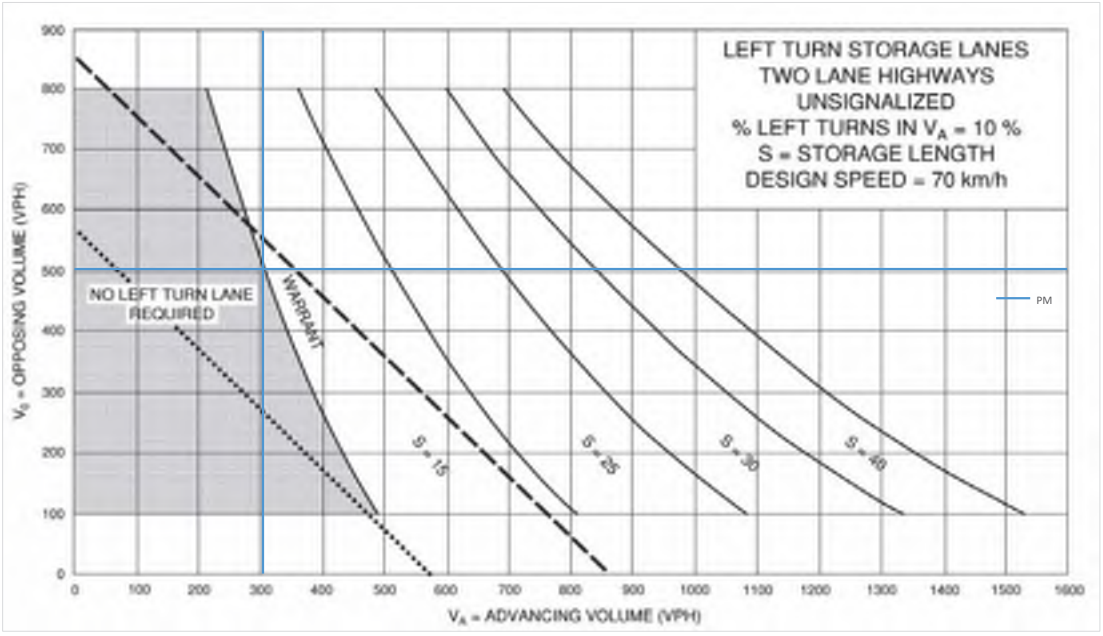
Future Background 2030 - Northbound Left



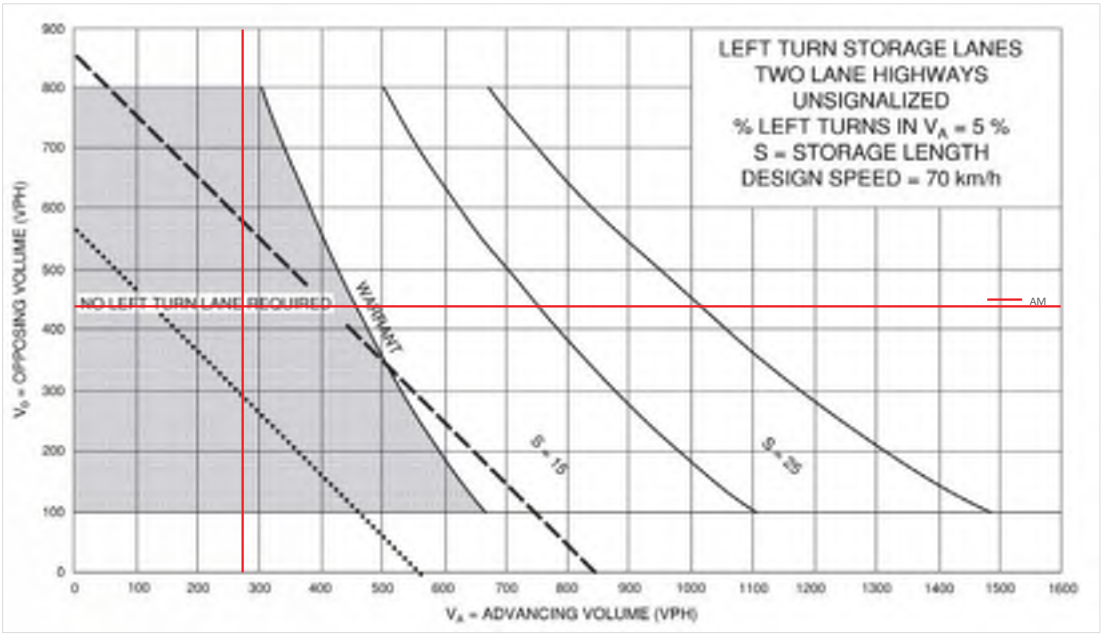
Future Background 2035 - Northbound Left



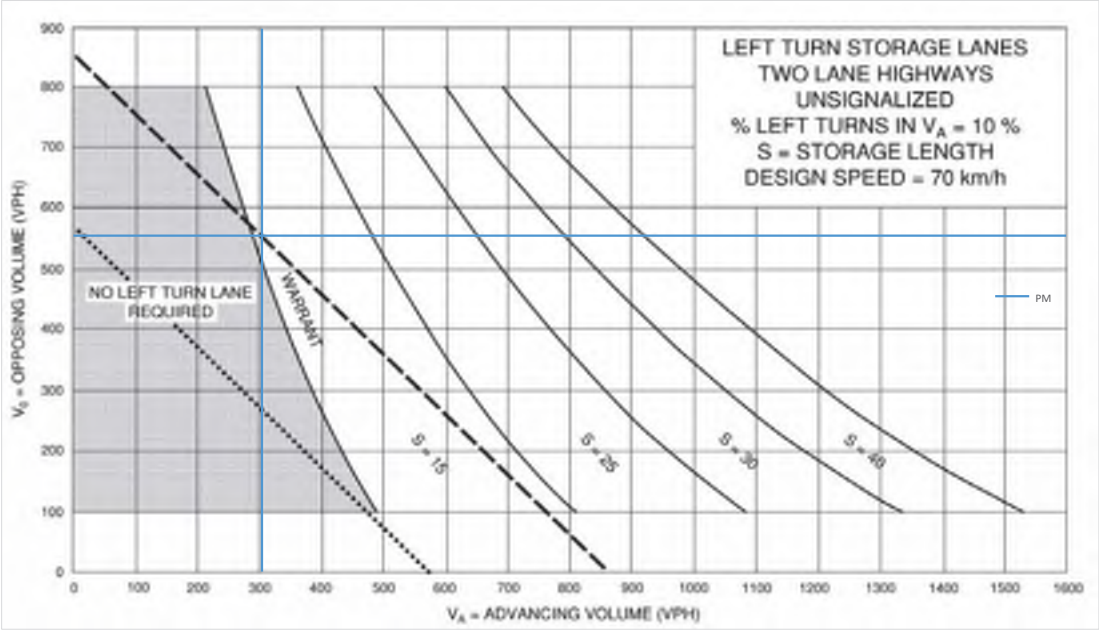
Future Background 2035 - Northbound Left



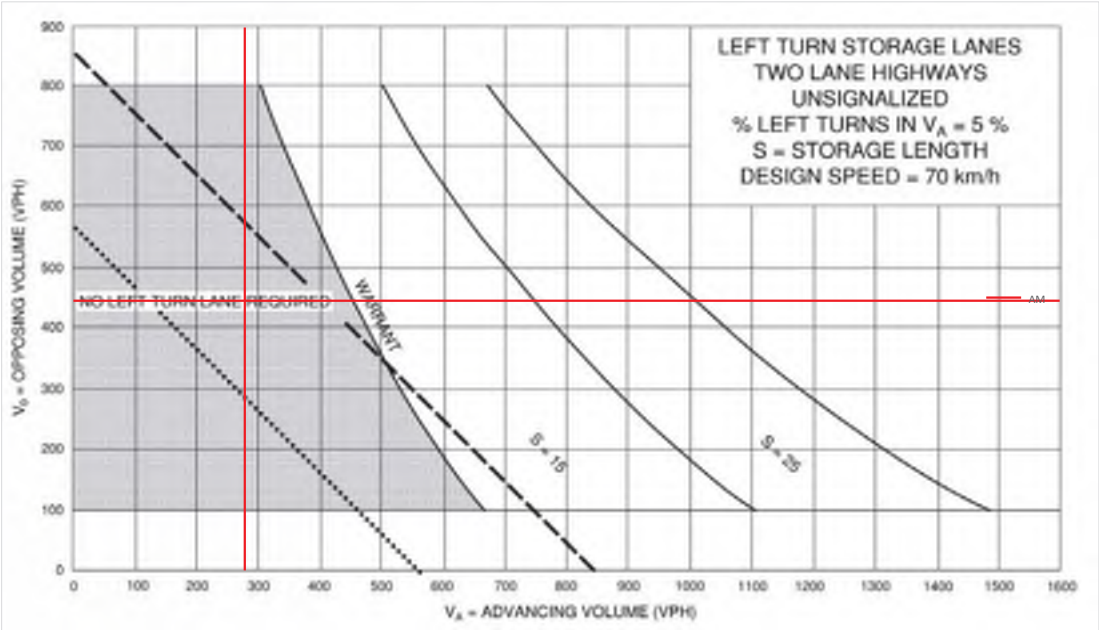
Future Total 2030 - Northbound Left



Future Total 2030 - Northbound Left



Future Total 2035 - Northbound Left



Stittsville Main Street / Huntley Road at Flewellyn Road

Existing

Design Speed																	
											Yes						
70 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	69	15	7	43	29	17	176	12	39	188	53	13.9%	280	205		
PM	44	56	14	6	71	71	27	256	14	33	255	47	9.9%	335	297		

Future Background 2030

Design Speed																	
											Yes						
70 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	123	15	19	88	171	17	237	17	100	261	53	24.2%	414	271		
PM	44	99	14	15	126	171	27	246	26	174	278	47	34.9%	499	299		

Future Background 2035

Design Speed																	
											Yes						
70 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	123	15	19	92	171	17	242	17	100	267	53	23.8%	420	276		
PM	44	104	14	15	126	171	27	251	26	174	284	47	34.5%	505	304		

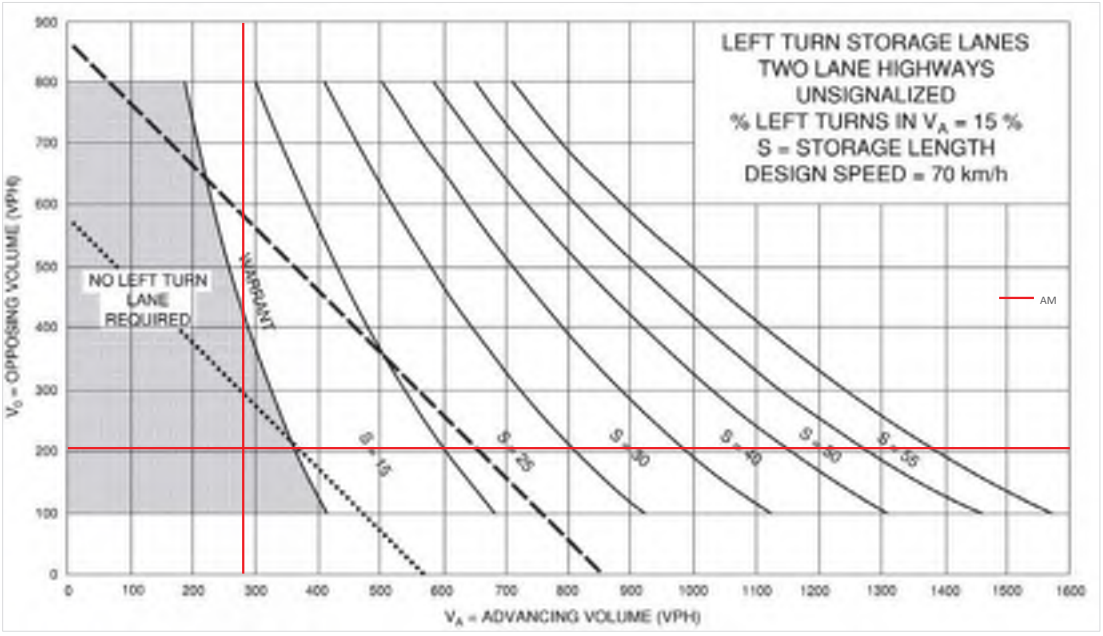
Future Total 2030

Design Speed																	
											Yes						
70 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	127	15	24	97	233	17	237	19	127	261	53	28.8%	441	273		
PM	44	107	14	19	132	215	27	246	31	232	278	47	41.7%	557	304		

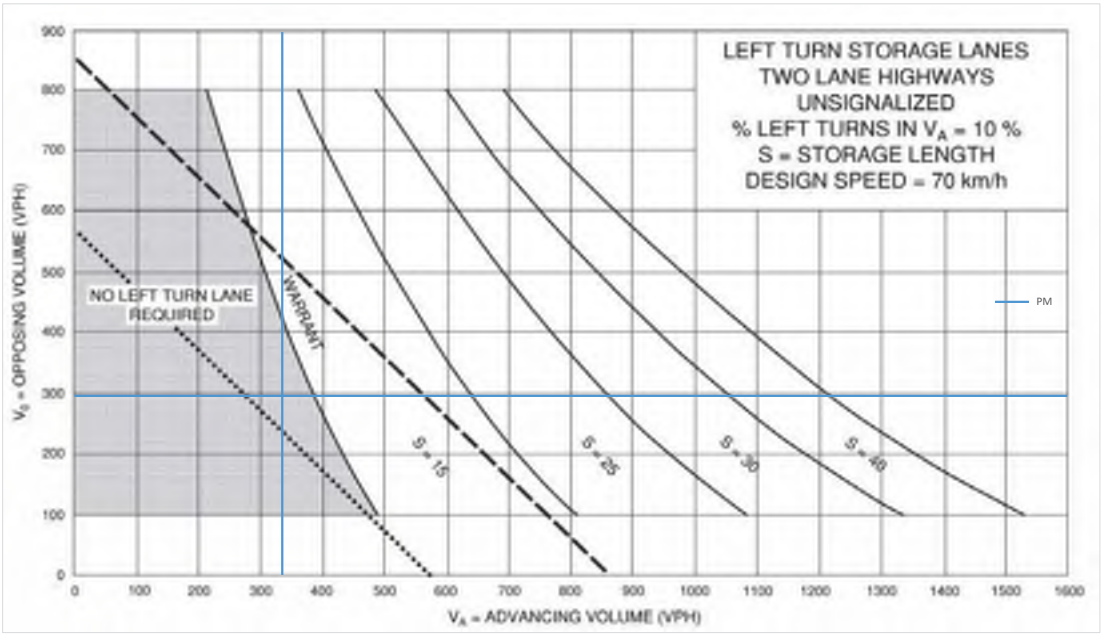
Future Total 2035

Design Speed																	
											Yes						
70 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
AM	38	127	15	24	101	233	17	242	19	127	267	53	28.4%	447	278		
PM	44	112	14	19	132	215	27	251	31	232	284	47	41.2%	563	309		

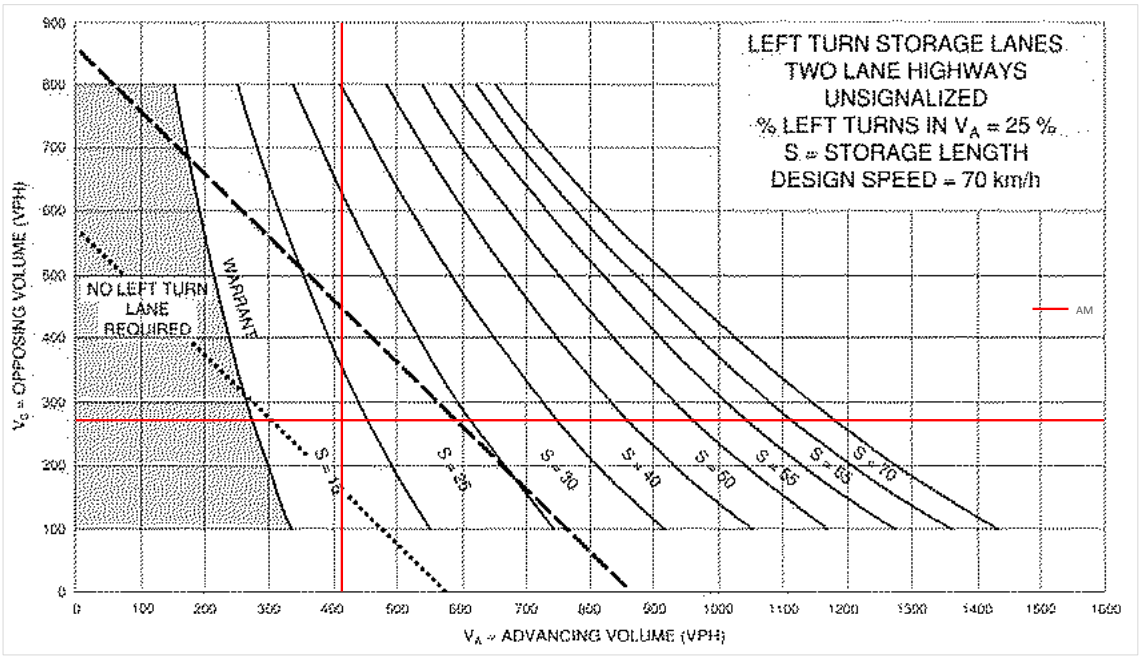
Existing - Southbound Left



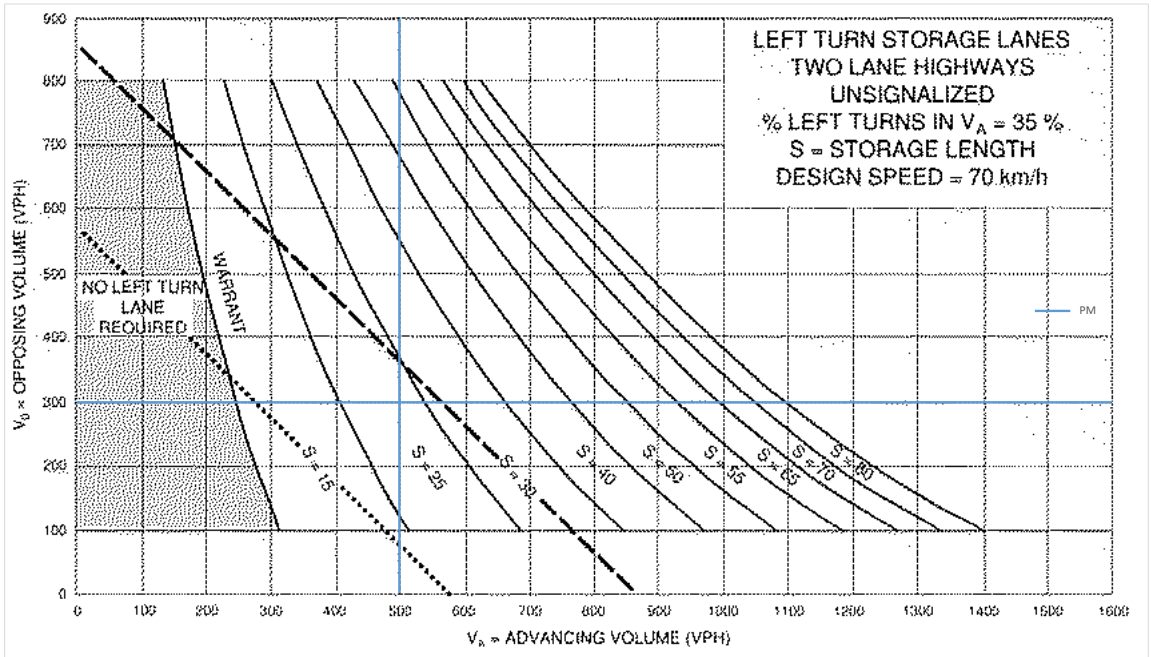
Existing - Southbound Left



Future Background 2030 - Southbound Left



Future Background 2030 - Southbound Left



Flewellyn Road at Street 7

Future Background 2030

Design Speed		Yes														
90	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	53	193	0	0	167	53	0	0	0	118	0	114	21.5%	246	220
	PM	121	184	0	0	234	121	0	0	0	83	0	80	39.7%	305	355

Future Background 2035

Design Speed		Yes														
90	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	53	193	0	0	171	53	0	0	0	118	0	114	21.5%	246	224
	PM	121	189	0	0	234	121	0	0	0	83	0	80	39.0%	310	355

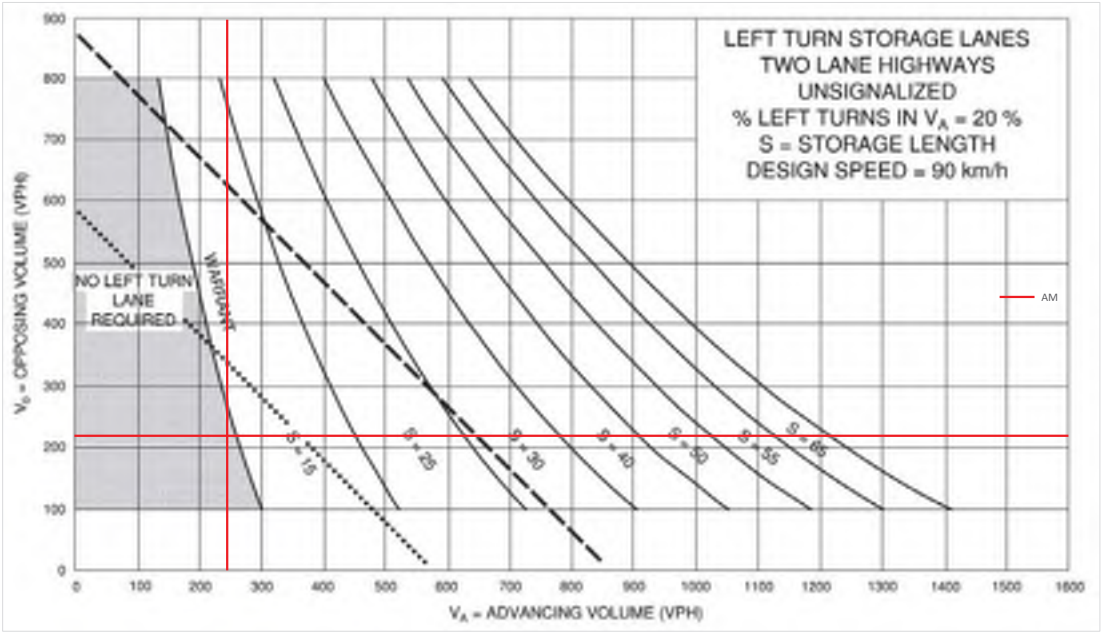
Future Total 2030

Design Speed		Yes														
90	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	53	220	0	0	243	53	0	0	0	118	0	114	19.4%	273	296
	PM	121	242	0	0	288	121	0	0	0	83	0	80	33.3%	363	409

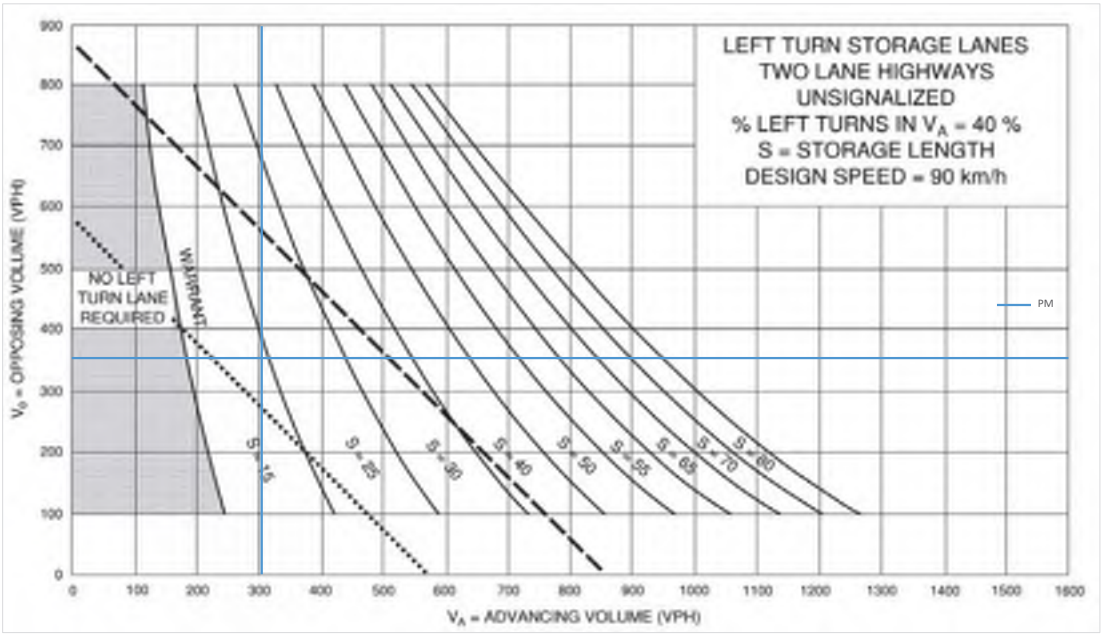
Future Total 2035

Design Speed		Yes														
90	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	53	220	0	0	247	53	0	0	0	118	0	114	19.4%	273	300
	PM	121	247	0	0	288	121	0	0	0	83	0	80	32.9%	368	409

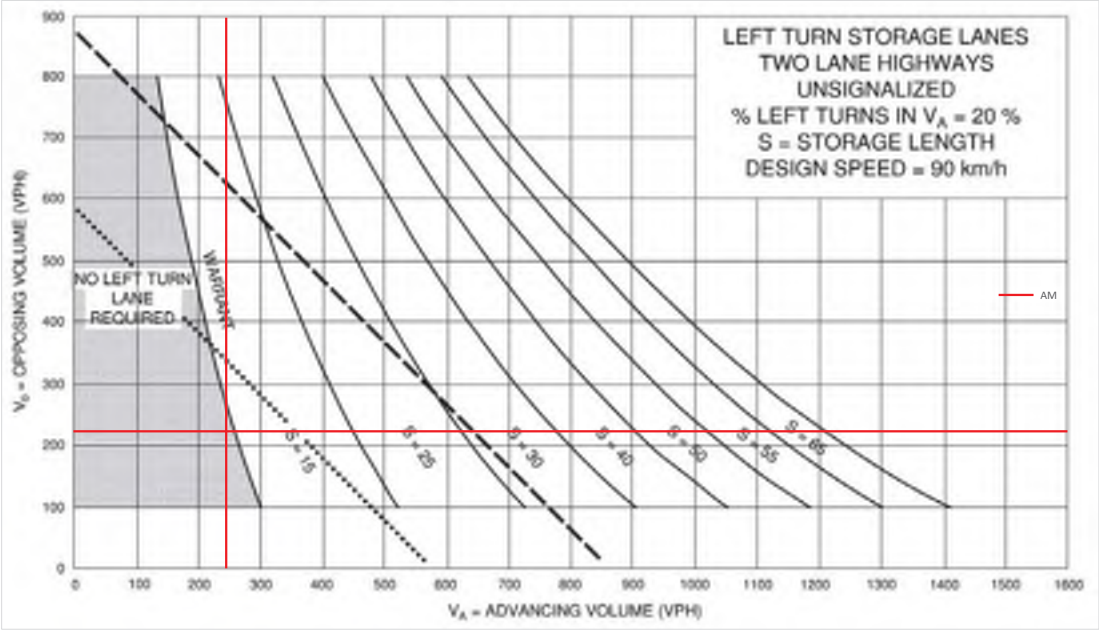
Future Background 2030 - Eastbound Left



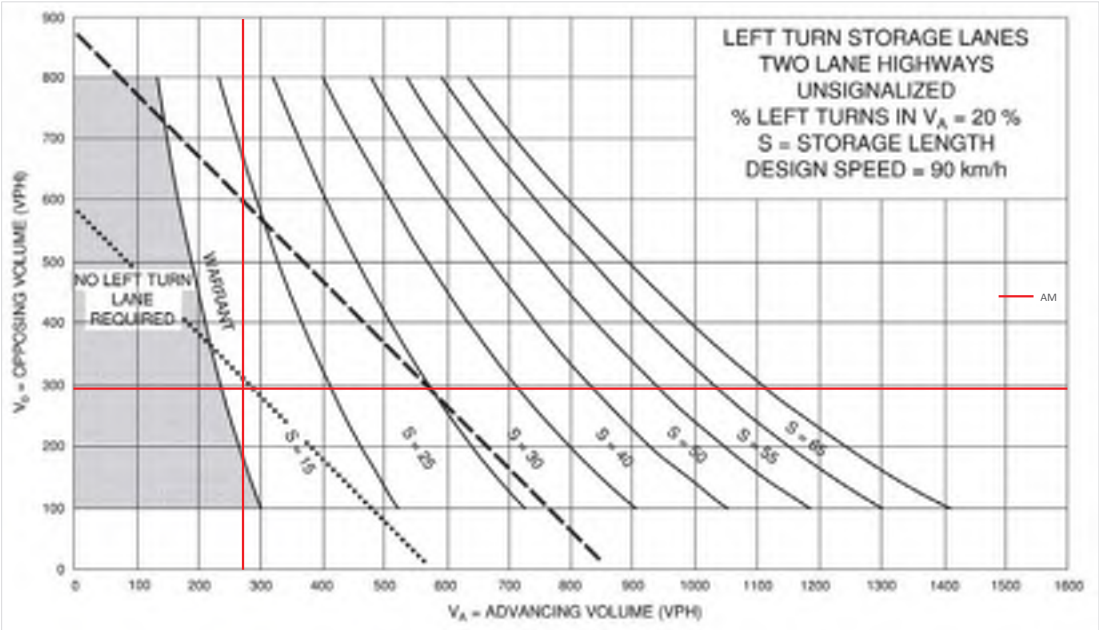
Future Background 2030 - Eastbound Left



Future Background 2035 - Eastbound Left



Future Total 2030 - Eastbound Left



Flewellyn Road at Street 19

Future Background 2030

Design Speed: Yes

90 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	23	288	0	0	159	26	0	0	0	61	0	61	7.4%	311	185
PM	52	215	0	0	312	60	0	0	0	43	0	43	19.5%	267	372

Future Background 2035

Design Speed: Yes

90 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	23	288	0	0	163	26	0	0	0	61	0	61	7.4%	311	189
PM	52	220	0	0	312	60	0	0	0	43	0	43	19.1%	272	372

Future Total 2030

Design Speed: Yes

90 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	50	288	0	0	159	60	0	0	0	139	0	137	14.8%	338	219
PM	110	215	0	0	312	133	0	0	0	98	0	97	33.8%	325	445

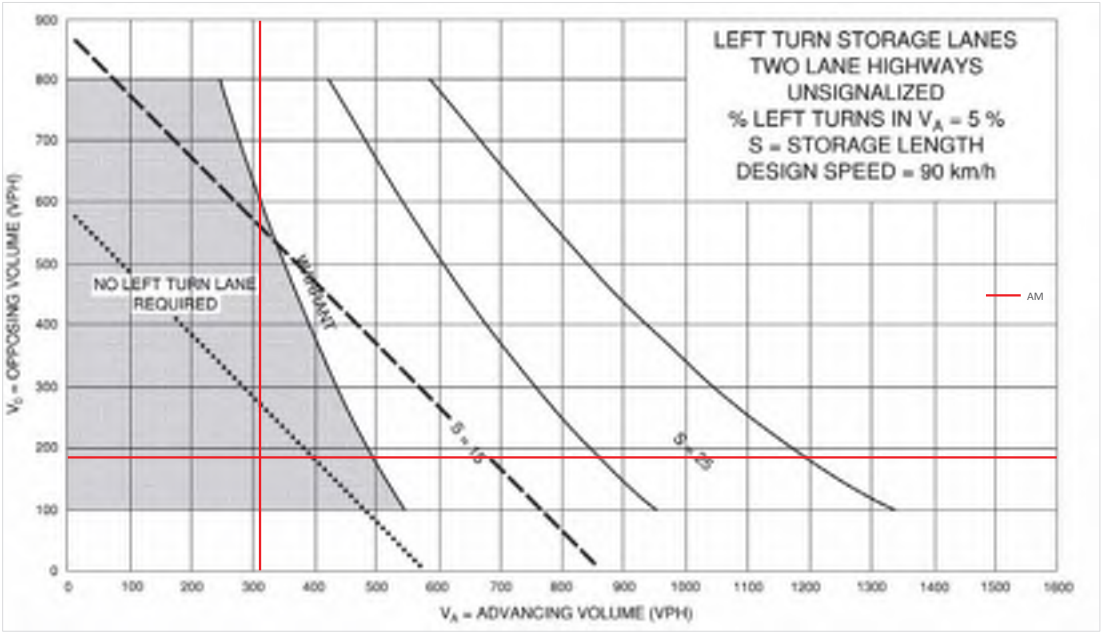
Future Total 2035

Design Speed: Yes

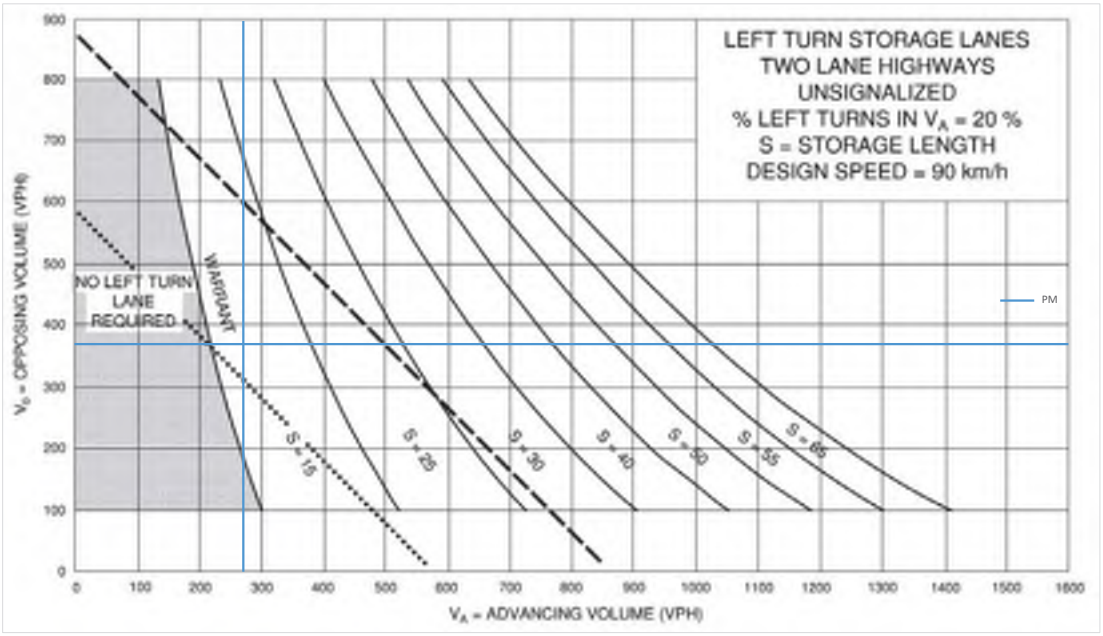
90 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	50	288	0	0	163	60	0	0	0	139	0	137	14.8%	338	223
PM	110	220	0	0	312	133	0	0	0	98	0	97	33.3%	330	445

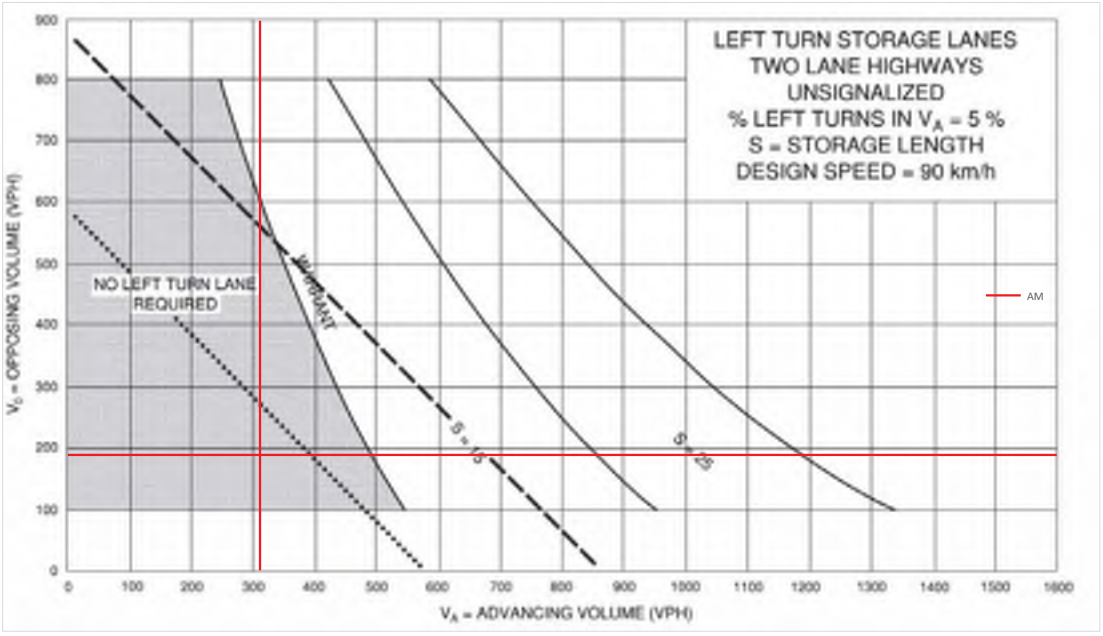
Future Background 2030 - Eastbound Left



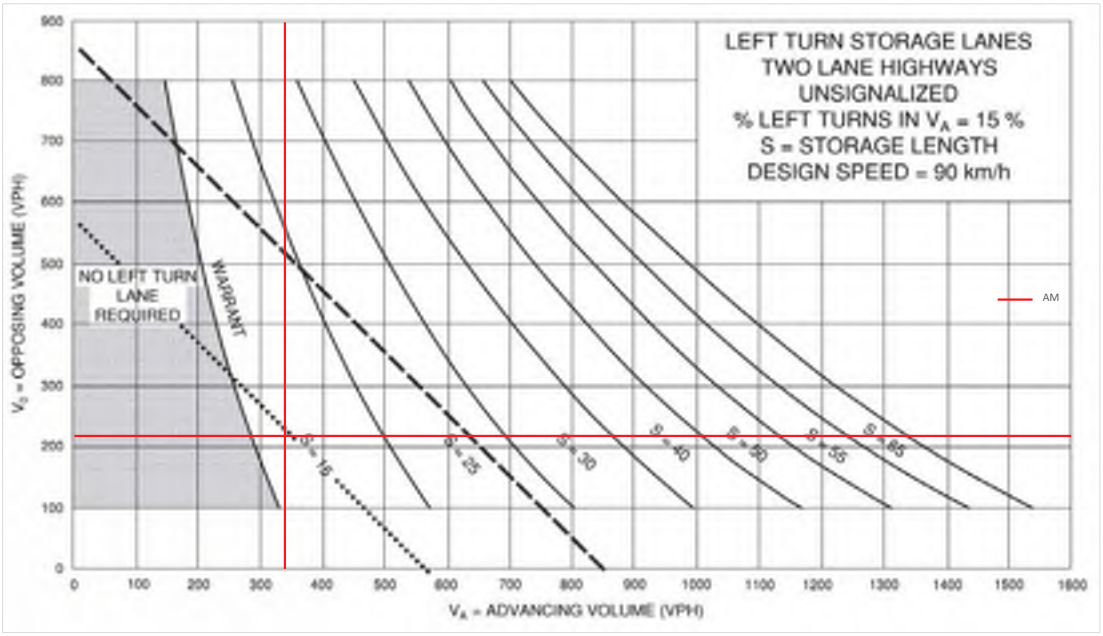
Future Background 2035 - Eastbound Left



Future Background 2035 - Eastbound Left



Future Total 2030 - Eastbound Left



Shea Road at Street 21

Future Background 2030

Design Speed							Yes								
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	41	0	12				5	319	0	0	288	18	1.5%	324	306
PM	29	0	9				12	312	0	0	313	40	3.7%	324	353

Future Background 2035

Design Speed							Yes								
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	41	0	12				5	341	0	0	325	18	1.4%	346	343
PM	29	0	9				12	348	0	0	332	40	3.3%	360	372

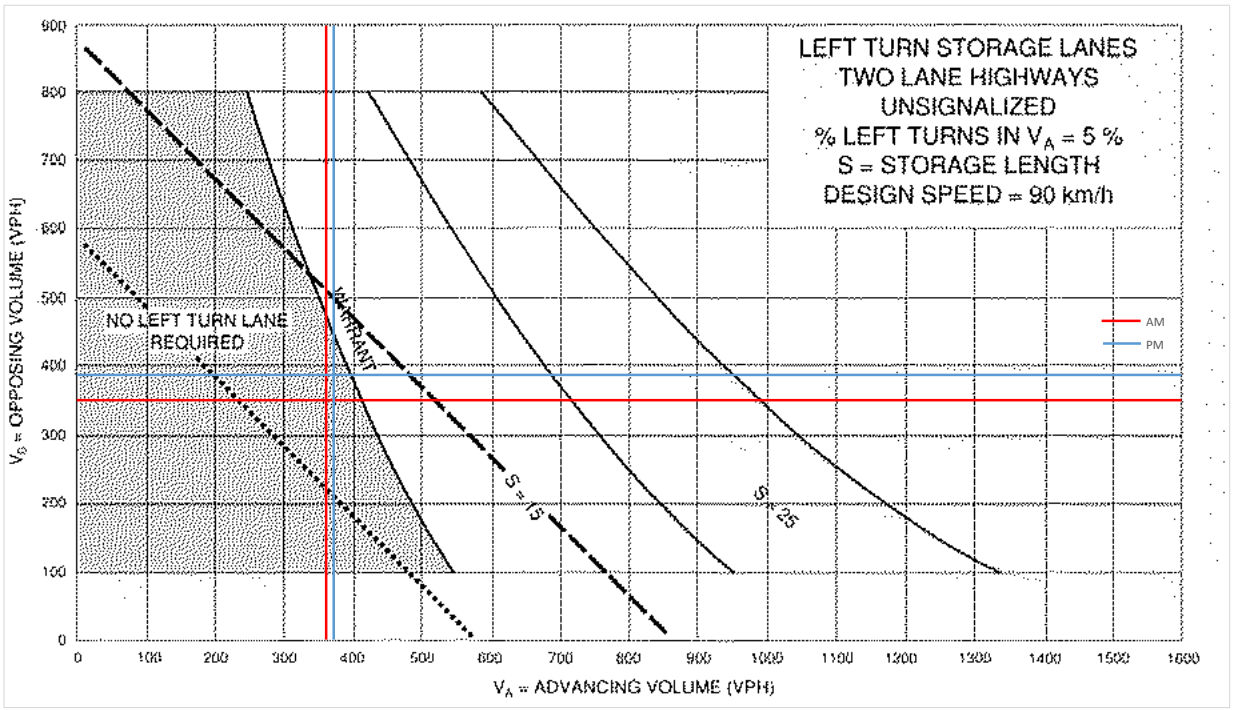
Future Total 2030

Design Speed							Yes								
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	45	0	14				6	333	0	0	294	20	1.8%	339	314
PM	32	0	10				14	322	0	0	326	43	4.2%	336	369

Future Total 2035

Design Speed							Yes								
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	45	0	14				6	355	0	0	331	20	1.7%	361	351
PM	32	0	10				14	358	0	0	345	43	3.8%	372	388

Future Total 2035 - Northbound Left



Shea Road at Street 22

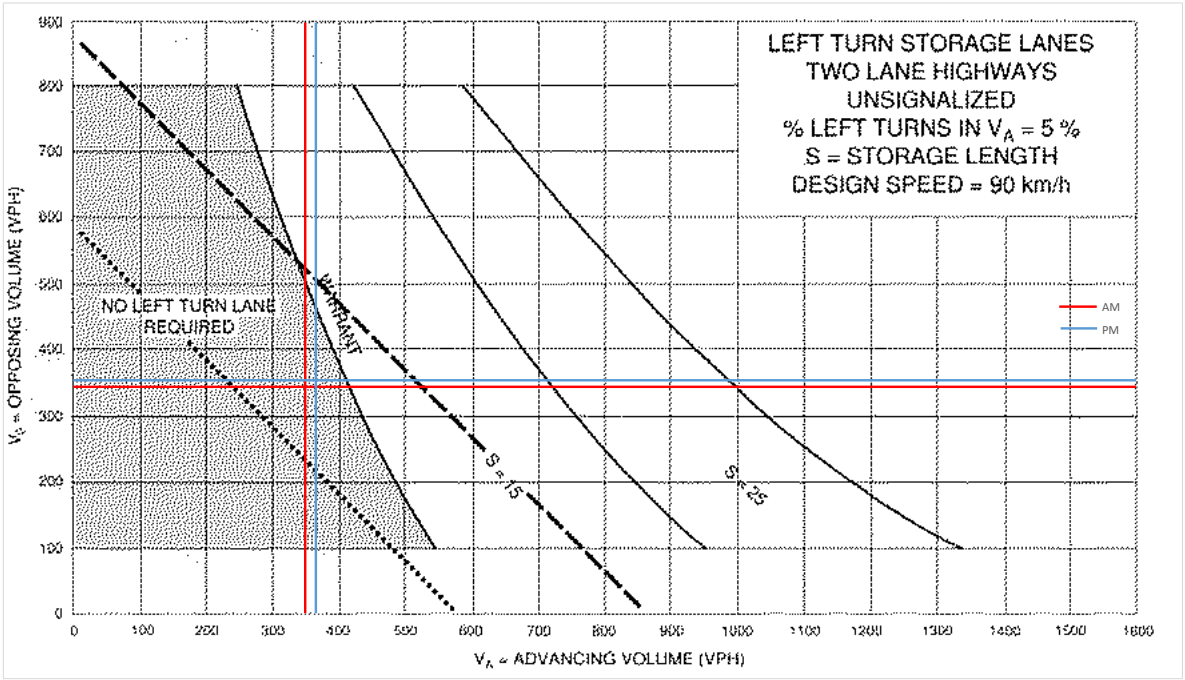
Future Total 2030

Design Speed							Yes								
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	14	0	4				2	325	0	0	302	6	0.6%	327	308
PM	10	0	3				3	326	0	0	323	13	0.9%	329	336

Future Total 2035

Design Speed							Yes								
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	14	0	4				2	347	0	0	339	6	0.6%	349	345
PM	10	0	3				3	362	0	0	342	13	0.8%	365	355

Future Total 2035 - Northbound Left



Appendix G

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition	# Vehicles	# Motorcycles	# Bicycles	# Pedestrians
4/22/2018	2018	11:30	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
5/15/2018	2018	13:45	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
7/30/2018	2018	17:09	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
8/31/2018	2018	17:29	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
11/16/2018	2018	9:35	FLEWELLYN RD @ SHEA RD (0000398)	03 - Snow	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	03 - Loose snow	0	0	0	0
11/28/2018	2018	18:43	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	07 - Dark	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
1/31/2019	2019	16:50	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	05 - Dusk	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
3/29/2019	2019	17:26	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
5/4/2019	2019	15:59	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
6/3/2019	2019	13:50	FLEWELLYN RD @ SHEA RD (0000398)	02 - Rain	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
11/7/2019	2019	7:51	FLEWELLYN RD @ SHEA RD (0000398)	03 - Snow	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	06 - Ice	0	0	0	0
2/13/2020	2020	7:08	FLEWELLYN RD @ SHEA RD (0000398)	03 - Snow	03 - Dawn	02 - Stop sign	0	03 - P.D. only	02 - Angle	02 - Wet	0	0	0	0
11/1/2020	2020	12:17	FLEWELLYN RD @ SHEA RD (0000398)	02 - Rain	01 - Daylight	02 - Stop sign	0	03 - P.D. only	07 - SMV other	02 - Wet	0	0	0	0
6/16/2021	2021	15:15	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
9/21/2021	2021	16:17	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
10/23/2021	2021	14:48	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
1/1/2022	2022	3:01	FLEWELLYN RD @ SHEA RD (0000398)	07 - Fog, mist, smoke, dust	07 - Dark	02 - Stop sign	0	02 - Non-fatal injury	07 - SMV other	02 - Wet	0	0	0	0
1/14/2022	2022	16:26	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
2/22/2022	2022	19:20	FLEWELLYN RD @ SHEA RD (0000398)	04 - Freezing Rain	07 - Dark	02 - Stop sign	0	03 - P.D. only	02 - Angle	06 - Ice	0	0	0	0
2/24/2022	2022	7:11	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	03 - Dawn	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
7/10/2022	2022	11:13	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
8/23/2022	2022	16:46	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
9/2/2022	2022	20:11	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	07 - Dark	02 - Stop sign	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	0	1	0	0
3/8/2018	2018	19:35	FERNBANK RD @ SHEA RD (0000399)	03 - Snow	07 - Dark	11 - Roundabout	0	03 - P.D. only	03 - Rear end	06 - Ice	0	0	0	0
7/27/2018	2018	18:03	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
8/10/2018	2018	11:00	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
11/14/2018	2018	7:46	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
1/21/2019	2019	14:03	FERNBANK RD @ SHEA RD (0000399)	05 - Drifting Snow	01 - Daylight	11 - Roundabout	0	03 - P.D. only	07 - SMV other	05 - Packed snow	0	0	0	0
2/26/2019	2019	8:58	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
4/1/2019	2019	7:10	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
11/6/2019	2019	7:15	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	03 - Dawn	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
12/4/2019	2019	10:28	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	02 - Wet	0	0	0	0
1/13/2020	2020	18:30	FERNBANK RD @ SHEA RD (0000399)	03 - Snow	07 - Dark	11 - Roundabout	0	03 - P.D. only	03 - Rear end	06 - Ice	0	0	0	0
10/23/2020	2020	19:23	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	07 - Dark	11 - Roundabout	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2/14/2021	2021	17:44	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	07 - Dark	11 - Roundabout	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	0	0	0	0
1/12/2022	2022	9:00	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	07 - SMV other	06 - Ice	0	0	0	0
2/12/2022	2022	10:57	FERNBANK RD @ SHEA RD (0000399)	04 - Freezing Rain	01 - Daylight	11 - Roundabout	0	03 - P.D. only	07 - SMV other	06 - Ice	0	0	0	0
3/3/2022	2022	10:00	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	99 - Other	01 - Dry	0	0	0	0
11/16/2018	2018	18:23	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	03 - Loose snow	0	0	0	0
1/10/2019	2019	9:15	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	03 - Snow	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	05 - Packed snow	0	0	0	0
1/24/2019	2019	8:33	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	04 - Freezing Rain	01 - Daylight	10 - No control	0	03 - P.D. only	07 - SMV other	04 - Slush	0	0	0	0
9/27/2019	2019	20:05	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
9/27/2020	2020	23:15	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
11/9/2020	2020	6:36	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
12/2/2021	2021	19:47	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	02 - Rain	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	02 - Wet	0	0	0	0
8/27/2018	2018	6:10	SHEA RD btwn FERNBANK RD & FLEWELLYN RD (__3ZABGL)	01 - Clear	03 - Dawn	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
11/9/2018	2018	23:17	SHEA RD btwn FERNBANK RD & FLEWELLYN RD (__3ZABGL)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	03 - Loose snow	0	0	0	0
2/19/2022	2022	17:29	SHEA RD btwn FERNBANK RD & FLEWELLYN RD (__3ZABGL)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	06 - Ice	0	0	0	0

Appendix H

MMLOS Analysis

CGH TRANSPORTATION

Multi-Modal Level of Service - Segments Form

Consultant	**CGH Transportation Inc.**	**Project**	**5993 Flewellyn**
Scenario	**Existing/Future**	**Date**	**10/4/2024**
Comments			

SEGMENTS			Shea Road	Flewellyn Road	New Local Road
			Ex/Fu	Ex/Fu	Fu
Pedestrian	Sidewalk Width Boulevard Width		no sidewalk n/a	no sidewalk n/a	≥ 2 m < 0.5
	Avg Daily Curb Lane Traffic Volume		> 3000	≤ 3000	≤ 3000
	Operating Speed On-Street Parking		> 60 km/h no	> 60 km/h no	≤ 30 km/h yes
	Exposure to Traffic PLoS	**F**	**F**	**F**	**A**
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		-	-	-
	Level of Service	**F**	**F**	**F**	**A**
Bicycle	Type of Cycling Facility		Mixed Traffic	Mixed Traffic	Mixed Traffic
	Number of Travel Lanes		2-3 lanes total	2-3 lanes total	2-3 lanes total
	Operating Speed		≥ 60 km/h	≥ 60 km/h	≤ 40 km/h
	# of Lanes & Operating Speed LoS		**F**	**F**	**B**
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS	**F**	-	-	-
	Bike Lane Blockages				
	Blockage LoS		-	-	-
	Median Refuge Width (no median = < 1.8 m)				
	No. of Lanes at Unsignalized Crossing				
	Sidestreet Operating Speed				
	Unsignalized Crossing - Lowest LoS		-	-	-
	Level of Service		**F**	**F**	**B**
Transit	Facility Type				
	Friction or Ratio Transit:Posted Speed	**-**			
	Level of Service		**-**	**-**	**-**
Truck	Truck Lane Width				
	Travel Lanes per Direction	**-**			
	Level of Service		**-**	**-**	**-**

Appendix I

TDM Checklist

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☐
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☐
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

TDM Measures Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

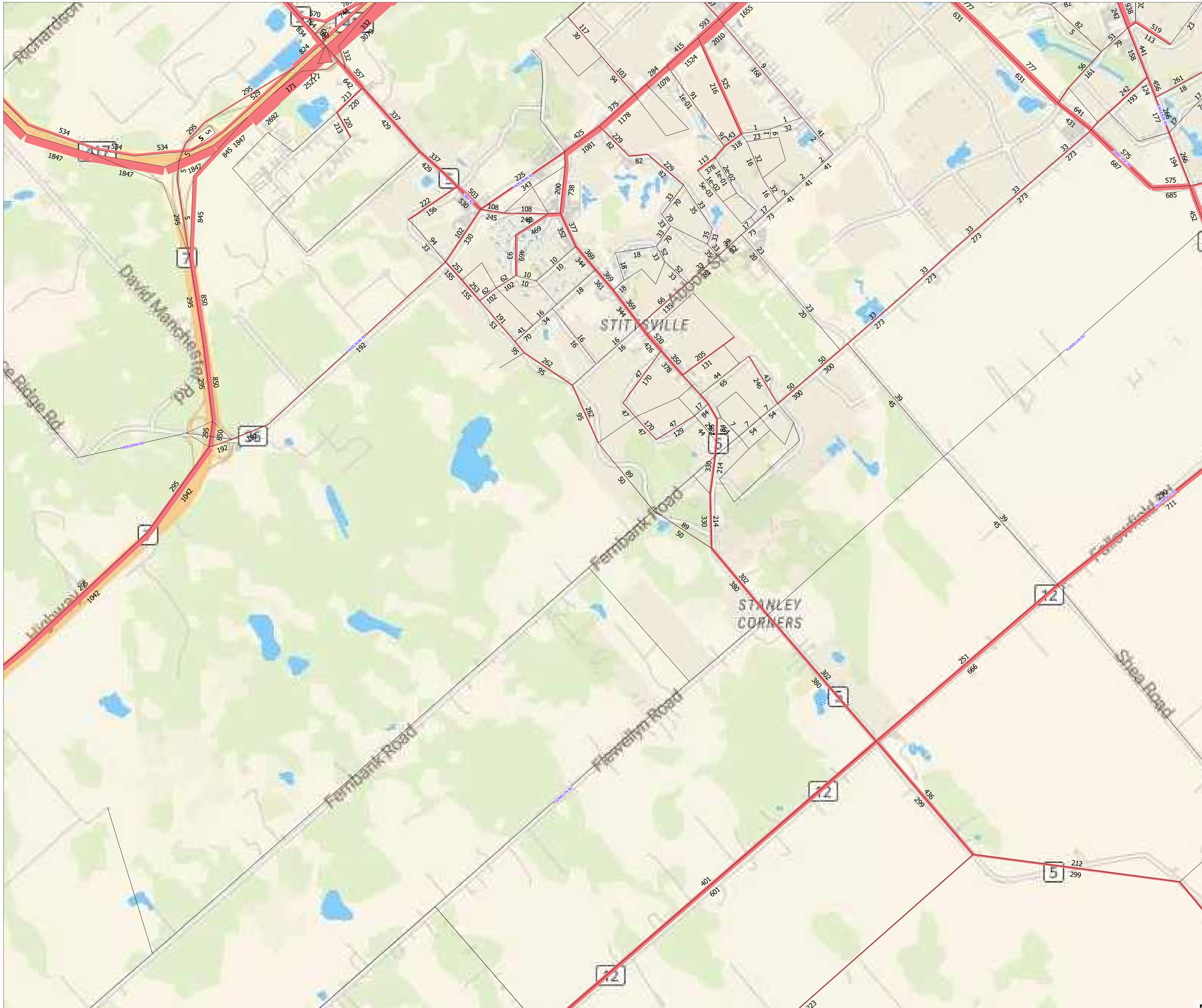
		TDM measures: *Residential developments*	Check if proposed & add descriptions
	3.	**TRANSIT**	
	3.1	**Transit information**	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☐
BETTER	3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
	3.2	**Transit fare incentives**	
BASIC ★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐
BETTER	3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☑
	3.3	**Enhanced public transit service**	
BETTER ★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☑
	3.4	**Private transit service**	
BETTER	3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
	4.	**CARSHARING & BIKESHARING**	
	4.1	**Bikeshare stations & memberships**	
BETTER	4.1.1	Contract with provider to install on-site bikeshare station *(multi-family)*	☐
BETTER	4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
	4.2	**Carshare vehicles & memberships**	
BETTER	4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER	4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
	5.	**PARKING**	
	5.1	**Priced parking**	
BASIC ★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐
BASIC ★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☐

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☑
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

Appendix J

TRANS Model

CGH TRANSPORTATION



TRANS Regional Model

Version 2.16 - Assigned Dec, 2021

AM Peak Hour Total Traffic Volume

Stittsville Growth

2011 Model - Basecase

User Initials: TIMW
Plot Prepared: Dec, 2021
EMME Scenario: 23711

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

500 1000 1500 2000

The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

TRANS Regional Model

Version 2.16 - Assigned Dec, 2021

AM Peak Hour Total Traffic Volume

Stittsville Growth

2031 Model - Basecase

User Initials: TIMW
Plot Prepared: Dec, 2021
EMME Scenario: 21811

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

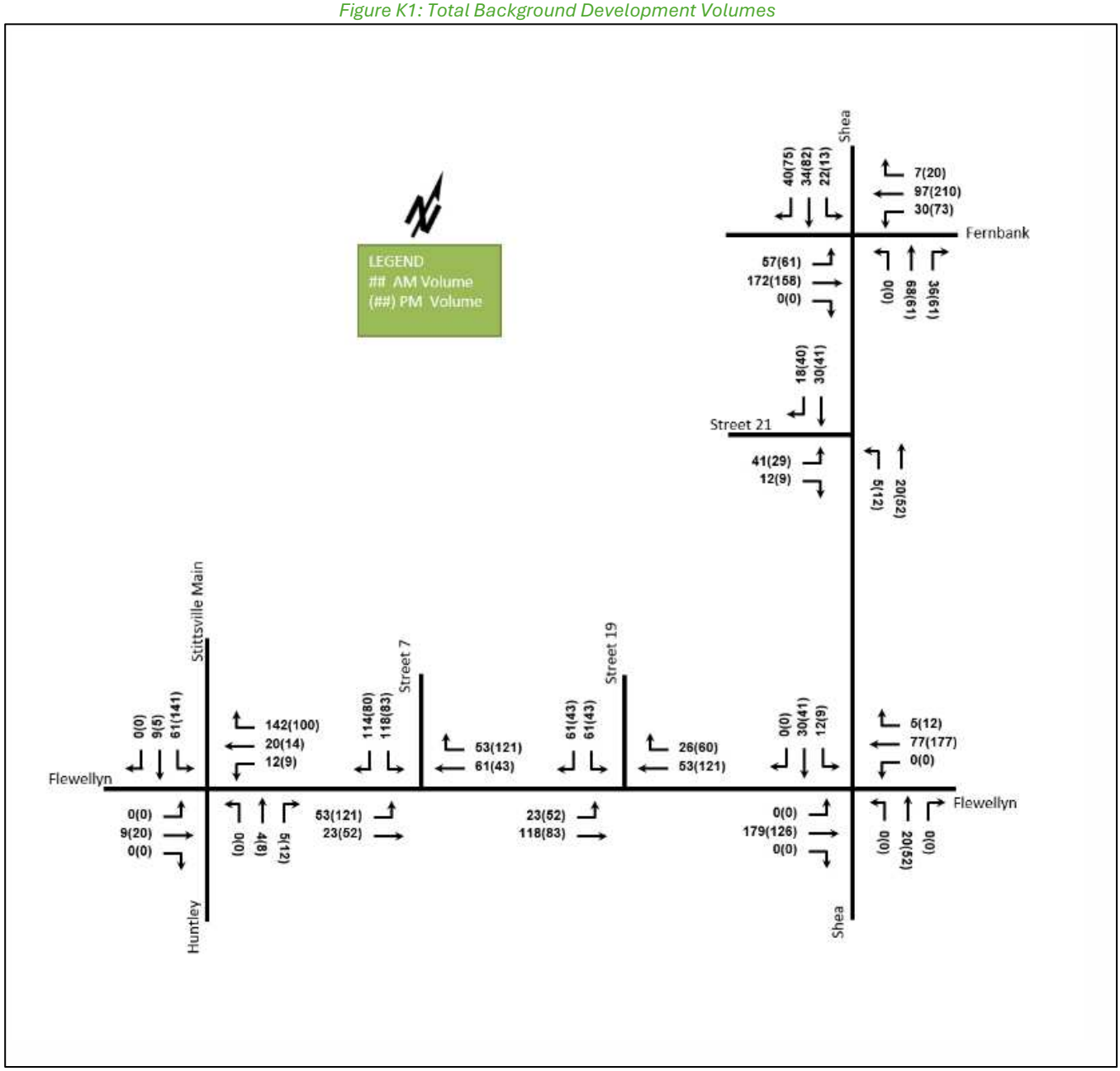
500 1000 1500 2000

Appendix K

Background Development

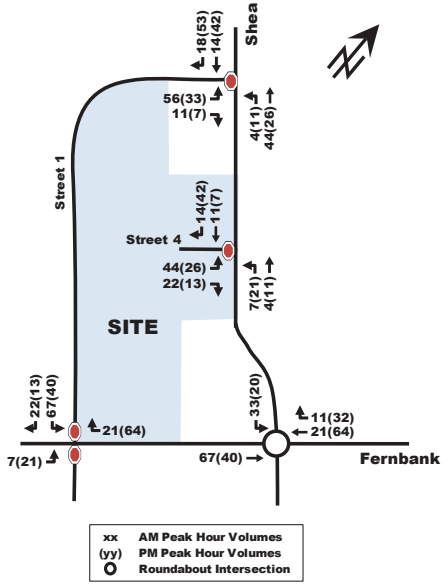
CGH TRANSPORTATION

Figure K1: Total Background Development Volumes



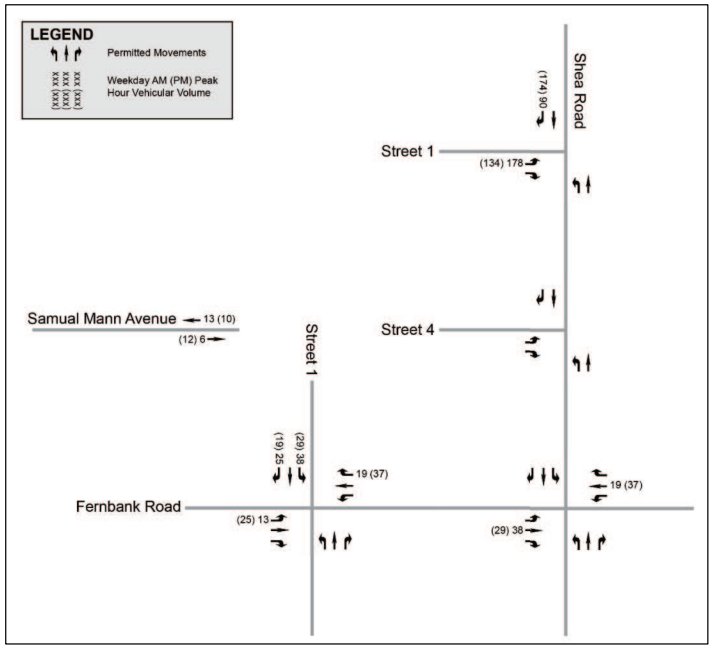
5957 & 5969 Fernbank Road (Parsons Addendum, 2020)

Figure 3: Total 'New' Auto Trips

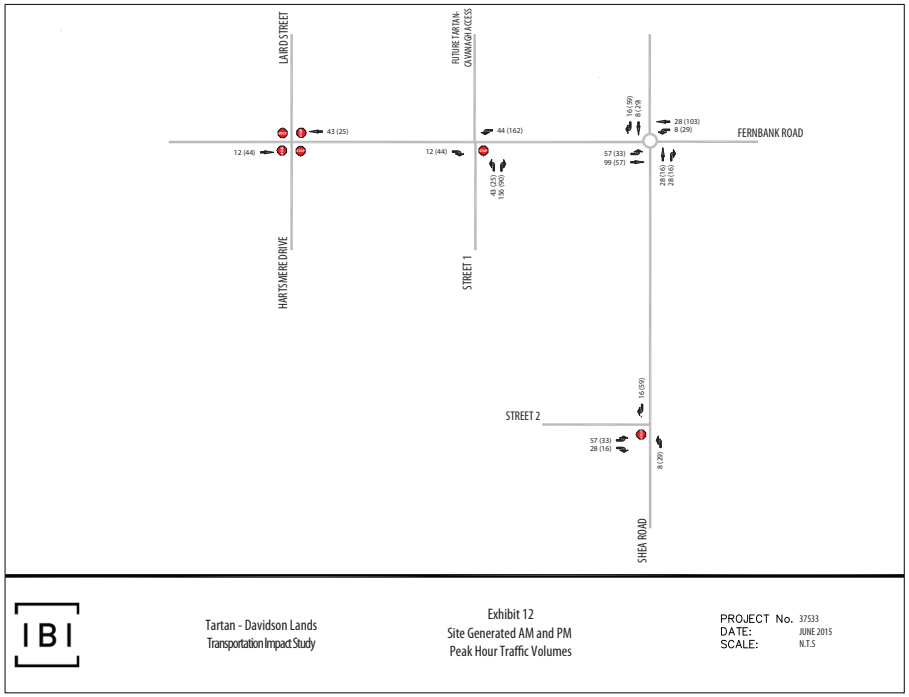


6041 Fernbank Road (IBI Group Addendum, 2021)

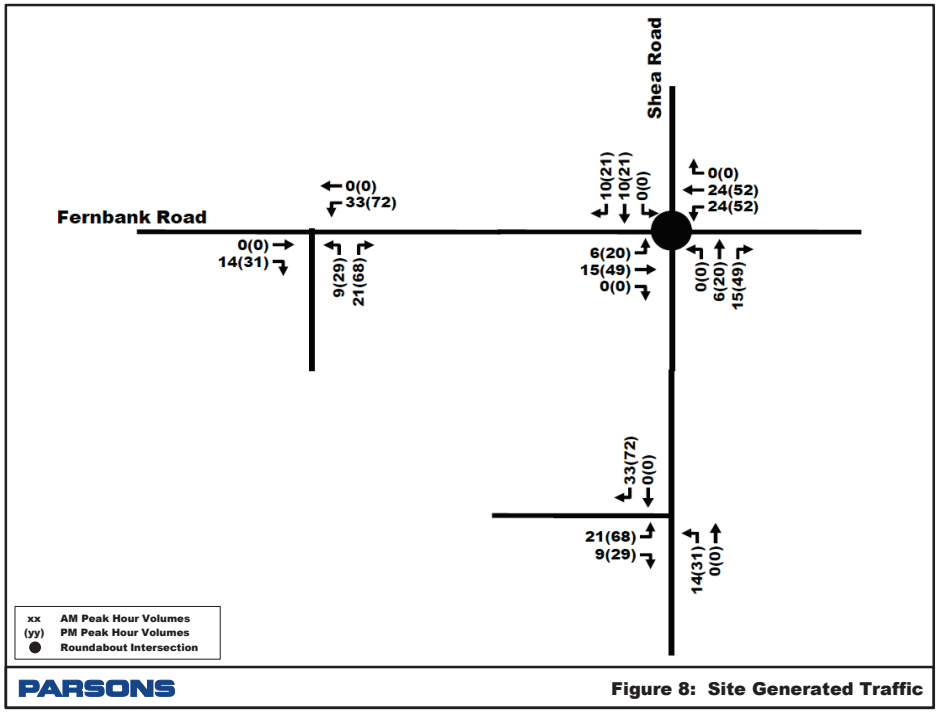
Figure 1 - Updated Site-Generated Traffic



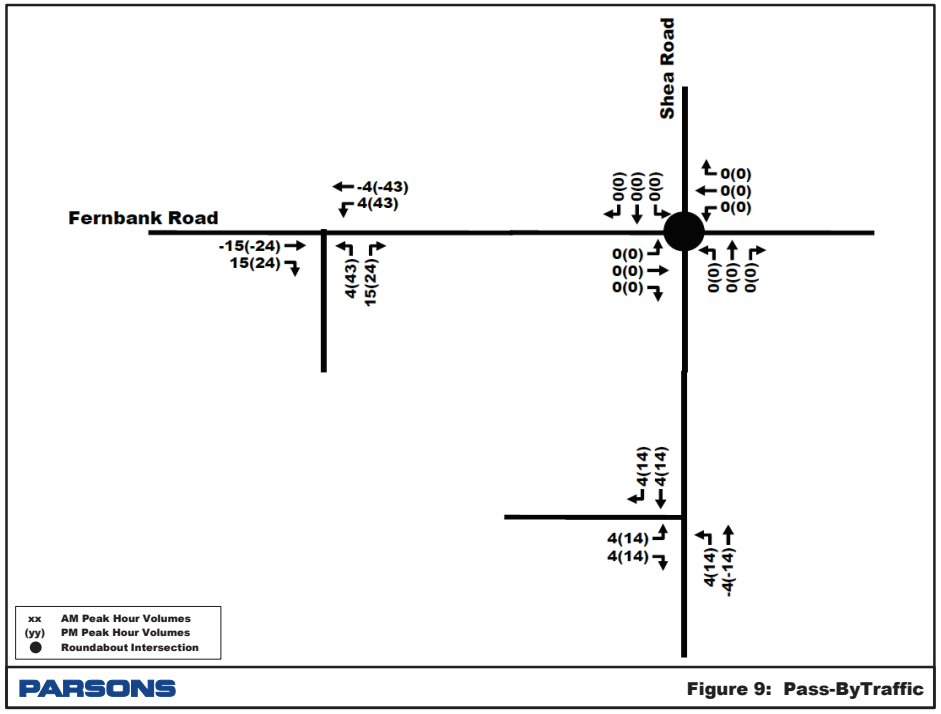
5993 Flewellyn Road (Davidson Lands) (IBI Group, 2015)



5960 Fernbank Road (Fernbank Shea, Commercial Development) (Parsons, 2016)



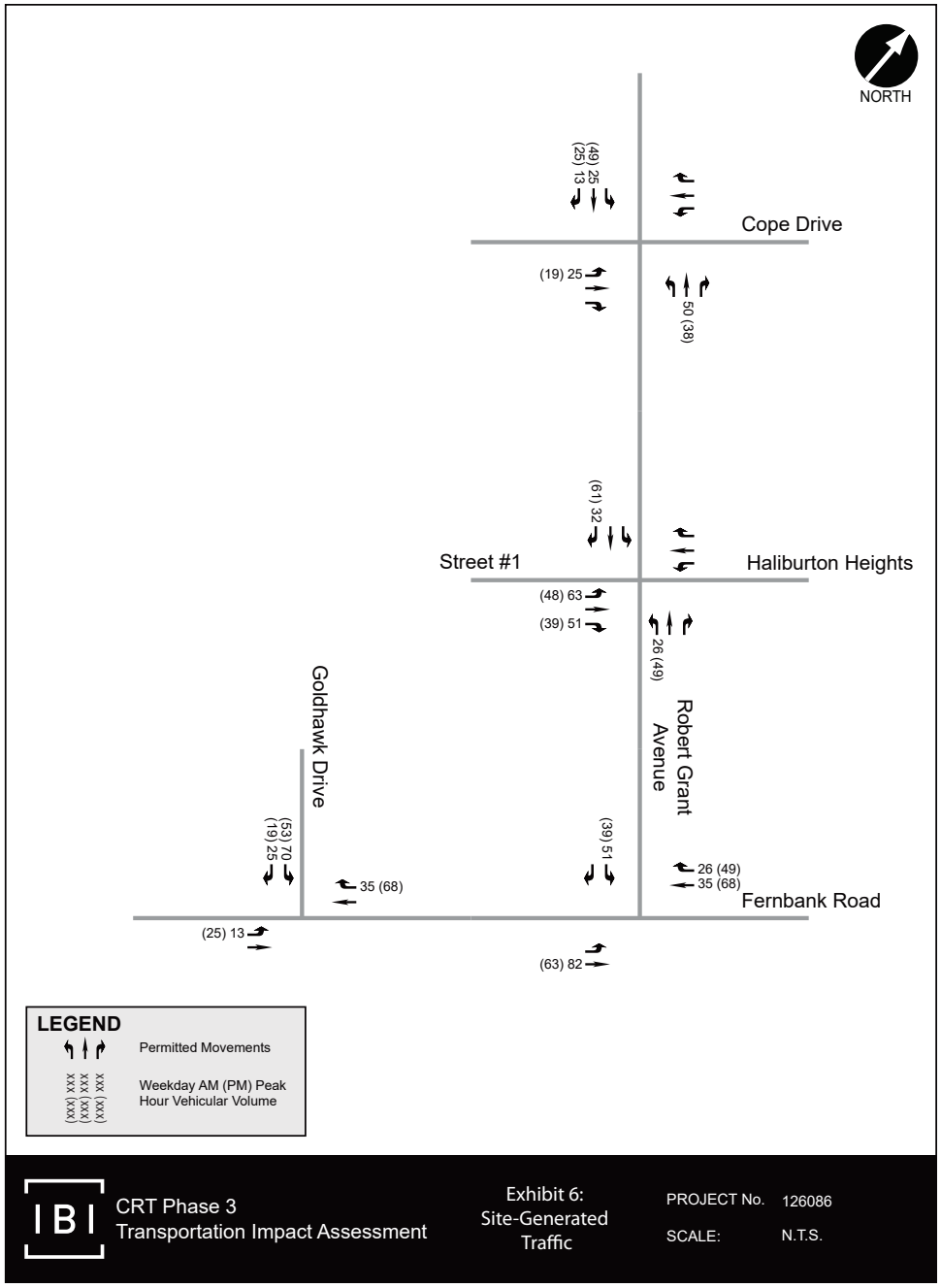
5960 Fernbank Road (Fernbank Shea, Commercial Development) (Parsons, 2016)



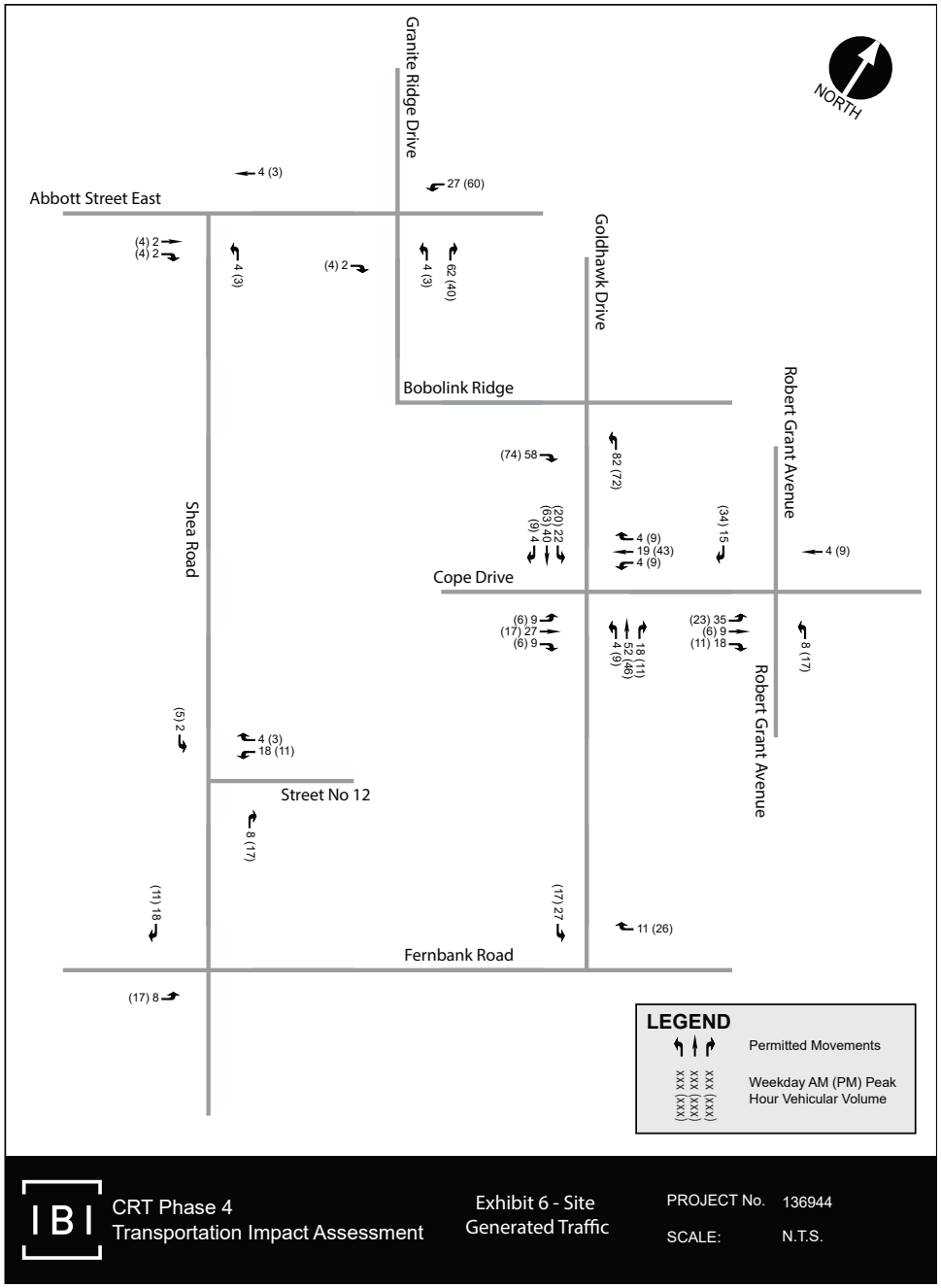
PARSONS

Figure 9: Pass-ByTraffic

5725 Fernbank Road (CRT Phase 3) (IBI Group, 2021)



5500 Abbott Street & 1555 Shea Road (CRT Phase 4) (IBI Group, 2022)



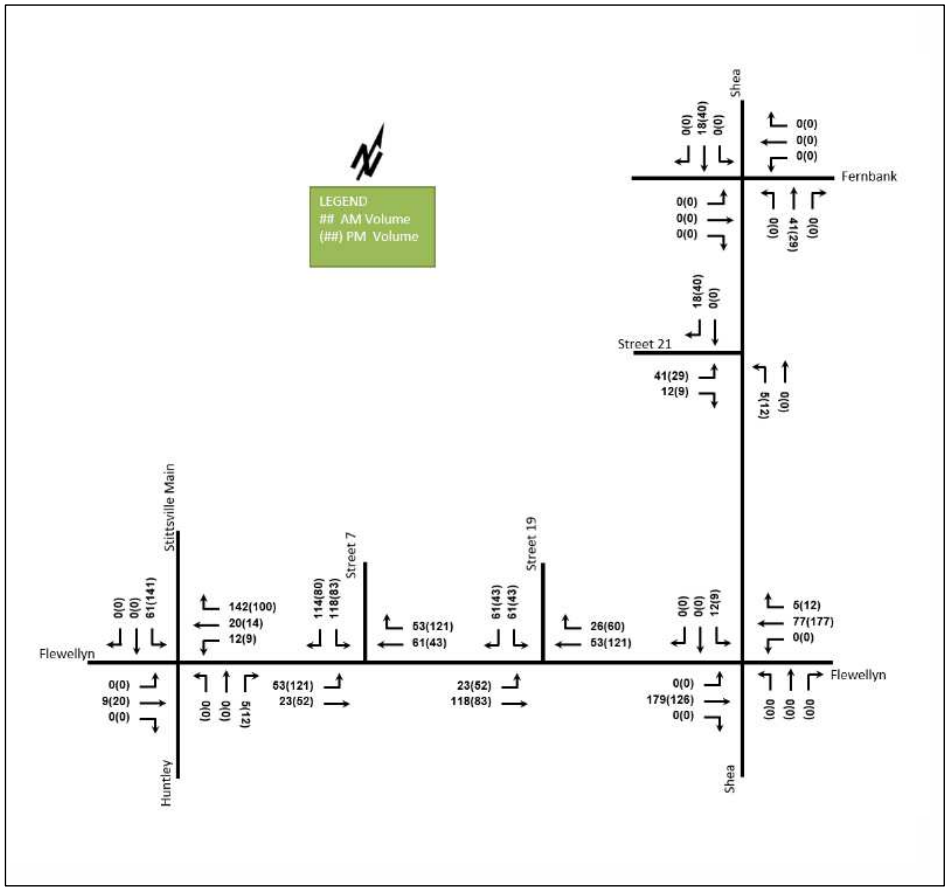
IBI CRT Phase 4 Transportation Impact Assessment

Exhibit 6 - Site Generated Traffic

PROJECT No. 136944

SCALE: N.T.S.

5993 & 6115 Flewellyn Road & 6070 Fernbank Road & 59 Aridus Crescent (TIA is not available) (CGH, 2024)



Appendix L

Synchro and Sidra Intersection Worksheets – 2030 Future Background Conditions

Intersection	
Intersection Delay, s/veh	17.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	38	123	15	19	88	171	17	237	17	100	261	53
Future Vol, veh/h	38	123	15	19	88	171	17	237	17	100	261	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	123	15	19	88	171	17	237	17	100	261	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.1	14.7	15.7	21.3
HCM LOS	B	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	22%	7%	24%
Vol Thru, %	87%	70%	32%	63%
Vol Right, %	6%	9%	62%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	271	176	278	414
LT Vol	17	38	19	100
Through Vol	237	123	88	261
RT Vol	17	15	171	53
Lane Flow Rate	271	176	278	414
Geometry Grp	1	1	1	1
Degree of Util (X)	0.491	0.329	0.474	0.689
Departure Headway (Hd)	6.516	6.733	6.143	5.993
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	553	532	584	600
Service Time	4.572	4.798	4.2	4.043
HCM Lane V/C Ratio	0.49	0.331	0.476	0.69
HCM Control Delay	15.7	13.1	14.7	21.3
HCM Lane LOS	C	B	B	C
HCM 95th-tile Q	2.7	1.4	2.5	5.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	347	462	33	92	297	75	18	283	111	131	199	239
Future Volume (vph)	347	462	33	92	297	75	18	283	111	131	199	239
Satd. Flow (prot)	0	1678	0	0	1659	0	0	1597	0	0	1574	0
Flt Permitted		0.980			0.990			0.998			0.989	
Satd. Flow (perm)	0	1678	0	0	1659	0	0	1597	0	0	1574	0
Lane Group Flow (vph)	0	842	0	0	464	0	0	412	0	0	569	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Control Type: Roundabout			
Intersection Capacity Utilization	146.6%	ICU Level of Service H	
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	19

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	60	263	26	2	124	22	8	242	13	37	212	51
Future Vol, veh/h	60	263	26	2	124	22	8	242	13	37	212	51
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	2	4	2	2	12	13	5	2	2	3	8
Mvmt Flow	60	263	26	2	124	22	8	242	13	37	212	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	151	0	0	294	0	0	677	556	286	673	558	145
Stage 1	-	-	-	-	-	-	401	401	-	144	144	-
Stage 2	-	-	-	-	-	-	276	155	-	529	414	-
Critical Hdwy	4.17	-	-	4.12	-	-	7.23	6.55	6.22	7.12	6.53	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.617	4.045	3.318	3.518	4.027	3.372
Pot Cap-1 Maneuver	1400	-	-	1268	-	-	352	435	753	369	437	887
Stage 1	-	-	-	-	-	-	604	596	-	859	776	-
Stage 2	-	-	-	-	-	-	707	764	-	533	591	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1395	-	-	1263	-	-	188	409	747	184	411	880
Mov Cap-2 Maneuver	-	-	-	-	-	-	188	409	-	184	411	-
Stage 1	-	-	-	-	-	-	571	563	-	812	771	-
Stage 2	-	-	-	-	-	-	480	759	-	282	558	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.1	29.1	39.9
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	404	1395	-	-	1263	-	-	387
HCM Lane V/C Ratio	0.651	0.043	-	-	0.002	-	-	0.775
HCM Control Delay (s)	29.1	7.7	0	-	7.9	0	-	39.9
HCM Lane LOS	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	4.5	0.1	-	-	0	-	-	6.5

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑			↰	↱	
Traffic Vol, veh/h	41	12	5	319	288	18
Future Vol, veh/h	41	12	5	319	288	18
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	12	5	319	288	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	636	307	311	0	-	0
Stage 1	302	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	442	733	1249	-	-	-
Stage 1	750	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	436	727	1244	-	-	-
Mov Cap-2 Maneuver	436	-	-	-	-	-
Stage 1	743	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1244	-	479	-	-
HCM Lane V/C Ratio	0.004	-	0.111	-	-
HCM Control Delay (s)	7.9	0	13.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	288	159	26	61	61
Future Vol, veh/h	23	288	159	26	61	61
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	288	159	26	61	61

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	190	0	-	0	516	182
Stage 1	-	-	-	-	177	-
Stage 2	-	-	-	-	339	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1384	-	-	-	519	861
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1379	-	-	-	504	854
Mov Cap-2 Maneuver	-	-	-	-	504	-
Stage 1	-	-	-	-	834	-
Stage 2	-	-	-	-	719	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1379	-	-	-	634
HCM Lane V/C Ratio	0.017	-	-	-	0.192
HCM Control Delay (s)	7.7	0	-	-	12
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	193	167	53	118	114
Future Vol, veh/h	53	193	167	53	118	114
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	193	167	53	118	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	225	0	-	0	503	204
Stage 1	-	-	-	-	199	-
Stage 2	-	-	-	-	304	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1344	-	-	-	528	837
Stage 1	-	-	-	-	835	-
Stage 2	-	-	-	-	748	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1339	-	-	-	501	831
Mov Cap-2 Maneuver	-	-	-	-	501	-
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	745	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1339	-	-	-	622
HCM Lane V/C Ratio	0.04	-	-	-	0.373
HCM Control Delay (s)	7.8	0	-	-	14.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.7

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FB2030 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.874	33.4	LOS D	8.5	63.3	0.95	1.40	2.39	39.9
2	T1	All MCs	283	5.0	283	5.0	0.874	28.1	LOS D	8.5	63.3	0.95	1.40	2.39	40.5
3	R2	All MCs	111	13.0	111	13.0	0.874	29.3	LOS D	8.5	63.3	0.95	1.40	2.39	40.2
Approach			412	7.2	412	7.2	0.874	28.7	LOS D	8.5	63.3	0.95	1.40	2.39	40.4
East: Fernbank															
4	L2	All MCs	92	5.0	92	5.0	0.690	18.4	LOS C	5.4	39.2	0.86	0.98	1.31	47.4
5	T1	All MCs	297	4.0	297	4.0	0.690	13.2	LOS B	5.4	39.2	0.86	0.98	1.31	48.2
6	R2	All MCs	75	2.0	75	2.0	0.690	12.8	LOS B	5.4	39.2	0.86	0.98	1.31	47.9
Approach			464	3.9	464	3.9	0.690	14.2	LOS B	5.4	39.2	0.86	0.98	1.31	48.0
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.660	14.7	LOS B	5.8	42.2	0.81	0.80	1.05	49.5
8	T1	All MCs	199	7.0	199	7.0	0.660	9.8	LOS A	5.8	42.2	0.81	0.80	1.05	50.3
9	R2	All MCs	239	5.0	239	5.0	0.660	9.5	LOS A	5.8	42.2	0.81	0.80	1.05	50.0
Approach			569	5.5	569	5.5	0.660	10.8	LOS B	5.8	42.2	0.81	0.80	1.05	50.0
West: Fernbank															
10	L2	All MCs	347	4.0	347	4.0	0.979	40.3	LOS E	29.7	214.3	1.00	1.81	3.10	36.8
11	T1	All MCs	462	3.0	462	3.0	0.979	35.1	LOS E	29.7	214.3	1.00	1.81	3.10	37.2
12	R2	All MCs	33	3.0	33	3.0	0.979	35.0	LOS D	29.7	214.3	1.00	1.81	3.10	37.1
Approach			842	3.4	842	3.4	0.979	37.3	LOS E	29.7	214.3	1.00	1.81	3.10	37.0
All Vehicles			2287	4.7	2287	4.7	0.979	24.4	LOS C	29.7	214.3	0.92	1.32	2.10	42.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Intersection	
Intersection Delay, s/veh	25.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	99	14	15	126	171	27	246	26	174	278	47
Future Vol, veh/h	44	99	14	15	126	171	27	246	26	174	278	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	99	14	15	126	171	27	246	26	174	278	47
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.1	18.2	18.2	37.7
HCM LOS	B	C	C	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	28%	5%	35%
Vol Thru, %	82%	63%	40%	56%
Vol Right, %	9%	9%	55%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	299	157	312	499
LT Vol	27	44	15	174
Through Vol	246	99	126	278
RT Vol	26	14	171	47
Lane Flow Rate	299	157	312	499
Geometry Grp	1	1	1	1
Degree of Util (X)	0.563	0.326	0.571	0.868
Departure Headway (Hd)	6.782	7.486	6.702	6.368
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	535	482	543	574
Service Time	4.782	5.504	4.702	4.368
HCM Lane V/C Ratio	0.559	0.326	0.575	0.869
HCM Control Delay	18.2	14.1	18.2	37.7
HCM Lane LOS	C	B	C	E
HCM 95th-tile Q	3.5	1.4	3.6	9.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	161	542	34	149	625	115	30	249	110	60	245	187
Future Volume (vph)	161	542	34	149	625	115	30	249	110	60	245	187
Satd. Flow (prot)	0	1692	0	0	1674	0	0	1642	0	0	1604	0
Flt Permitted		0.989			0.992			0.996			0.994	
Satd. Flow (perm)	0	1692	0	0	1674	0	0	1642	0	0	1604	0
Lane Group Flow (vph)	0	737	0	0	889	0	0	389	0	0	492	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Control Type: Roundabout			
Intersection Capacity Utilization 113.9%		ICU Level of Service H	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	23.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	53	194	11	2	281	45	16	226	17	23	228	71
Future Vol, veh/h	53	194	11	2	281	45	16	226	17	23	228	71
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	2	18	2	2	2	6	2	6	2	2	3
Mvmt Flow	53	194	11	2	281	45	16	226	17	23	228	71

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	331	0	0	210	0	0	773	646	210	745	629	314
Stage 1	-	-	-	-	-	-	311	311	-	313	313	-
Stage 2	-	-	-	-	-	-	462	335	-	432	316	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.16	6.52	6.26	7.12	6.52	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.554	4.018	3.354	3.518	4.018	3.327
Pot Cap-1 Maneuver	1212	-	-	1361	-	-	311	390	820	330	399	724
Stage 1	-	-	-	-	-	-	691	658	-	698	657	-
Stage 2	-	-	-	-	-	-	572	643	-	602	655	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1207	-	-	1356	-	-	138	367	814	157	375	718
Mov Cap-2 Maneuver	-	-	-	-	-	-	138	367	-	157	375	-
Stage 1	-	-	-	-	-	-	654	622	-	660	653	-
Stage 2	-	-	-	-	-	-	333	639	-	355	620	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0	41.3	50.6
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	344	1207	-	-	1356	-	-	377
HCM Lane V/C Ratio	0.753	0.044	-	-	0.001	-	-	0.854
HCM Control Delay (s)	41.3	8.1	0	-	7.7	0	-	50.6
HCM Lane LOS	E	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	5.9	0.1	-	-	0	-	-	8.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	9	12	312	313	40
Future Vol, veh/h	29	9	12	312	313	40
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	9	12	312	313	40

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	679	343	358	0	-	0
Stage 1	338	-	-	-	-	-
Stage 2	341	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	417	700	1201	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	409	695	1196	-	-	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	717	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.7	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1196	-	453	-	-
HCM Lane V/C Ratio	0.01	-	0.084	-	-
HCM Control Delay (s)	8	0	13.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	215	312	60	43	43
Future Vol, veh/h	52	215	312	60	43	43
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	215	312	60	43	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	377	0	-	0	671	352
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	324	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1181	-	-	-	422	692
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	733	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1176	-	-	-	398	687
Mov Cap-2 Maneuver	-	-	-	-	398	-
Stage 1	-	-	-	-	677	-
Stage 2	-	-	-	-	730	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	13.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1176	-	-	-	504
HCM Lane V/C Ratio	0.044	-	-	-	0.171
HCM Control Delay (s)	8.2	0	-	-	13.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	121	184	234	121	83	80
Future Vol, veh/h	121	184	234	121	83	80
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	184	234	121	83	80

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	360	0	-	0	731	305
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	431	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1199	-	-	-	389	735
Stage 1	-	-	-	-	752	-
Stage 2	-	-	-	-	655	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1194	-	-	-	342	729
Mov Cap-2 Maneuver	-	-	-	-	342	-
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	652	-

Approach	EB	WB	SB
HCM Control Delay, s	3.3	0	16.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1194	-	-	-	463
HCM Lane V/C Ratio	0.101	-	-	-	0.352
HCM Control Delay (s)	8.4	0	-	-	16.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	1.6

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FB2030 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.652	18.8	LOS C	4.4	32.1	0.84	0.99	1.28	47.4
2	T1	All MCs	249	3.0	249	3.0	0.652	13.7	LOS B	4.4	32.1	0.84	0.99	1.28	48.1
3	R2	All MCs	110	6.0	110	6.0	0.652	13.9	LOS B	4.4	32.1	0.84	0.99	1.28	47.8
Approach			389	3.8	389	3.8	0.652	14.2	LOS B	4.4	32.1	0.84	0.99	1.28	48.0
East: Fernbank															
4	L2	All MCs	149	8.0	149	8.0	1.052	80.4	LOS F	52.7	380.6	1.00	2.80	5.51	26.6
5	T1	All MCs	625	3.0	625	3.0	1.052	74.8	LOS F	52.7	380.6	1.00	2.80	5.51	26.9
6	R2	All MCs	115	2.0	115	2.0	1.052	74.6	LOS F	52.7	380.6	1.00	2.80	5.51	26.8
Approach			889	3.7	889	3.7	1.052	75.7	LOS F	52.7	380.6	1.00	2.80	5.51	26.8
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.837	25.7	LOS D	8.5	62.0	0.95	1.24	1.98	43.3
8	T1	All MCs	245	2.0	245	2.0	0.837	20.6	LOS C	8.5	62.0	0.95	1.24	1.98	44.0
9	R2	All MCs	187	9.0	187	9.0	0.837	21.4	LOS C	8.5	62.0	0.95	1.24	1.98	43.6
Approach			492	4.7	492	4.7	0.837	21.5	LOS C	8.5	62.0	0.95	1.24	1.98	43.7
West: Fernbank															
10	L2	All MCs	161	5.0	161	5.0	0.876	23.0	LOS C	14.2	102.4	1.00	1.17	1.86	44.8
11	T1	All MCs	542	3.0	542	3.0	0.876	17.7	LOS C	14.2	102.4	1.00	1.17	1.86	45.5
12	R2	All MCs	34	3.0	34	3.0	0.876	17.5	LOS C	14.2	102.4	1.00	1.17	1.86	45.2
Approach			737	3.4	737	3.4	0.876	18.8	LOS C	14.2	102.4	1.00	1.17	1.86	45.3
All Vehicles			2507	3.8	2507	3.8	1.052	38.8	LOS E	52.7	380.6	0.97	1.74	3.09	36.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix M

2030 Future Background Conditions– Shea Road at Flewellyn Road with AWSC

CGH TRANSPORTATION

Intersection	
Intersection Delay, s/veh	15.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	60	263	26	2	124	22	8	242	13	37	212	51
Future Vol, veh/h	60	263	26	2	124	22	8	242	13	37	212	51
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	7	2	4	2	2	12	13	5	2	2	3	8
Mvmt Flow	60	263	26	2	124	22	8	242	13	37	212	51
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	17.6	11.7	14.6	14.9
HCM LOS	C	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	17%	1%	12%
Vol Thru, %	92%	75%	84%	71%
Vol Right, %	5%	7%	15%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	263	349	148	300
LT Vol	8	60	2	37
Through Vol	242	263	124	212
RT Vol	13	26	22	51
Lane Flow Rate	263	349	148	300
Geometry Grp	1	1	1	1
Degree of Util (X)	0.46	0.593	0.263	0.5
Departure Headway (Hd)	6.303	6.121	6.392	6.005
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	571	593	561	600
Service Time	4.35	4.121	4.442	4.05
HCM Lane V/C Ratio	0.461	0.589	0.264	0.5
HCM Control Delay	14.6	17.6	11.7	14.9
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	2.4	3.9	1	2.8

Intersection	
Intersection Delay, s/veh	17
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	53	194	11	2	281	45	16	226	17	23	228	71
Future Vol, veh/h	53	194	11	2	281	45	16	226	17	23	228	71
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	2	18	2	2	2	6	2	6	2	2	3
Mvmt Flow	53	194	11	2	281	45	16	226	17	23	228	71
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.9	18.1	15.8	17.7
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	21%	1%	7%
Vol Thru, %	87%	75%	86%	71%
Vol Right, %	7%	4%	14%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	259	258	328	322
LT Vol	16	53	2	23
Through Vol	226	194	281	228
RT Vol	17	11	45	71
Lane Flow Rate	259	258	328	322
Geometry Grp	1	1	1	1
Degree of Util (X)	0.48	0.48	0.582	0.571
Departure Headway (Hd)	6.678	6.699	6.393	6.379
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	536	534	561	564
Service Time	4.758	4.778	4.468	4.453
HCM Lane V/C Ratio	0.483	0.483	0.585	0.571
HCM Control Delay	15.8	15.9	18.1	17.7
HCM Lane LOS	C	C	C	C
HCM 95th-tile Q	2.6	2.6	3.7	3.6

Appendix N

Synchro and Sidra Intersection Worksheets – 2035 Future Background Conditions

Intersection	
Intersection Delay, s/veh	17.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	123	15	19	92	171	17	242	17	100	267	53
Future Vol, veh/h	38	123	15	19	92	171	17	242	17	100	267	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	123	15	19	92	171	17	242	17	100	267	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.3	15	16.1	22.3
HCM LOS	B	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	22%	7%	24%
Vol Thru, %	88%	70%	33%	64%
Vol Right, %	6%	9%	61%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	276	176	282	420
LT Vol	17	38	19	100
Through Vol	242	123	92	267
RT Vol	17	15	171	53
Lane Flow Rate	276	176	282	420
Geometry Grp	1	1	1	1
Degree of Util (X)	0.503	0.333	0.486	0.705
Departure Headway (Hd)	6.567	6.806	6.204	6.04
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	546	526	578	596
Service Time	4.63	4.876	4.265	4.094
HCM Lane V/C Ratio	0.505	0.335	0.488	0.705
HCM Control Delay	16.1	13.3	15	22.3
HCM Lane LOS	C	B	B	C
HCM 95th-tile Q	2.8	1.4	2.6	5.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	347	462	33	92	314	75	18	305	111	131	236	239
Future Volume (vph)	347	462	33	92	314	75	18	305	111	131	236	239
Satd. Flow (prot)	0	1678	0	0	1662	0	0	1601	0	0	1579	0
Flt Permitted		0.980			0.991			0.998			0.989	
Satd. Flow (perm)	0	1678	0	0	1662	0	0	1601	0	0	1579	0
Lane Group Flow (vph)	0	842	0	0	481	0	0	434	0	0	606	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Control Type: Roundabout			
Intersection Capacity Utilization 150.8%		ICU Level of Service H	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	17
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	263	26	2	128	22	8	264	13	37	249	51
Future Vol, veh/h	60	263	26	2	128	22	8	264	13	37	249	51
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	7	2	4	2	2	12	13	5	2	2	3	8
Mvmt Flow	60	263	26	2	128	22	8	264	13	37	249	51
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	19.1	12.4	16.3	17.4
HCM LOS	C	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	17%	1%	11%
Vol Thru, %	93%	75%	84%	74%
Vol Right, %	5%	7%	14%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	285	349	152	337
LT Vol	8	60	2	37
Through Vol	264	263	128	249
RT Vol	13	26	22	51
Lane Flow Rate	285	349	152	337
Geometry Grp	1	1	1	1
Degree of Util (X)	0.514	0.615	0.283	0.577
Departure Headway (Hd)	6.489	6.342	6.693	6.164
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	553	569	535	583
Service Time	4.547	4.396	4.762	4.22
HCM Lane V/C Ratio	0.515	0.613	0.284	0.578
HCM Control Delay	16.3	19.1	12.4	17.4
HCM Lane LOS	C	C	B	C
HCM 95th-tile Q	2.9	4.2	1.2	3.7

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	41	12	5	341	325	18
Future Volume (vph)	41	12	5	341	325	18
Satd. Flow (prot)	1628	0	0	1743	1733	0
Flt Permitted	0.963			0.999		
Satd. Flow (perm)	1628	0	0	1743	1733	0
Lane Group Flow (vph)	53	0	0	346	343	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	41	12	5	341	325	18
Future Vol, veh/h	41	12	5	341	325	18
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	12	5	341	325	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	695	344	348	0	-	0
Stage 1	339	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	408	699	1211	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	709	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	403	694	1206	-	-	-
Mov Cap-2 Maneuver	403	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	706	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1206	-	445	-	-
HCM Lane V/C Ratio	0.004	-	0.119	-	-
HCM Control Delay (s)	8	0	14.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	288	163	26	61	61
Future Vol, veh/h	23	288	163	26	61	61
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	288	163	26	61	61

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	194	0	-	0	520	186
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	339	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1379	-	-	-	516	856
Stage 1	-	-	-	-	850	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1374	-	-	-	502	849
Mov Cap-2 Maneuver	-	-	-	-	502	-
Stage 1	-	-	-	-	830	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1374	-	-	-	631
HCM Lane V/C Ratio	0.017	-	-	-	0.193
HCM Control Delay (s)	7.7	0	-	-	12.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	193	171	53	118	114
Future Vol, veh/h	53	193	171	53	118	114
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	193	171	53	118	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	229	0	-	0	507	208
Stage 1	-	-	-	-	203	-
Stage 2	-	-	-	-	304	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1339	-	-	-	525	832
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	748	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1334	-	-	-	497	826
Mov Cap-2 Maneuver	-	-	-	-	497	-
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	745	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	14.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1334	-	-	-	618
HCM Lane V/C Ratio	0.04	-	-	-	0.375
HCM Control Delay (s)	7.8	0	-	-	14.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.7

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FB2035 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.904	36.9	LOS E	10.1	75.3	0.96	1.51	2.72	38.5
2	T1	All MCs	305	5.0	305	5.0	0.904	31.7	LOS D	10.1	75.3	0.96	1.51	2.72	39.0
3	R2	All MCs	111	13.0	111	13.0	0.904	32.9	LOS D	10.1	75.3	0.96	1.51	2.72	38.7
Approach			434	7.1	434	7.1	0.904	32.2	LOS D	10.1	75.3	0.96	1.51	2.72	38.9
East: Fernbank															
4	L2	All MCs	92	5.0	92	5.0	0.727	19.6	LOS C	6.1	44.1	0.89	1.02	1.42	46.7
5	T1	All MCs	314	4.0	314	4.0	0.727	14.4	LOS B	6.1	44.1	0.89	1.02	1.42	47.5
6	R2	All MCs	75	2.0	75	2.0	0.727	14.0	LOS B	6.1	44.1	0.89	1.02	1.42	47.2
Approach			481	3.9	481	3.9	0.727	15.3	LOS C	6.1	44.1	0.89	1.02	1.42	47.3
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.717	16.0	LOS C	7.0	51.6	0.87	0.86	1.20	48.7
8	T1	All MCs	236	7.0	236	7.0	0.717	11.1	LOS B	7.0	51.6	0.87	0.86	1.20	49.4
9	R2	All MCs	239	5.0	239	5.0	0.717	10.8	LOS B	7.0	51.6	0.87	0.86	1.20	49.1
Approach			606	5.6	606	5.6	0.717	12.0	LOS B	7.0	51.6	0.87	0.86	1.20	49.2
West: Fernbank															
10	L2	All MCs	347	4.0	347	4.0	1.019	59.7	LOS F	39.7	286.4	1.00	2.33	4.40	30.9
11	T1	All MCs	462	3.0	462	3.0	1.019	54.5	LOS F	39.7	286.4	1.00	2.33	4.40	31.2
12	R2	All MCs	33	3.0	33	3.0	1.019	54.4	LOS F	39.7	286.4	1.00	2.33	4.40	31.1
Approach			842	3.4	842	3.4	1.019	56.7	LOS F	39.7	286.4	1.00	2.33	4.40	31.1
All Vehicles			2363	4.7	2363	4.7	1.019	32.3	LOS D	39.7	286.4	0.94	1.54	2.66	38.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	28
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	44	104	14	15	126	171	27	251	26	174	284	47
Future Vol, veh/h	44	104	14	15	126	171	27	251	26	174	284	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	104	14	15	126	171	27	251	26	174	284	47
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.6	19.1	18.9	43.3
HCM LOS	B	C	C	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	27%	5%	34%
Vol Thru, %	83%	64%	40%	56%
Vol Right, %	9%	9%	55%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	304	162	312	505
LT Vol	27	44	15	174
Through Vol	251	104	126	284
RT Vol	26	14	171	47
Lane Flow Rate	304	162	312	505
Geometry Grp	1	1	1	1
Degree of Util (X)	0.578	0.341	0.589	0.903
Departure Headway (Hd)	6.848	7.571	6.793	6.436
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	526	473	534	566
Service Time	4.912	5.646	4.824	4.459
HCM Lane V/C Ratio	0.578	0.342	0.584	0.892
HCM Control Delay	18.9	14.6	19.1	43.3
HCM Lane LOS	C	B	C	E
HCM 95th-tile Q	3.6	1.5	3.8	10.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	161	574	34	149	625	115	30	285	110	60	264	187
Future Volume (vph)	161	574	34	149	625	115	30	285	110	60	264	187
Satd. Flow (prot)	0	1694	0	0	1674	0	0	1649	0	0	1609	0
Flt Permitted		0.990			0.992			0.996			0.994	
Satd. Flow (perm)	0	1694	0	0	1674	0	0	1649	0	0	1609	0
Lane Group Flow (vph)	0	769	0	0	889	0	0	425	0	0	511	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Control Type: Roundabout			
Intersection Capacity Utilization 116.7%		ICU Level of Service H	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	19.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	53	199	11	2	281	45	16	262	17	23	247	71
Future Vol, veh/h	53	199	11	2	281	45	16	262	17	23	247	71
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	2	18	2	2	2	6	2	6	2	2	3
Mvmt Flow	53	199	11	2	281	45	16	262	17	23	247	71
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	17.7	20.4	19	20.8
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	20%	1%	7%
Vol Thru, %	89%	76%	86%	72%
Vol Right, %	6%	4%	14%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	295	263	328	341
LT Vol	16	53	2	23
Through Vol	262	199	281	247
RT Vol	17	11	45	71
Lane Flow Rate	295	263	328	341
Geometry Grp	1	1	1	1
Degree of Util (X)	0.572	0.52	0.62	0.636
Departure Headway (Hd)	6.983	7.124	6.806	6.719
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	516	505	531	535
Service Time	5.035	5.179	4.856	4.77
HCM Lane V/C Ratio	0.572	0.521	0.618	0.637
HCM Control Delay	19	17.7	20.4	20.8
HCM Lane LOS	C	C	C	C
HCM 95th-tile Q	3.5	3	4.2	4.4

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰			↑	↑	
Traffic Vol, veh/h	29	9	12	348	332	40
Future Vol, veh/h	29	9	12	348	332	40
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	9	12	348	332	40

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	734	362	377	0	-	0
Stage 1	357	-	-	-	-	-
Stage 2	377	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	387	683	1181	-	-	-
Stage 1	708	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	379	678	1176	-	-	-
Mov Cap-2 Maneuver	379	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	691	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.3	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1176	-	423	-	-
HCM Lane V/C Ratio	0.01	-	0.09	-	-
HCM Control Delay (s)	8.1	0	14.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	220	312	60	43	43
Future Vol, veh/h	52	220	312	60	43	43
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	220	312	60	43	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	377	0	-	0	676	352
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	329	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1181	-	-	-	419	692
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	729	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1176	-	-	-	395	687
Mov Cap-2 Maneuver	-	-	-	-	395	-
Stage 1	-	-	-	-	677	-
Stage 2	-	-	-	-	726	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	13.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1176	-	-	-	502
HCM Lane V/C Ratio	0.044	-	-	-	0.171
HCM Control Delay (s)	8.2	0	-	-	13.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	121	189	234	121	83	80
Future Vol, veh/h	121	189	234	121	83	80
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	189	234	121	83	80

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	360	0	-	0	736	305
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	436	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1199	-	-	-	386	735
Stage 1	-	-	-	-	752	-
Stage 2	-	-	-	-	652	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1194	-	-	-	340	729
Mov Cap-2 Maneuver	-	-	-	-	340	-
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	649	-

Approach	EB	WB	SB
HCM Control Delay, s	3.3	0	17
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1194	-	-	-	461
HCM Lane V/C Ratio	0.101	-	-	-	0.354
HCM Control Delay (s)	8.4	0	-	-	17
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	1.6

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FB2035 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.736	21.5	LOS C	5.7	41.4	0.89	1.08	1.52	45.8
2	T1	All MCs	285	3.0	285	3.0	0.736	16.4	LOS C	5.7	41.4	0.89	1.08	1.52	46.5
3	R2	All MCs	110	6.0	110	6.0	0.736	16.6	LOS C	5.7	41.4	0.89	1.08	1.52	46.2
Approach			425	3.8	425	3.8	0.736	16.8	LOS C	5.7	41.4	0.89	1.08	1.52	46.4
East: Fernbank															
4	L2	All MCs	149	8.0	149	8.0	1.093	112.4	LOS F	67.4	486.8	1.00	3.51	7.45	21.7
5	T1	All MCs	625	3.0	625	3.0	1.093	106.8	LOS F	67.4	486.8	1.00	3.51	7.45	21.9
6	R2	All MCs	115	2.0	115	2.0	1.093	106.5	LOS F	67.4	486.8	1.00	3.51	7.45	21.8
Approach			889	3.7	889	3.7	1.093	107.7	LOS F	67.4	486.8	1.00	3.51	7.45	21.8
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.842	25.5	LOS D	8.9	65.1	0.96	1.24	2.00	43.4
8	T1	All MCs	264	2.0	264	2.0	0.842	20.5	LOS C	8.9	65.1	0.96	1.24	2.00	44.1
9	R2	All MCs	187	9.0	187	9.0	0.842	21.2	LOS C	8.9	65.1	0.96	1.24	2.00	43.7
Approach			511	4.6	511	4.6	0.842	21.3	LOS C	8.9	65.1	0.96	1.24	2.00	43.8
West: Fernbank															
10	L2	All MCs	161	5.0	161	5.0	0.928	29.0	LOS D	19.2	138.3	1.00	1.42	2.34	41.8
11	T1	All MCs	574	3.0	574	3.0	0.928	23.7	LOS C	19.2	138.3	1.00	1.42	2.34	42.4
12	R2	All MCs	34	3.0	34	3.0	0.928	23.6	LOS C	19.2	138.3	1.00	1.42	2.34	42.2
Approach			769	3.4	769	3.4	0.928	24.8	LOS C	19.2	138.3	1.00	1.42	2.34	42.3
All Vehicles			2594	3.8	2594	3.8	1.093	51.2	LOS F	67.4	486.8	0.97	2.04	3.89	32.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix O

Synchro and Sidra Intersection Worksheets – 2030 Future Total Conditions

Intersection	
Intersection Delay, s/veh	22.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	38	127	15	24	97	233	17	237	19	127	261	53
Future Vol, veh/h	38	127	15	24	97	233	17	237	19	127	261	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	127	15	24	97	233	17	237	19	127	261	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.7	20.6	18.4	31
HCM LOS	B	C	C	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	21%	7%	29%
Vol Thru, %	87%	71%	27%	59%
Vol Right, %	7%	8%	66%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	273	180	354	441
LT Vol	17	38	24	127
Through Vol	237	127	97	261
RT Vol	19	15	233	53
Lane Flow Rate	273	180	354	441
Geometry Grp	1	1	1	1
Degree of Util (X)	0.542	0.369	0.642	0.802
Departure Headway (Hd)	7.143	7.37	6.527	6.543
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	502	486	556	556
Service Time	5.206	5.44	4.554	4.569
HCM Lane V/C Ratio	0.544	0.37	0.637	0.793
HCM Control Delay	18.4	14.7	20.6	31
HCM Lane LOS	C	B	C	D
HCM 95th-tile Q	3.2	1.7	4.5	7.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	347	462	33	92	297	75	18	301	111	131	207	239
Future Volume (vph)	347	462	33	92	297	75	18	301	111	131	207	239
Satd. Flow (prot)	0	1678	0	0	1659	0	0	1601	0	0	1575	0
Flt Permitted		0.980			0.990			0.998			0.989	
Satd. Flow (perm)	0	1678	0	0	1659	0	0	1601	0	0	1575	0
Lane Group Flow (vph)	0	842	0	0	464	0	0	430	0	0	577	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Control Type: Roundabout			
Intersection Capacity Utilization	148.0%	ICU Level of Service H	
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	20.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	60	341	26	2	158	24	8	242	13	42	212	51
Future Vol, veh/h	60	341	26	2	158	24	8	242	13	42	212	51
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	7	2	4	2	2	12	13	5	2	2	3	8
Mvmt Flow	60	341	26	2	158	24	8	242	13	42	212	51
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	26.7	13.6	16.8	17.6
HCM LOS	D	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	14%	1%	14%
Vol Thru, %	92%	80%	86%	70%
Vol Right, %	5%	6%	13%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	263	427	184	305
LT Vol	8	60	2	42
Through Vol	242	341	158	212
RT Vol	13	26	24	51
Lane Flow Rate	263	427	184	305
Geometry Grp	1	1	1	1
Degree of Util (X)	0.502	0.756	0.349	0.555
Departure Headway (Hd)	6.875	6.37	6.826	6.553
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	521	564	523	549
Service Time	4.956	4.437	4.916	4.631
HCM Lane V/C Ratio	0.505	0.757	0.352	0.556
HCM Control Delay	16.8	26.7	13.6	17.6
HCM Lane LOS	C	D	B	C
HCM 95th-tile Q	2.8	6.7	1.6	3.4

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰			↱	↱	
Traffic Vol, veh/h	45	14	6	333	294	20
Future Vol, veh/h	45	14	6	333	294	20
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	14	6	333	294	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	659	314	319	0	-	0
Stage 1	309	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	429	726	1241	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	423	720	1236	-	-	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	738	-	-	-	-	-
Stage 2	710	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1236	-	469	-	-
HCM Lane V/C Ratio	0.005	-	0.126	-	-
HCM Control Delay (s)	7.9	0	13.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	288	159	60	139	137
Future Vol, veh/h	50	288	159	60	139	137
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	288	159	60	139	137

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	224	0	-	0	587	199
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	393	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1345	-	-	-	472	842
Stage 1	-	-	-	-	839	-
Stage 2	-	-	-	-	682	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1340	-	-	-	447	835
Mov Cap-2 Maneuver	-	-	-	-	447	-
Stage 1	-	-	-	-	799	-
Stage 2	-	-	-	-	679	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1340	-	-	-	581
HCM Lane V/C Ratio	0.037	-	-	-	0.475
HCM Control Delay (s)	7.8	0	-	-	16.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.5

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	220	243	53	118	114
Future Vol, veh/h	53	220	243	53	118	114
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	220	243	53	118	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	301	0	-	0	606	280
Stage 1	-	-	-	-	275	-
Stage 2	-	-	-	-	331	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1260	-	-	-	460	759
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1255	-	-	-	434	753
Mov Cap-2 Maneuver	-	-	-	-	434	-
Stage 1	-	-	-	-	731	-
Stage 2	-	-	-	-	725	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	16.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1255	-	-	-	548
HCM Lane V/C Ratio	0.042	-	-	-	0.423
HCM Control Delay (s)	8	0	-	-	16.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	4	2	325	302	6
Future Vol, veh/h	14	4	2	325	302	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	4	2	325	302	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	634	305	308	0	-	0
Stage 1	305	-	-	-	-	-
Stage 2	329	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	443	735	1253	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	729	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	442	735	1253	-	-	-
Mov Cap-2 Maneuver	442	-	-	-	-	-
Stage 1	747	-	-	-	-	-
Stage 2	729	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1253	-	485	-	-
HCM Lane V/C Ratio	0.002	-	0.037	-	-
HCM Control Delay (s)	7.9	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FT2030 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.911	38.5	LOS E	10.4	77.4	0.97	1.54	2.82	37.9
2	T1	All MCs	301	5.0	301	5.0	0.911	33.2	LOS D	10.4	77.4	0.97	1.54	2.82	38.4
3	R2	All MCs	111	13.0	111	13.0	0.911	34.5	LOS D	10.4	77.4	0.97	1.54	2.82	38.1
Approach			430	7.1	430	7.1	0.911	33.8	LOS D	10.4	77.4	0.97	1.54	2.82	38.3
East: Fernbank															
4	L2	All MCs	92	5.0	92	5.0	0.703	19.0	LOS C	5.6	40.5	0.87	1.00	1.36	47.0
5	T1	All MCs	297	4.0	297	4.0	0.703	13.8	LOS B	5.6	40.5	0.87	1.00	1.36	47.8
6	R2	All MCs	75	2.0	75	2.0	0.703	13.4	LOS B	5.6	40.5	0.87	1.00	1.36	47.6
Approach			464	3.9	464	3.9	0.703	14.7	LOS B	5.6	40.5	0.87	1.00	1.36	47.6
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.669	14.8	LOS B	6.0	43.7	0.82	0.81	1.07	49.4
8	T1	All MCs	207	7.0	207	7.0	0.669	9.9	LOS A	6.0	43.7	0.82	0.81	1.07	50.2
9	R2	All MCs	239	5.0	239	5.0	0.669	9.7	LOS A	6.0	43.7	0.82	0.81	1.07	49.9
Approach			577	5.5	577	5.5	0.669	10.9	LOS B	6.0	43.7	0.82	0.81	1.07	49.9
West: Fernbank															
10	L2	All MCs	347	4.0	347	4.0	0.987	43.7	LOS E	31.7	228.3	1.00	1.91	3.33	35.6
11	T1	All MCs	462	3.0	462	3.0	0.987	38.6	LOS E	31.7	228.3	1.00	1.91	3.33	36.0
12	R2	All MCs	33	3.0	33	3.0	0.987	38.4	LOS E	31.7	228.3	1.00	1.91	3.33	35.9
Approach			842	3.4	842	3.4	0.987	40.7	LOS E	31.7	228.3	1.00	1.91	3.33	35.8
All Vehicles			2313	4.7	2313	4.7	0.987	26.8	LOS D	31.7	228.3	0.92	1.38	2.28	41.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	44
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	44	107	14	19	132	215	27	246	31	232	278	47
Future Vol, veh/h	44	107	14	19	132	215	27	246	31	232	278	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	107	14	19	132	215	27	246	31	232	278	47
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.9	25.4	21.3	76.9
HCM LOS	C	D	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	27%	5%	42%
Vol Thru, %	81%	65%	36%	50%
Vol Right, %	10%	8%	59%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	304	165	366	557
LT Vol	27	44	19	232
Through Vol	246	107	132	278
RT Vol	31	14	215	47
Lane Flow Rate	304	165	366	557
Geometry Grp	1	1	1	1
Degree of Util (X)	0.608	0.364	0.703	1.043
Departure Headway (Hd)	7.45	8.255	7.166	6.741
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	486	439	509	535
Service Time	5.45	6.255	5.166	4.822
HCM Lane V/C Ratio	0.626	0.376	0.719	1.041
HCM Control Delay	21.3	15.9	25.4	76.9
HCM Lane LOS	C	C	D	F
HCM 95th-tile Q	4	1.6	5.5	15.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	161	542	34	149	625	115	30	262	110	60	262	187
Future Volume (vph)	161	542	34	149	625	115	30	262	110	60	262	187
Satd. Flow (prot)	0	1692	0	0	1674	0	0	1644	0	0	1607	0
Flt Permitted		0.989			0.992			0.996			0.994	
Satd. Flow (perm)	0	1692	0	0	1674	0	0	1644	0	0	1607	0
Lane Group Flow (vph)	0	737	0	0	889	0	0	402	0	0	509	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Control Type: Roundabout	
Intersection Capacity Utilization 115.2%	ICU Level of Service H
Analysis Period (min) 15	

Intersection	
Intersection Delay, s/veh	24.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	53	249	11	2	354	50	16	226	17	27	228	71
Future Vol, veh/h	53	249	11	2	354	50	16	226	17	27	228	71
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	2	18	2	2	2	6	2	6	2	2	3
Mvmt Flow	53	249	11	2	354	50	16	226	17	27	228	71
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	22.8	31.4	19.6	23.2
HCM LOS	C	D	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	17%	0%	8%
Vol Thru, %	87%	80%	87%	70%
Vol Right, %	7%	4%	12%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	259	313	406	326
LT Vol	16	53	2	27
Through Vol	226	249	354	228
RT Vol	17	11	50	71
Lane Flow Rate	259	313	406	326
Geometry Grp	1	1	1	1
Degree of Util (X)	0.547	0.64	0.787	0.656
Departure Headway (Hd)	7.607	7.362	6.98	7.243
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	471	488	516	496
Service Time	5.698	5.45	5.059	5.326
HCM Lane V/C Ratio	0.55	0.641	0.787	0.657
HCM Control Delay	19.6	22.8	31.4	23.2
HCM Lane LOS	C	C	D	C
HCM 95th-tile Q	3.2	4.4	7.2	4.7

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰			↑	↱	
Traffic Vol, veh/h	32	10	14	322	326	43
Future Vol, veh/h	32	10	14	322	326	43
Conflicting Peds, #/hr	5	0	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	10	14	322	326	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	708	353	374	0	-	0
Stage 1	353	-	-	-	-	-
Stage 2	355	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	401	691	1184	-	-	-
Stage 1	711	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	392	688	1179	-	-	-
Mov Cap-2 Maneuver	392	-	-	-	-	-
Stage 1	698	-	-	-	-	-
Stage 2	707	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1179	-	437	-	-
HCM Lane V/C Ratio	0.012	-	0.096	-	-
HCM Control Delay (s)	8.1	0	14.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	110	215	312	133	98	97
Future Vol, veh/h	110	215	312	133	98	97
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	110	215	312	133	98	97

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	450	0	-	0	824	389
Stage 1	-	-	-	-	384	-
Stage 2	-	-	-	-	440	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1110	-	-	-	343	659
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	649	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1106	-	-	-	302	654
Mov Cap-2 Maneuver	-	-	-	-	302	-
Stage 1	-	-	-	-	608	-
Stage 2	-	-	-	-	646	-

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	21.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1106	-	-	-	412
HCM Lane V/C Ratio	0.099	-	-	-	0.473
HCM Control Delay (s)	8.6	0	-	-	21.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	2.5

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	121	242	288	121	83	80
Future Vol, veh/h	121	242	288	121	83	80
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	242	288	121	83	80

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	414	0	-	0	843	359
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	489	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1145	-	-	-	334	685
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	616	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1141	-	-	-	291	680
Mov Cap-2 Maneuver	-	-	-	-	291	-
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	614	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	19.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1141	-	-	-	405
HCM Lane V/C Ratio	0.106	-	-	-	0.402
HCM Control Delay (s)	8.5	0	-	-	19.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	1.9

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	3	3	326	323	13
Future Vol, veh/h	10	3	3	326	323	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	3	3	326	323	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	662	330	336	0	-	0
Stage 1	330	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	427	712	1223	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	426	712	1223	-	-	-
Mov Cap-2 Maneuver	426	-	-	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	727	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1223	-	470	-	-
HCM Lane V/C Ratio	0.002	-	0.028	-	-
HCM Control Delay (s)	8	0	12.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FT2030 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.697	20.3	LOS C	5.0	36.3	0.87	1.04	1.41	46.5
2	T1	All MCs	262	3.0	262	3.0	0.697	15.2	LOS C	5.0	36.3	0.87	1.04	1.41	47.2
3	R2	All MCs	110	6.0	110	6.0	0.697	15.4	LOS C	5.0	36.3	0.87	1.04	1.41	46.9
Approach			402	3.8	402	3.8	0.697	15.7	LOS C	5.0	36.3	0.87	1.04	1.41	47.1
East: Fernbank															
4	L2	All MCs	149	8.0	149	8.0	1.066	91.4	LOS F	57.8	417.5	1.00	3.05	6.18	24.7
5	T1	All MCs	625	3.0	625	3.0	1.066	85.8	LOS F	57.8	417.5	1.00	3.05	6.18	24.9
6	R2	All MCs	115	2.0	115	2.0	1.066	85.6	LOS F	57.8	417.5	1.00	3.05	6.18	24.8
Approach			889	3.7	889	3.7	1.066	86.7	LOS F	57.8	417.5	1.00	3.05	6.18	24.9
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.855	26.9	LOS D	9.4	68.1	0.97	1.28	2.10	42.8
8	T1	All MCs	262	2.0	262	2.0	0.855	21.8	LOS C	9.4	68.1	0.97	1.28	2.10	43.4
9	R2	All MCs	187	9.0	187	9.0	0.855	22.5	LOS C	9.4	68.1	0.97	1.28	2.10	43.0
Approach			509	4.6	509	4.6	0.855	22.7	LOS C	9.4	68.1	0.97	1.28	2.10	43.2
West: Fernbank															
10	L2	All MCs	161	5.0	161	5.0	0.929	29.3	LOS D	19.4	139.5	1.00	1.43	2.36	41.6
11	T1	All MCs	574	3.0	574	3.0	0.929	24.0	LOS C	19.4	139.5	1.00	1.43	2.36	42.3
12	R2	All MCs	34	3.0	34	3.0	0.929	23.9	LOS C	19.4	139.5	1.00	1.43	2.36	42.0
Approach			769	3.4	769	3.4	0.929	25.1	LOS D	19.4	139.5	1.00	1.43	2.36	42.1
All Vehicles			2569	3.8	2569	3.8	1.066	44.5	LOS E	57.8	417.5	0.97	1.90	3.48	34.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix P

2030 Future Total Conditions – Stittsville Main Street / Huntley Road at Flewellyn Road with SBL

Intersection	
Intersection Delay, s/veh	17.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	127	15	24	97	233	17	237	19	127	261	53
Future Vol, veh/h	38	127	15	24	97	233	17	237	19	127	261	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	127	15	24	97	233	17	237	19	127	261	53
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	14	18.8	17.8	17.4
HCM LOS	B	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	21%	7%	100%	0%
Vol Thru, %	87%	71%	27%	0%	83%
Vol Right, %	7%	8%	66%	0%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	273	180	354	127	314
LT Vol	17	38	24	127	0
Through Vol	237	127	97	0	261
RT Vol	19	15	233	0	53
Lane Flow Rate	273	180	354	127	314
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.531	0.354	0.614	0.262	0.597
Departure Headway (Hd)	7.003	7.07	6.247	7.439	6.841
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	513	506	577	481	524
Service Time	5.075	5.145	4.309	5.205	4.607
HCM Lane V/C Ratio	0.532	0.356	0.614	0.264	0.599
HCM Control Delay	17.8	14	18.8	12.8	19.3
HCM Lane LOS	C	B	C	B	C
HCM 95th-tile Q	3.1	1.6	4.1	1	3.9

Intersection	
Intersection Delay, s/veh	19.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	107	14	19	132	215	27	246	31	232	278	47
Future Vol, veh/h	44	107	14	19	132	215	27	246	31	232	278	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	107	14	19	132	215	27	246	31	232	278	47
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	14.6	22.1	19.8	19.5
HCM LOS	B	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	27%	5%	100%	0%
Vol Thru, %	81%	65%	36%	0%	86%
Vol Right, %	10%	8%	59%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	304	165	366	232	325
LT Vol	27	44	19	232	0
Through Vol	246	107	132	0	278
RT Vol	31	14	215	0	47
Lane Flow Rate	304	165	366	232	325
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.591	0.345	0.669	0.489	0.63
Departure Headway (Hd)	7.001	7.534	6.581	7.591	6.974
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	514	475	545	473	517
Service Time	5.084	5.627	4.651	5.368	4.752
HCM Lane V/C Ratio	0.591	0.347	0.672	0.49	0.629
HCM Control Delay	19.8	14.6	22.1	17.5	21
HCM Lane LOS	C	B	C	C	C
HCM 95th-tile Q	3.8	1.5	5	2.6	4.3

Appendix Q

Synchro and Sidra Intersection Worksheets – 2035 Future Total Conditions

Intersection	
Intersection Delay, s/veh	17.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	127	15	24	101	233	17	242	19	127	267	53
Future Vol, veh/h	38	127	15	24	101	233	17	242	19	127	267	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	127	15	24	101	233	17	242	19	127	267	53
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	14.2	19.5	18.3	18
HCM LOS	B	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	21%	7%	100%	0%
Vol Thru, %	87%	71%	28%	0%	83%
Vol Right, %	7%	8%	65%	0%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	278	180	358	127	320
LT Vol	17	38	24	127	0
Through Vol	242	127	101	0	267
RT Vol	19	15	233	0	53
Lane Flow Rate	278	180	358	127	320
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.545	0.357	0.627	0.264	0.612
Departure Headway (Hd)	7.053	7.143	6.303	7.485	6.89
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	509	500	569	479	522
Service Time	5.13	5.224	4.367	5.257	4.661
HCM Lane V/C Ratio	0.546	0.36	0.629	0.265	0.613
HCM Control Delay	18.3	14.2	19.5	12.9	20
HCM Lane LOS	C	B	C	B	C
HCM 95th-tile Q	3.2	1.6	4.3	1.1	4.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	347	462	33	92	314	75	18	323	111	131	244	239
Future Volume (vph)	347	462	33	92	314	75	18	323	111	131	244	239
Satd. Flow (prot)	0	1678	0	0	1662	0	0	1605	0	0	1579	0
Flt Permitted		0.980			0.991			0.998			0.989	
Satd. Flow (perm)	0	1678	0	0	1662	0	0	1605	0	0	1579	0
Lane Group Flow (vph)	0	842	0	0	481	0	0	452	0	0	614	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Control Type: Roundabout			
Intersection Capacity Utilization 152.2%		ICU Level of Service H	
Analysis Period (min) 15			

Intersection	
Intersection Delay, s/veh	24
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	341	26	2	162	24	8	264	13	42	249	51
Future Vol, veh/h	60	341	26	2	162	24	8	264	13	42	249	51
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	7	2	4	2	2	12	13	5	2	2	3	8
Mvmt Flow	60	341	26	2	162	24	8	264	13	42	249	51
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	32.5	14.9	19.6	22
HCM LOS	D	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	14%	1%	12%
Vol Thru, %	93%	80%	86%	73%
Vol Right, %	5%	6%	13%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	285	427	188	342
LT Vol	8	60	2	42
Through Vol	264	341	162	249
RT Vol	13	26	24	51
Lane Flow Rate	285	427	188	342
Geometry Grp	1	1	1	1
Degree of Util (X)	0.572	0.808	0.382	0.652
Departure Headway (Hd)	7.231	6.814	7.321	6.868
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	499	534	491	523
Service Time	5.299	4.814	5.393	4.93
HCM Lane V/C Ratio	0.571	0.8	0.383	0.654
HCM Control Delay	19.6	32.5	14.9	22
HCM Lane LOS	C	D	B	C
HCM 95th-tile Q	3.5	7.8	1.8	4.7

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	45	14	6	355	331	20
Future Vol, veh/h	45	14	6	355	331	20
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	14	6	355	331	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	718	351	356	0	-	0
Stage 1	346	-	-	-	-	-
Stage 2	372	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	396	692	1203	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	390	687	1198	-	-	-
Mov Cap-2 Maneuver	390	-	-	-	-	-
Stage 1	709	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1198	-	435	-	-
HCM Lane V/C Ratio	0.005	-	0.136	-	-
HCM Control Delay (s)	8	0	14.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	288	163	60	139	137
Future Vol, veh/h	50	288	163	60	139	137
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	288	163	60	139	137

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	228	0	-	0	591	203
Stage 1	-	-	-	-	198	-
Stage 2	-	-	-	-	393	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1340	-	-	-	470	838
Stage 1	-	-	-	-	835	-
Stage 2	-	-	-	-	682	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1335	-	-	-	445	832
Mov Cap-2 Maneuver	-	-	-	-	445	-
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	679	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	16.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1335	-	-	-	579
HCM Lane V/C Ratio	0.037	-	-	-	0.477
HCM Control Delay (s)	7.8	0	-	-	16.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.6

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	220	247	53	118	114
Future Vol, veh/h	53	220	247	53	118	114
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	220	247	53	118	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	305	0	-	0	610	284
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	331	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1256	-	-	-	458	755
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1251	-	-	-	432	749
Mov Cap-2 Maneuver	-	-	-	-	432	-
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	725	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	16.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1251	-	-	-	545
HCM Lane V/C Ratio	0.042	-	-	-	0.426
HCM Control Delay (s)	8	0	-	-	16.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	4	2	347	339	6
Future Vol, veh/h	14	4	2	347	339	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	4	2	347	339	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	693	342	345	0	-	0
Stage 1	342	-	-	-	-	-
Stage 2	351	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	409	701	1214	-	-	-
Stage 1	719	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	408	701	1214	-	-	-
Mov Cap-2 Maneuver	408	-	-	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	713	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1214	-	450	-	-
HCM Lane V/C Ratio	0.002	-	0.04	-	-
HCM Control Delay (s)	8	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FT2035 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.934	42.1	LOS E	12.2	90.8	0.98	1.65	3.15	36.5
2	T1	All MCs	323	5.0	323	5.0	0.934	36.9	LOS E	12.2	90.8	0.98	1.65	3.15	37.0
3	R2	All MCs	111	13.0	111	13.0	0.934	38.1	LOS E	12.2	90.8	0.98	1.65	3.15	36.7
Approach			452	7.0	452	7.0	0.934	37.4	LOS E	12.2	90.8	0.98	1.65	3.15	36.9
East: Fernbank															
4	L2	All MCs	92	5.0	92	5.0	0.739	20.1	LOS C	6.3	45.5	0.90	1.04	1.47	46.4
5	T1	All MCs	314	4.0	314	4.0	0.739	14.9	LOS B	6.3	45.5	0.90	1.04	1.47	47.1
6	R2	All MCs	75	2.0	75	2.0	0.739	14.6	LOS B	6.3	45.5	0.90	1.04	1.47	46.9
Approach			481	3.9	481	3.9	0.739	15.9	LOS C	6.3	45.5	0.90	1.04	1.47	46.9
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.726	16.2	LOS C	7.3	53.6	0.88	0.87	1.23	48.5
8	T1	All MCs	244	7.0	244	7.0	0.726	11.3	LOS B	7.3	53.6	0.88	0.87	1.23	49.3
9	R2	All MCs	239	5.0	239	5.0	0.726	11.0	LOS B	7.3	53.6	0.88	0.87	1.23	49.0
Approach			614	5.6	614	5.6	0.726	12.2	LOS B	7.3	53.6	0.88	0.87	1.23	49.0
West: Fernbank															
10	L2	All MCs	347	4.0	347	4.0	1.028	65.2	LOS F	42.3	304.6	1.00	2.46	4.75	29.6
11	T1	All MCs	462	3.0	462	3.0	1.028	60.0	LOS F	42.3	304.6	1.00	2.46	4.75	29.9
12	R2	All MCs	33	3.0	33	3.0	1.028	59.8	LOS F	42.3	304.6	1.00	2.46	4.75	29.8
Approach			842	3.4	842	3.4	1.028	62.1	LOS F	42.3	304.6	1.00	2.46	4.75	29.8
All Vehicles			2389	4.7	2389	4.7	1.028	35.3	LOS E	42.3	304.6	0.95	1.61	2.88	37.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	20.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	112	14	19	132	215	27	251	31	232	284	47
Future Vol, veh/h	44	112	14	19	132	215	27	251	31	232	284	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	112	14	19	132	215	27	251	31	232	284	47
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	15	22.6	20.6	20.2
HCM LOS	B	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	26%	5%	100%	0%
Vol Thru, %	81%	66%	36%	0%	86%
Vol Right, %	10%	8%	59%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	309	170	366	232	331
LT Vol	27	44	19	232	0
Through Vol	251	112	132	0	284
RT Vol	31	14	215	0	47
Lane Flow Rate	309	170	366	232	331
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.606	0.363	0.676	0.493	0.647
Departure Headway (Hd)	7.061	7.696	6.647	7.647	7.033
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	507	471	542	469	510
Service Time	5.159	5.696	4.732	5.44	4.825
HCM Lane V/C Ratio	0.609	0.361	0.675	0.495	0.649
HCM Control Delay	20.6	15	22.6	17.7	22
HCM Lane LOS	C	B	C	C	C
HCM 95th-tile Q	4	1.6	5.1	2.7	4.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	574	34	149	625	115	30	298	110	60	281	187
Future Volume (vph)	161	574	34	149	625	115	30	298	110	60	281	187
Satd. Flow (prot)	0	1694	0	0	1674	0	0	1652	0	0	1612	0
Flt Permitted		0.990			0.992			0.997			0.994	
Satd. Flow (perm)	0	1694	0	0	1674	0	0	1652	0	0	1612	0
Lane Group Flow (vph)	0	769	0	0	889	0	0	438	0	0	528	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Control Type: Roundabout			
Intersection Capacity Utilization	118.0%	ICU Level of Service H	
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	31.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	53	254	11	2	354	50	16	262	17	27	247	71
Future Vol, veh/h	53	254	11	2	354	50	16	262	17	27	247	71
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	2	18	2	2	2	6	2	6	2	2	3
Mvmt Flow	53	254	11	2	354	50	16	262	17	27	247	71
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	28	40.7	25.7	30.2
HCM LOS	D	E	D	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	17%	0%	8%
Vol Thru, %	89%	80%	87%	72%
Vol Right, %	6%	3%	12%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	295	318	406	345
LT Vol	16	53	2	27
Through Vol	262	254	354	247
RT Vol	17	11	50	71
Lane Flow Rate	295	318	406	345
Geometry Grp	1	1	1	1
Degree of Util (X)	0.662	0.703	0.851	0.743
Departure Headway (Hd)	8.077	7.964	7.547	7.756
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	445	452	479	466
Service Time	6.162	6.046	5.621	5.836
HCM Lane V/C Ratio	0.663	0.704	0.848	0.74
HCM Control Delay	25.7	28	40.7	30.2
HCM Lane LOS	D	D	E	D
HCM 95th-tile Q	4.7	5.4	8.6	6.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰			↑	↱	
Traffic Vol, veh/h	32	10	14	358	345	43
Future Vol, veh/h	32	10	14	358	345	43
Conflicting Peds, #/hr	5	0	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	10	14	358	345	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	763	372	393	0	-	0
Stage 1	372	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	372	674	1166	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	683	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	363	671	1161	-	-	-
Mov Cap-2 Maneuver	363	-	-	-	-	-
Stage 1	684	-	-	-	-	-
Stage 2	680	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1161	-	408	-	-
HCM Lane V/C Ratio	0.012	-	0.103	-	-
HCM Control Delay (s)	8.1	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	110	220	312	133	98	97
Future Vol, veh/h	110	220	312	133	98	97
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	110	220	312	133	98	97

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	450	0	-	0	829	389
Stage 1	-	-	-	-	384	-
Stage 2	-	-	-	-	445	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1110	-	-	-	340	659
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	646	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1106	-	-	-	299	654
Mov Cap-2 Maneuver	-	-	-	-	299	-
Stage 1	-	-	-	-	608	-
Stage 2	-	-	-	-	643	-

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	21.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1106	-	-	-	410
HCM Lane V/C Ratio	0.099	-	-	-	0.476
HCM Control Delay (s)	8.6	0	-	-	21.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	2.5

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	121	247	288	121	83	80
Future Vol, veh/h	121	247	288	121	83	80
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	247	288	121	83	80

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	414	0	-	0	848	359
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	494	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1145	-	-	-	332	685
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	613	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1141	-	-	-	289	680
Mov Cap-2 Maneuver	-	-	-	-	289	-
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	611	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	19.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1141	-	-	-	403
HCM Lane V/C Ratio	0.106	-	-	-	0.404
HCM Control Delay (s)	8.5	0	-	-	19.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	1.9

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	3	3	362	342	13
Future Vol, veh/h	10	3	3	362	342	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	3	3	362	342	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	717	349	355	0	-	0
Stage 1	349	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	396	694	1204	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	395	694	1204	-	-	-
Mov Cap-2 Maneuver	395	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	700	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1204	-	439	-	-
HCM Lane V/C Ratio	0.002	-	0.03	-	-
HCM Control Delay (s)	8	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FT2035 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.759	22.3	LOS C	6.2	44.8	0.90	1.11	1.60	45.4
2	T1	All MCs	298	3.0	298	3.0	0.759	17.2	LOS C	6.2	44.8	0.90	1.11	1.60	46.1
3	R2	All MCs	110	6.0	110	6.0	0.759	17.4	LOS C	6.2	44.8	0.90	1.11	1.60	45.8
Approach			438	3.8	438	3.8	0.759	17.6	LOS C	6.2	44.8	0.90	1.11	1.60	46.0
East: Fernbank															
4	L2	All MCs	149	8.0	149	8.0	1.108	125.0	LOS F	73.0	527.4	1.00	3.77	8.19	20.2
5	T1	All MCs	625	3.0	625	3.0	1.108	119.3	LOS F	73.0	527.4	1.00	3.77	8.19	20.4
6	R2	All MCs	115	2.0	115	2.0	1.108	119.1	LOS F	73.0	527.4	1.00	3.77	8.19	20.3
Approach			889	3.7	889	3.7	1.108	120.3	LOS F	73.0	527.4	1.00	3.77	8.19	20.3
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.860	26.7	LOS D	9.8	71.4	0.98	1.28	2.12	42.9
8	T1	All MCs	281	2.0	281	2.0	0.860	21.6	LOS C	9.8	71.4	0.98	1.28	2.12	43.5
9	R2	All MCs	187	9.0	187	9.0	0.860	22.4	LOS C	9.8	71.4	0.98	1.28	2.12	43.1
Approach			528	4.5	528	4.5	0.860	22.5	LOS C	9.8	71.4	0.98	1.28	2.12	43.3
West: Fernbank															
10	L2	All MCs	161	5.0	161	5.0	0.943	32.0	LOS D	21.0	151.4	1.00	1.53	2.58	40.4
11	T1	All MCs	574	3.0	574	3.0	0.943	26.8	LOS D	21.0	151.4	1.00	1.53	2.58	41.0
12	R2	All MCs	34	3.0	34	3.0	0.943	26.6	LOS D	21.0	151.4	1.00	1.53	2.58	40.8
Approach			769	3.4	769	3.4	0.943	27.9	LOS D	21.0	151.4	1.00	1.53	2.58	40.9
All Vehicles			2624	3.8	2624	3.8	1.108	56.4	LOS F	73.0	527.4	0.98	2.17	4.23	31.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.