5993, 6115, 6141, 6159 Flewellyn Road & 6070 Fernbank Road (Stittsville South)

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Strategy Report (Revision #2)

Prepared for:

Caivan Stittsville West Ltd
3713 Borrisokane Road
Ottawa, ON K2J 4J4

Prepared by:

CGH TRANSPORTATION

6 Plaza Court
Ottawa, ON K2H 7W1

January 2026

PN: 2021-128

Table of Contents

List of Figures

Table of Tables

List of Appendices

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 a plan of subdivision application.

The subdivision lands are located within the W-4 Urban Expansion Area Lands (W-4 Lands) outlined in the City's Official Plan Schedule C17. The W-4 Lands related applications have been submitted to lift the Future Neighbourhood Overlay. The transportation report prepared in support of that submission will be the parent transportation study in the process that informs the concept plan for the future neighbourhood. This TIA will assess the plan of subdivision under the typical development review process and assess the impact of any changes between the overall concept plan and any revisions to the plan of subdivision.

2 Existing and Planned Conditions

2.1 Proposed Development

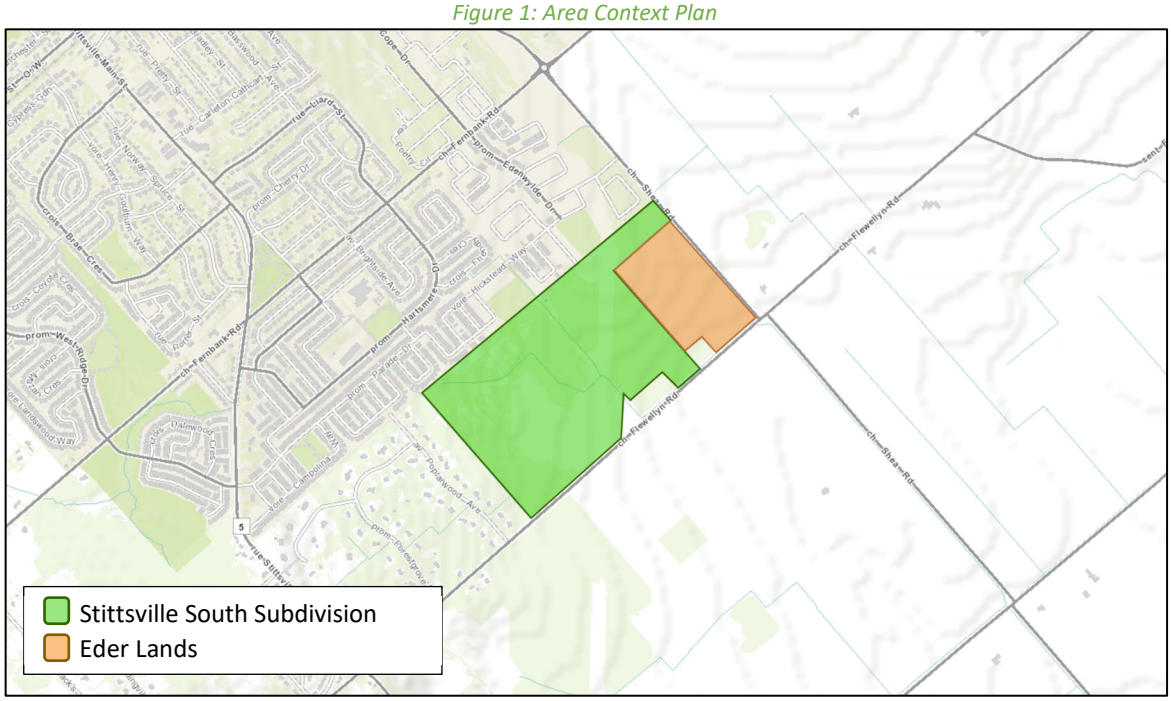
The proposed development, situated in the W-4 Urban Expansion boundary, is located at the northwest corner of Shea Road at Flewellyn Road intersection and bounded by the Eder Lands, Flewellyn Road, a separated estate home conclave along Poplarwood Avenue, and the existing community south of Hickstead Way. The proposed development current zoning is Rural (RU). The anticipated build-out year is 2030.

The plan of subdivision proposes a total of 558 townhomes, 566 single-detached homes, 442 stacked townhomes, and park/open space within the proposed development. The subject lands encompass 5993, 6115, 6141, and 6159 Flewellyn Road, 6070 Fernbank Road, 59 Aridus Crescent, the hydro corridor, Faulkner Drain, and stormwater maintenance ponds. New collector roads are proposed to connect to Shea Road and Flewellyn Road, while new local roads are proposed to connect to Painted Sky Way and Parade Drive at the Hickstead Way intersection.

The Eder Lands, adjacent to the proposed development, were considered within the W-4 Lands study and reside outside the urban boundary. They are not part of the proposed subdivision within this study.

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

Figure 1: Area Context Plan

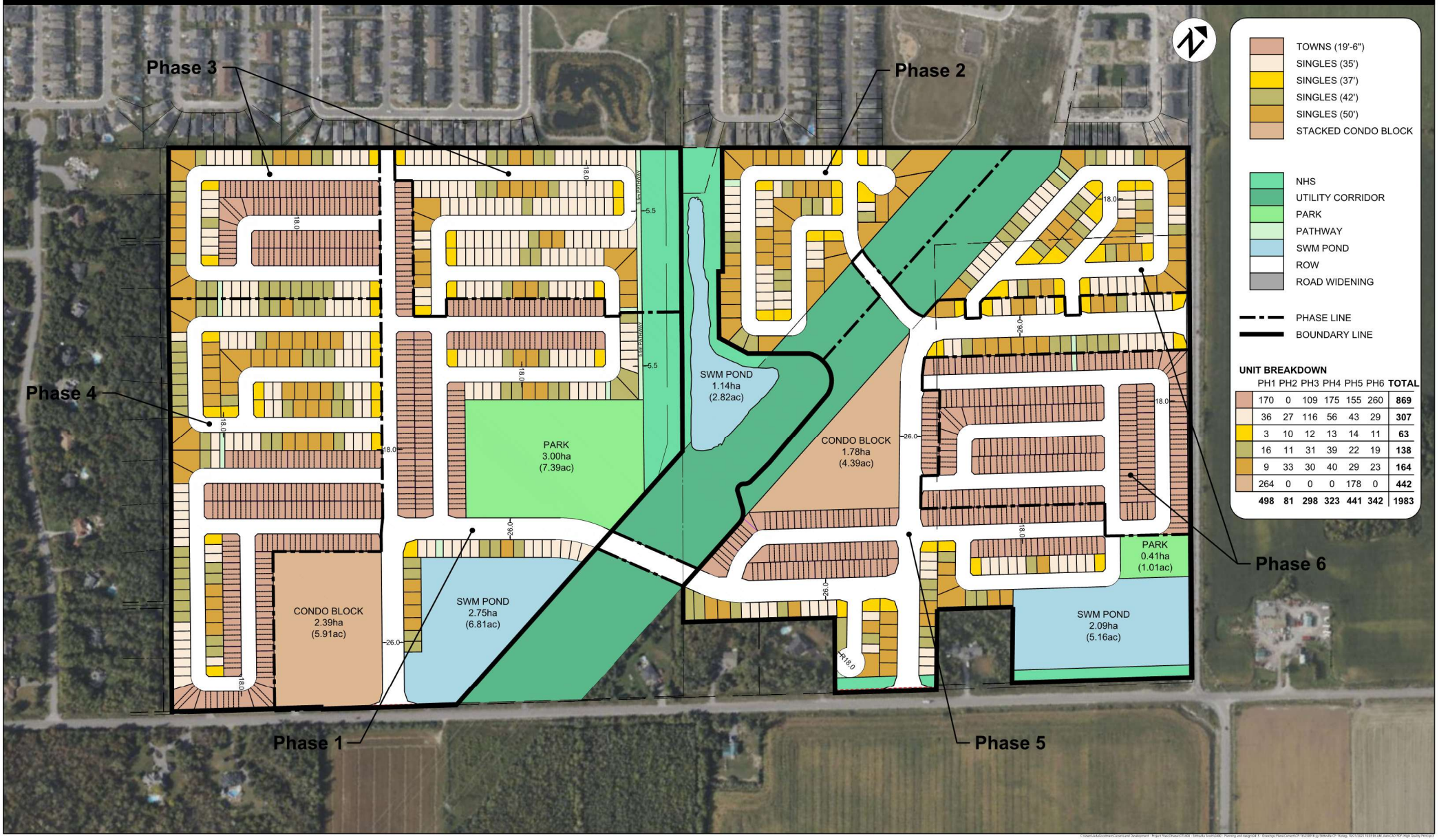


Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 11, 2025

CAIVAN

STITTSVILLE

DRAWING: CP-16
DATE: 10/21/2025
AUTHOR: JG
SCALE: 1:4,000



TOWNS (19'-6")
SINGLES (35')
SINGLES (37')
SINGLES (42')
SINGLES (50')
STACKED CONDO BLOCK

NHS
UTILITY CORRIDOR
PARK
PATHWAY
SWM POND
ROW
ROAD WIDENING

PHASE LINE
BOUNDARY LINE

UNIT BREAKDOWN

	PH1	PH2	PH3	PH4	PH5	PH6	TOTAL
	170	0	109	175	155	260	**869**
	36	27	116	56	43	29	**307**
	3	10	12	13	14	11	**63**
	16	11	31	39	22	19	**138**
	9	33	30	40	29	23	**164**
	264	0	0	0	178	0	**442**
	498	**81**	**298**	**323**	**441**	**342**	**1983**

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 two-lane rural cross-section including paved shoulders within the study area. The posted limit is 60 km/h, and the City-protected right of way is 30.0 metres within the study area. 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 and the City-protected right of way is 30.0 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 paved shoulders within the study area. The posted speed limit is 80 km/h, and the existing and City-protected right of way is 26.0 metres. A proposed City update to Official Plan (OP) Schedule C16 as part of the recent Transportation Master Plan (TMP) update is understood to include a right-of-way protection of 37.0 metres for this road, subject to unequal widening, as part of a forthcoming Official Plan Amendment. The result of such an OP update would be additional widening to the south and no impacts would be noted for the site property on its frontage.

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, and the City-protected right of way is 26.0 metres. A proposed City update to OP Schedule C16 as part of the recent TMP update is understood to include a right-of-way protection of 30.0 metres within 100 metres of an intersection with an arterial (e.g. Fernbank Road) for this road as part of a forthcoming Official Plan Amendment.

Painted Sky Way: Painted Sky Way is a City of Ottawa local road with a two-lane urban cross-section. The speed limit is assumed to be 40 km/h, consistent with the remainder of the adjacent subdivision, and the existing right of way is 18.0 metres.

Parade Drive: Parade Drive is a City of Ottawa local road with a two-lane urban cross-section. Sidewalks are present on both sides of the road. The posted speed limit is 40 km/h, and the existing right of way is 20.0 metres east of Hickstead Way and 24.0 metres west of Hickstead Way.

Hickstead Way: Hickstead Way is a City of Ottawa local road with a two-lane urban cross-section. Sidewalks are present on both sides of the road east of Parade Drive and on the north side of the road west of Parade Drive ending at a pathway block at the 90-degree bend towards Parade Drive. The speed limit is assumed to be consistent with Parade Drive at a posted 40 km/h, and the existing right of way is 18.0 metres.

Cosanti Drive: Cosanti Drive is a City of Ottawa local road with a two-lane urban cross-section. Sidewalks are expected to be constructed along both sides of the roadway. The unposted speed limit is 40 km/h, and the City-protected right of way is 22.0 metres.

2.2.2 Existing Intersections

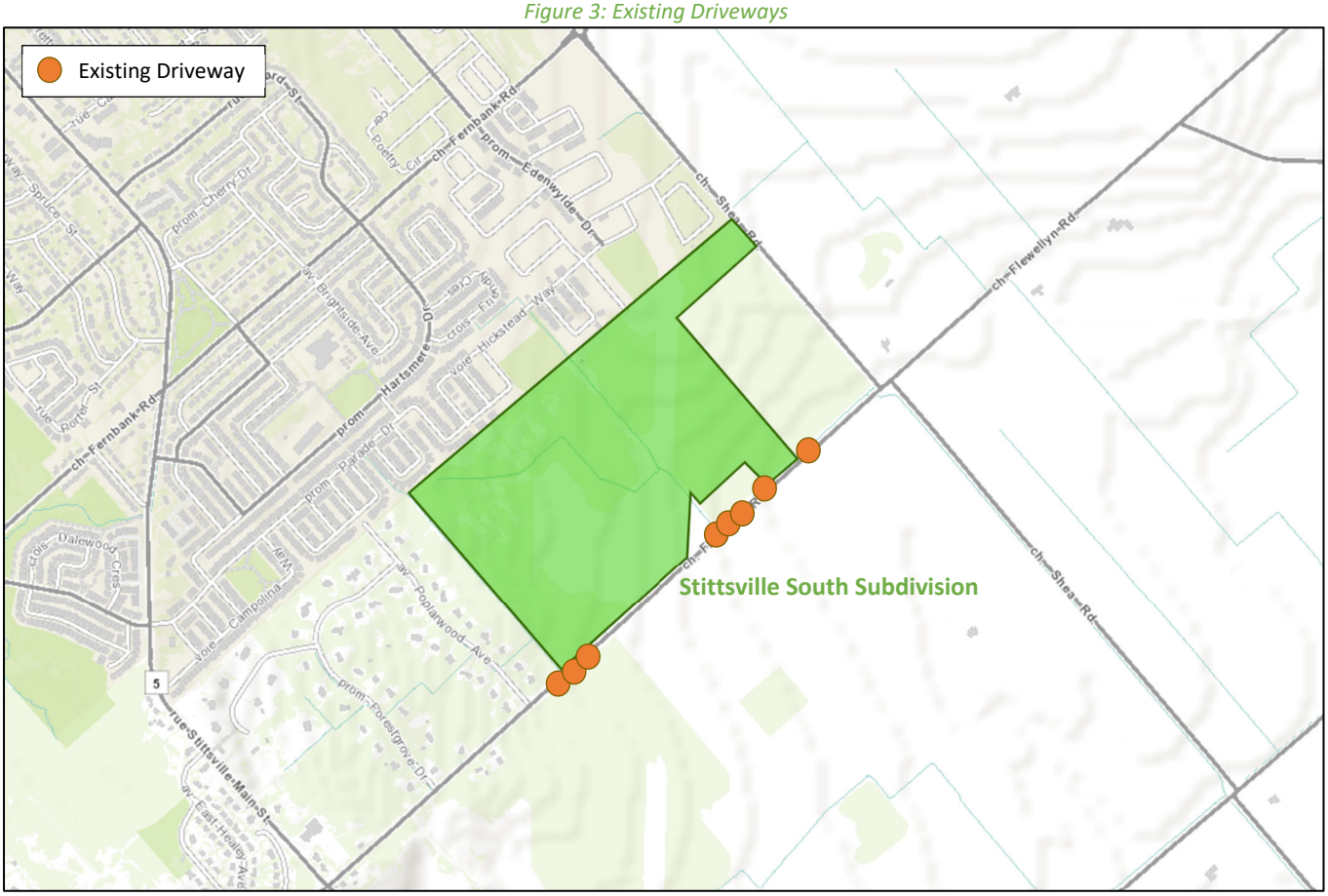
The key intersections within one kilometre of the site have been summarized below:

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.
Shea Road at Cosanti Drive	The intersection of Shea Road at Cosanti Drive is a T-intersection with stop control on the minor approach of Cosanti Drive. The northbound approach consists of a left-turn/through lane, the southbound approach consists of a through/right-turn lane. The eastbound approach consists of a left-turn/right-turn lane. No turn restrictions were noted.

2.2.3 Existing Driveways

Within 200 metres of the subdivision accesses, driveways are present on both sides of Flewellyn Road to single detached dwellings. Figure 3 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 11, 2025

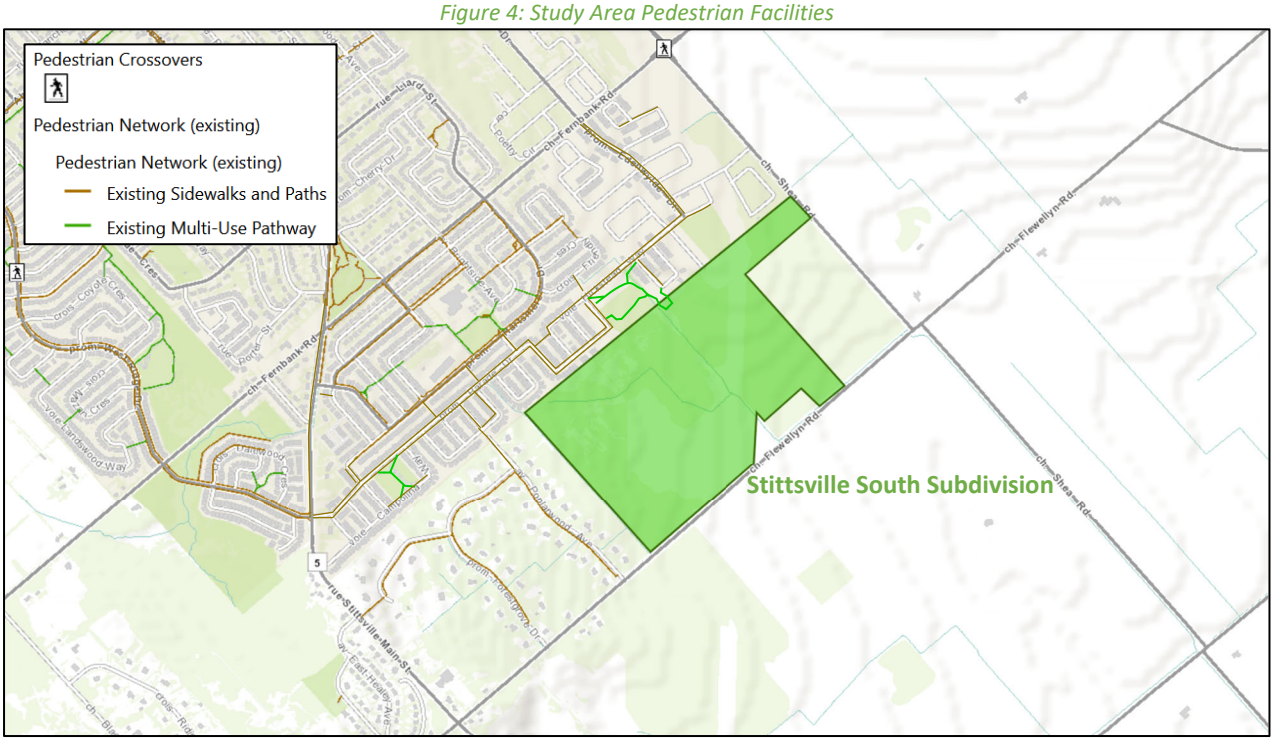
2.2.4 Cycling and Pedestrian Facilities

Figure 4 illustrates the pedestrian facilities in the study area and Figure 5 illustrates the cycling facilities in the study area. 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 where possible, despite not being formalized within the City's pedestrian network in geoOttawa. As the area is still developing, these should not be considered a fulsome record of all facilities.

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.

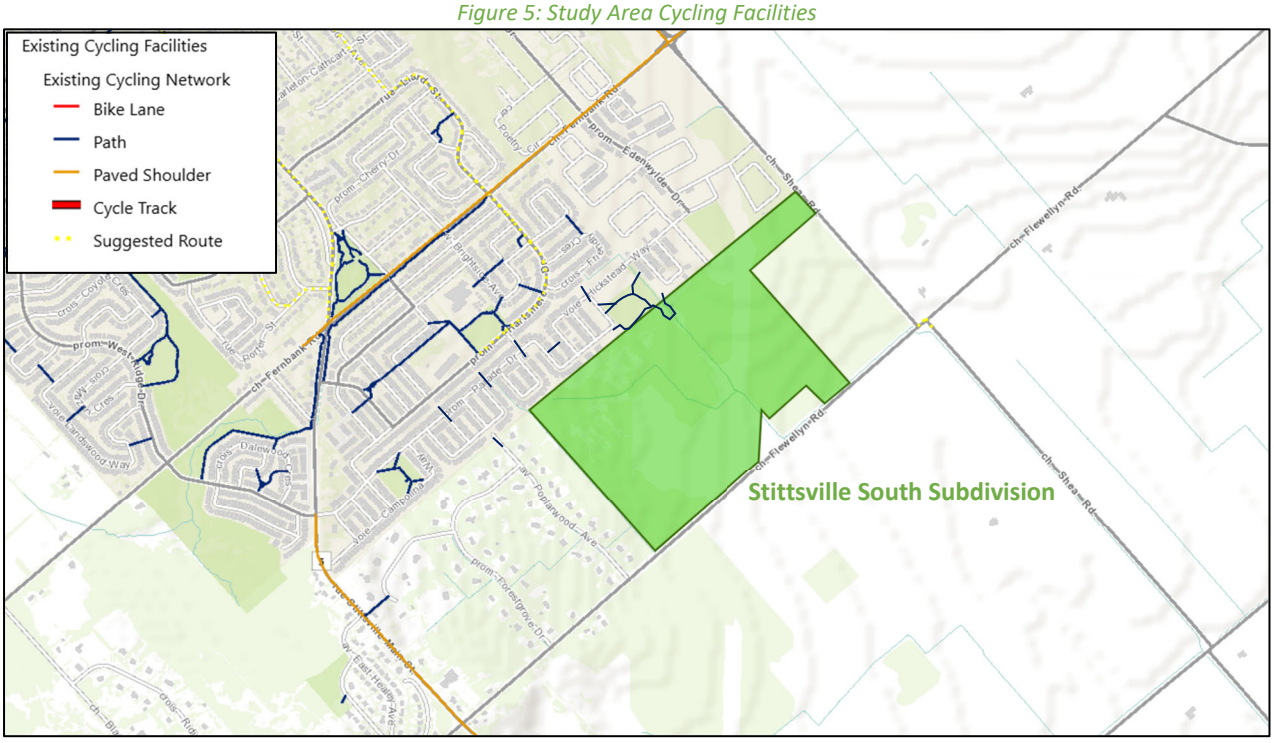
Paved shoulders are present on both sides along Stittsville Main Street south of Etta Street, Huntley Road, Fernbank Road, Shea Road north of Fernbank Road, Flewellyn Road and on the west side along Stittsville Main Street between Etta Street and Upcountry Drive. A suggested route is noted at the offset Flewellyn Road and Shea Road intersection in the geoOttawa existing cycling network. The 2025 TMP identifies the implementation of new active transportation facilities on both sides of Fernbank Road from West Ridge Drive to Shea Road, improving the existing pathway on the south side of Fernbank from Stittsville Main Street to Hartsmere Drive and implementing new sidewalks and cycletracks on both sides of Shea Road from Abbott Street to the Stittsville South W4 future community. Cycletracks are planned to be constructed on Cope Drive north of Fernbank Road as part of the 6041 Fernbank and 5957 and 5969 Fernbank subdivisions.

Figure 4: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 11, 2025

Figure 5: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 11, 2025

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 6 and Figure 7, respectively. It is also noted that no pedestrian and cyclist volumes are available at the intersection of Shea Road at Cosanti Drive. At the intersection of Shea Road at

Fernbank Road, the City of Ottawa notes that the collection data for active mode volumes may be lower than summer conditions, although this has not been confirmed.

Figure 6: Existing Pedestrian Volumes

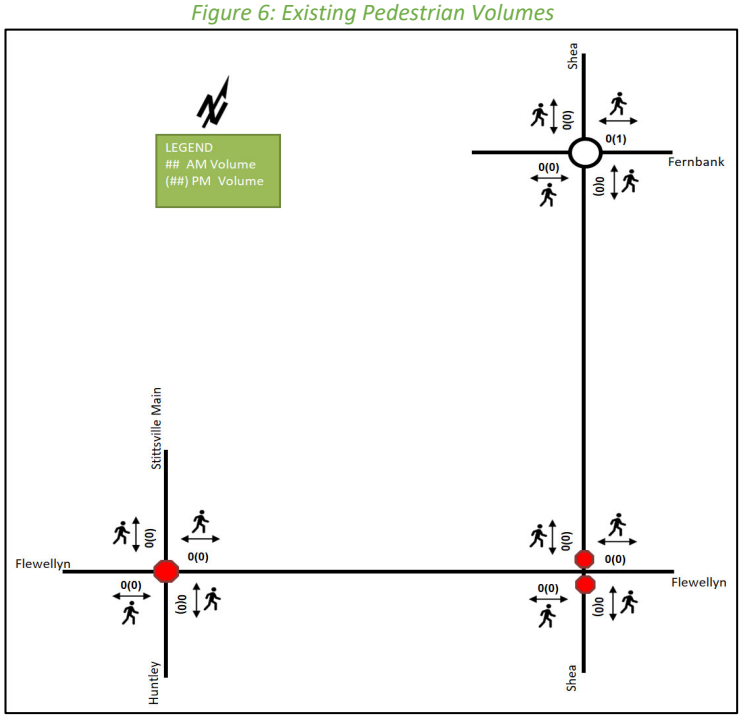
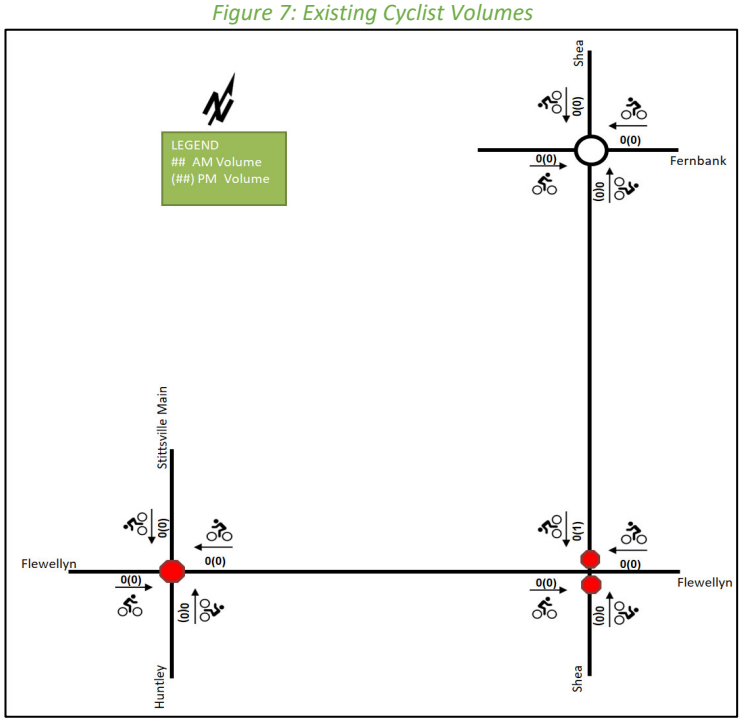


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

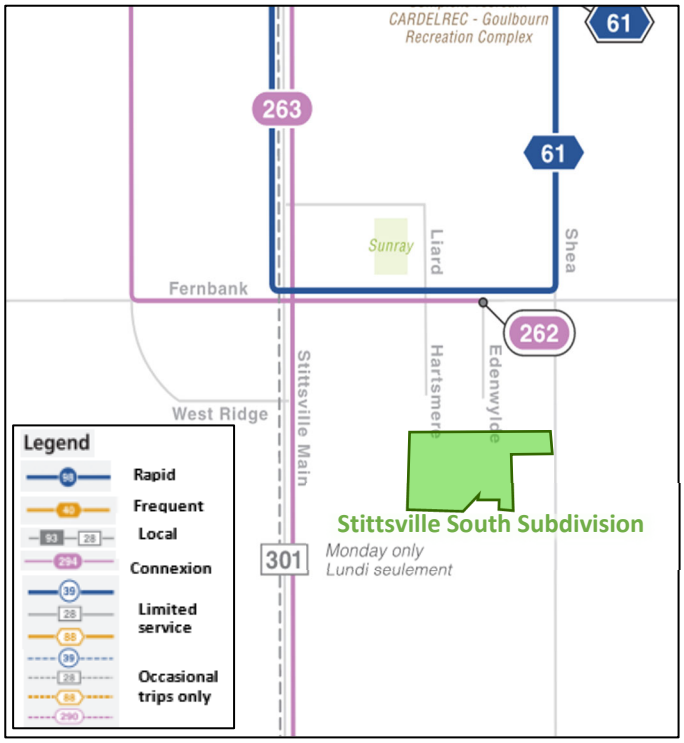
Figure 8 illustrates the existing transit system map in proximity to the proposed site and Figure 9 illustrates nearby transit stops. It is noted that no transit stops are present within 400 metres of the site. All transit information is from April 28, 2025, and is included for general information purposes and context to the surrounding area.

Route #61 currently travels along Shea Road, Fernbank Road, and Stittsville Main Street, 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 April 28, 2025, service levels are:

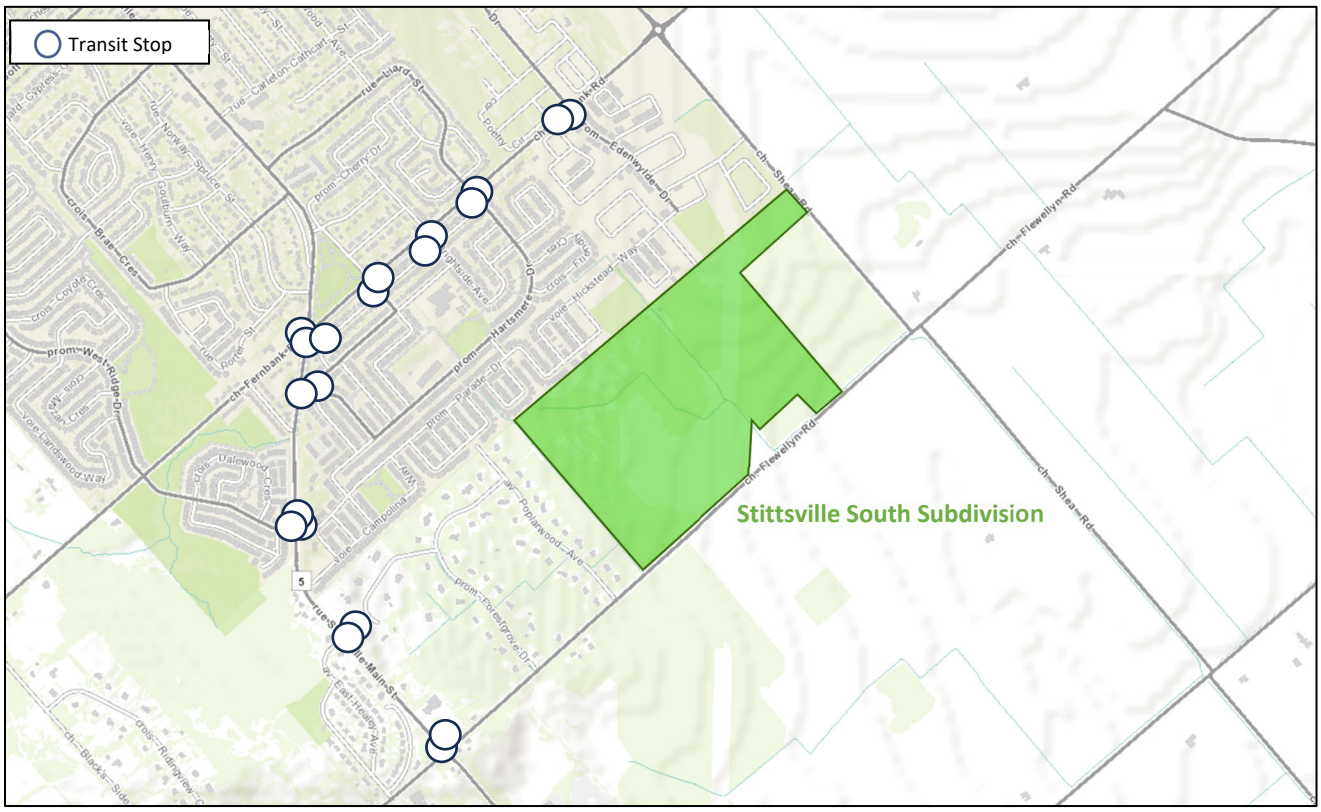
- Route # 61 – 30-minute service all day
- Route # 262 – Four morning buses and five evening buses per day
- Route # 263 – Three morning buses and four afternoon buses per day in the peak direction
- Route # 301 – One morning bus and one afternoon bus on Monday in the peak direction

Figure 8: Study Area Transit Service (April 28, 2025)



Source: http://www.octranspo.com/ Accessed: April 28, 2025

Figure 9: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: February 11, 2025

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. The volumes at the intersection of Shea Road at Cosanti Drive were estimated based on the 5993 Flewellyn TIA (IBI Group, 2015), and the trip generation are noted to be updated to the TRANS 2020 methodology.

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
Shea Road at Cosanti Drive	-	5993 Flewellyn TIA (IBI Group, 2015)

Figure 10 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. Level of service is based on HCM 2010 delay for stop-controlled intersection, and Sidra HCM 6 for roundabout intersections. Detailed turning movement count data is included in Appendix B and the synchro and sidra worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

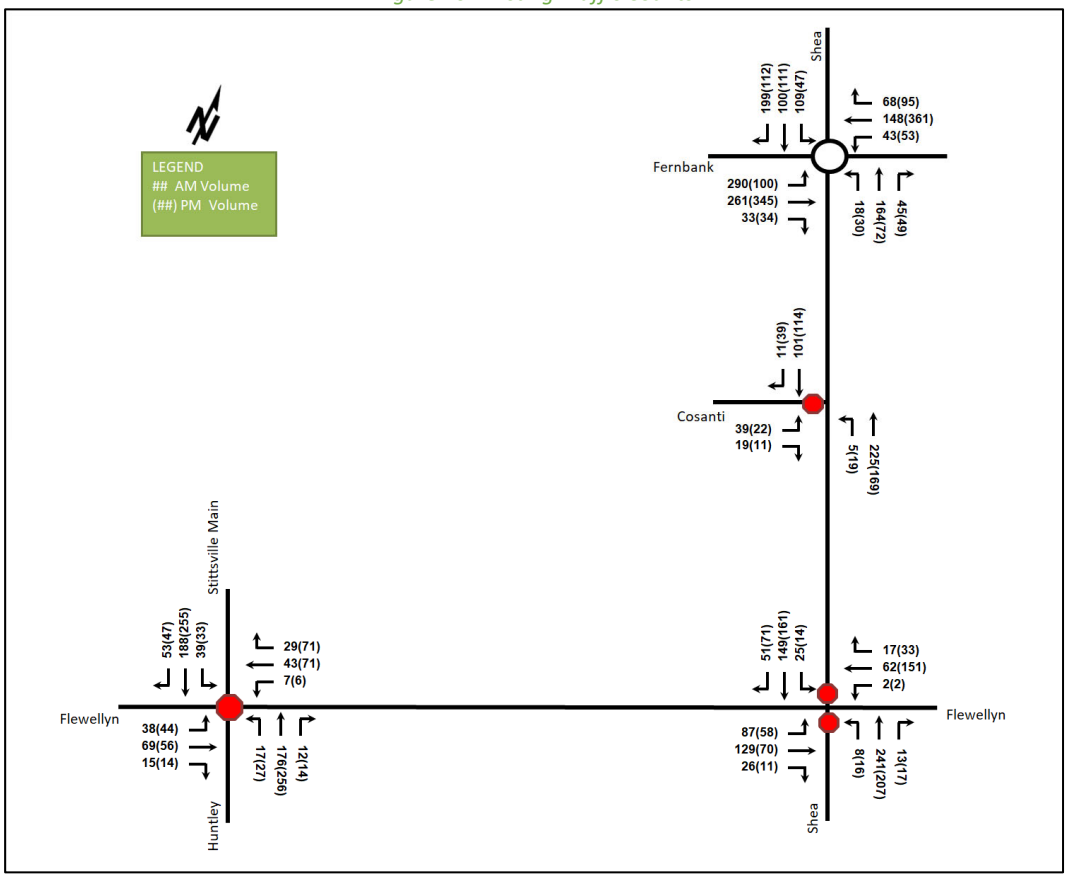


Table 2: Existing Intersection Operations

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	13.1	58.3	A	0.50	9.3	23.7
	WB	A	0.37	9.3	13.5	A	0.53	9.7	26.0
	NB	B	0.42	12.5	15.7	A	0.22	7.2	6.8
	SB	A	0.43	8.2	18.8	A	0.38	9.2	14.0
	Overall	**B**	**0.65**	**11.0**	**58.3**	**A**	**0.53**	**9.2**	**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**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Cosanti Drive *Unsignalized*	EBL/R	B	0.09	10.7	2.3	B	0.05	10.6	1.5
	NBL/R	A	0.00	7.5	0.0	A	0.02	7.6	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.7**	**-**	**A**	**-**	**1.3**	**-**

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 intersections of Shea Road at Flewellyn Road and Shea Road at Cosanti Drive for the existing conditions. The Shea Road at Flewellyn Road intersection met the all-way stop-control warrants for consideration. Although warrants are met, the City has stated an all-way stop-control cannot be implemented due to the offset condition. It is noted that the minor stop-control condition is acceptable from an operational perspective to remain, however it is ultimately recommended for the City to realign the north and south legs to implement alternative intersection control to address the existing safety concerns and cycling route needs. 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. The intersection of Shea Road at Flewellyn Road does not meet signal warrants. The Stittsville Main Street / Huntley Road at Flewellyn Road intersection met the Signal Justification 1. While justified, the intersection can remain as an all-way stop-control from an operational perspective. Signal warrant calculation sheets are provided in Appendix E.

Left-turn lane warrant analysis was performed for the intersections of Shea Road at Flewellyn Road, Stittsville Main Street / Huntley Road at Flewellyn Road, and Shea Road at Cosanti Drive for existing conditions, none of the intersections met 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 (2018-2022). Table 3 summarizes the collision types and conditions in the study area, Figure 11 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		**60**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	12	20%
	Property Damage Only	48	80%
Initial Impact Type	**Angle**	28	47%
	Sideswipe	1	2%
	Turning Movement	1	2%
	Turning Movement	1	2%
	SMV Other	16	27%
	Other	2	3%
Road Surface Condition	**Dry**	35	58%
	Wet	11	18%

		Number	%
Total Collisions		**60**	**100%**
	Loose Snow	4	7%
	Slush	1	2%
	Packed Snow	2	3%
	Ice	7	12%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

Figure 11: Study Area Collision Records, 2018-2022

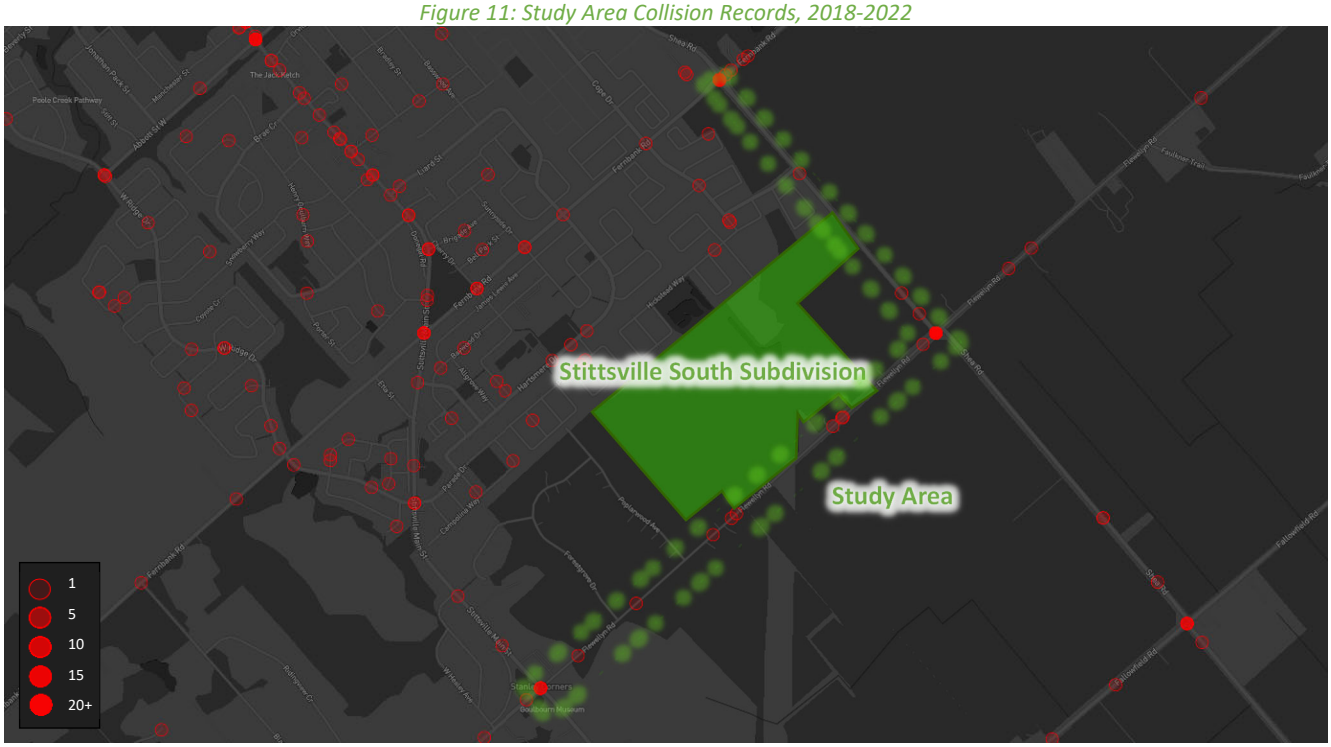


Table 4: Summary of Collision Locations, 2018-2022

	Number	%
Intersections / Segments	**60**	**100%**
Flewellyn Rd @ Shea Rd	23	38%
Fernbank Rd @ Shea Rd	15	25%
Flewellyn Rd btwn Poplarwood Ave & Shea Rd	7	12%
Stittsville Main St/Huntley Rd @ Flewellyn Rd	10	17%
Shea Rd btwn Fernbank Rd & Flewellyn Rd	3	5%
Flewellyn Rd btwn Forestgrove Dr & Stittsville Main St	1	2%
Flewellyn Rd btwn Forestgrove Dr & Poplarwood Ave	1	2%

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%

		Number	%
Total Collisions		**23**	**100%**
	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 current ability exists for the subdivision to re-align Shea Road. The City has implemented an interim solution of pavement markings with 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. Beyond the interim measures implemented, long term measures are being investigated by the City's intersection control improvement programs for the intersection, anticipated to be the realignment of the north and south legs, and/or the implementation of a roundabout. It is anticipated that this ultimate measure would address safety concerns at this location.

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%

		Number	%
Total Collisions		**15**	**100%**
	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 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.

2.3.1.2 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. The affordable network only contains transit priority measures along Hazeldean Road and Robert Grant Avenue.

2.3.1.1 Transportation Master Plan (2025)

The Transportation Master Plan (2025) includes a Capital Infrastructure Plan identifying transportation investment to support the forecasted growth and strategic connectivity and livability targets for the City. It also identifies committed projects, and a subset of priority projects that are expected to be implemented by 2046 based on current affordability assumptions. Area projects anticipated to impact travel in the study area that are included within the Capital Infrastructure Plan are:

- Transit Network
    - Priority
        - Fernbank Road transit priority corridor
        - Stittsville Main Road transit priority corridor
        - Hazeldean Road transit priority corridor
    - Needs-Based
        - Median bus rapid transit from Hazeldean Station to Abbott Street East (Robert Grant Transitway)
        - Conceptual future transit corridor extension of Robert Grant Transitway south from Abbot Street East into the rural area
- Road Network
    - Committed
        - Robert Grant Avenue Extension from Abbott Street to Hazeldean Road
    - Priority
        - Robert Grant Avenue Extension, including a new two-lane road between Palladium Drive and Hazeldean Road
        - Implementing new active transportation facilities on both sides of Fernbank Road from West Ridge Drive to Shea Road and improving connectivity to the existing pathway on the south side of Fernbank from Stittsville Main Street to Hartsmere Drive
        - Implementing new sidewalks and cycletracks on both sides of Shea Road from Abbott Street to the Stittsville South W4 future community
- Cycling Network-Rural
        - Rural paved shoulder along Flewellyn Road (*already implemented*)

2.3.2 Other Study Area Developments

Figure 12 illustrates all the developments noted in the larger Stittsville context and Table 7 summarizes the details of each development.

Figure 12: Area Developments

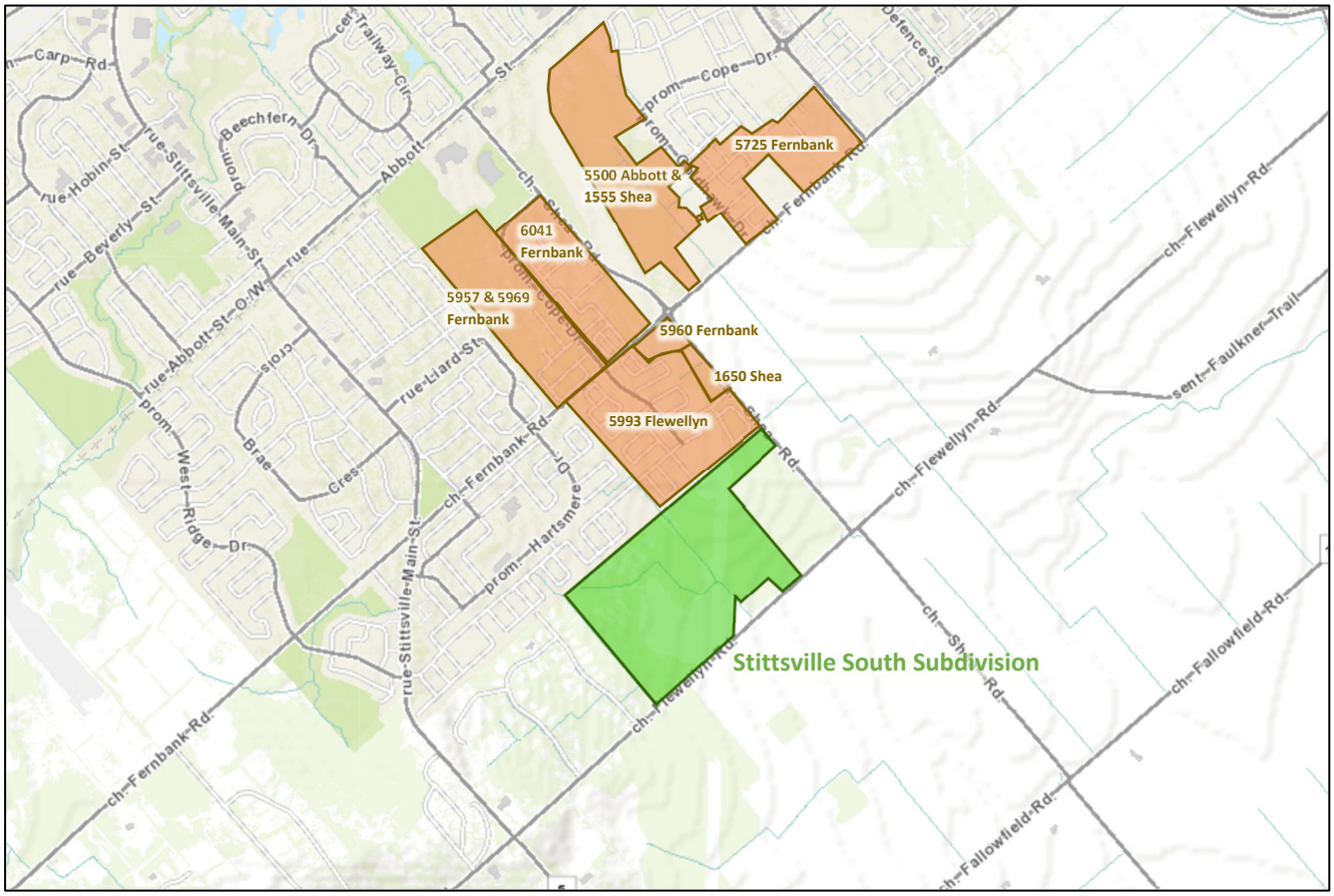


Table 7: Area Development Details

#	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	95%	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

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
  - Cosanti Drive
  - Street 21 (Future Conditions)
- Flewellyn Road at:
  - Street 16 (Future Conditions)
  - Street 12 (Future Conditions)
  - Stittsville Main Street/ Huntley Road

The boundary road will be Shea Road and Flewellyn Road, and Screenline 56 is present within proximity to the site.

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 and Table 9.

Table 8: TRANS Trip Generation Person Trip Rates – Kanata/Stittsville

Travel Mode	Kanata/Stittsville					
	Single Detached		Multi-Unit (Low-Rise)		Multi-Unit (High-Rise)	
	AM	PM	AM	PM	AM	PM
Auto Driver	52%	56%	52%	58%	43%	55%
Auto Passenger	15%	19%	14%	17%	26%	19%
Transit	20%	14%	22%	17%	28%	21%
Cycling	1%	1%	0%	0%	0%	0%
Walking	12%	9%	11%	8%	4%	5%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 9: TRANS Trip Generation Person Trip Rates – Rural Southwest

Travel Mode	Rural Southwest					
	Single Detached		Multi-Unit (Low-Rise)		Multi-Unit (High-Rise)	
	AM	PM	AM	PM	AM	PM
Auto Driver	60%	67%	66%	62%	63%	64%
Auto Passenger	14%	17%	13%	19%	15%	18%
Transit	24%	14%	21%	16%	19%	16%
Cycling	2%	2%	1%	3%	0%	0%
Walking	0%	0%	0%	0%	3%	1%
Total	**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 10 summarizes the expected modes shares for the development area.

Table 10: Expected Development Mode Shares

Travel Mode	Single Detached		Multi-Unit (Low-Rise)		Multi-Unit (High-Rise)	
	AM	PM	AM	PM	AM	PM
Auto Driver	51%	59%	55%	58%	49%	57%
Auto Passenger	15%	19%	15%	19%	27%	21%
Transit	24%	14%	21%	16%	19%	16%
Cycling	2%	2%	2%	2%	2%	2%
Walking	8%	6%	7%	5%	3%	4%
Total	**100%**	**100%**	**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 11 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 11: 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
Multi-Unit (High-Rise)	221 & 222 (TRANS)	AM	0.80
		PM	0.90

Using the above person trip rates, the total person trip generation has been estimated. Table 12 summarizes the total person trip generation.

Table 12: 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	566	348	812	1160	870	534	1404
Multi-Unit (Low-Rise)	558	226	527	753	494	388	882
Multi-Unit (High-Rise)	442	110	244	354	231	167	398

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 13 summarizes the residential trip generation by mode and peak hour.

Table 13: 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%**	85	199	284	**59%**	226	138	364
	Auto Passenger	**15%**	25	59	84	**19%**	73	44	117
	Transit	**24%**	46	107	153	**14%**	58	35	93
	Cycling	**2%**	4	9	13	**2%**	8	5	13
	Walking	**8%**	16	38	54	**6%**	27	17	44
	Total	**100%**	**176**	**412**	**588**	**100%**	**392**	**239**	**631**
Multi-Unit (Low-Rise)	Auto Driver	**55%**	60	139	199	**58%**	126	99	225
	Auto Passenger	**15%**	16	38	54	**19%**	41	33	74
	Transit	**21%**	26	61	87	**16%**	37	29	66
	Cycling	**2%**	3	6	9	**2%**	5	4	9
	Walking	**7%**	9	22	31	**5%**	13	10	23
	Total	**100%**	**114**	**266**	**380**	**100%**	**222**	**175**	**397**
Multi-Unit (High-Rise)	Auto Driver	**49%**	25	58	83	**57%**	56	44	100
	Auto Passenger	**27%**	14	32	46	**21%**	21	16	37
	Transit	**19%**	11	26	37	**16%**	17	13	30
	Cycling	**2%**	1	3	4	**2%**	2	2	4
	Walking	**3%**	2	4	6	**4%**	4	4	8
	Total	**100%**	**53**	**123**	**176**	**100%**	**100**	**79**	**179**
Total	Auto Driver	**-**	170	396	566	-	408	281	689
	Auto Passenger	**-**	55	129	184	-	135	93	228
	Transit	**-**	83	194	277	-	112	77	189
	Cycling	**-**	8	18	26	-	15	11	26
	Walking	**-**	27	64	91	-	44	31	75
	Total	**-**	**343**	**801**	**1144**	**-**	**714**	**493**	**1207**

As shown above, a total of 566 AM and 689 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 11, Fernbank Road, east of Shea Road, during the PM peak hour in the westbound direction is expected to reach over the TRANS capacity in the future background conditions, therefore, no trip assignments are anticipated through Fernbank Road during the PM peak hour in the westbound direction. Table 14 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.

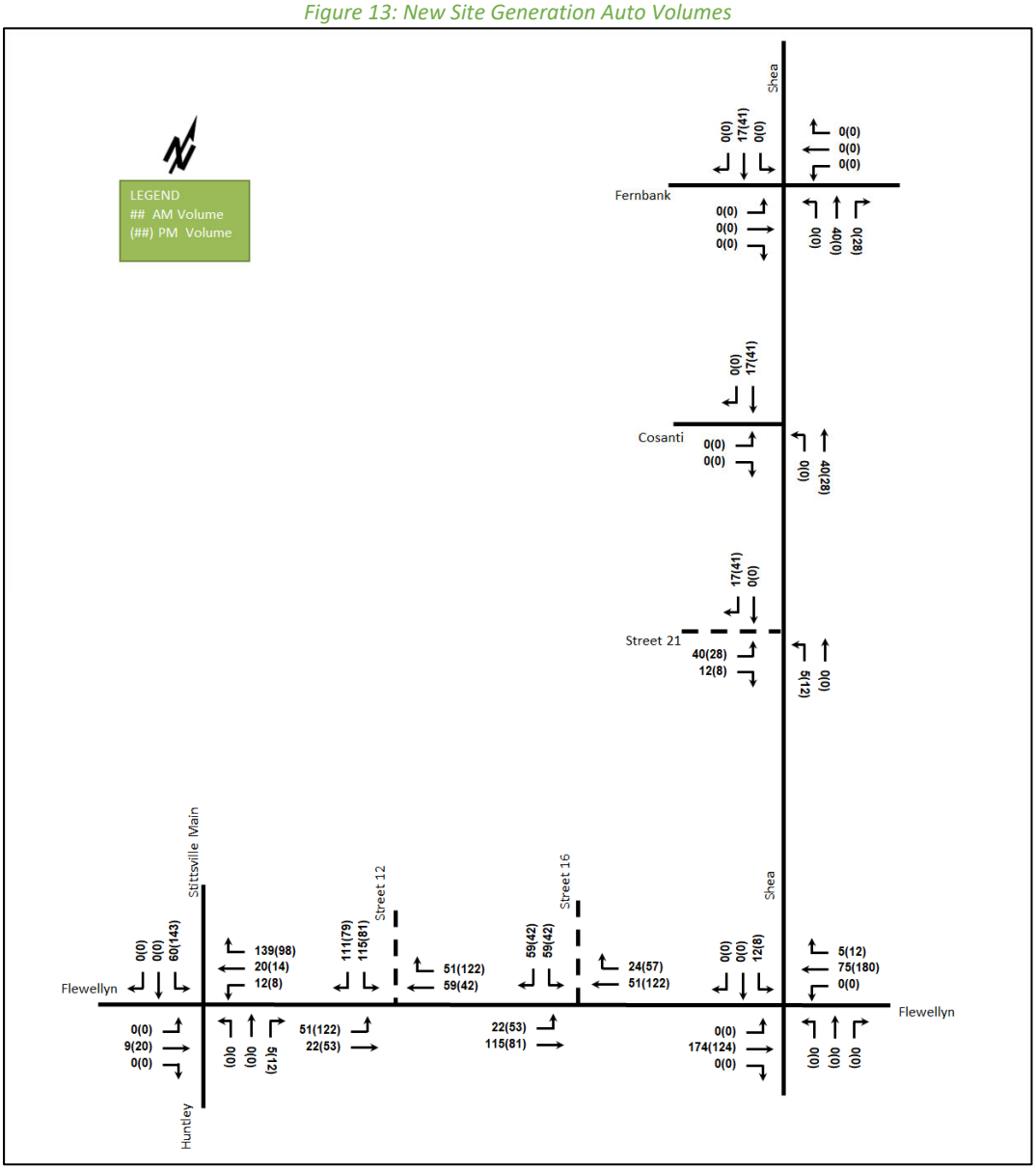
Table 14: OD Survey Distribution

To/From	Residential % of Trips	Inbound Via	Outbound Via
North	80%	35% via Flewellyn to Stittsville Main north 10% via Shea north 35% via Flewellyn east	35% via Stittsville Main north 10% via Shea North (AM)/10% via Fernbank east (PM) 35% via Flewellyn east
South	3%	3% via Flewellyn to Huntley	3% via Huntley
East	12%	12% via Flewellyn	12% via Flewellyn
West	5%	5% via Flewellyn	5% via Flewellyn
Total	100%	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 11 Network Concept review and screenline capacities. Of note, Fernbank Road, east of Shea Road, during the PM peak hour in the westbound direction is to reach the TRANS capacity in the future background conditions, therefore, no trip assignments are anticipated through Fernbank Road during the PM peak hour in the westbound direction. Figure 13 illustrates the new site-generated volumes.

Figure 13: New Site Generation Auto Volumes



5 Exemption Review

Table 15 summarizes the exemptions for this TIA.

Table 15: 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

Module	Element	Explanation	Exempt/Required
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
Network Impact			
3.2 Background Network Travel Demand	All Elements	Only required when one or more other Network Impact Modules are triggered when the development generates more than 75 auto or transit trips	Required
3.3 Demand Rationalization		Only required when one or more other Network Impact Modules when the development generates more than 75 auto trips	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

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

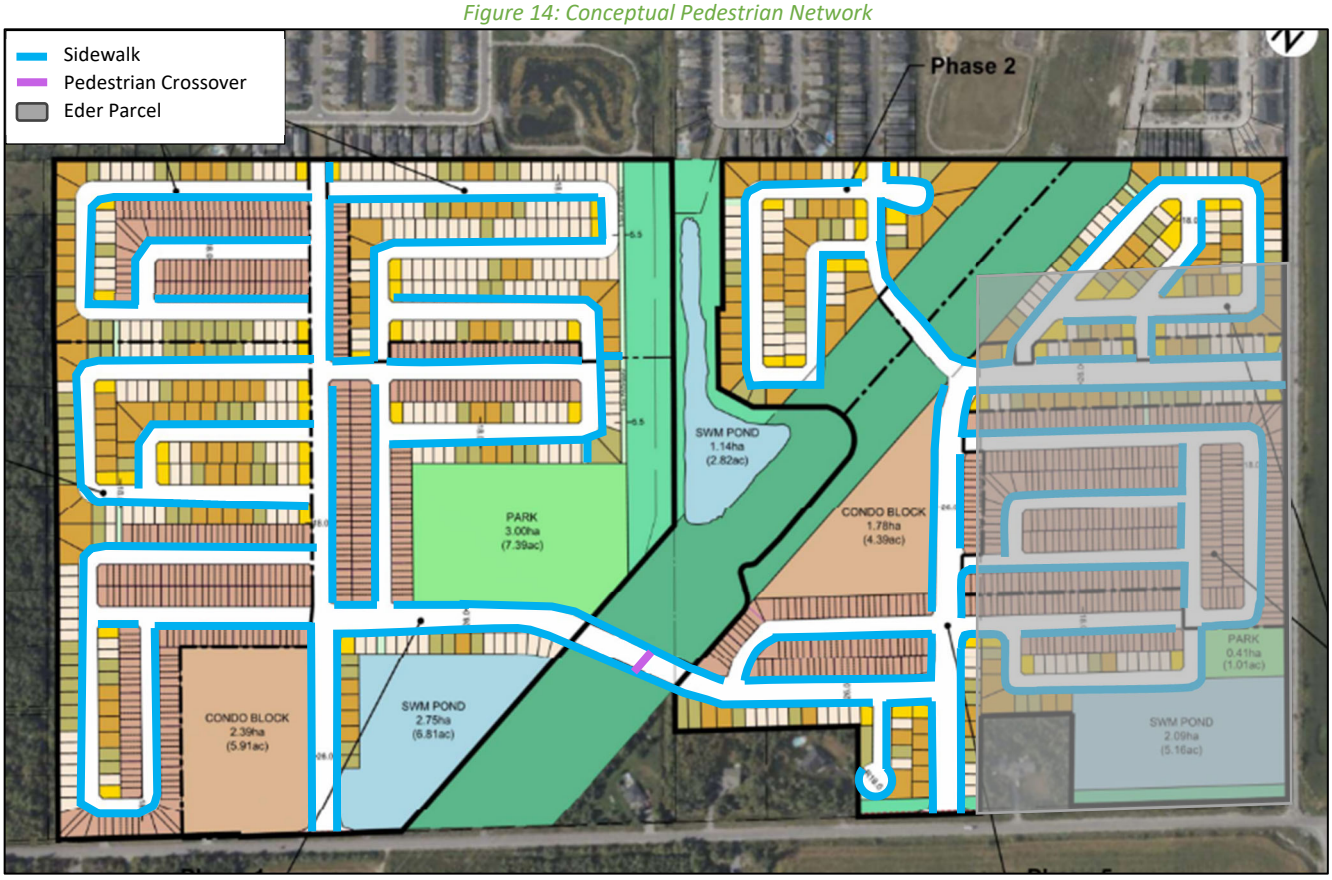
6 Development Design

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 stacked townhomes. Bicycle parking is assumed to be within the individual units.

The existing Hydro corridor and existing stormwater management ponds are noted within the subdivision, and two new proposed stormwater management pond areas and two parks are proposed. Sidewalks are provided on the new collector roads and local roads within the subdivision, to the boundary streets of Shea Road and Flewellyn Road and the northern community. Pedestrian crossovers are proposed at major active mode crossing locations and to facilitate future the Hydro corridor multi-use pathway links. Figure 14 illustrates the conceptual pedestrian network.

Figure 14: Conceptual Pedestrian Network



6.2 New Street Networks

The new collector roads are proposed to connect Shea Road and Flewellyn Road and serve as potential transit routes. The new 26.0-metre-wide collector road are proposed with 2.0-metre-wide sidewalks and 1.5 metre cycletracks. On-street parking is proposed on one side of the road, and the proposed speed limit will be 40 km/h.

All the new local roadways are 18.0-metre-wide and on-street parking along one side of the road and include 2.0-metre-wide sidewalks on one side. The new local roads are proposed to connect Painted Sky Way and Parade Drive, and sidewalks will be provided from the proposed subdivision to Parade Drive. The proposed speed limit will be 30 km/h.

Street 21 is located approximately 410 meters north of the intersection of Shea Road and Flewellyn Road, and approximately 430 meters south of the intersection of Shea Road and Cosanti Drive. The intersection offsets exceed the TAC's minimum corner clearance requirement of 25 meters from major intersections.

Street 16 is approximately 320 meters west of the intersection of Shea Road and Flewellyn Road, while Street 12 is 575 meters further west of Street 16. Both Street 12 and Street 16 exceed the TAC's minimum corner clearance of 25 meters from major intersections.

To support the pedestrian and cycling connectivity within the subdivision, traffic calming elements have been illustrated on the conceptual traffic calming plan, adhering to the philosophies of the Traffic Calming Guidelines and preliminary input from the City. The plan has not been coordinated or reconciled with the civil design, utility requirements, grading requirements or streetscaping elements such as trees. The features include bulb-outs to narrow approaches to intersections (e.g. reduced crossing distance), speed humps, midblock narrowing to reduce

vehicle speeds and lateral roadway shifts. It is noted that the lateral shifts have potential impacts to transit service and maintenance operations, as well as the removal of 45 metres or more of on-street parking. The lateral shifts also are considered to have limited traffic calming benefits as they are designed for smooth and comfortable travel at the direction of City Staff. Traffic calming elements for connections to the existing roadways will be coordinated with the adjacent existing roadway during the detailed design phase. Potential bus stop locations have been drafted for review, following the high-level locations outlined in Section 10. The locations match previous consultant with Transit Services. The location of the southbound stop on Street 12 will need to be confirmed by Transit Services or determine if an alternative location on Street 12 westbound is preferred.

Conceptually, corner triangles have been illustrated based in preliminary City feedback for overlapping 5x15 metre corner triangles at the collector-to-collector road intersections, 3x9 metre corner triangles for local to collector intersections and 3x3 metre corner triangles for local-to-local intersections. These are not intended to be the corner triangles ultimately provided, they are illustrative only to address City commentary. Servicing and landscape designs for the subdivision will determine if these protections are required.

Per the Section 26.1.c. of the Private Approach By-Law, corner lots are noted to have a minimum distance between the nearest limit of a private approach and the intersecting street line (right-of-way line) of six metres. It is noted that a portion of the townhouse lot types have a lot width of 8.65 metres, where a 3.0-metre-wide shared driveway at the end of the lot would entail a driveway that is 5.65 metres from the adjacent right-of-way line. No operational issues would be noted for the 0.35-metre reduction below the 6.0-metre minimum cited in the Private Approach By-Law, and the driveway and lot configurations are recommended to be approved.

A conceptual traffic calming plan has been provided in Appendix H.

6.3 Boundary Street Design

Table 16 summarizes the MMLOS analysis for the boundary streets of Shea Road and Flewellyn Road, and the internal roads of new local and collector roads. Shea Road has been considered with interim pedestrian facilities and the TMP identified urbanization. As Shea Road and 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” for future conditions”. The MMLOS worksheets have been provided in Appendix I.

Table 16: Boundary Street MMLOS Analysis

	Segment	Condition	Pedestrian LOS		Bicycle LOS		Transit LOS	
			PLOS	Target	BLOS	Target	TLOS	Target
Boundary Roadways	Shea Road	Existing	F	No target	F	No target	-	N/A
		Interim	**E**	C	**F**	D	D	D
		Ultimate	**E**	C	A	D	D	D
	Flewellyn Road	Existing	F	No target	E	No target	-	N/A
		Future	**F**	C	**E**	D	D	D
Internal Roadways	New local road (with sidewalk)	Future	A	C	B	D	-	-
	New local road (without sidewalk)	Future	C	C	B	D	-	-
	New collector road	Future	A	C	A	D	D	D

Both Shea Road and Flewellyn Road have a level of service (LOS) F for pedestrian mode in the existing conditions. In the future conditions, Shea Road will improve slightly to an LOS E and remain below the targets once urbanized. To meet the theoretical pedestrian LOS target on Shea Road, the operating speed would need to be reduced to

30-50 km/h. To meet the theoretical pedestrian LOS target on Flewellyn Road, various combinations can be considered:

- a speed reduction to 30 km/h, or
- a speed reduction to 50-60 km/h and a 2.0 metre sidewalk adjacent to the road edge; or
- a 2.0 metre sidewalk with a 0.5-2.0 metre boulevard

Shea Road has a level of service (LOS) F for bicycle mode in the existing and interim conditions and will meet the bicycle LOS target once facilities are implemented in the ultimate condition.

Flewellyn Road has a LOS E for bicycle mode in the existing and future conditions. No improvements are noted along Flewellyn Road. To meet the theoretical bicycle LOS target on Flewellyn Road, the operating speed would need to be reduced to 50-70 km/h.

Both Shea Road and Flewellyn Road meet the transit level of service targets in the future conditions. The truck LOS is not applicable for the boundary roads, per the application of the MMLOS Guidelines.

The internal local roads will have an LOS of A for pedestrian and LOS B for bicycle, and the collector roads will have LOS of A for both pedestrian and bicycle, and LOS D for transit. Therefore, all of the internal roadways will meet the MMLOS targets. The truck LOS is not applicable for the internal roadways, per the application of the MMLOS Guidelines.

With respect to meeting the MMLOS targets along Shea Road and Flewellyn Road, the addition of facilities to the cross-section will represent significant reconstruction of the roadways and the extension of other municipal services to support that reconstruction. While an interim condition has been noted for Shea Road, it is unknown if this is possible prior to full urbanization, storm sewers and removal of the ditches to implement pedestrian and cycling facilities. Along Flewellyn Road, the Faulkner Municipal Drain prevents the inclusion of north side facilities being implemented for over 600 metres west of Shea Road. An alternative solution may be implemented in conjunction with the City's intersection improvement at Shea Road at Flewellyn Road to incorporate speed reductions west and north of the future intersection.

The connectivity of extending facilities on Flewellyn Road does not provide a solution to a missing link nor a demand for active mode travel. The connectivity is all focused to and from the north of the subdivision, integrating with the existing community, and these locations are in an isolated corner without desire line or destination to connect to. It is recommended that the existing pave shoulders remain and provide the rural connectivity on Flewellyn Road.

7 Transportation Demand Management

7.1 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.

7.2 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 the intersections in the study area are anticipated to have residual capacity, Fernbank Road is expected to reach its capacity in the future background

conditions reviewed in Section 11. It is anticipated that future pedestrian facilities and cycling facilities provided within the subdivision to connect to northern communities, along with transit service 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.

7.3 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 J. 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

8 Background Network Travel Demands

8.1 Transportation Network Plans

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

8.2 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 17 and the TRANS model plots are provided in Appendix K.

Table 17: 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 18 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 18: 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%

Street	AM Peak Hour		PM Peak Hour	
	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%

8.3 Other Developments

The background developments explicitly considered in the background conditions (Section 2.3.2) include:

- 5957 & 5969 Fernbank Road
- 6041 Fernbank Road
- 5993 Flewellyn Road
- 5960 Fernbank Road
- 5500 Abbott & 1555 Shea Road
- 5725 Fernbank Road

The total background development volumes and the development volumes for each development within the study area have been provided in Appendix L. The developments at 5957 and 5969 Fernbank Road, 6041 Fernbank Road, 5993 Flewellyn Road, and 5500 Abbott Street and 1555 Shea Road trip generation are noted to be updated to the TRANS 2020 methodology. It is noted that 95% of the development at 5993 Flewellyn Road have been completed in 2024.

9 Demand Rationalization

9.1 2030 Future Background Intersection Operations

Typical of City of Ottawa requirements, the area network volumes have been balanced along the road network, having the most recent intersections counts with the highest priority/reference to adjust adjacent intersections. Figure 15 illustrates the 2030 background volumes and Table 19 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 intersection. Level of service is based on HCM 2010 delay for stop-controlled intersections, and Sidra HCM 6 for the roundabout intersection. The synchro and sidra worksheets for the 2030 future background horizon are provided in Appendix M.

Figure 15: 2030 Future Background Volumes

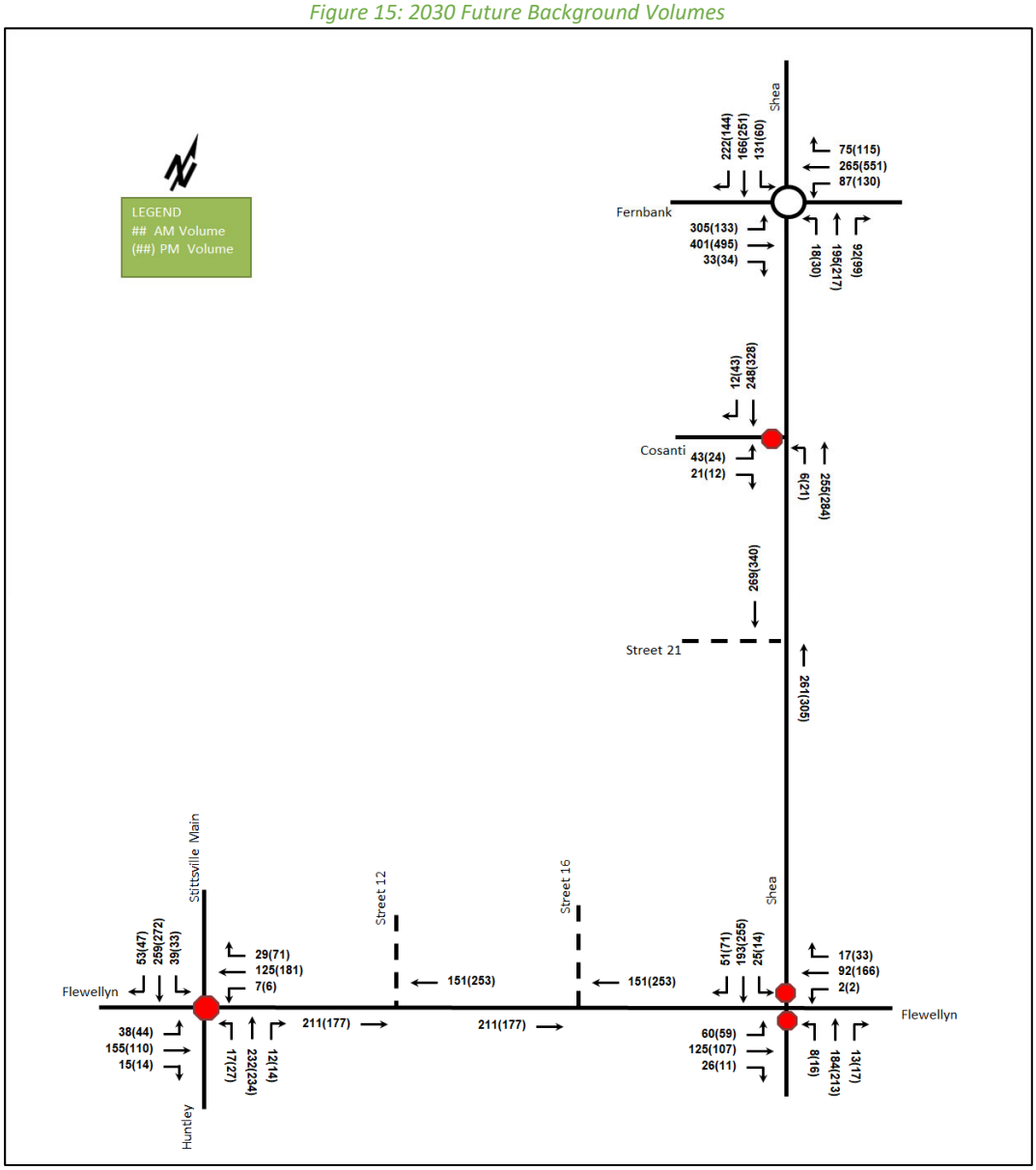


Table 19: 2030 Future Background Intersection Operations

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	C	0.82	24.7	124.1	C	0.78	22.1	90.5
	WB	B	0.55	13.0	30.5	D	0.88	31.9	175.5
	NB	C	0.58	18.8	24.8	B	0.54	14.5	24.5
	SB	B	0.58	12.2	38.8	C	0.73	23.5	46.2
	Overall	**C**	**0.82**	**18.0**	**124.1**	**C**	**0.88**	**24.7**	**175.5**
Shea Road at Flewellyn Road *Unsignalized*	EB	A	0.04	7.6	0.8	A	0.04	7.8	0.8
	WB	A	0.00	7.5	0.0	A	0.00	7.5	0.0
	NB	C	0.39	16.0	13.5	C	0.53	20.9	22.5
	SB	C	0.49	17.7	20.3	C	0.65	23.4	34.5
	Overall	**B**	**-**	**10.7**	**-**	**B**	**-**	**14.1**	**-**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	B	0.35	12.2	11.3	B	0.30	12.1	9.0
	WB	B	0.27	11.3	8.3	B	0.43	13.5	16.5
	NB	B	0.43	13.3	15.8	B	0.46	14.0	18.0
	SB	B	0.54	14.7	24.0	C	0.56	15.7	25.5
	Overall	**B**	**-**	**13.2**	**-**	**B**	**-**	**14.1**	**-**
Shea Road at Cosanti Drive *Unsignalized*	EBL/R	B	0.11	12.0	3.0	B	0.08	13.2	1.5
	NBL/R	A	0.01	7.8	0.0	A	0.02	8.1	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.4**	**-**	**A**	**-**	**0.9**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.000
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.

As noted in the existing conditions and collision review, Shea Road at Flewellyn Road requires geometric and intersection control improvements to address the existing safety issues. As in the existing conditions, until this solution can be implemented, it is recommended that the intersection remain minor stop controlled. All-way stop control warrant calculation sheets are provided in Appendix D.

As noted in the existing conditions, the Stittsville Main Street / Huntley Road at Flewellyn Road was found to be warranted by Justification 1. As with the existing conditions, no signalization is recommended at this intersection based on the forecasted operations at this horizon. Signal warrant analysis of Justification 7 was conducted for the intersections of Shea Road at Flewellyn Road for 2030 future background conditions. The intersection did not meet Justification 7 for the forecasted conditions at this horizon. Signal warrant calculation sheets are provided in Appendix E.

Left-turn lane warrant analysis was performed for the intersections of Shea Road at Flewellyn Road, Stittsville Main Street / Huntley Road at Flewellyn Road, and Shea Road at Cosanti Drive for 2030 future background conditions, none of the intersections met the left-turn warrant for any approach. The left-turn warrant calculation sheets are provided in Appendix F.

9.2 2035 Future Background Intersection Operations

Figure 16 illustrates the 2035 background volumes and Table 20 summarizes the 2035 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 intersection. Level of service is based on HCM 2010 delay for stop-controlled intersections, and Sidra HCM 6 for the roundabout intersection. The synchro and sidra worksheets for the 2035 future background horizon are provided in Appendix N.

Figure 16: 2035 Future Background Volumes

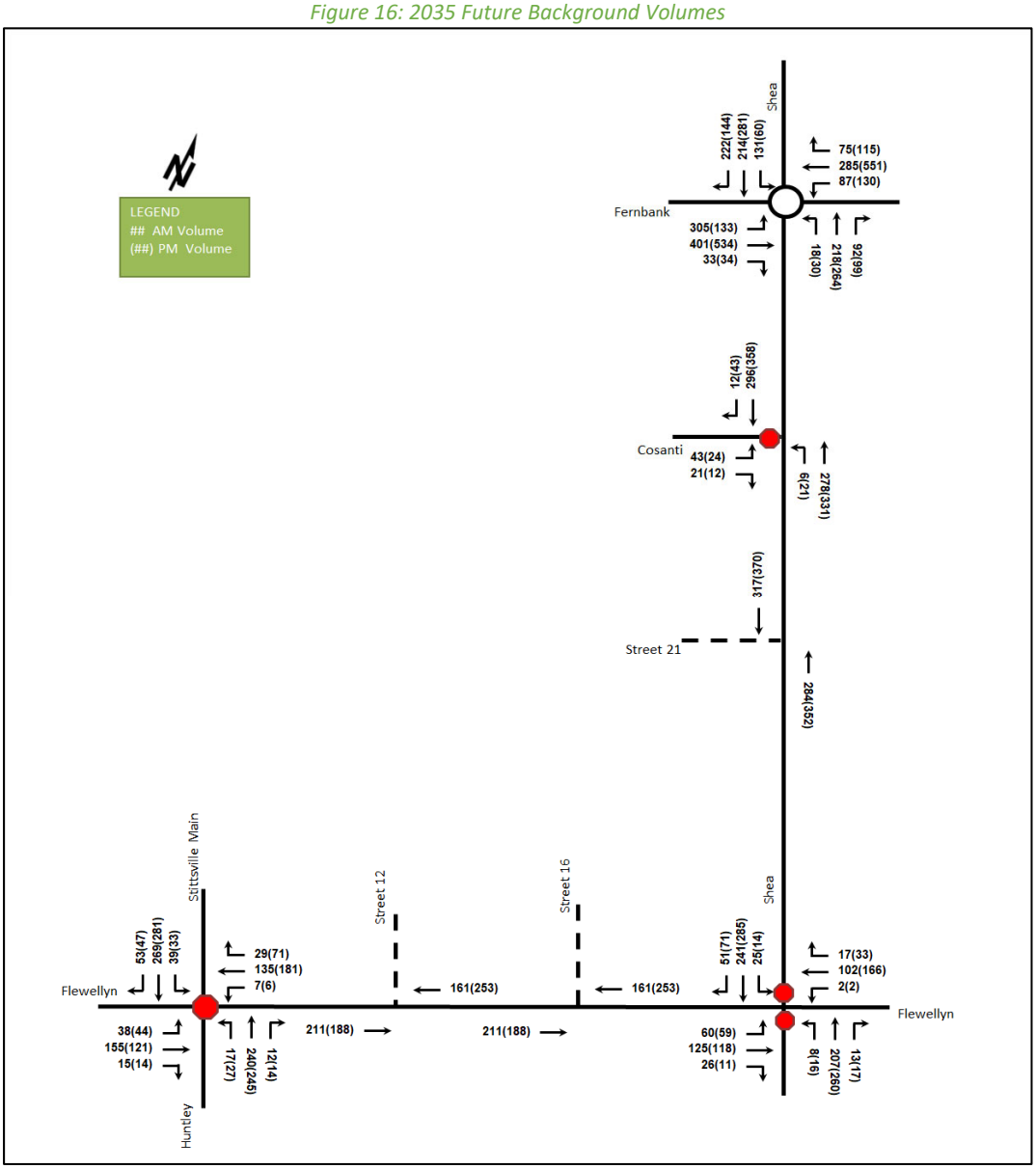


Table 20: 2035 Future Background Intersection Operations

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	D	0.87	31.2	143.2	D	0.86	30.2	124.0
	WB	B	0.59	14.4	35.2	E	0.93	42.7	210.6
	NB	C	0.62	20.7	28.3	C	0.63	18.5	33.0
	SB	B	0.65	14.5	52.1	D	0.77	27.1	55.2
	Overall	**C**	**0.87**	**21.4**	**143.2**	**D**	**0.93**	**31.8**	**210.6**
Shea Road at Flewellyn Road *Unsignalized*	EB	A	0.04	7.6	0.8	A	0.04	7.8	0.8
	WB	A	0.00	7.5	0.0	A	0.00	7.5	0.0
	NB	C	0.44	17.4	16.5	D	0.64	25.8	33.0
	SB	C	0.60	21.2	29.3	D	0.72	28.4	44.3
	Overall	**B**	-	**12.7**	-	**B**	-	**17.6**	-

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	0.35	12.4	12.0	B	0.32	12.6	10.5
	WB	B	0.29	11.6	9.0	B	0.44	14.0	16.5
	NB	B	0.45	13.8	17.3	B	0.48	14.7	19.5
	SB	C	0.56	15.4	25.5	C	0.59	17.1	29.3
	Overall	**B**	**-**	**13.7**	**-**	**B**	**-**	**15.0**	**-**
Shea Road at Cosanti Drive ***Unsignalized***	EBL/R	B	0.12	12.7	3.0	B	0.08	14.0	2.3
	NBL/R	A	0.01	7.9	0.0	A	0.02	8.2	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.3**	**-**	**A**	**-**	**0.9**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.000
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 intersections in the study area operate well. No capacity issues are noted.

As noted in the existing conditions, the intersection of Shea Road at Flewellyn Road met the all-way stop control warrant in the existing condition. The intersection is recommended to remain as minor stop-control until Shea Road can be realigned. All-way stop control warrant calculation sheets are provided in Appendix D.

The conclusions concerning signalization and Justification 7 warrant analysis remain the same at this horizon as noted in the 2030 future background conditions.

Left-turn lane warrant analysis was performed for the intersections of Shea Road at Flewellyn Road, Stittsville Main Street / Huntley Road at Flewellyn Road, and Shea Road at Cosanti Drive for 2035 future background conditions. The southbound left turn at Shea Road at Flewellyn Road intersection met warrants for the forecasted 2035 future background conditions during the PM peak hour, although implementation of additional lanes is not recommended until the offset configuration has been addressed.

9.3 Network Rationalization

No capacity constraints are noted at the study area intersections in the background conditions. Section 11 documents the screenline review for Fernbank Road, east of Shea Road is noted to be over the TRANS capacity during the PM peak hour in the westbound direction in the future conditions, with residual capacity on the other area roadways to support future development.

The TMP outlines the widening of Terry Fox Drive between Abbott Street and Eagleson Road. This project should facilitate travel between the origins and destinations of the local screenline elements to permit a more distributed pattern across the two roads. While this widening remains a network improvement for the Stitsville/Kanata area, it is not required to support the proposed subdivision.

10 Transit

10.1 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	83	194	277	112	77	189

The proposed development is anticipated to generate 277 AM and 189 PM peak hour two-way transit trips. From the trip distribution found in Section 4.3 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. Future transit stops will be planned within the subdivision, which will be the primary bus stops for the residents within the subdivision.

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	73	171	99	68	Bus	Three standard buses
East	10	23	13	9	Bus	Two-fifths of a standard bus

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 future transit stops are proposed within the subdivision, as illustrated in Figure 17, with previous confirmation from Transit Services that locations are generally acceptable for the subdivision. Ultimately these routes are expected to form local service extending from the BRT station at Fernbank and Robert Grant Avenue. In the near term, a combination of a new dedicated route combined with the extension of the peak hour services to 15–20-minute service in the area (e.g. routes #61, #262, #263) would provide the service required for the community.

Figure 17 Conceptual Subdivision Transit Stop Locations

10.2 Transit Priority

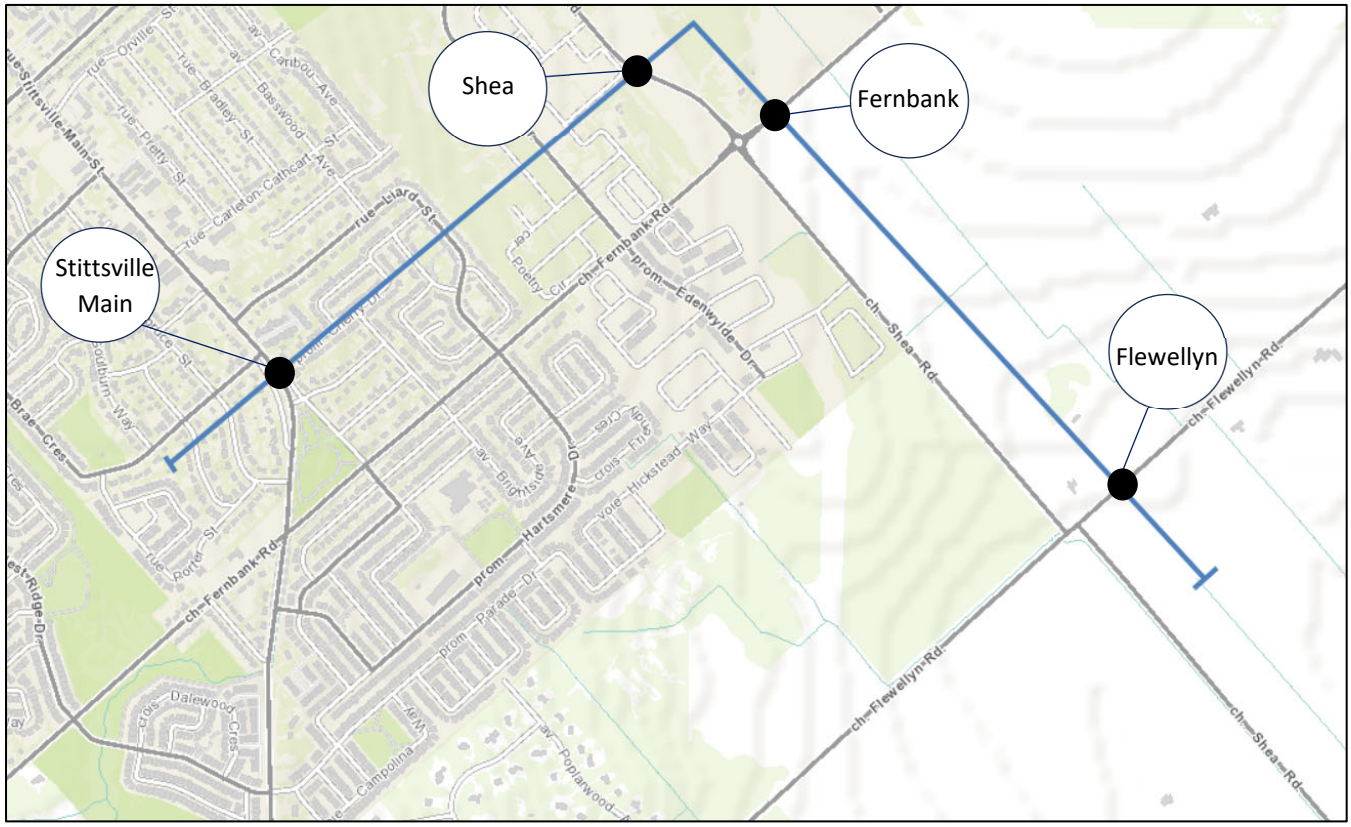
No transit priority is required along the boundary or within the subdivision. Within the regional network, the westbound road capacity along Fernbank Road may require localized widening to improve transit service from Robert Grant Avenue to Shea Road to maintain service times along this segment of roadway. The single lane roundabout at Fernbank Road and Shea Road restricts the ability to provide priority measures for turning movements, therefore any widening for westbound travel would be for transit to queue jump the general travel lanes on Fernbank Road and access the roundabout quicker.

11 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. The screenline capacity has applied the City's peak period conversion factors, 0.84 and 0.92 for the morning and afternoon peak periods respectively, to calculate the peak period volumes and percent utilization.

To assess the capacity of the area network, a local screenline was created around the study area and has been illustrated in Figure 18. 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 18: 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	228-439	23-44%
	Shea Road	Collector	800 cars/hour	246-522	31-65%
	Fernbank Road	Arterial	800 cars/hour	218-509	27-64%
	Flewellyn Road	Collector	800 cars/hour	68-186	9-23%
2030 Future Background	**Stittsville Main Street**	Arterial	1000 cars/hour	234-451	23-45%
	Shea Road	Collector	800 cars/hour	419-575	52-72%
	Fernbank Road	Arterial	800 cars/hour	359-796	45-100%
	Flewellyn Road	Collector	800 cars/hour	93-201	12-25%
2035 Future Background	**Stittsville Main Street**	Arterial	1000 cars/hour	239-460	24-46%
	Shea Road	Collector	800 cars/hour	446-598	56-75%
	Fernbank Road	Arterial	800 cars/hour	375-796	47-100%
	Flewellyn Road	Collector	800 cars/hour	102-201	13-25%
2030 Future Total	**Stittsville Main Street**	Arterial	1000 cars/hour	284-594	28-59%
	Shea Road	Collector	800 cars/hour	428-615	54-77%
	Fernbank Road	Arterial	800 cars/hour	359-796	45-100%
	Flewellyn Road	Collector	800 cars/hour	160-393	20-49%
2035 Future Total	**Stittsville Main Street**	Arterial	1000 cars/hour	289-603	29-60%
	Shea Road	Collector	800 cars/hour	471-638	59-80%
	Fernbank Road	Arterial	800 cars/hour	375-796	47-100%
	Flewellyn Road	Collector	800 cars/hour	169-393	21-49%

Notes:
Lane Capacity = single lane estimate
Volumes = directional volume range during AM or PM peak hours applied the City's peak period conversion factors, 0.84 and 0.92 for the morning and afternoon peak periods respectively
Percent Utilization = utilization range based on Volume for lane

Based on the percent utilization, all roadways have residual capacity in both the future background and total conditions. Fernbank Road, east of Shea Road is expected to reach 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 in the westbound direction during the PM peak hour. Ultimately, the widening of Fernbank Road will improve the capacity on Fernbank Road.

12 Intersection Design

12.1 Intersection Control

The new roadway intersections are proposed as being stop-controlled on the minor approach.

All-way stop control warrant analysis was performed for the new intersections along Shea Road and Flewellyn Road and none of the intersections met the all-way stop control warrants for consideration. All-way stop control warrant calculation sheets are provided in Appendix D.

12.2 Intersection Design

12.2.1 2030 Future Total Intersection Operations

The eastbound left turns at Flewellyn Road at Street12 during both peak hours and at Street 16 during the PM peak hour met the left-turn warrant for consideration in the 2030 future total conditions. Although the warrants were met, the operations are acceptable without the turn lane. The Municipal Drain also constrains the ability to provide a left-turn lane for Street 16. It is noted that no left turn warrants were met at Shea Road at Street 21. The left-turn warrant calculation sheets are provided in Appendix F.

Should a left-turn lane be required at Flewellyn Road at Street 12, the storage length is expected to be 30 metres.

The 2030 future total intersection volumes are illustrated in Figure 19 and the intersection operations are summarized below in Table 24. 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 Sidra HCM 6 was used for roundabout intersection operations. The synchro and sidra worksheets have been provided in Appendix O.

Figure 19: 2030 Future Total Volumes

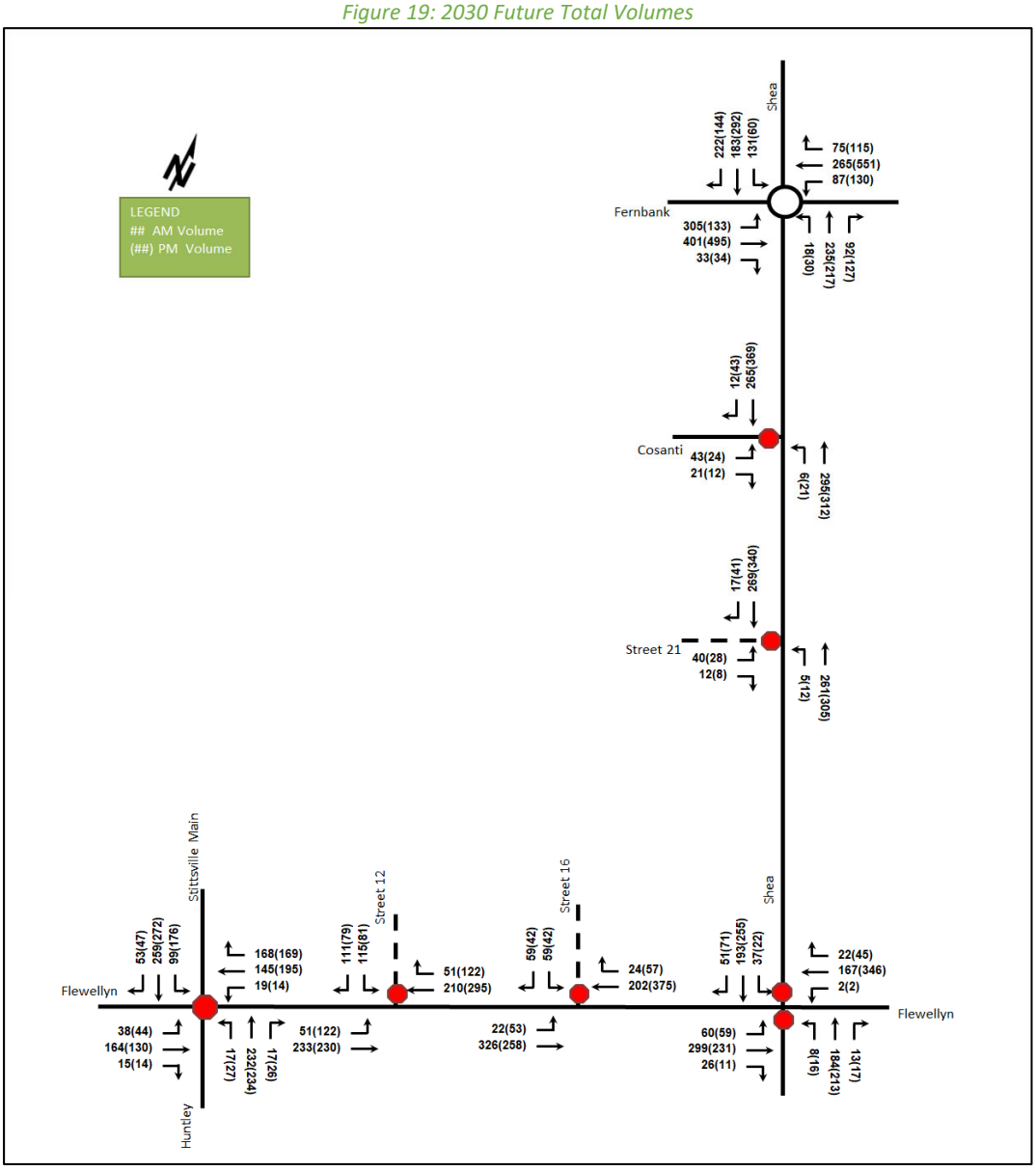


Table 24: 2030 Future Total Intersection Operations

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	D	0.84	26.7	130.2	D	0.82	26.0	99.6
	WB	B	0.58	14.1	32.5	D	0.88	31.9	175.4
	NB	C	0.65	22.3	31.3	C	0.58	15.9	28.5
	SB	B	0.60	12.7	42.4	D	0.79	28.8	59.1
	Overall	**C**	**0.84**	**19.7**	**130.2**	**D**	**0.88**	**27.0**	**175.4**
Shea Road at Flewellyn Road *Unsignalized*	EB	A	0.04	7.8	0.8	A	0.05	8.3	1.5
	WB	A	0.00	7.9	0.0	A	0.00	7.7	0.0
	NB	D	0.55	26.2	24.0	**F**	**0.89**	**69.2**	**59.3**
	SB	E	0.76	39.1	450	**F**	**1.06**	**104.5**	**96.0**
	Overall	**B**	**-**	**15.9**	**-**	**F**	**-**	**41.8**	**-**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	C	0.43	15.6	16.5	C	0.42	16.9	15.8
	WB	C	0.61	19.4	30.8	D	0.75	28.2	46.5
	NB	C	0.53	18.0	22.5	C	0.60	21.4	29.3
	SB	D	0.75	26.8	48.8	**F**	**0.95**	**54.6**	**90.0**
	Overall	**C**	**-**	**20.9**	**-**	**D**	**-**	**34.9**	**-**
Shea Road at Cosanti Drive *Unsignalized*	EBL/R	B	0.12	12.5	3.0	B	0.08	14.0	2.3
	NBL/R	A	0.01	7.8	0.0	A	0.02	8.2	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.3**	**-**	**A**	**-**	**0.9**	**-**
Shea Road at Street 21 *Unsignalized*	EBL/R	B	0.10	12.4	2.3	B	0.08	13.8	2.3
	NBL/T	A	0.00	7.8	0.0	A	0.01	8.1	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.1**	**-**	**A**	**-**	**0.8**	**-**
Flewellyn Road at Street 16 *Unsignalized*	EBL/T	A	0.02	7.7	0.8	A	0.05	8.3	0.8
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.20	12.5	5.3	B	0.19	14.7	5.3
	Overall	**A**	**-**	**2.4**	**-**	**A**	**-**	**2.0**	**-**
Flewellyn Road at Street 12 *Unsignalized*	EBL/T	A	0.04	7.9	0.8	A	0.11	8.5	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.39	15.1	13.5	C	0.39	19.0	13.5
	Overall	**A**	**-**	**4.9**	**-**	**A**	**-**	**4.4**	**-**

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 except for the northbound and southbound movement at Shea Road at Flewellyn Road intersection during the PM peak hour and the southbound movement at Stittsville Main Street / Huntley Road at Flewellyn Road during the PM peak hour.

As noted in the existing conditions, the intersection of Shea Road at Flewellyn Road met the all-way stop control warrant. The intersection was assumed to remain as minor stop-control conditions until Shea Road can be realigned. All-way stop control warrant calculation sheets are provided in Appendix D.

The Shea Road at Flewellyn Road intersection met minimum vehicular volume justification however not the delay to cross traffic justification of Signal Justification 7 in the 2030 future total conditions. Signal warrant calculation sheets are provided in Appendix E. Given the existing geometric offset at the intersection and existing safety concern for this location, it is recommended that the City expedite the acquisition of land to facilitate intersection

improvements and a higher order of intersection control. This control could be signalization or a roundabout, depending on the property acquisition and funding allocation. It is noted that the City has indicated a preference for a roundabout at this location.

The volumes met the warrant for consideration of a southbound left-turn lane in the 2030 future total conditions during both peak hours at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road, and the implementation of an auxiliary southbound left turn would address the anticipated capacity constraints. It is noted that the existing property and intersection alignment prevent the implementation of the southbound left-turn at this time.

The eastbound left turn warrant was met for consideration at Shea Road at Flewellyn Road intersection at this horizon, although implementation of additional lanes is not recommended until Shea Road can be realigned. The left-turn warrant calculation sheets are provided in Appendix F.

Right turn lanes have been reviewed for Shea Road at Street 21, Flewellyn Road at Street 12 and Flewellyn Road at Street 16. The need for right turn lanes is not based on warrants and should be implemented to address operations. No operational issues are noted along either Shea Road or Flewellyn Road at these locations to require auxiliary turn lanes and they are not recommended.

Based on the operational analysis and the warrants provided, geometric improvements and upgrading to a roundabout has been assessed at the intersection of Shea Road at Flewellyn Road, and a 45-metre auxiliary southbound left turn lane has been assessed at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road. Table 25 summarizes the 2030 future total operations of possible mitigation measures for the intersections of Shea Road at Flewellyn Road and Stittsville Main Street/Huntley Road at Flewellyn Road should these improvements be implemented. The Synchro and Sidra worksheets are provided in Appendix P.

Table 25: 2030 Future Total - Mitigation Measures

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 *Roundabout*	EB	A	0.36	7.1	14.4	A	0.30	6.5	10.8
	WB	A	0.18	5.1	6.0	A	0.39	7.7	15.4
	NB	A	0.23	6.5	7.6	A	0.25	6.1	8.6
	SB	A	0.25	5.5	9.1	A	0.37	8.0	14.0
	Overall	**A**	**0.36**	**6.2**	**14.4**	**A**	**0.39**	**7.2**	**15.4**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	C	0.42	15.0	15.8	C	0.39	15.3	13.5
	WB	C	0.59	18.3	28.5	C	0.70	23.5	40.5
	NB	C	0.52	17.7	22.5	C	0.57	19.4	27.0
	SBL	B	0.21	12.2	6.0	C	0.38	15.1	12.8
	SBT/R	C	0.60	19.5	29.3	C	0.63	21.1	32.3
	Overall	**C**	**-**	**17.4**	**-**	**C**	**-**	**19.8**	**-**

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

While not recommended, the inclusion of 30.0-metre auxiliary eastbound left-turn lane at the intersection of Flewellyn Road and Street 12 and a 15.0-metre auxiliary eastbound left-turn lane at Street 16, have been summarized in Table 26 for informational purposes only. The addition of the lanes has negligible change to the overall operations. The ability to provide the turn lane at Street 16 is prevented by the Faulkner Municipal Drain, and similarly, the existing property and Stittsville Main Street and Huntley Road alignment prevent the implementation of the southbound left turn lane at Flewellyn Road. The Synchro worksheets are provided in Appendix Q.

Table 26: 2030 Future Total - EBL at Flewellyn Road at Street 12 & at Street 16

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Flewellyn Road at Street 16 ***Unsignalized***	EBL	A	0.02	7.7	0.8	A	0.05	8.3	0.8
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.20	12.5	5.3	B	0.18	14.6	5.3
	Overall	**A**	**-**	**2.4**	**-**	**A**	**-**	**2.0**	**-**
Flewellyn Road at Street 12 ***Unsignalized***	EBL	A	0.04	7.9	0.8	A	0.11	8.5	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.39	15.0	13.5	C	0.38	18.8	13.5
	Overall	**A**	**-**	**4.9**	**-**	**A**	**-**	**4.4**	**-**

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

12.2.2 2035 Future Total Intersection Operations

The 2035 future total intersection volumes are illustrated in Figure 20 and the intersection operations are summarized below in Table 27. As noted in the 2030 future total conditions, geometric improvements and upgrading to a roundabout/signal is recommended at the intersection of Shea Road at Flewellyn Road, and a 45 metres auxiliary southbound left turn lane would mitigate operation constraints at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road. The intersection of Shea Road at Flewellyn Road will be analyzed as a roundabout intersection and a 45 metres auxiliary southbound left turn lane at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road will be analyzed in the 2035 future total conditions. Similar to the 2030 future total conditions, no left turn warrants were met at Shea Road at Street 21.

Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout intersections. HCM 2010 methodology was used for unsignalized intersection operations and Sidra HCM 6 was used for roundabout intersection operations. The synchro worksheets have been provided in Appendix R.

Figure 20: 2035 Future Total Volumes

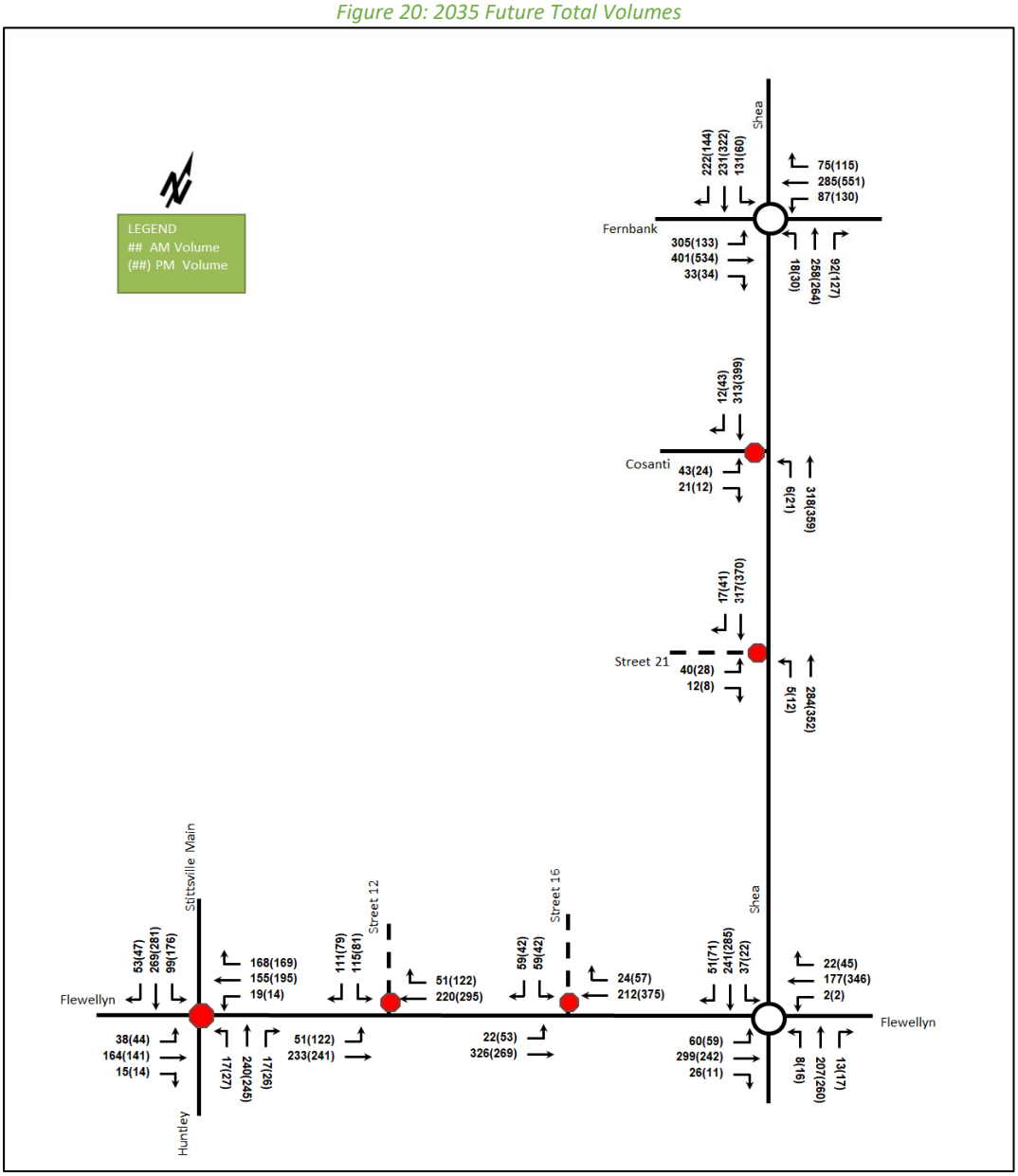


Table 27: 2035 Future Total Intersection Operations

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	D	0.89	34.3	151.9	E	0.89	37.5	142.1
	WB	C	0.62	15.8	37.5	E	0.93	42.7	210.4
	NB	C	0.70	24.8	36.0	C	0.68	20.8	38.7
	SB	C	0.67	15.2	56.9	D	0.84	34.3	72.5
	Overall	**C**	**0.89**	**23.6**	**151.9**	**E**	**0.93**	**35.6**	**210.4**

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 *Roundabout*	EB	A	0.38	7.6	15.1	A	0.32	7.0	11.6
	WB	A	0.20	5.4	6.5	A	0.41	8.3	16.1
	NB	A	0.26	6.8	8.7	A	0.30	6.8	10.8
	SB	A	0.30	6.0	11.2	A	0.41	8.5	15.6
	Overall	**A**	**0.38**	**6.6**	**15.1**	**A**	**0.41**	**7.7**	**16.1**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	C	0.43	15.5	15.8	C	0.42	16.3	15.8
	WB	C	0.62	19.6	31.5	D	0.72	25.7	44.3
	NB	C	0.55	18.6	24.0	C	0.61	21.1	30.0
	SBL	B	0.21	12.4	6.0	C	0.39	15.6	13.5
	SBT/R	C	0.63	20.9	32.3	C	0.66	23.5	36.0
	Overall	**C**	**-**	**18.4**	**-**	**C**	**-**	**21.5**	**-**
Shea Road at Cosanti Drive *Unsignalized*	EBL/R	B	0.13	13.3	3.0	C	0.09	14.9	2.3
	NBL/R	A	0.01	7.9	0.0	A	0.02	8.3	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**0.8**	**-**
Shea Road at Street 21 *Unsignalized*	EBL/R	B	0.11	13.2	3.0	B	0.09	14.8	2.3
	NBL/T	A	0.00	8.0	0.0	A	0.01	8.2	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.1**	**-**	**A**	**-**	**0.8**	**-**
Flewellyn Road at Street 16 *Unsignalized*	EBL/T	A	0.02	7.8	0.8	A	0.05	8.3	0.8
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.20	12.7	5.3	B	0.19	14.9	5.3
	Overall	**A**	**-**	**2.4**	**-**	**A**	**-**	**2.0**	**-**
Flewellyn Road at Street 12 *Unsignalized*	EBL/T	A	0.04	7.9	0.8	A	0.11	8.5	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.39	15.3	14.3	C	0.39	19.3	13.5
	Overall	**A**	**-**	**4.9**	**-**	**A**	**-**	**4.4**	**-**

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.

The new intersections along Shea Road and Flewellyn Road are assumed to be a minor stop-control condition. All-way stop control warrant calculation sheets are provided in Appendix D.

No additional signal warrants were met in 2035 future total conditions. Signal warrant calculation sheets are provided in Appendix E.

Similar to the 2030 future total conditions, the turn lanes are not required operationally on the eastbound left turns at Flewellyn Road at Street 12 and at Street 16. The 2035 future total operations with a 30.0 metres auxiliary eastbound left turn lane at the intersections of Flewellyn Road at Street 12 and a 15.0 metres auxiliary eastbound left turn lane at Street 16 have been summarized in Table 28 for informational purposes only. The left-turn warrant calculation sheets are provided in Appendix F. The Synchro worksheets are provided in Appendix S.

Table 28: 2035 Future Total - EBL at Flewellyn Road at Street 12 & at Street 16

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Flewellyn Road at Street 16 ***Unsignalized***	EBL	A	0.02	7.8	0.8	A	0.05	8.3	0.8
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.20	12.7	5.3	B	0.19	14.8	5.3
	Overall	**A**	**-**	**2.4**	**-**	**A**	**-**	**2.0**	**-**
Flewellyn Road at Street 12 ***Unsignalized***	EBL	A	0.04	7.9	0.8	A	0.11	8.5	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.39	15.2	14.3	C	0.39	19.0	13.5
	Overall	**A**	**-**	**4.9**	**-**	**A**	**-**	**4.4**	**-**

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

12.2.3 Intersection MMLOS

All study area intersections are unsignalized intersections, therefore, no MMLOS is required.

12.2.4 Recommended Design Elements

Based on the operational analysis provided, the following network improvements are indicated for consideration by the 2030 future total horizon:

- Shea Road at Flewellyn Road:
  - Geometric improvements and upgrading to a roundabout/signal (requires City land acquisition), to be confirmed through the City's intersection control study, to address the existing and future background safety issues
- Stittsville Main Street/Huntley Road at Flewellyn Road:
  - A 45-metre auxiliary southbound left turn lane (requires City land acquisition)

12.3 Sensitivity Analysis

12.3.1 Eder Lands Sensitivity

While the Eder Lands are not within the proposed subdivision limits, they are a gap in the urban boundary and were considered within the W-4 Lands review to ensure the area was planned wholistically. Given this, a sensitivity analysis of these extra lands will be provided to give a fulsome analysis of the expected transportation network impacts. The sensitivity analysis will be provided for the 2030 build-out year and consider the proposed subdivision and Eder Lands.

It is estimated that the Eder Lands to be comprised of approximately 311 townhomes and 106 single detached homes.

12.3.1.1 Eder Lands Trip Generation and Assignment

Using the same methodology outlined in Section 4, Table 29 summarizes the total person trip generation for the Eder Lands, Table 30 summarizes the trip generation by mode and peak hour and Figure 21 illustrates the new site-generated volumes for the Eder Lands.

Table 29: Eder Lands Person Trip Generation by Peak Period

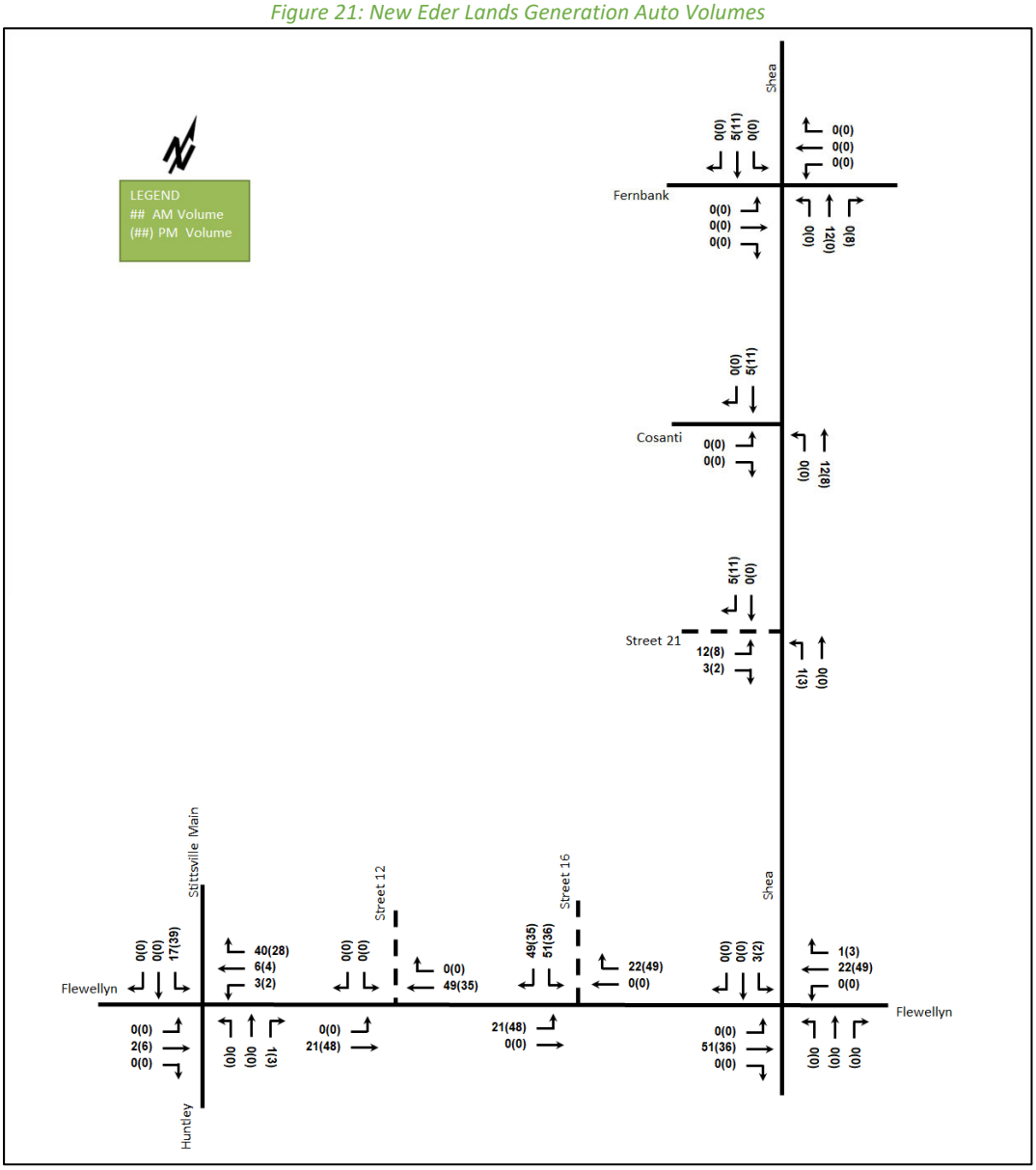
Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Single-Detached	106	65	152	217	163	100	263
Multi-Unit (Low-Rise)	311	126	294	420	275	216	491

Table 30: Eder Lands Trip Generation by Mode

Travel Mode		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Total	Auto Driver	49	115	164	112	81	193
	Auto Passenger	14	32	46	37	26	63
	Transit	23	54	77	32	22	54
	Cycling	3	5	7	4	3	7
	Walking	8	19	27	12	9	21
	Total	**97**	**225**	**321**	**197**	**141**	**338**

As shown above, a total of 164 AM and 193 PM new peak hour two-way vehicle trips are projected as a result of the Eder Lands.

Figure 21: New Eder Lands Generation Auto Volumes



With Eder Lands, the 2035 future total intersection volumes are illustrated in Figure 22 and the intersection operations are summarized below in Table 31. As noted in the 2035 future total conditions, the intersection of Shea Road at Flewellyn Road will be analyzed as a roundabout intersection and an auxiliary southbound left turn lane at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road will be analyzed in 2035 future total conditions. Based on TAC calculations, it is estimated that a 55-metre storage length on southbound left turn would be required with Eder Lands.

Similar to the conditions without Eder Lands, although eastbound left turn warrants were met for consideration at the intersections of Flewellyn Road at Street 12 and at Street 16, the operations are acceptable without the turn lane. No left turn warrants were met at Shea Road at Street 21. The left-turn warrant calculation sheets are provided in Appendix F.

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 Sidra HCM 6 was used for roundabout intersection operations. The synchro worksheets have been provided in Appendix T.

Figure 22: 2035 Future Total Volumes– Sensitivity with Eder Lands

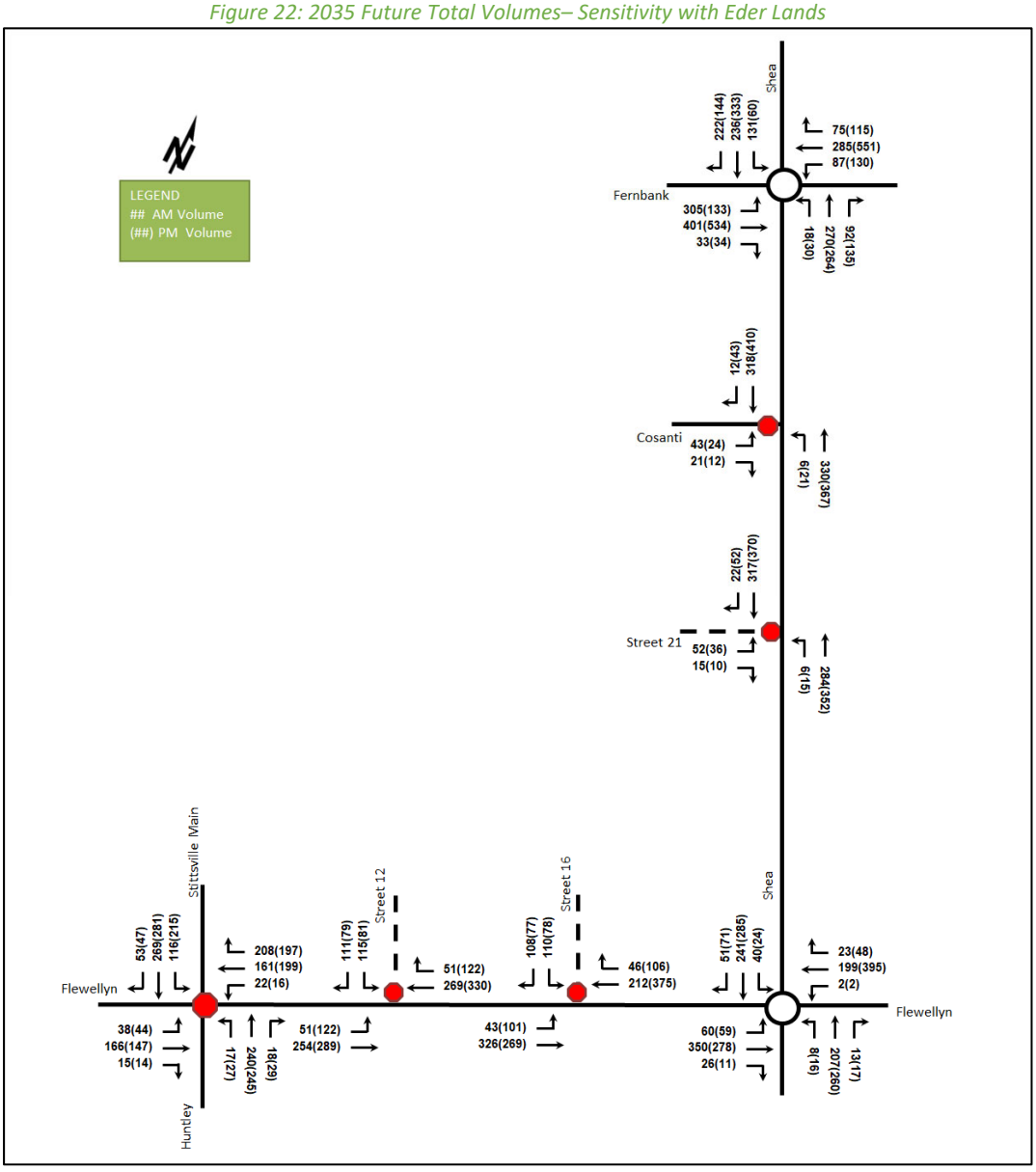


Table 31: 2035 Future Total Intersection Operations– Sensitivity with Eder Lands

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	0.89	35.3	154.7	E	0.90	40.0	148.2
	WB	C	0.63	16.3	38.2	E	0.93	42.7	210.3
	NB	D	0.72	26.4	38.8	C	0.69	21.6	40.5
	SB	C	0.67	15.5	58.4	E	0.85	36.9	78.7
	Overall	**C**	**0.89**	**24.4**	**154.7**	**E**	**0.93**	**37.0**	**210.3**

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 ***Roundabout***	EB	A	0.43	8.4	18.0	A	0.36	7.5	13.5
	WB	A	0.22	5.6	7.4	A	0.46	9.2	20.6
	NB	A	0.28	7.4	9.1	A	0.32	7.2	11.2
	SB	A	0.31	6.3	11.6	A	0.43	9.2	17.8
	Overall	**A**	**0.43**	**7.1**	**18.0**	**A**	**0.46**	**8.4**	**20.6**
Stittsville Main Street / Huntley Road at Flewellyn Road ***Unsignalized***	EB	C	0.46	16.8	17.3	C	0.46	17.7	17.3
	WB	D	0.72	26.1	45.8	D	0.80	33.2	57.8
	NB	C	0.58	20.7	27.0	C	0.64	23.5	33.0
	SBL	B	0.26	13.5	7.5	C	0.49	18.6	19.5
	SBT/R	C	0.66	23.4	35.3	D	0.69	25.7	39.0
	Overall	**C**	**-**	**21.7**	**-**	**D**	**-**	**25.2**	**-**
Shea Road at Cosanti Drive ***Unsignalized***	EBL/R	B	0.13	13.5	3.0	C	0.09	15.2	2.3
	NBL/R	A	0.01	7.9	0.0	A	0.02	8.3	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**0.8**	**-**
Shea Road at Street 21 ***Unsignalized***	EBL/R	B	0.14	13.6	3.8	C	0.12	15.2	3.0
	NBL/T	A	0.01	8.0	0.0	A	0.01	8.2	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.4**	**-**	**A**	**-**	**1.0**	**-**
Flewellyn Road at Street 16 ***Unsignalized***	EBL/T	A	0.03	7.8	0.8	A	0.09	8.7	2.3
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.40	15.8	14.3	C	0.41	20.8	14.3
	Overall	**A**	**-**	**4.5**	**-**	**A**	**-**	**4.1**	**-**
Flewellyn Road at Street 12 ***Unsignalized***	EBL/T	A	0.04	8.0	0.8	A	0.11	8.6	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.43	16.8	15.8	C	0.43	21.9	15.8
	Overall	**A**	**-**	**4.9**	**-**	**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

With Eder Lands, the study area intersections are anticipated to operate well during both the AM and PM peak hours.

Similar to the conditions without Eder Lands, Table 28 summarized the 2035 future total operations with a 30.0-metre auxiliary eastbound left turn lane at the intersections of Flewellyn Road at Street 12 and a 25.0-metre auxiliary eastbound left turn lane at Street 16 for informational purposes only. The Synchro worksheets are provided in Appendix U.

Table 32: 2035 Future Total – Sensitivity with Eder Lands, EBL at Flewellyn Road at Street 12 & at Street 16

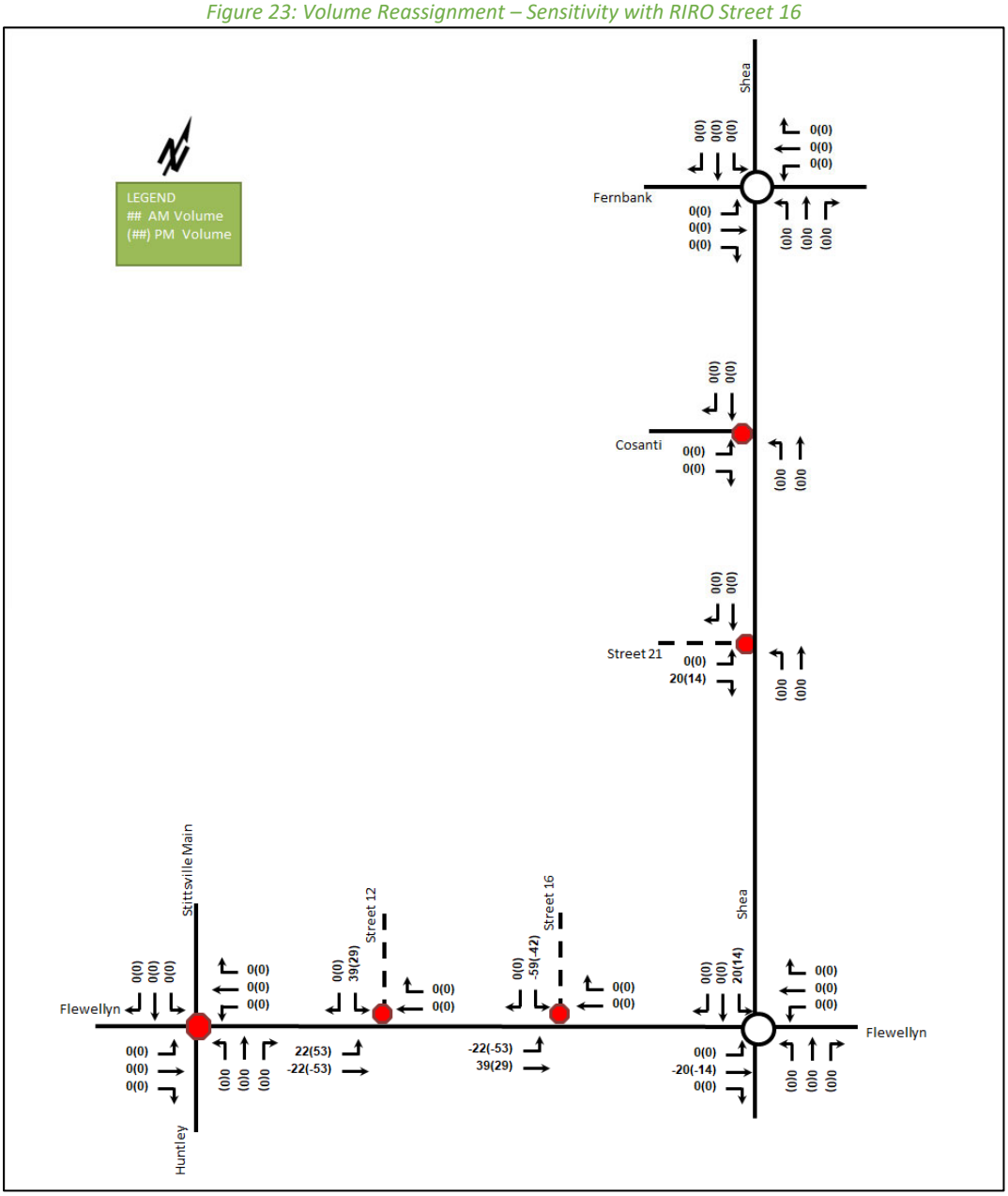
Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Flewellyn Road at Street 16 ***Unsignalized***	EBL	A	0.03	7.8	0.8	A	0.09	8.7	2.3
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.40	15.7	14.3	C	0.40	20.4	14.3
	Overall	**A**	**-**	**4.4**	**-**	**A**	**-**	**4.0**	**-**
Flewellyn Road at Street 12 ***Unsignalized***	EBL	A	0.04	8.0	0.8	A	0.11	8.6	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.43	16.7	15.8	C	0.42	21.4	15.8
	Overall	**A**	**-**	**4.9**	**-**	**A**	**-**	**4.4**	**-**

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

12.3.2 Right-In/Right-Out Street 16 Sensitivity

Based on the presence of the municipal drain on the north side of Flewellyn Road east of the hydro corridor, the roadway is constrained, and no inbound (eastbound) left-turn lane can be provided at the intersection of Flewellyn Road at Street 16. As such, one solution may be to restrict the north leg to right-in/right out (RIRO), via whatever means is determined to be appropriate through its design. Should such a restriction be required, as part of future urban boundary expansion to the south and the eventual urbanization of Flewellyn Road along the subdivision frontage, this connectivity should be reviewed and opportunities to introduce left-turn movements pursued at such time. A sensitivity analysis has been conducted examining the traffic impacts of this potential restriction. Figure 23 illustrates the reassigned left-turn volumes within the study area for this sensitivity analysis, and it is noted that changes are only forecast to be resultant at the intersections of Flewellyn Road at Street 12, at Street 16, and at Shea Road, as well as at the intersection of Shea Road at Street 21.

Figure 23: Volume Reassignment – Sensitivity with RIRO Street 16



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 Sidra HCM 6 was used for roundabout intersection operations. Figure 24 illustrates the 2035 future total horizons with the right-in/right-out restriction, including the eastbound left-turn lane at the intersection of Flewellyn Road at Street 12, and the synchro worksheets have been provided in Appendix V.

Figure 24: 2035 Future Total Volumes – Sensitivity with RIRO Street 16

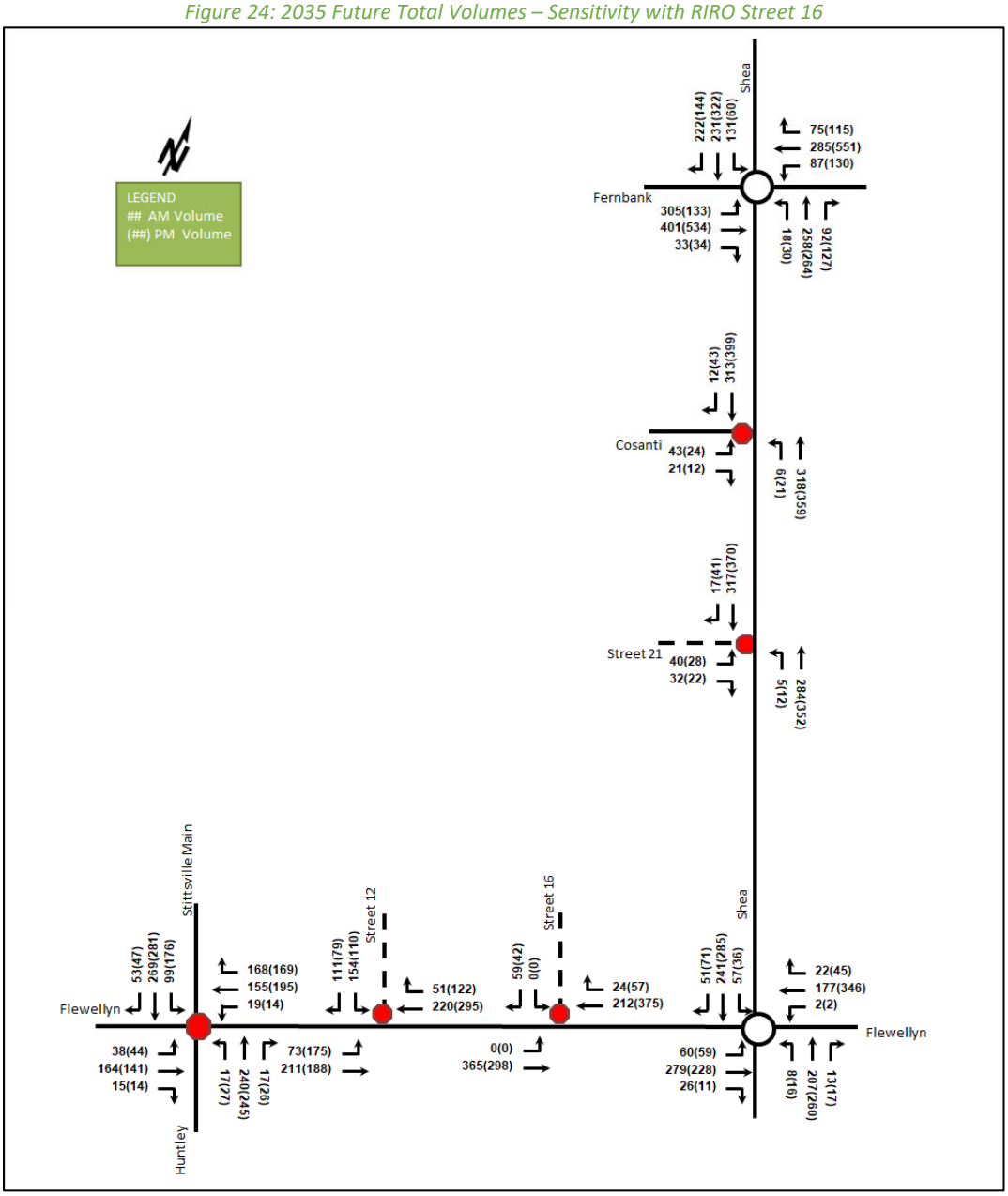


Table 33: 2035 Future Total Intersection Operations– Sensitivity with RIRO Street 16

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 *Roundabout*	EB	A	0.37	7.6	14.2	A	0.31	6.9	11.1
	WB	A	0.20	5.4	6.5	A	0.41	8.3	16.1
	NB	A	0.26	5.1	8.7	A	0.30	6.8	10.8
	SB	A	0.31	6.3	12.2	A	0.42	8.7	16.4
	Overall	**A**	**0.37**	**6.6**	**14.2**	**A**	**0.42**	**7.8**	**16.4**

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	12.7	3.8	B	0.11	13.9	3.0
	NBL/T	A	0.00	8.0	0.0	A	0.01	8.2	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.4**	**-**	**A**	**-**	**1.0**	**-**
Flewellyn Road at Street 16 ***Unsignalized***	EBT	-	-	-	-	-	-	-	-
	WBT/R	-	-	-	-	-	-	-	-
	SBR	A	0.07	9.8	1.5	B	0.07	11.0	1.5
	Overall	**A**	**-**	**0.9**	**-**	**A**	**-**	**0.6**	**-**
Flewellyn Road at Street 12 ***Unsignalized***	EBL/T	A	0.06	8.0	1.5	A	0.15	8.7	3.8
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.49	18.1	20.3	D	0.53	26.0	22.5
	Overall	**A**	**-**	**6.5**	**-**	**A**	**-**	**6.6**	**-**

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

With the intersection of Street 16 at Flewellyn Road having a right-in/right-out north leg, the study area intersections are anticipated to operate well during both the AM and PM peak hours. Negligible changes are noted throughout the study area outside of the minor increases in delay on the southbound approach of Street 12 with the shift of outbound left-turning traffic to this intersection. Overall, while it would not be typically considered a preferable option to limit connectivity, the change is supportable should it be required by the geometric constraints. Given this typical preference, the opportunity to limit inbound left-turns should be explored, with outbound left-turns permitted.

12.3.3 Recommended Design Elements

The sensitivity analysis for the Eder Lands and the potential right-in/right-out control for Street 16 are consistent with the analysis presented in Section 12.2.

13 W-4 Concept Plan

The plan of subdivision has undergone minor revisions from the concept proposed during the urban expansion process to remove the future neighbourhood overlay. The collector road network has remained consistent with the accesses similar to those originally proposed. The internal local road network has been refined for specific unit typologies, and the condo blocks have been reoriented from the Eder parcel into the subject subdivision and to the southwest corner. Pedestrian walkway blocks have been added to link the various west side local road loops, break up a number of larger block lengths and link to various parks or open space.

A forecasted trip reduction has resulted from the various changes to the subdivision area, from 1,459 units (416 single family homes, 707 townhomes, 336 stacked condo) to 1,692 residential units (566 single family homes, 558 townhomes, 442 stacked condo), predominantly through a reduction in the townhome units. The unit change did not have a notable impact on the transportation network operations and can be supported through the recommendations of the W-4 concept plan work.

Overall, the refinements for the plan of subdivision are consistent with the previous studies from a transportation perspective.

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 plan of subdivision proposed a total of 558 townhomes, 566 single-detached homes, 442 stacked townhomes, and park/open space within the proposed development
- New collector roadways are proposed to connect to Shea Road and Flewellyn Road, and new local roads to connect to Painted Sky Way and to Parade Drive at Hickstead Way intersection
- The anticipated build-out is assumed to be 2030
- The trip generation and safety triggers were met for the TIA Screening
- The Eder Lands are not part of the proposed subdivision and reside outside the urban boundary

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, Hickstead Way, and Cosanti Drive 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, Flewellyn 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 met the all-way stop-control warrants for consideration, and while the operation is acceptable to remain as a minor stop-control condition, the City's realignment of the north and south legs to implement higher order control is recommended to address noted safety issues once the requisite property is acquired
- The Stittsville Main Street / Huntley Road at Flewellyn Road intersection met the signal warrant Justification 1, however 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
- Interim measures have been employed by the City to improve road safety, however the ultimate solution is recommended to be the City's realignment of the north and south legs of the intersection and the potential implementation of higher order control such as a roundabout

Planned Conditions

- Fernbank Road transit priority corridor, Stittsville Main Road transit priority corridor, and Hazeldean Road transit priority corridor are identified as transit priority projects, and Robert Grant Transitway median BRT from Hazeldean Station to Abbott Street East is identified as a needs-based project within the TMP Transit Network

- Robert Grant Avenue is being extended northwards from Abbott Street to Hazeldean Road, identified as a committed road project within the TMP Road Network
- Robert Grant Avenue Extension, including a new two-lane road between Palladium Drive and Hazeldean Road, implementing new active transportation facilities on both sides of Fernbank Road from West Ridge Drive to Shea Road and improving connection to the existing pathway on the south side of Fernbank from Stittsville Main Street to Hartsmere Drive, and implementing new sidewalks and cycletracks on both sides of Shea Road from Abbott Street to the northern edge of the Stittsville South W4 future community are identified as priority road projects within the TMP Road Network
- Rural paved shoulder along Flewellyn Road have been constructed as identified within the TMP cycling network

Development Generated Travel Demand

- The proposed development is forecasted to produce 1144 two-way people trips during the AM peak hour and 1207 two-way people trips during the PM peak hour
- Of the forecasted people trips, 566 two-way trips will be vehicle trips during the AM peak hour and 689 two-way trips will be vehicle trips during the PM peak hour
- Of the forecasted people trips, 277 two-way trips will be transit trips during the AM peak hour and 189 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 stacked townhomes
- Bicycle parking is assumed to be within the individual units
- The collector roads will have a sidewalk and cycletrack on both sides of the roadway
- Local roads will have a sidewalk on one side
- Pedestrian crossovers are proposed within the Hydro corridor to allow a continuous multi-use pathway and at the internal collector road intersections
- The existing Hydro corridor and existing stormwater management ponds are noted within the subdivision, and two new proposed stormwater management pond areas and two parks are proposed

New Street Networks

- The new 26.0-metre-wide collector road are proposed with 2.0-metre-wide sidewalk and 1.5 metre cycletrack on both sides of the roadway
- All the new local roadways are 18.0-metre-wide and on-street parking along one side of the road, with a 2.0-metre-wide sidewalk on one side
- The proposed speed limit for new collector roads will be 40 km/h and for new local roads will be 30 km/h
- Street 12, 16, and 21 exceeds the TAC's minimum corner clearance of 25 meters from major intersections
- Conceptual traffic calming elements have been illustrated for the subdivision, adhering to the philosophies of the Traffic Calming Guidelines and preliminary input from the City
- The features include bulb-outs to narrow approaches to intersections (e.g. reduced crossing distance), speed humps, and midblock narrowing to reduce vehicle speeds and lateral roadway shifts

- It is noted that the lateral shifts have potential impacts to transit service and maintenance operations, as well as the removal of 45 metres or more of on-street parking
- Traffic calming elements for connections to the existing roadways will be coordinated with the adjacent existing roadway during the subdivision detailed design
- Conceptual corner triangles have been illustrated based in preliminary City feedback for overlapping 5x15 metre corner triangles at the collector-to-collector road intersections, 3x9 metre corner triangles for local to collector intersections and 3x3 metre corner triangles for local-to-local intersections
- These are not intended to be the corner triangles ultimately provided, they are illustrative only to address City commentary
- Subdivision detailed design will be required to confirm all corner triangles, and the proposed lot dimensions limit the ability to provide a full 6.0 metres offset from side property line to private approach, by a 0.35-metre deficit, however no operational issues would be noted for this geometry, and the proposed configurations are recommended to be approved

Boundary Street Design

- Both boundary roads of Shea Road and Flewellyn Road will have a LOS of F for pedestrian LOS during the existing conditions
- Shea Road will improve slightly to LOS E once urbanized
- To meet the theoretical pedestrian LOS target on Shea Road, the operating speed would need to be reduced to 30-50 km/h
- Speed reduction to 30 km/h, or speed reduction to 50-60 km/h and 2.0 metre sidewalk with a 2.0 metre, or a 2.0 metre sidewalk with a 0.5-2.0 metre boulevard would be needed to meet the future theoretical PLOS target on Flewellyn Road
- Shea Road has a bicycle LOS of F in the existing and interim conditions, although the boundary street will meet the bicycle LOS target once urbanized
- Flewellyn Road has a bicycle LOS E , and the operating speed would need to be reduced to 50-70 km/h to meet the BLOS target on Flewellyn Road
- Transit LOS will be met on both Shea Road and Flewellyn Road and no truck LOS targets are applicable
- Both the internal local and collector roads are expected to meet the MMLOS targets
- Barriers to implementation of the sidewalk include the rural cross-sections of both roadways requiring significant reconstruction and extension of municipal services, and the Faulkner Municipal Drain along a significant portion of Flewellyn Road
- It is also noted no desire line of destination is located along Flewellyn Road to necessitate a sidewalk or pathway facility, and no missing link will be addressed

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 intersections in the study area operate well in the future background conditions
- No capacity constraints are noted at the study area intersections in the background conditions
- No intersection will meet warrants for consideration of signalization or left turn lanes in the future background conditions
- No changes to the recommended improvements discussed to address existing safety issues are resultant from the future background conditions review
- The TMP outlines the widening of Terry Fox Drive between Abbott Street and Eagleson Road which should facilitate travel between the origins and destinations of the local screenline elements to permit a more distributed pattern across the two roads, however this improvement is not required to support the proposed subdivision

Transit

- The proposed development is anticipated to generate an additional 277 AM and 189 PM peak hour two-way transit trips
- It is noted that future transit stops will be planned within the subdivision, which will be the primary bus stops for residents within the subdivision
- Potential bus stop locations have been consultant with Transit Services, and the location of the southbound stop on Street 12 will need to be confirmed
- 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
- In the near term, a combination of a new dedicated route combined with the extension of the peak hour services to 15–20-minute service in the area (e.g. routes #61, #262, #263) would provide the service required for the community

Network Concept

- Area roadways have the residual capacity in both the background and total conditions; therefore, site traffic can be accommodated from a regional network perspective
- Fernbank Road, east of Shea Road is noted to reach the TRANS capacity during the PM peak hour in the westbound direction in the future conditions, with residual capacity on the other area roadways to support future development
- No site-generated trips have been assigned to travel via Fernbank Road east of Shea Road based on the capacity review

Intersection Design

- The new roadway intersections within the subdivision and from the subdivision to Flewellyn Road and Shea Road are proposed as stop-controlled on the minor approach
- Although eastbound left turns at Flewellyn Road at Street 12 during both peak hours and at Street 16 during the PM peak hour met the left-turn warrants for consideration in the 2030 future total conditions, no turn lane is recommended
- No left turn warrants were met at Shea Road at Street 21 at any horizon

- During both the AM and PM peak hours, the study area intersections are anticipated to operate well except for the northbound and southbound movement at Shea Road at Flewellyn Road intersection during the PM peak hour and the southbound movement at Stittsville Main Street / Huntley Road at Flewellyn Road during the PM peak hour in 2030 future total conditions
- The Shea Road at Flewellyn Road intersection met Signal Justification 7 for minimum vehicular volume in the 2030 future total conditions
- The southbound left turns met the warrants for consideration in 2030 future total conditions during both peak hours at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road, and will require the City acquire land to implement an auxiliary southbound left turn lane
- Geometric improvements and upgrading to a roundabout/signal by the City are supported by this study at the intersection of Shea Road at Flewellyn Road, consistent with the recommendations to address the existing safety issues at the intersection
- A 45 metres auxiliary southbound left turn lane would mitigate the operational constraints noted at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road by 2030 future total horizon
- Both of the above mitigation measures are in constrained existing property and cannot be investigated without land acquisition by the City
- The study area intersections are anticipated to operate well during both peak hours in 2035 future total conditions with mitigation measures

Eder Lands Sensitivity

- A total of 164 AM and 193 PM new peak hour two-way vehicle trips are projected as a result of the Eder Lands
- The Eder Lands sensitivity analysis does not require additional mitigation measures at the study area intersections

Street 16 Right-in/Right-Out Restriction Sensitivity

- The access intersections and the remaining network would be expected to experience negligible impacts from the Street 16 intersection becoming a right-in/right-out condition

15 Conclusion

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

Prepared By:

Reihaneh Azhdar

Reihaneh Azhdar
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: 24-Jul-24
Project Number: 2021-128
Project Reference: Flewellyn

1.1 Description of Proposed Development	
Municipal Address	5993,6115 Flewellyn & 6070 Fernbank
Description of Location	At the northwest corner of Shea Road at Flewellyn Road intersection
Land Use Classification	Rural (RU)
Development Size	707 townhomes, 416 single detached homes, 336 stacked condo units
Accesses	New roadways are proposed to connect to Shea Road, Flewellyn Road, Painted Sky Way, and the block that connects to Parade Drive at Hickstead Way intersection
Phase of Development	Multiple
Buildout Year	2030
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Multi-Family (Low-Rise)	
Development Size	1459	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?	Yes	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

Revision Date: June 2023

Appendix B

Turning Movement Counts

Transportation Services - Traffic Services

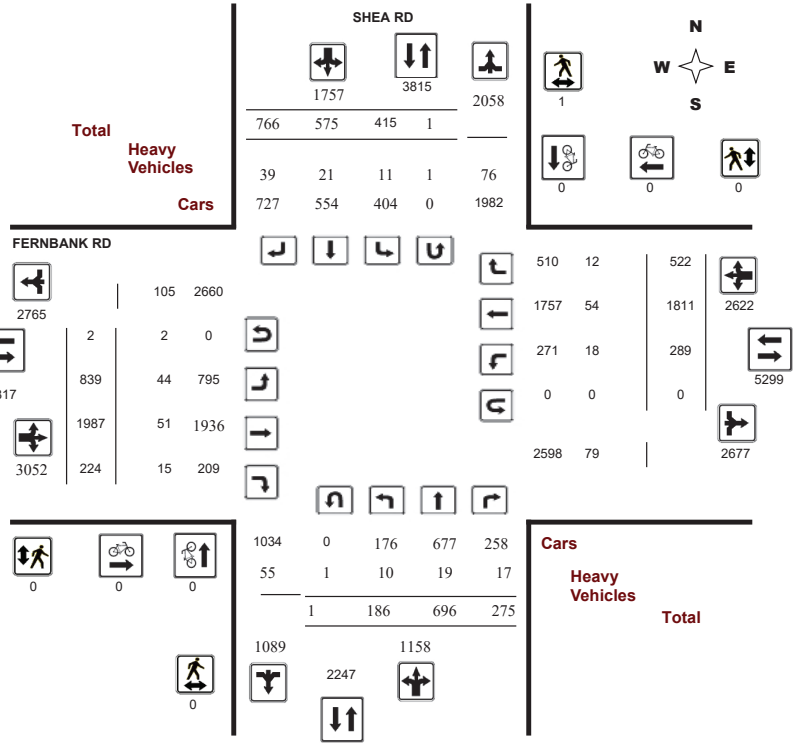
Turning Movement Count - Study Results

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

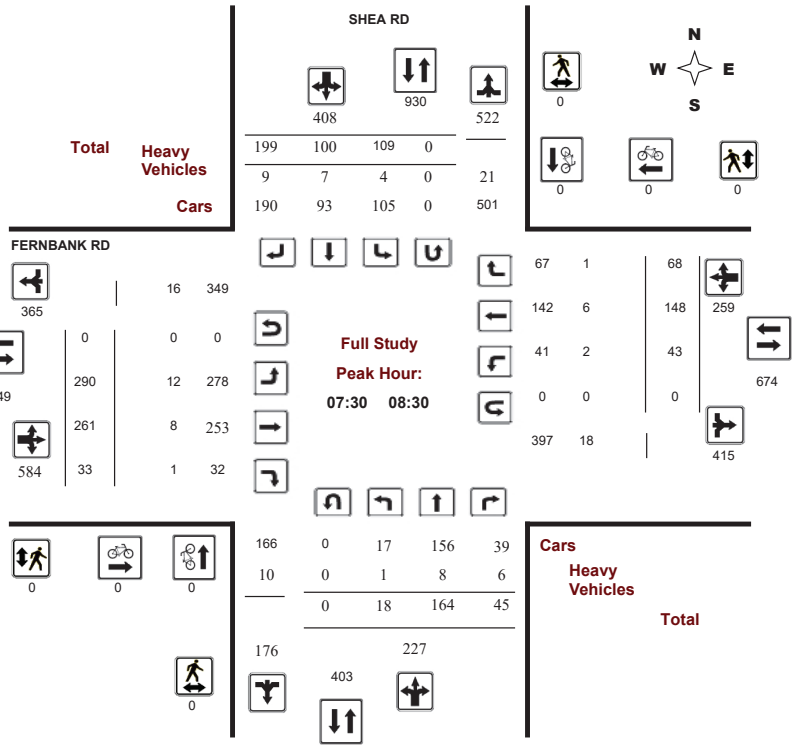
Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

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

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

Full Study Peak Hour Diagram



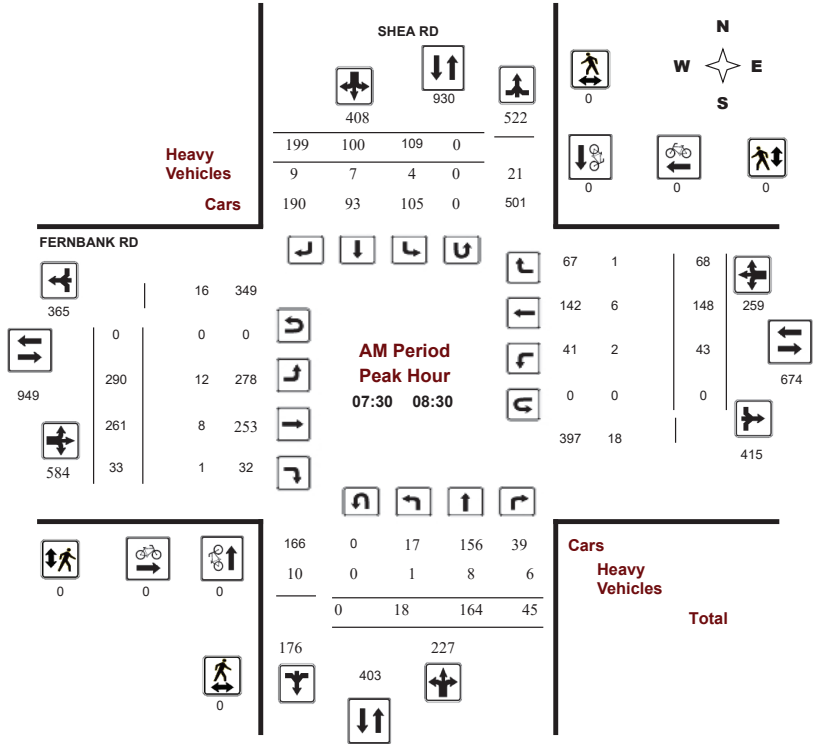
Transportation Services - Traffic Services

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

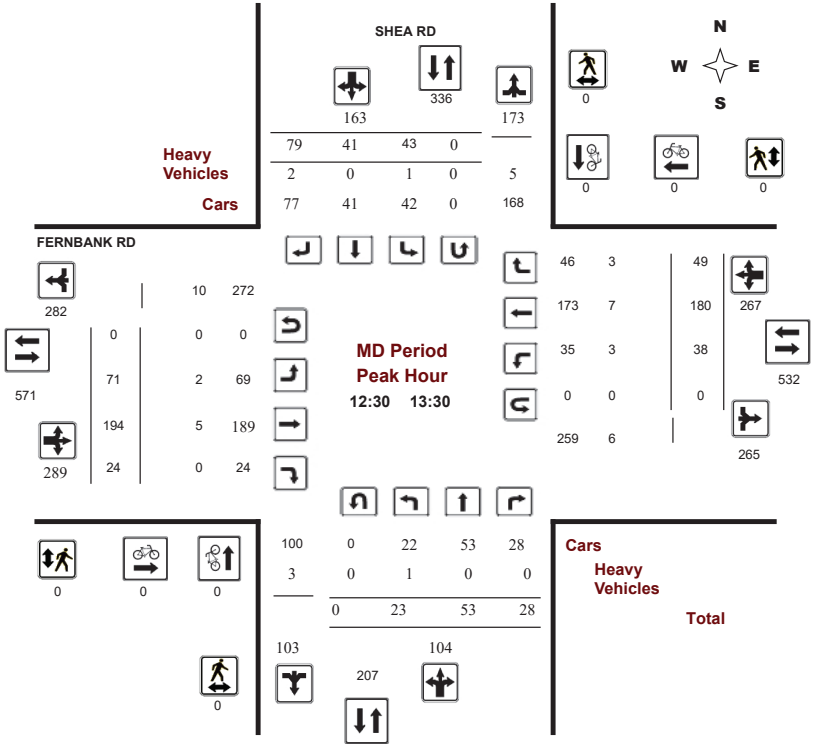
Transportation Services - Traffic Services

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

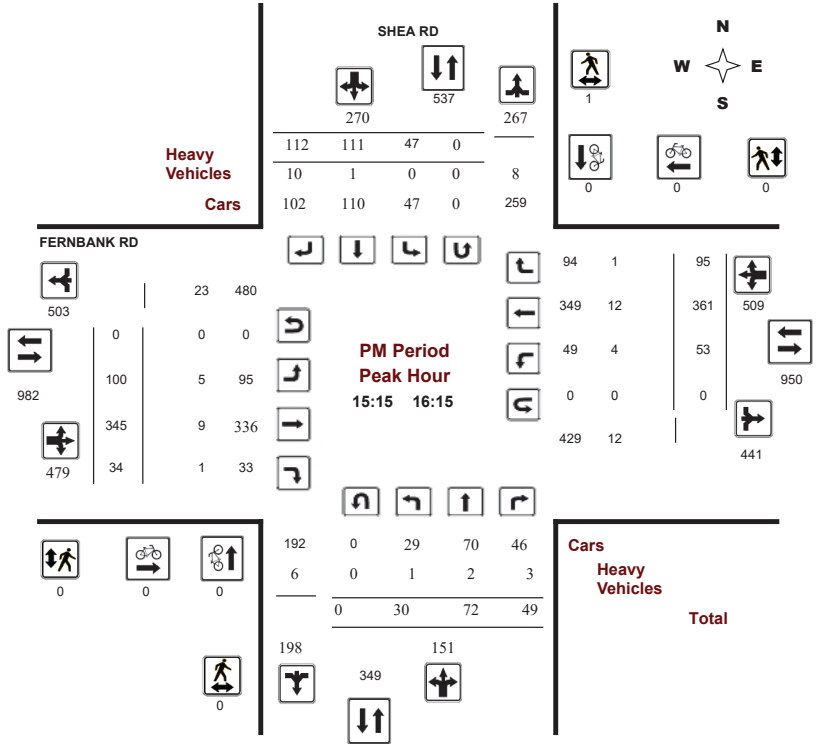
Transportation Services - Traffic Services

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

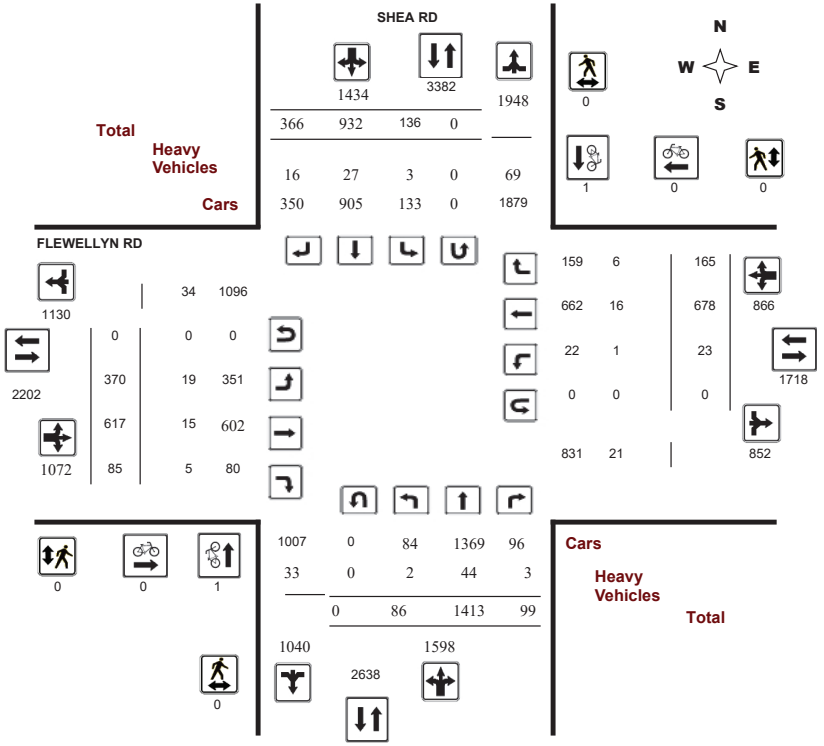
Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

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

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

Full Study Diagram



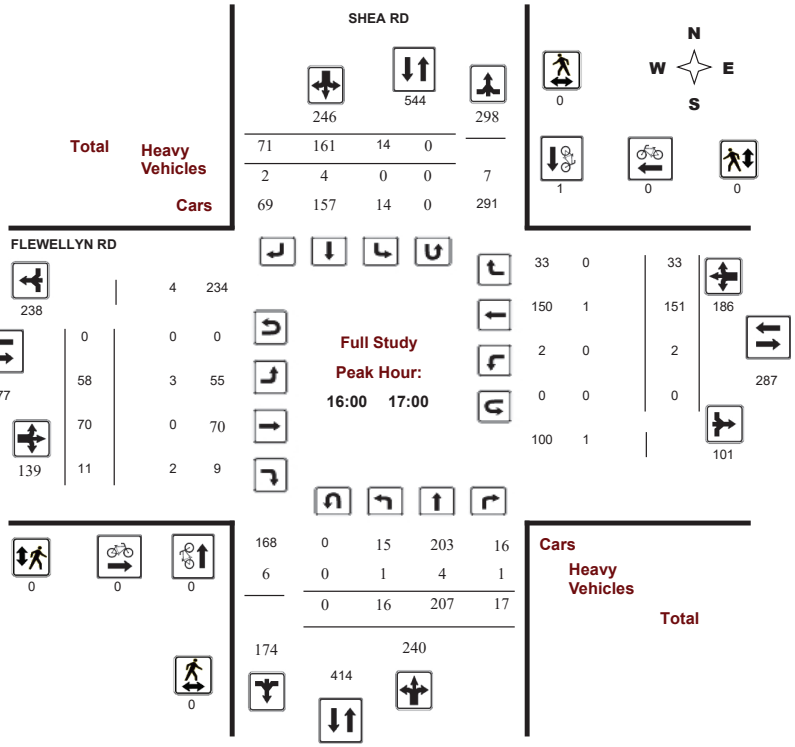
Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023
Start Time: 07:00
WO No: 40938
Device: Miovision

Full Study Peak Hour Diagram

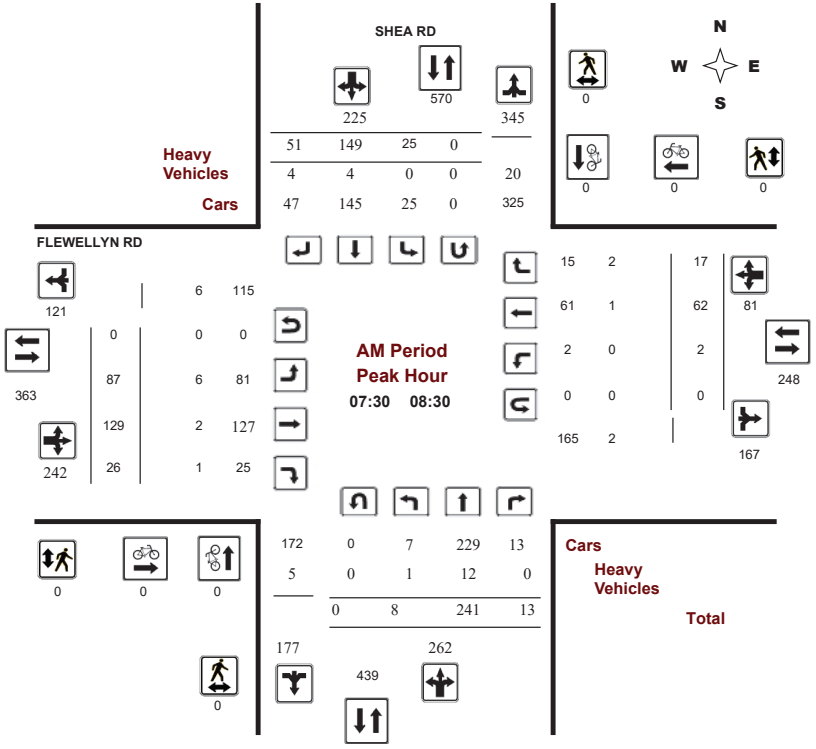


Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023
Start Time: 07:00
WO No: 40938
Device: Miovision



Comments

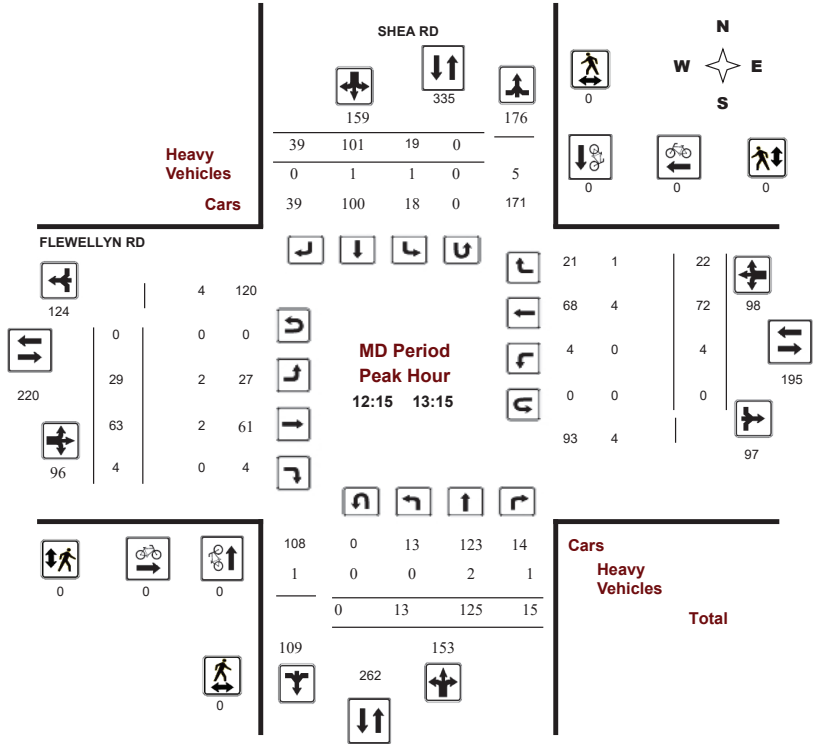
Transportation Services - Traffic Services

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

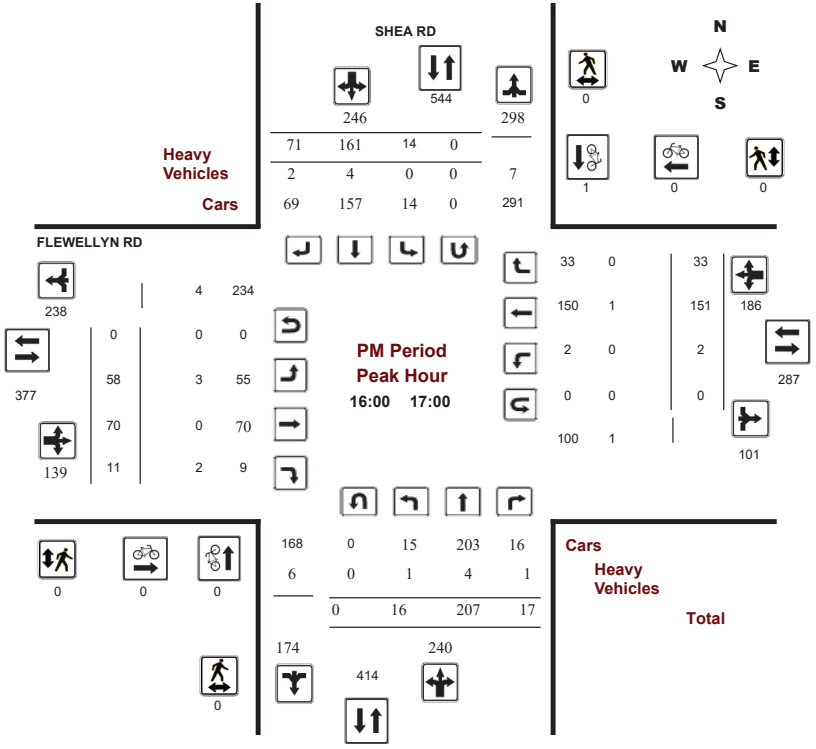
Transportation Services - Traffic Services

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

ACCURATE TRUSTED TRAFFIC DATA

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

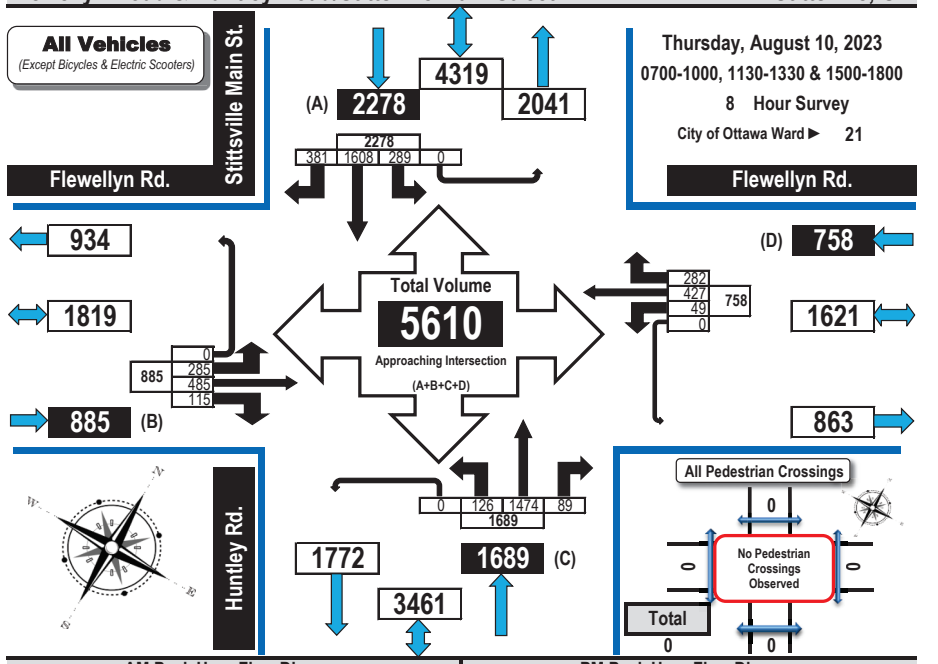
Comments:
OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

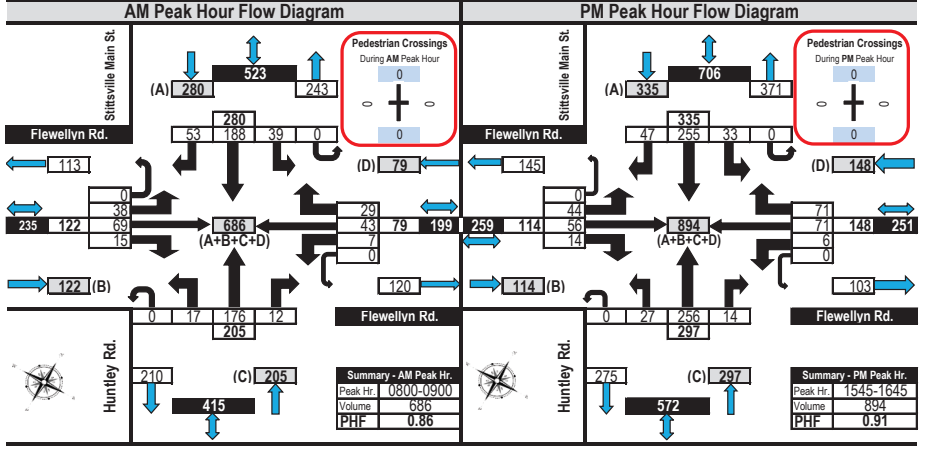
Notes:
1. Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

ACCURATE TRUSTED TRAFFIC DATA

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

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





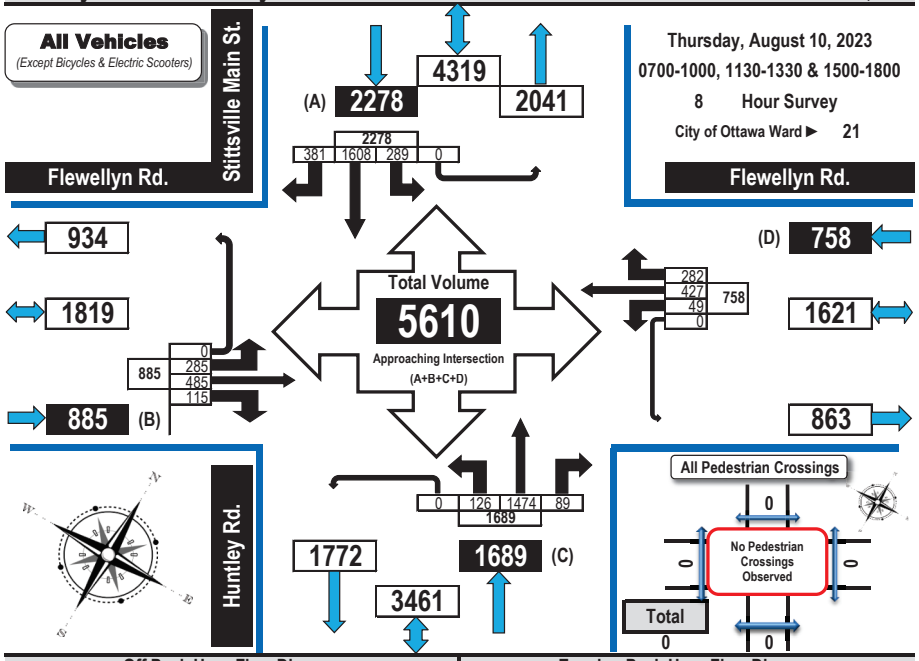
ACCURATE TRUSTED TRAFFIC DATA

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

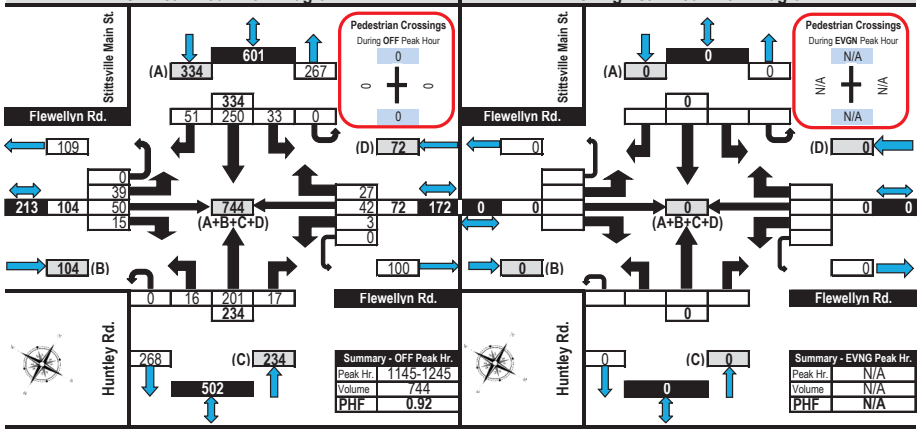
Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**

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

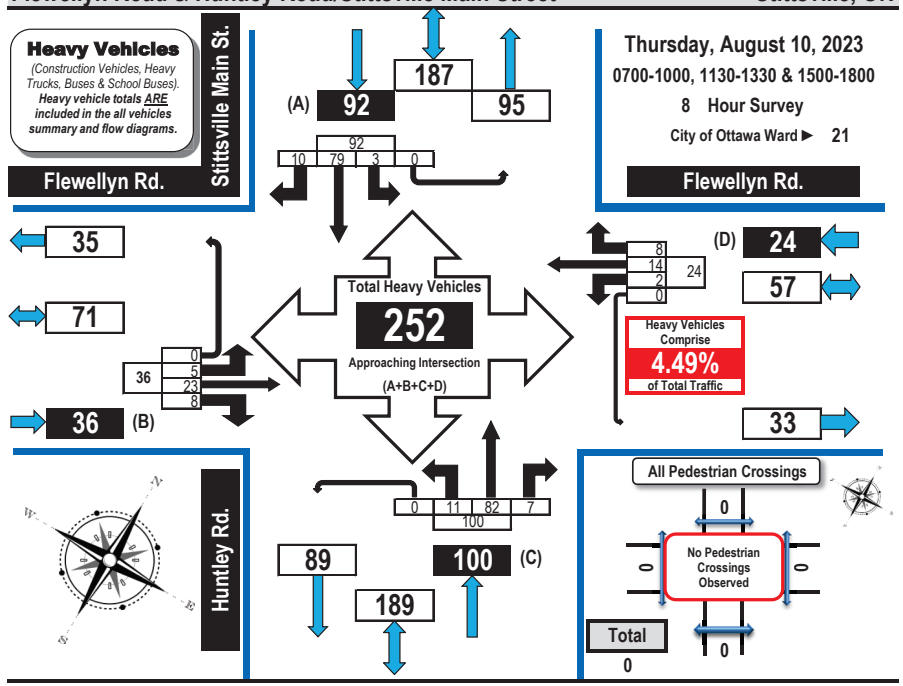
ACCURATE TRUSTED TRAFFIC DATA

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.

ACCURATE TRUSTED TRAFFIC DATA

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

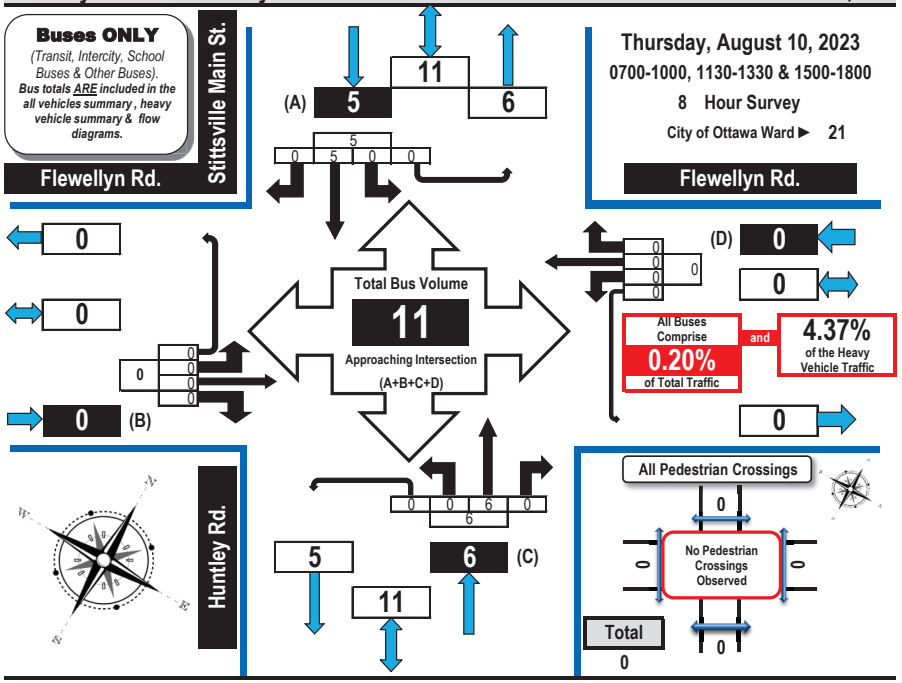
Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**

Buses ONLY
(Transit, Intercity, School Buses & Other Buses).
Bus totals ARE included in the all vehicles summary , heavy vehicle summary & flow diagrams.

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

Stittsville Main St.

Flewellyn Rd.



Huntley Rd.

	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.

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count
Bicycle Summary
Flow Diagram

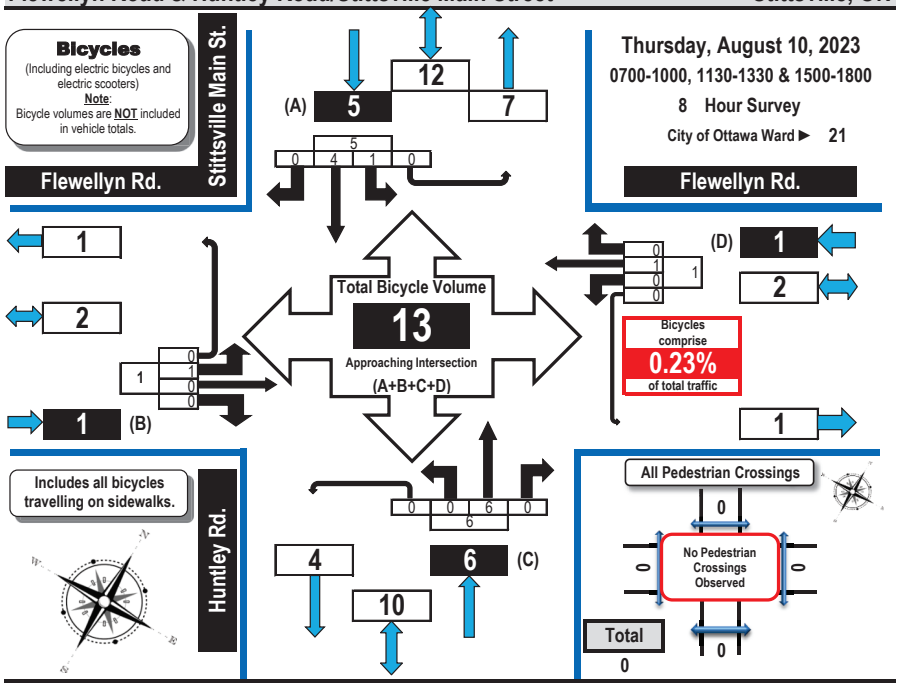
Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**

Bicycles
(Including electric bicycles and electric scooters)
Note:
Bicycle volumes are **NOT** included in vehicle totals.

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

Stittsville Main St.

Flewellyn Rd.



Includes all bicycles travelling on sidewalks.

Huntley Rd.

	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.

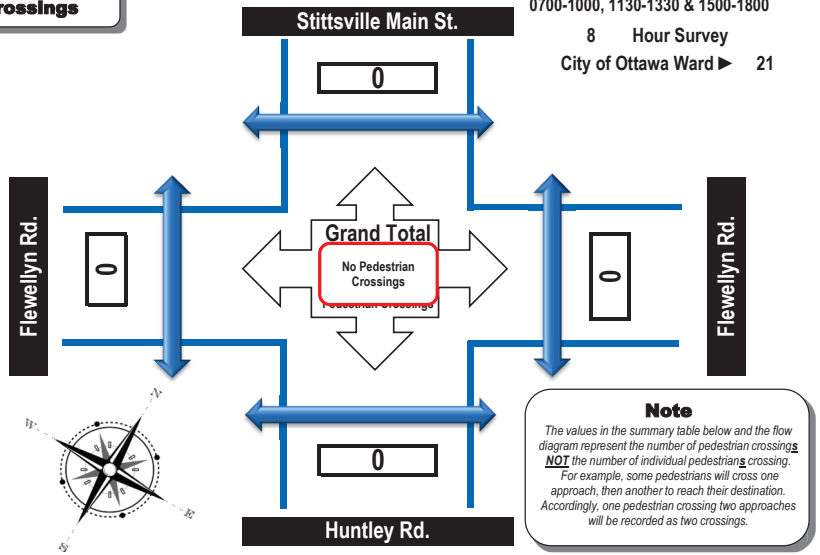
ACCURATE TRUSTED TRAFFIC DATA

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

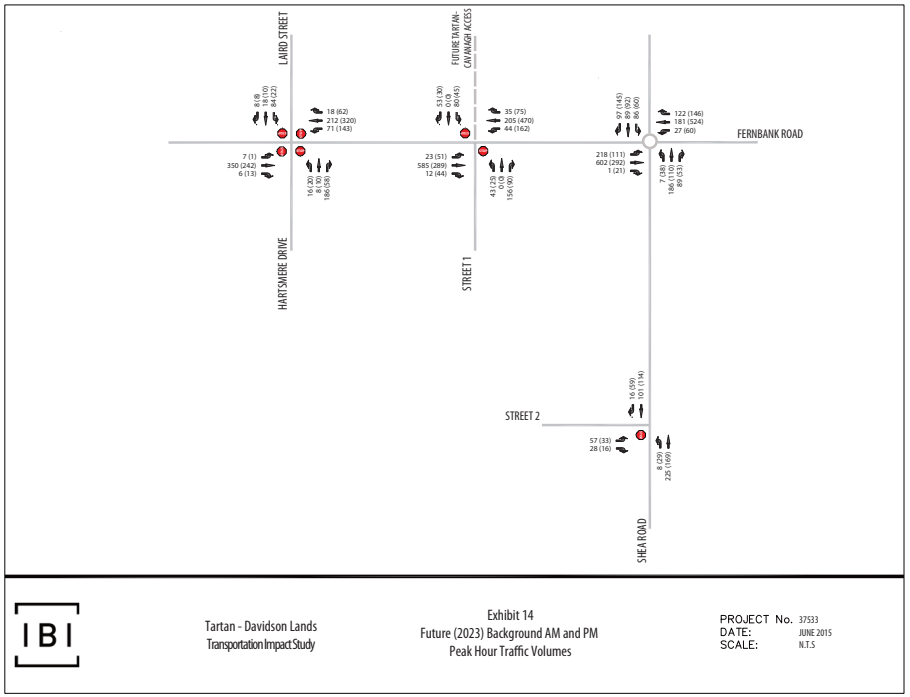


Note
*The values in the summary table below and the flow diagram represent the number of pedestrian crossings **NOT** the number of individual pedestrians crossing. For example, some pedestrians will cross one approach, then another to reach their destination. Accordingly, one pedestrian crossing two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



IBI

Tartan - Davidson Lands
Transportation Impact Study

Exhibit 14
Future (2023) Background AM and PM
Peak Hour Traffic Volumes

PROJECT No. 37533
DATE: JUNE 2015
SCALE: N.T.S

Appendix C

Synchro and Sidra Intersection Worksheets – Existing Conditions

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	12.4	LOS B	2.1	15.7	0.73	0.73	0.94	45.8
2	T1	All MCs	182	5.0	182	5.0	0.423	12.2	LOS B	2.1	15.7	0.73	0.73	0.94	46.6
3	R2	All MCs	50	13.0	50	13.0	0.423	13.5	LOS B	2.1	15.7	0.73	0.73	0.94	46.1
Approach			252	6.7	252	6.7	0.423	12.5	LOS B	2.1	15.7	0.73	0.73	0.94	46.4
East: Fernbank															
4	L2	All MCs	48	5.0	48	5.0	0.373	9.4	LOS A	1.9	13.5	0.66	0.56	0.71	47.5
5	T1	All MCs	164	4.0	164	4.0	0.373	9.3	LOS A	1.9	13.5	0.66	0.56	0.71	48.3
6	R2	All MCs	76	2.0	76	2.0	0.373	9.1	LOS A	1.9	13.5	0.66	0.56	0.71	48.0
Approach			288	3.6	288	3.6	0.373	9.3	LOS A	1.9	13.5	0.66	0.56	0.71	48.1
North: Shea															
7	L2	All MCs	121	4.0	121	4.0	0.434	8.1	LOS A	2.6	18.8	0.53	0.33	0.53	47.8
8	T1	All MCs	111	7.0	111	7.0	0.434	8.3	LOS A	2.6	18.8	0.53	0.33	0.53	48.6
9	R2	All MCs	221	5.0	221	5.0	0.434	8.2	LOS A	2.6	18.8	0.53	0.33	0.53	48.3
Approach			453	5.2	453	5.2	0.434	8.2	LOS A	2.6	18.8	0.53	0.33	0.53	48.2
West: Fernbank															
10	L2	All MCs	322	4.0	322	4.0	0.647	13.2	LOS B	8.1	58.3	0.75	0.65	1.09	44.5
11	T1	All MCs	290	3.0	290	3.0	0.647	13.1	LOS B	8.1	58.3	0.75	0.65	1.09	45.2
12	R2	All MCs	37	3.0	37	3.0	0.647	13.1	LOS B	8.1	58.3	0.75	0.65	1.09	44.9
Approach			649	3.5	649	3.5	0.647	13.1	LOS B	8.1	58.3	0.75	0.65	1.09	44.8
All Vehicles			1642	4.5	1642	4.5	0.647	11.0	LOS B	8.1	58.3	0.67	0.56	0.84	46.5

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

Organisation: CGH TRANSPORTATION | Licence: NETWORK / FLOATING | Processed: Tuesday, December 17, 2024 11:14:16 AM
Project: C:\Users\MichelleChen\CGH TRANSPORTATION\CGH Active Projects - Documents\2021\2021-128 Caivan Flewellyn\DATA\W-4 Report\Sidra - W-4 Report\2021-128 Shea Road at Fernbank Road - 2024-12-13.sip9

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

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

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰			↑	↱	
Traffic Vol, veh/h	39	19	5	225	101	11
Future Vol, veh/h	39	19	5	225	101	11
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	5	3	2
Mvmt Flow	43	21	6	250	112	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	380	118	124	0	-	0
Stage 1	118	-	-	-	-	-
Stage 2	262	-	-	-	-	-
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	622	934	1463	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	619	934	1463	-	-	-
Mov Cap-2 Maneuver	619	-	-	-	-	-
Stage 1	902	-	-	-	-	-
Stage 2	782	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1463	-	696	-	-
HCM Lane V/C Ratio	0.004	-	0.093	-	-
HCM Control Delay (s)	7.5	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

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	7.1	LOS A	0.9	6.8	0.60	0.50	0.60	48.7
2	T1	All MCs	80	3.0	80	3.0	0.223	7.1	LOS A	0.9	6.8	0.60	0.50	0.60	49.5
3	R2	All MCs	54	6.0	54	6.0	0.223	7.5	LOS A	0.9	6.8	0.60	0.50	0.60	49.1
Approach			168	4.0	168	4.0	0.223	7.2	LOS A	0.9	6.8	0.60	0.50	0.60	49.2
East: Fernbank															
4	L2	All MCs	59	8.0	59	8.0	0.530	10.0	LOS A	3.6	26.0	0.59	0.36	0.59	47.3
5	T1	All MCs	401	3.0	401	3.0	0.530	9.7	LOS A	3.6	26.0	0.59	0.36	0.59	48.2
6	R2	All MCs	106	2.0	106	2.0	0.530	9.6	LOS A	3.6	26.0	0.59	0.36	0.59	48.0
Approach			566	3.3	566	3.3	0.530	9.7	LOS A	3.6	26.0	0.59	0.36	0.59	48.1
North: Shea															
7	L2	All MCs	52	2.0	52	2.0	0.380	8.9	LOS A	1.9	14.0	0.65	0.54	0.69	47.6
8	T1	All MCs	123	2.0	123	2.0	0.380	8.9	LOS A	1.9	14.0	0.65	0.54	0.69	48.3
9	R2	All MCs	124	9.0	124	9.0	0.380	9.6	LOS A	1.9	14.0	0.65	0.54	0.69	47.9
Approach			300	4.9	300	4.9	0.380	9.2	LOS A	1.9	14.0	0.65	0.54	0.69	48.0
West: Fernbank															
10	L2	All MCs	111	5.0	111	5.0	0.504	9.4	LOS A	3.3	23.7	0.58	0.36	0.58	47.4
11	T1	All MCs	383	3.0	383	3.0	0.504	9.3	LOS A	3.3	23.7	0.58	0.36	0.58	48.2
12	R2	All MCs	38	3.0	38	3.0	0.504	9.3	LOS A	3.3	23.7	0.58	0.36	0.58	47.9
Approach			532	3.4	532	3.4	0.504	9.3	LOS A	3.3	23.7	0.58	0.36	0.58	48.0
All Vehicles			1566	3.7	1566	3.7	0.530	9.2	LOS A	3.6	26.0	0.60	0.41	0.61	48.2

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

Organisation: CGH TRANSPORTATION | Licence: NETWORK / FLOATING | Processed: Tuesday, December 17, 2024 11:14:16 AM
Project: C:\Users\MichelleChen\CGH TRANSPORTATION\CGH Active Projects - Documents\2021\2021-128 Caivan Flewellyn\DATA\W-4 Report\Sidra - W-4 Report\2021-128 Shea Road at Fernbank Road - 2024-12-13.sip9

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

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

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑			↰	↱	
Traffic Vol, veh/h	22	11	19	169	114	39
Future Vol, veh/h	22	11	19	169	114	39
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	3	2	2
Mvmt Flow	24	12	21	188	127	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	379	149	170	0	-	0
Stage 1	149	-	-	-	-	-
Stage 2	230	-	-	-	-	-
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	623	898	1407	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	612	898	1407	-	-	-
Mov Cap-2 Maneuver	612	-	-	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	808	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1407	-	685	-	-
HCM Lane V/C Ratio	0.015	-	0.054	-	-
HCM Control Delay (s)	7.6	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

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 Shea Road at Cosanti Drive (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)
2264	305	0
Control Required		
Total Vehicle Volume	NO	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Cosanti Drive (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)
3947	335	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 Cosanti Drive (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	335	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 Cosanti Drive (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)
4376	335	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 Cosanti Drive (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)
4866	335	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)
4124	294	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)
4614	294	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 #12 (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)
4092	1194	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 #12 (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)
4157	1194	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 #16 (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)
4097	625	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 #16 (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)
4163	625	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

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	440	92%	92%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	175	146%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	265	55%	55%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	95	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
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

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	482	100%	100%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	180	150%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	302	63%	63%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	98	196%		

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
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

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	588	122%	122%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	318	265%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	270	56%	56%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	163	327%		

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
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

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	509	71%	71%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	199	117%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	310	43%	43%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	100	134%		

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
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

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	523	73%	73%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	204	120%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	319	44%	44%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	103	137%		

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
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

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	644	89%	89%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	279	164%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	365	51%	51%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	114	152%		

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
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

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	658	91%	91%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	284	167%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	374	52%	52%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	116	155%		

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
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

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	125	26	2	92	17	8	184	13	25	193	51	28.4%	211	111
PM	59	107	11	2	166	33	16	213	17	14	255	71	33.3%	177	201

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	125	26	2	102	17	8	207	13	25	241	51	28.4%	211	121
PM	59	118	11	2	166	33	16	260	17	14	285	71	31.4%	188	201

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	299	26	2	167	22	8	184	13	37	193	51	15.6%	385	191
PM	59	231	11	2	346	45	16	213	17	22	255	71	19.6%	301	393

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	299	26	2	177	22	8	207	13	37	241	51	15.6%	385	201
PM	59	242	11	2	346	45	16	260	17	22	285	71	18.9%	312	393

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	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																
					Yes											
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	60	125	26	2	92	17	8	184	13	25	193	51	1.8%	111	211
	PM	59	107	11	2	166	33	16	213	17	14	255	71	1.0%	201	177

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	125	26	2	102	17	8	207	13	25	241	51	1.7%	121	211
	PM	59	118	11	2	166	33	16	260	17	14	285	71	1.0%	201	188

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	299	26	2	167	22	8	184	13	37	193	51	1.0%	191	385
	PM	59	231	11	2	346	45	16	213	17	22	255	71	0.5%	393	301

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	299	26	2	177	22	8	207	13	37	241	51	1.0%	201	385
	PM	59	242	11	2	346	45	16	260	17	22	285	71	0.5%	393	312

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	125	26	2	92	17	8	184	13	25	193	51	3.9%	205	269	
	PM	59	107	11	2	166	33	16	213	17	14	255	71	6.5%	246	340	

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	125	26	2	102	17	8	207	13	25	241	51	3.5%	228	317	
	PM	59	118	11	2	166	33	16	260	17	14	285	71	5.5%	293	370	

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	299	26	2	167	22	8	184	13	37	193	51	3.9%	205	281	
	PM	59	231	11	2	346	45	16	213	17	22	255	71	6.5%	246	348	

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	299	26	2	177	22	8	207	13	37	241	51	3.5%	228	329	
	PM	59	242	11	2	346	45	16	260	17	22	285	71	5.5%	293	378	

Existing

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes 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																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	60	125	26	2	92	17	8	184	13	25	193	51	9.3%	269	205
	PM	59	107	11	2	166	33	16	213	17	14	255	71	4.1%	340	246

Future Background 2035

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	60	125	26	2	102	17	8	207	13	25	241	51	7.9%	317	228
	PM	59	118	11	2	166	33	16	260	17	14	285	71	3.8%	370	293

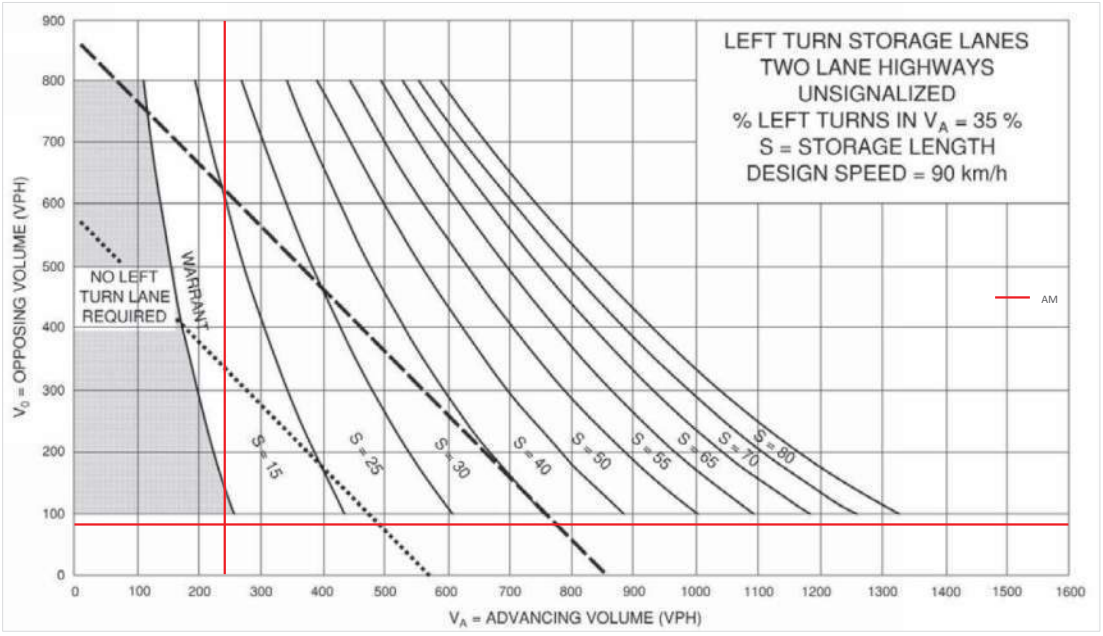
Future Total 2030

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	60	299	26	2	167	22	8	184	13	37	193	51	13.2%	281	205
	PM	59	231	11	2	346	45	16	213	17	22	255	71	6.3%	348	246

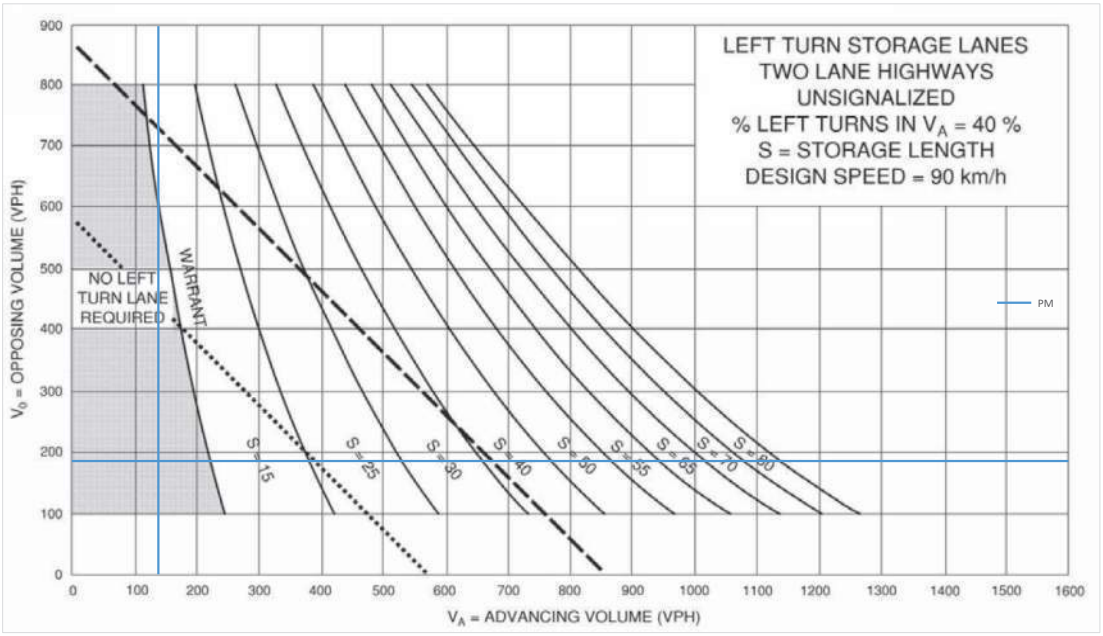
Future Total 2035

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	60	299	26	2	177	22	8	207	13	37	241	51	11.2%	329	228
	PM	59	242	11	2	346	45	16	260	17	22	285	71	5.8%	378	293

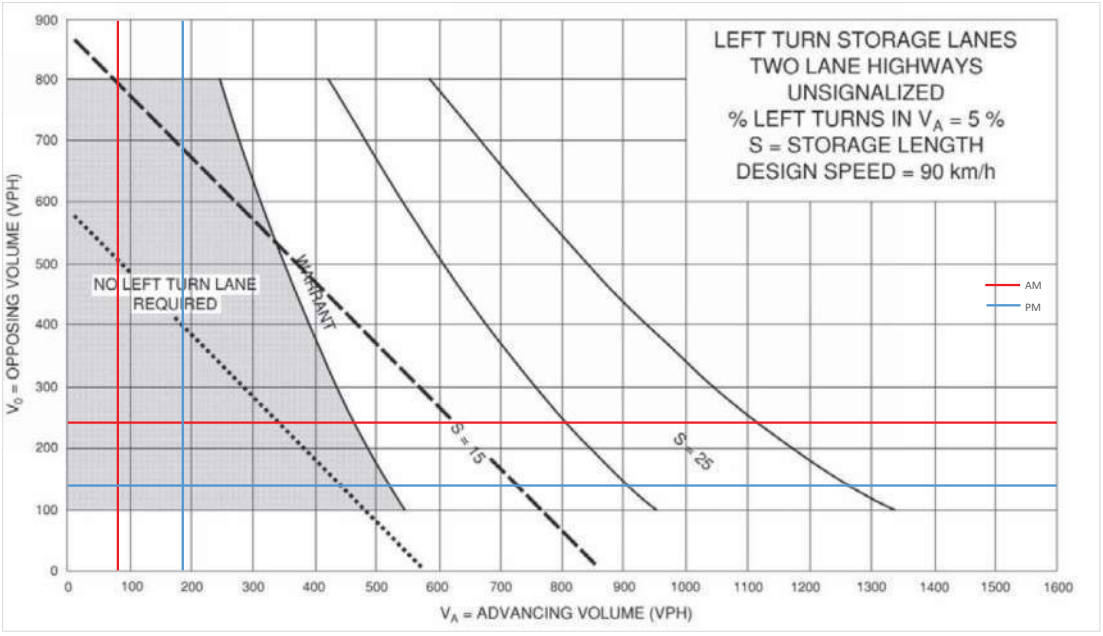
Existing - Eastbound Left



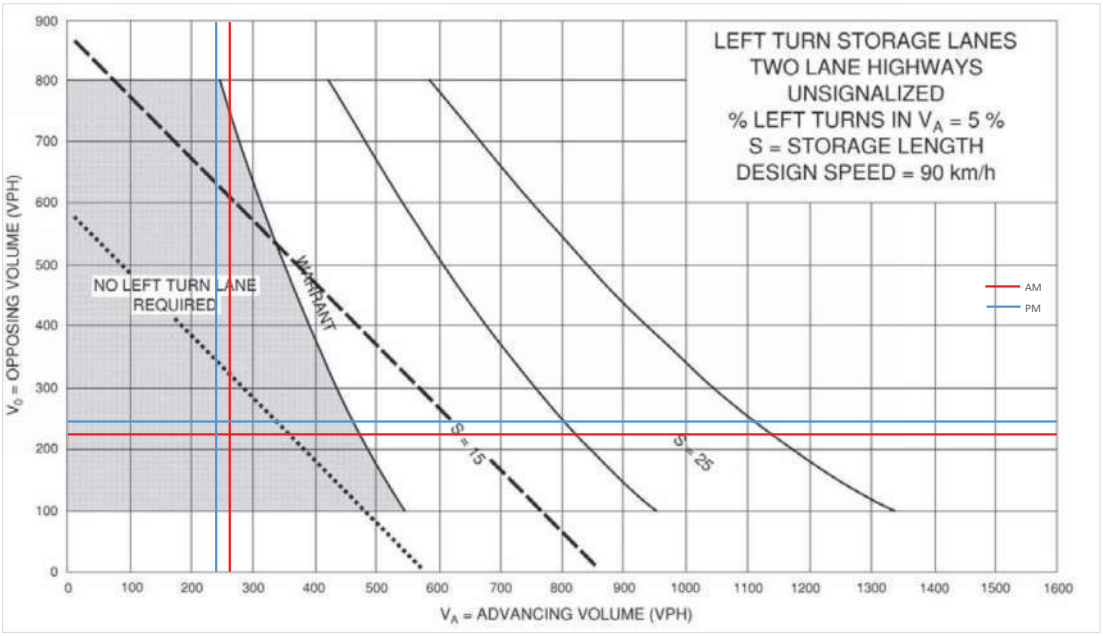
Existing - Eastbound Left



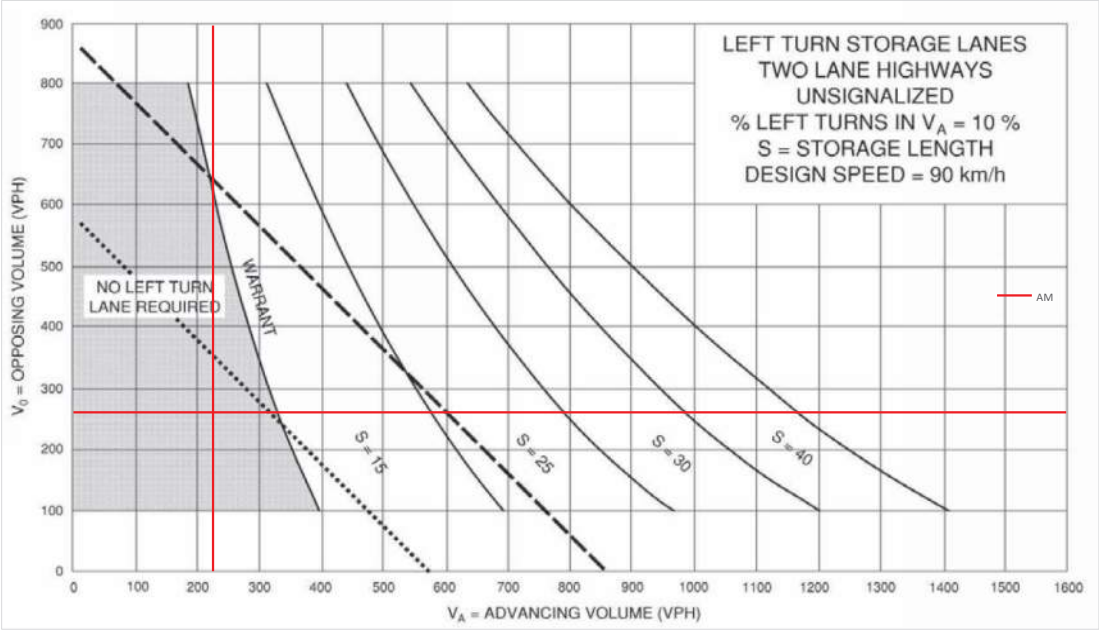
Existing - Westbound Left



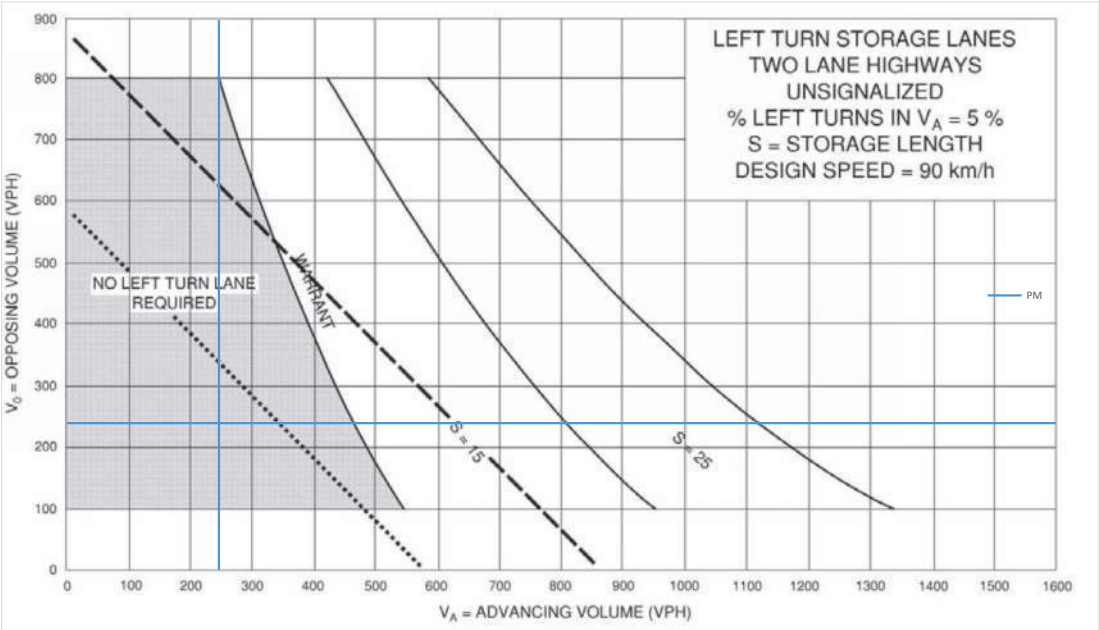
Existing - Northbound Left



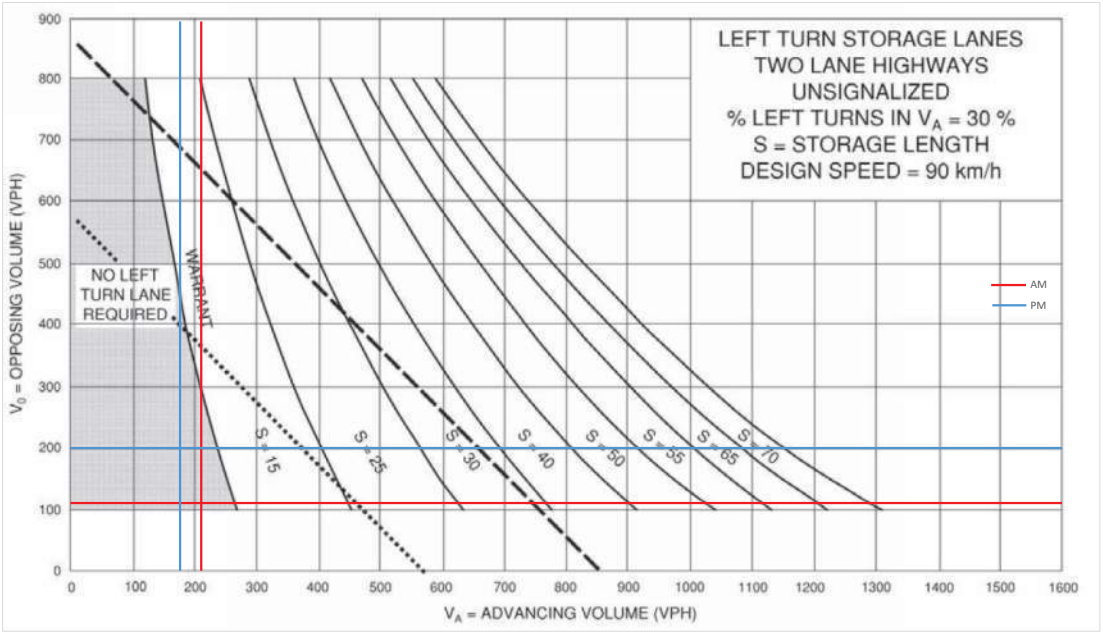
Existing - Southbound Left



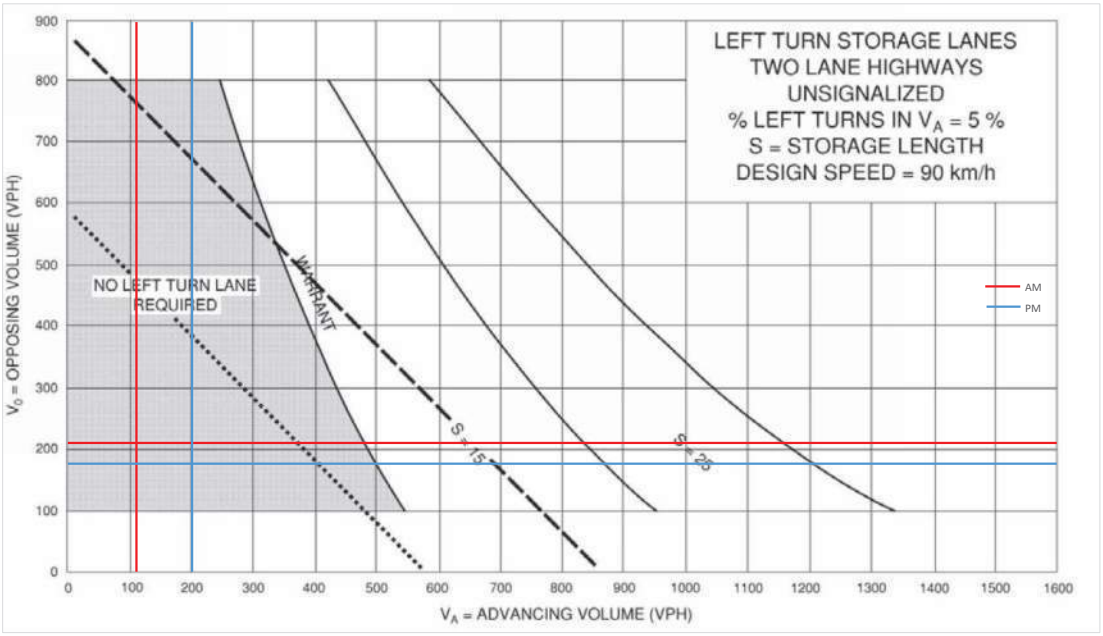
Existing - Southbound Left



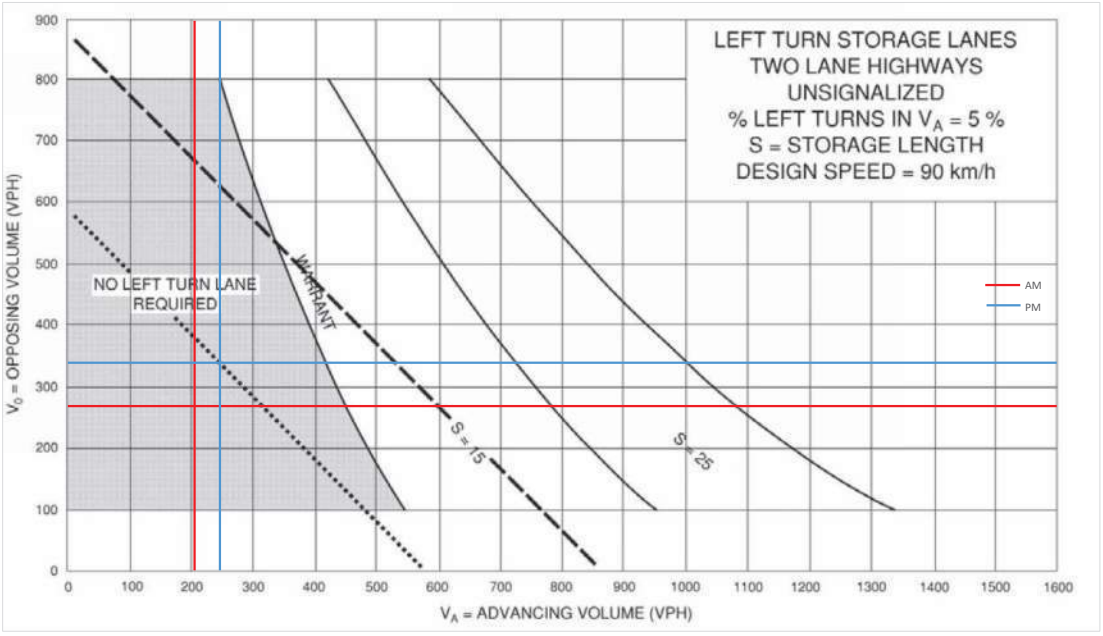
Future Background 2030 - Eastbound Left



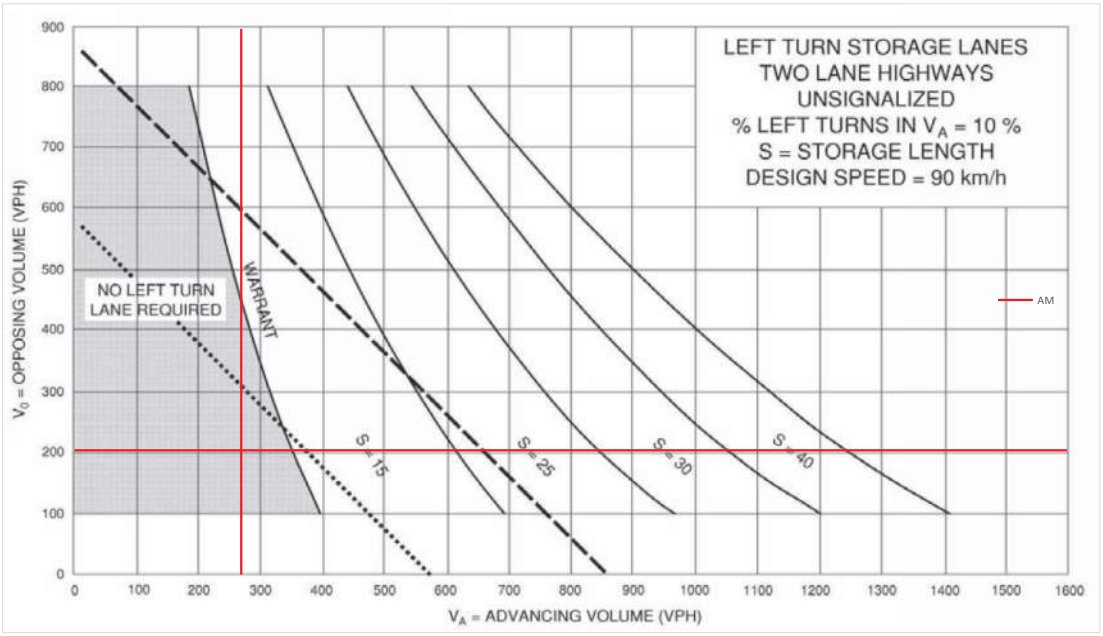
Future Background 2030 - Westbound Left



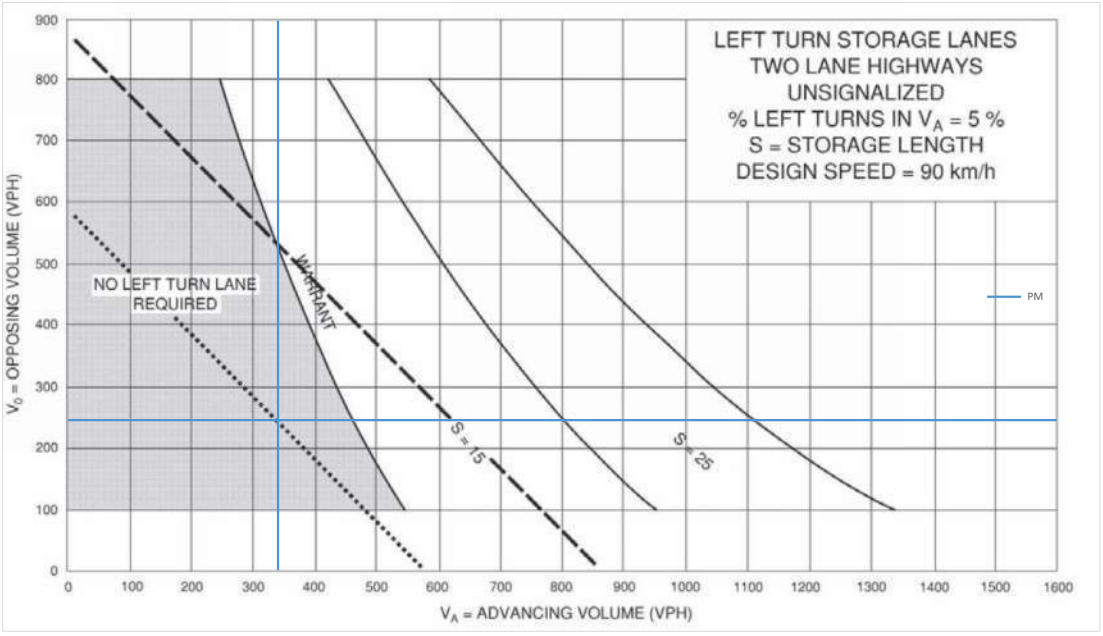
Future Background 2030 - Northbound Left



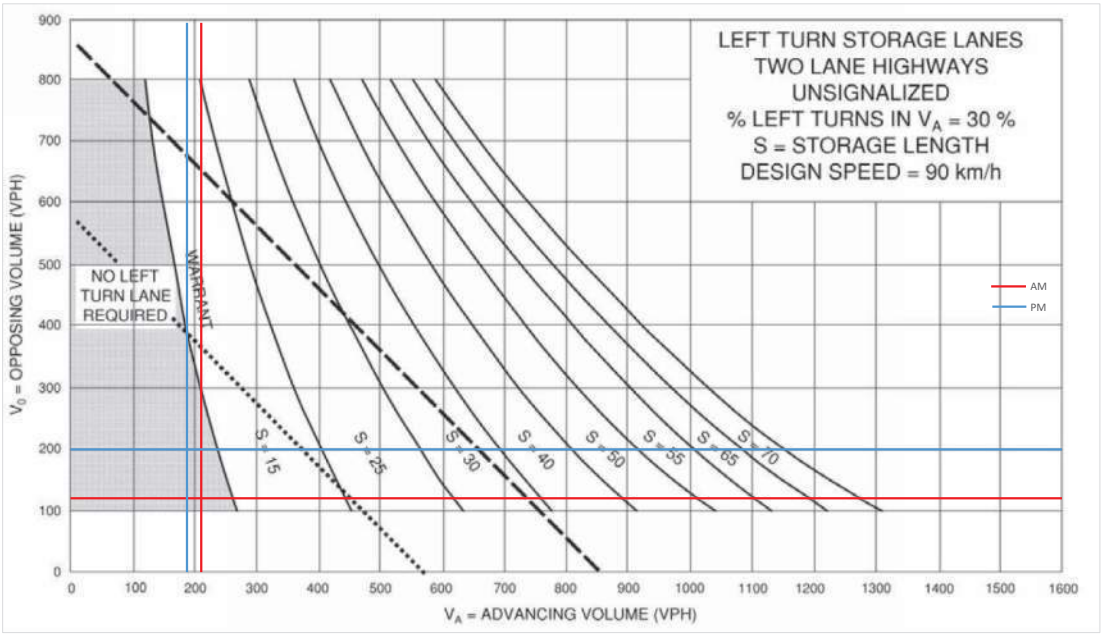
Future Background 2030 - Southbound Left



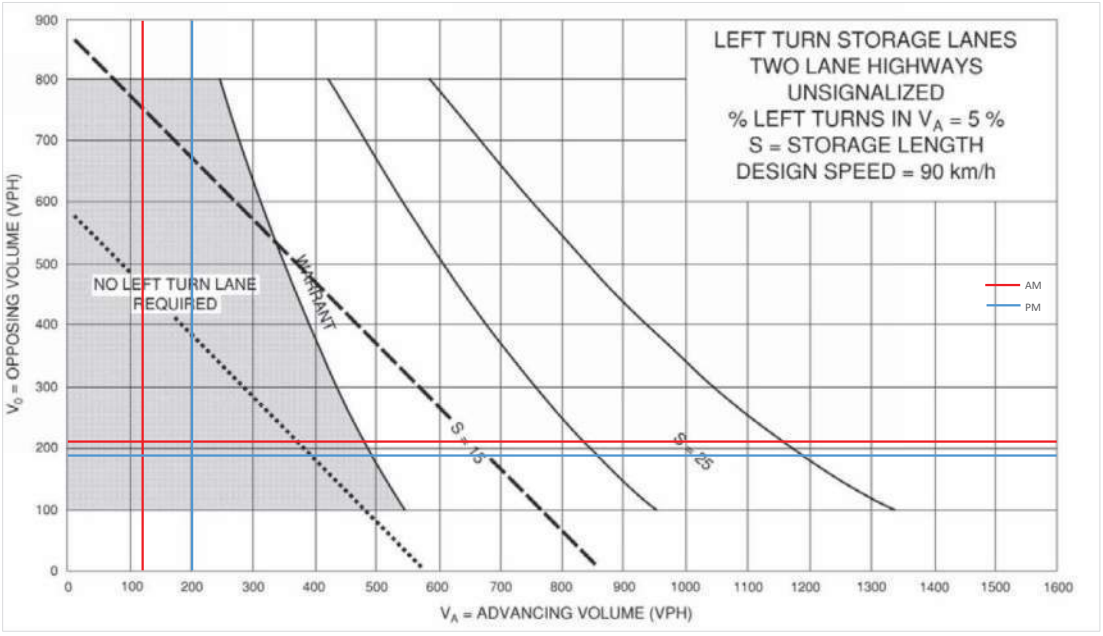
Future Background 2030 - Southbound Left



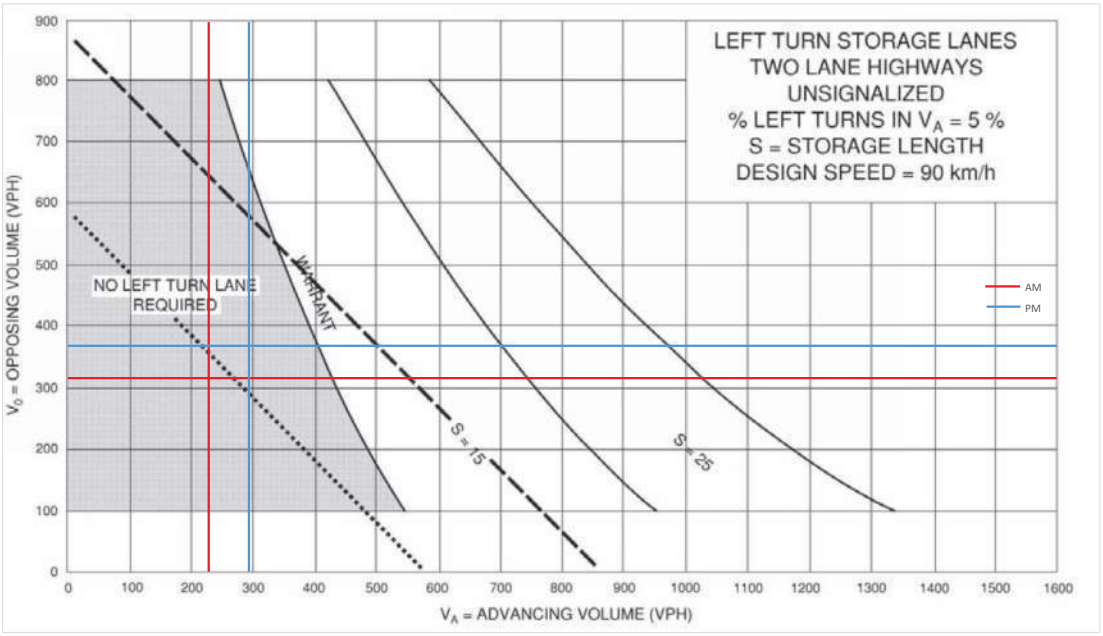
Future Background 2035 - Eastbound Left



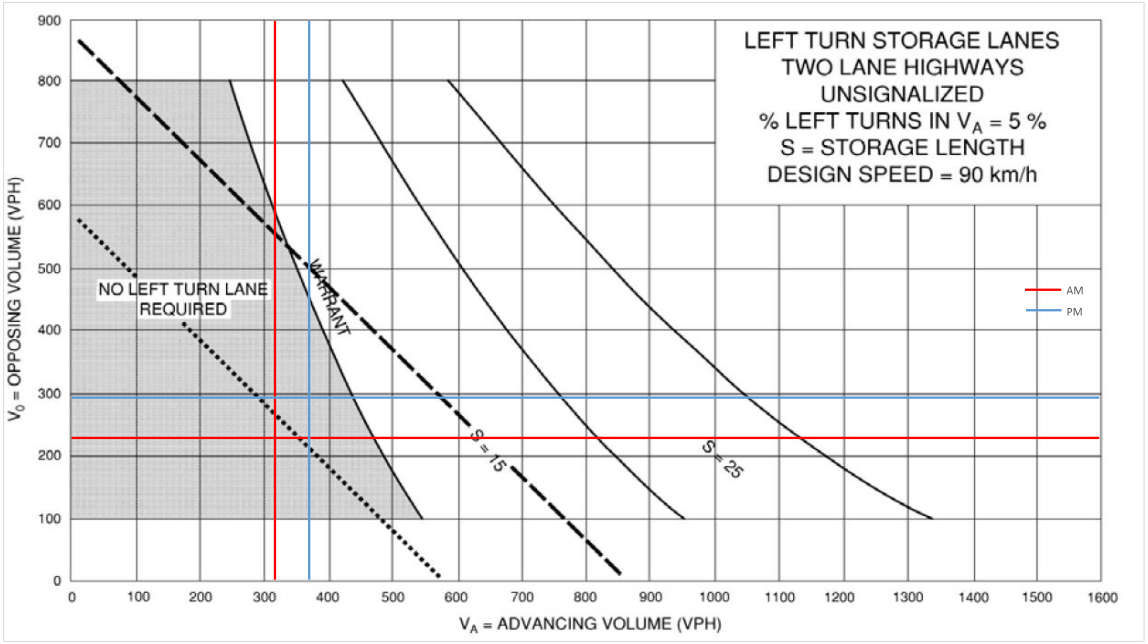
Future Background 2035 - Westbound Left



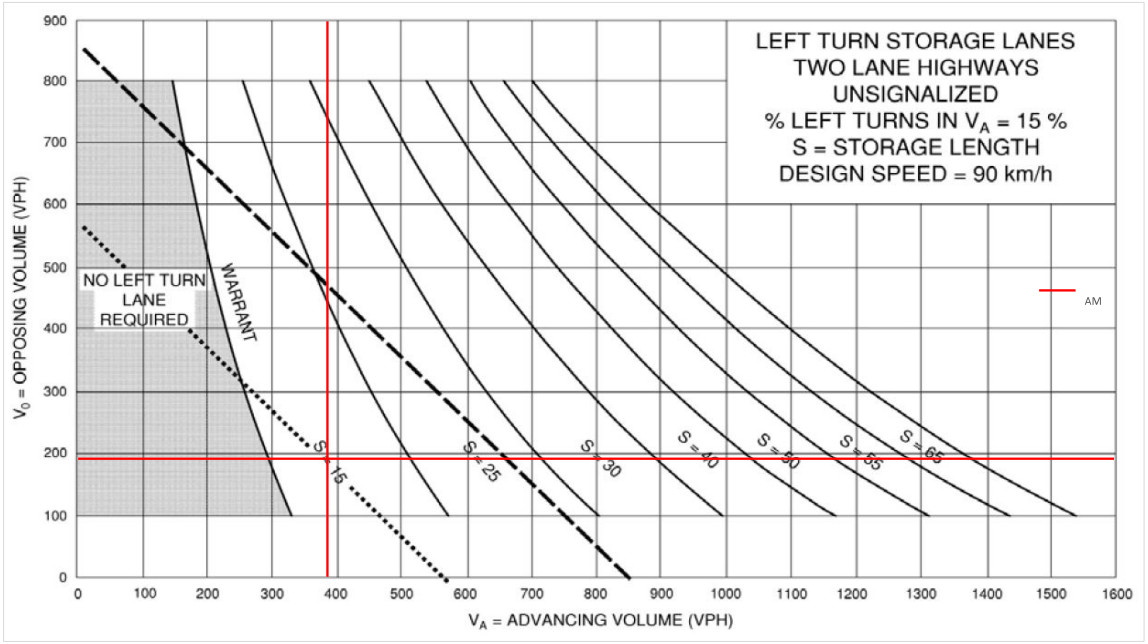
Future Background 2035 - Northbound Left



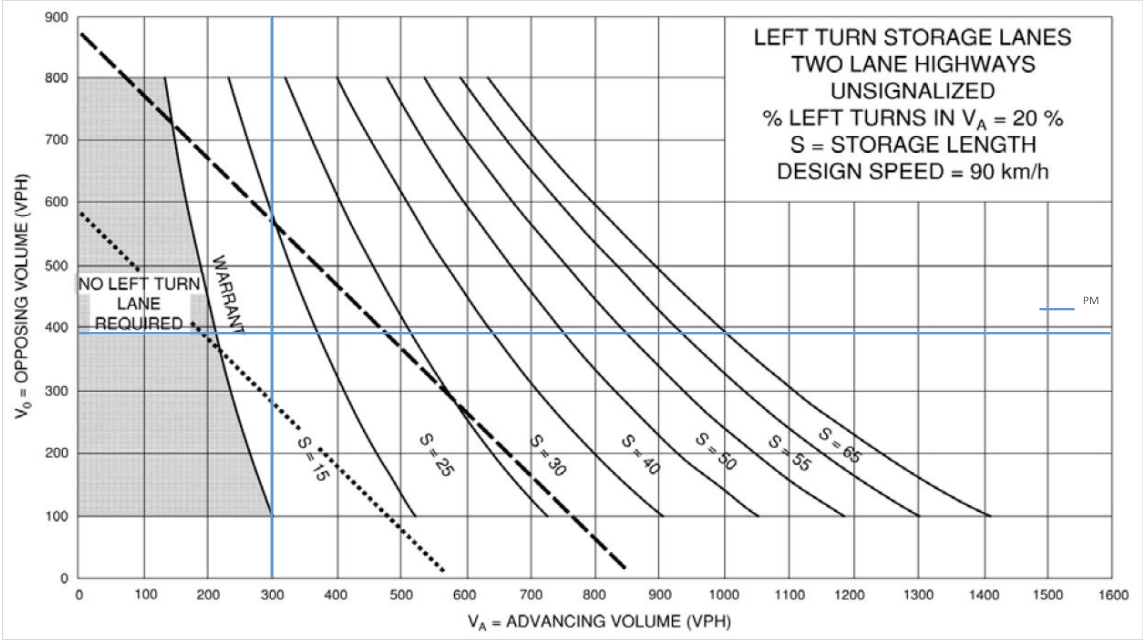
Future Background 2035 - Southbound Left



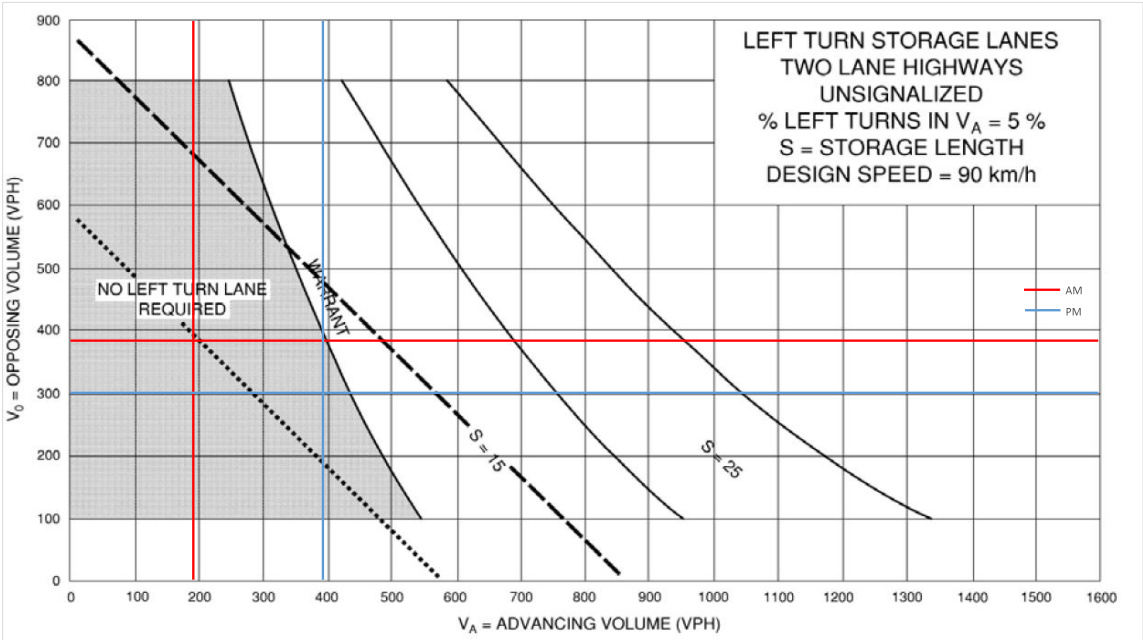
Future Total 2030 - Eastbound Left



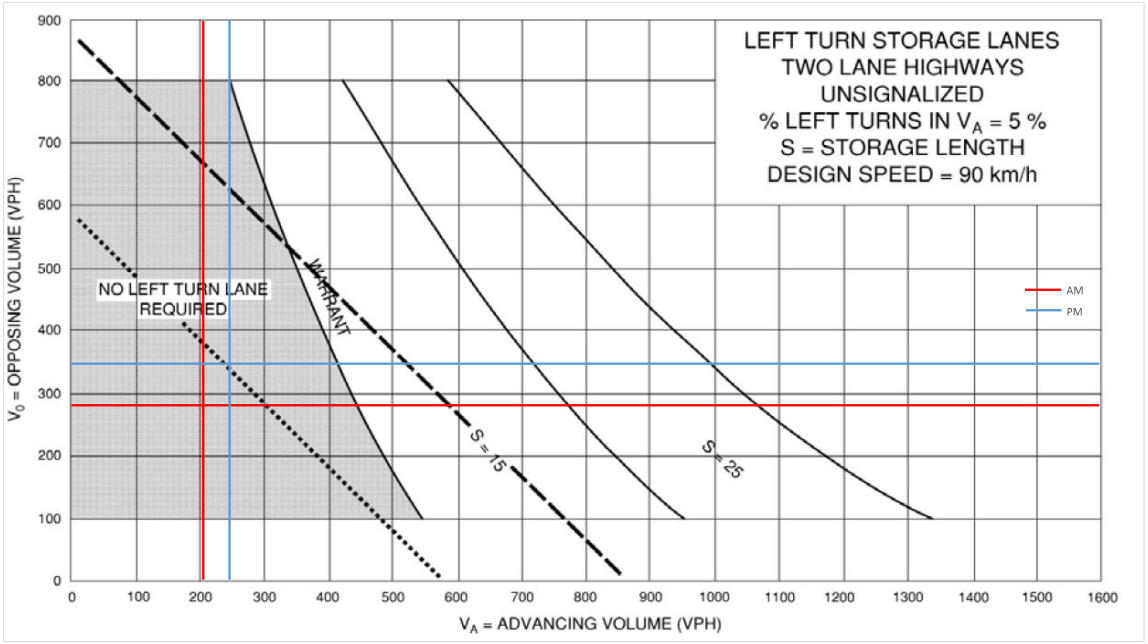
Future Total 2030 - Eastbound Left



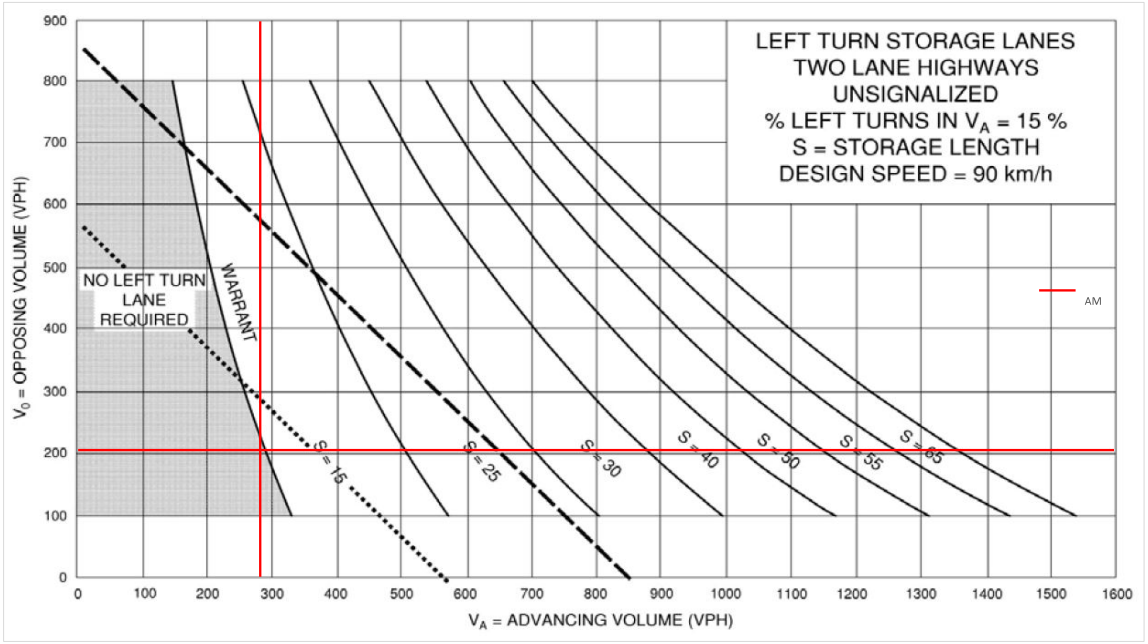
Future Total 2030 - Westbound Left



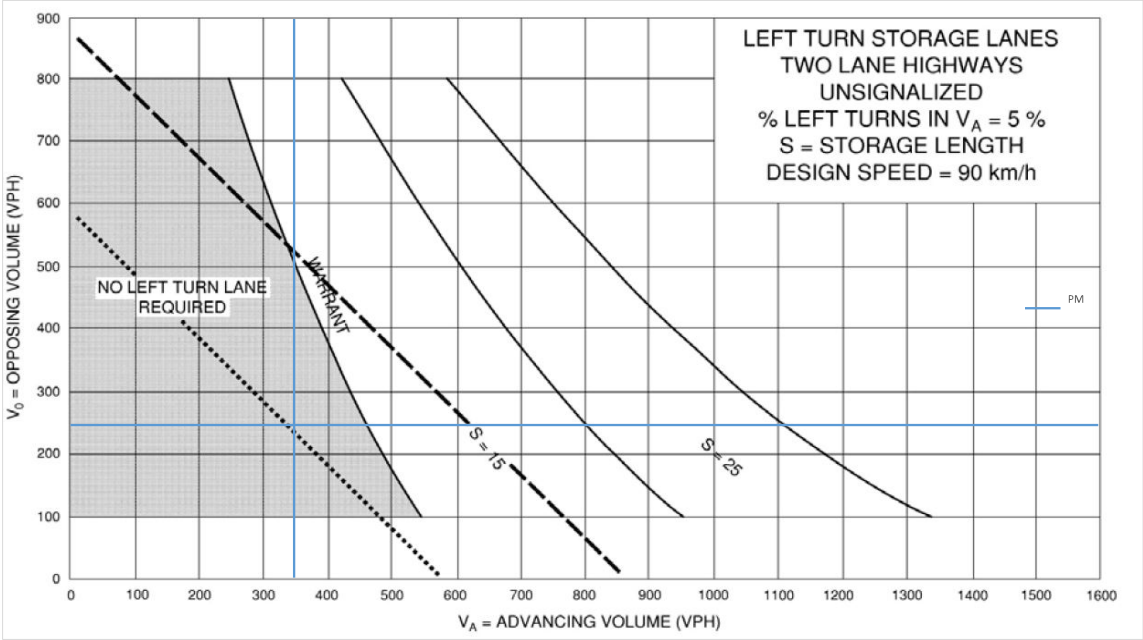
Future Total 2030 - Northbound Left



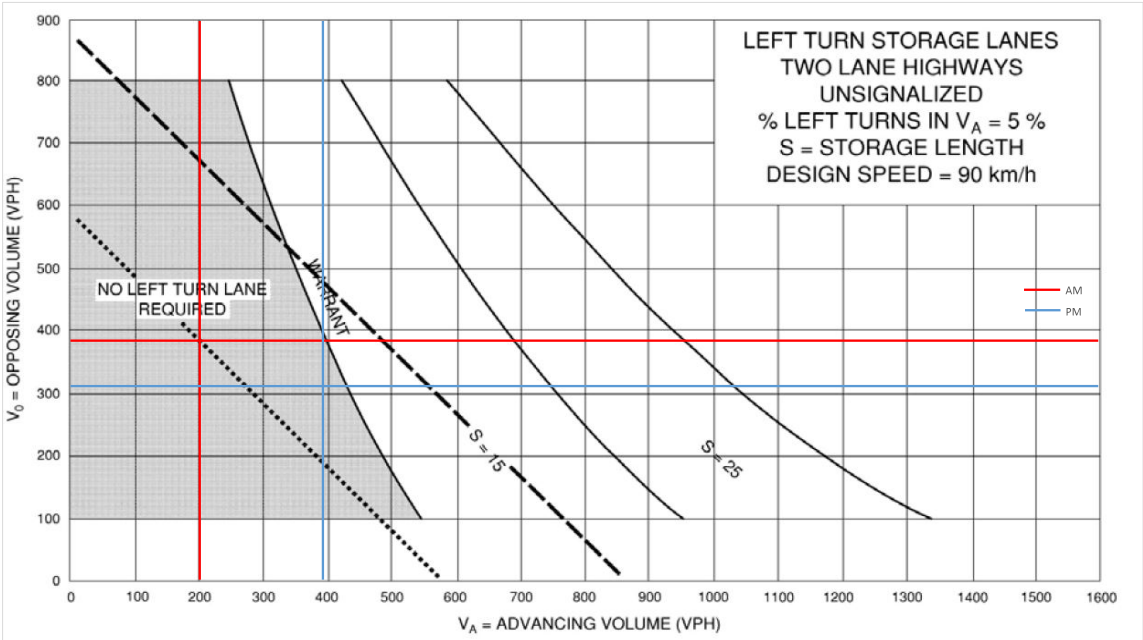
Future Total 2030 - Southbound Left



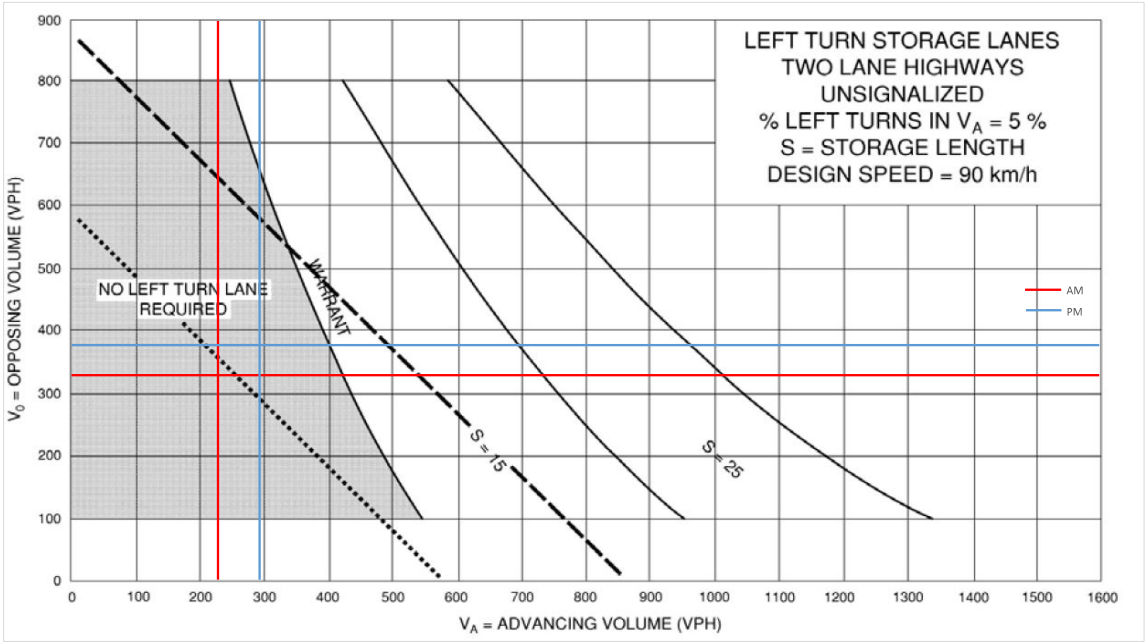
Future Total 2030 - Southbound Left



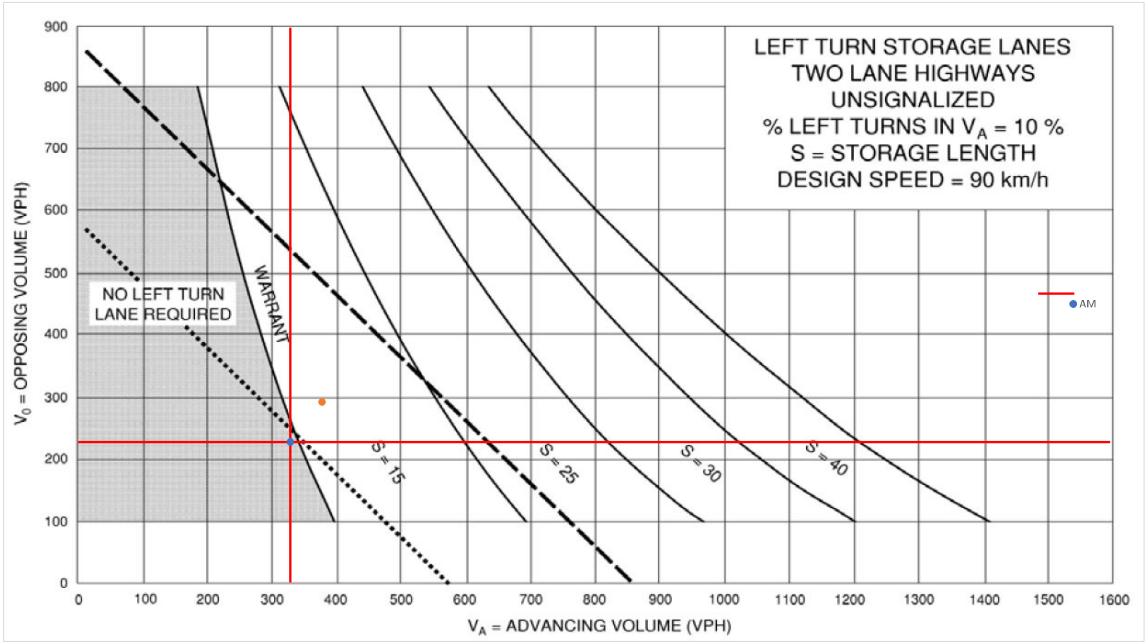
Future Total 2035 - Westbound Left



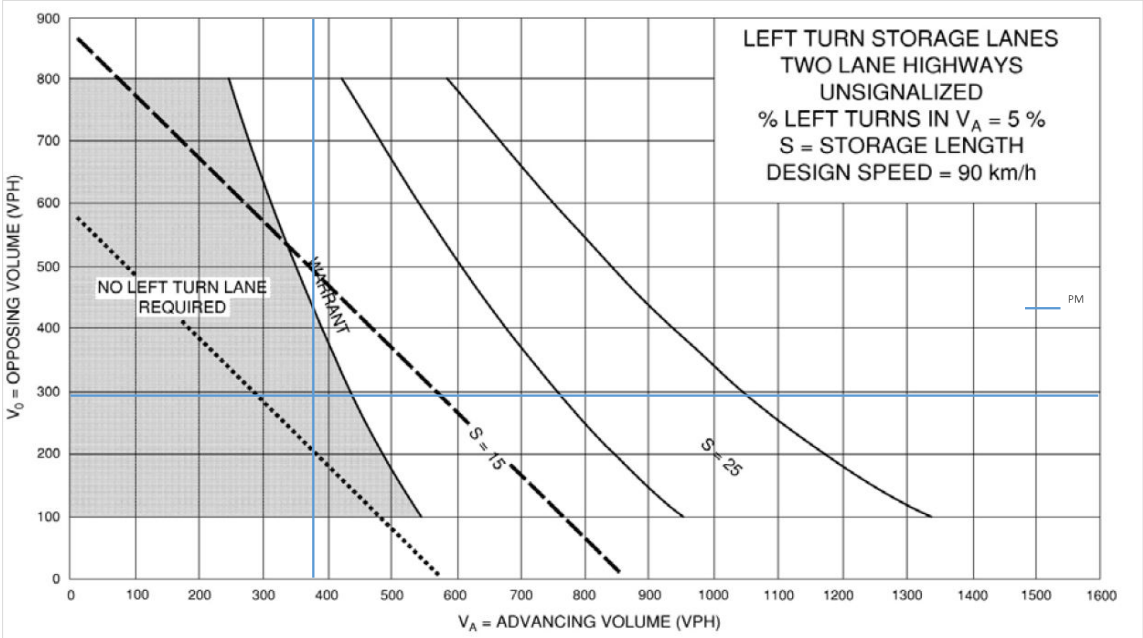
Future Total 2035 - Northbound Left



Future Total 2035 - Southbound Left



Future Total 2035 - Southbound Left



Stittsville Main Street Huntley Road at Flewellyn

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

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	155	15	7	125	29	17	232	12	39	259	53	18.3%	208	161
PM	44	110	14	6	181	71	27	234	14	33	272	47	26.2%	168	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	38	155	15	7	135	29	17	240	12	39	269	53	18.3%	208	171
PM	44	121	14	6	181	71	27	245	14	33	281	47	24.6%	179	258

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	38	164	15	19	145	168	17	232	17	99	259	53	17.5%	217	332
PM	44	130	14	14	195	169	27	234	26	176	272	47	23.4%	188	378

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	38	164	15	19	155	168	17	240	17	99	269	53	17.5%	217	342
PM	44	141	14	14	195	169	27	245	26	176	281	47	22.1%	199	378

Existing

Design Speed: 90 km/h — Yes

	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: 90 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	155	15	7	125	29	17	232	12	39	259	53	4.3%	161	208
PM	44	110	14	6	181	71	27	234	14	33	272	47	2.3%	258	168

Future Background 2035

Design Speed: 90 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	155	15	7	135	29	17	240	12	39	269	53	4.1%	171	208
PM	44	121	14	6	181	71	27	245	14	33	281	47	2.3%	258	179

Future Total 2030

Design Speed: 90 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	164	15	19	145	168	17	232	17	99	259	53	5.7%	332	217
PM	44	130	14	14	195	169	27	234	26	176	272	47	3.7%	378	188

Future Total 2035

Design Speed: 90 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	164	15	19	155	168	17	240	17	99	269	53	5.6%	342	217
PM	44	141	14	14	195	169	27	245	26	176	281	47	3.7%	378	199

Existing

Design Speed: 70 km/h — Yes

	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: 70 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	155	15	7	125	29	17	232	12	39	259	53	6.5%	261	351
PM	44	110	14	6	181	71	27	234	14	33	272	47	9.8%	275	352

Future Background 2035

Design Speed: 70 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	155	15	7	135	29	17	240	12	39	269	53	6.3%	269	361
PM	44	121	14	6	181	71	27	245	14	33	281	47	9.4%	286	361

Future Total 2030

Design Speed: 70 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	164	15	19	145	168	17	232	17	99	259	53	6.4%	266	411
PM	44	130	14	14	195	169	27	234	26	176	272	47	9.4%	287	495

Future Total 2035

Design Speed: 70 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	164	15	19	155	168	17	240	17	99	269	53	6.2%	274	421
PM	44	141	14	14	195	169	27	245	26	176	281	47	9.1%	298	504

Existing

Design Speed																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes 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																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	38	155	15	7	125	29	17	232	12	39	259	53	11.1%	351	261
	PM	44	110	14	6	181	71	27	234	14	33	272	47	9.4%	352	275

Future Background 2035

Design Speed																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	38	155	15	7	135	29	17	240	12	39	269	53	10.8%	361	269
	PM	44	121	14	6	181	71	27	245	14	33	281	47	9.1%	361	286

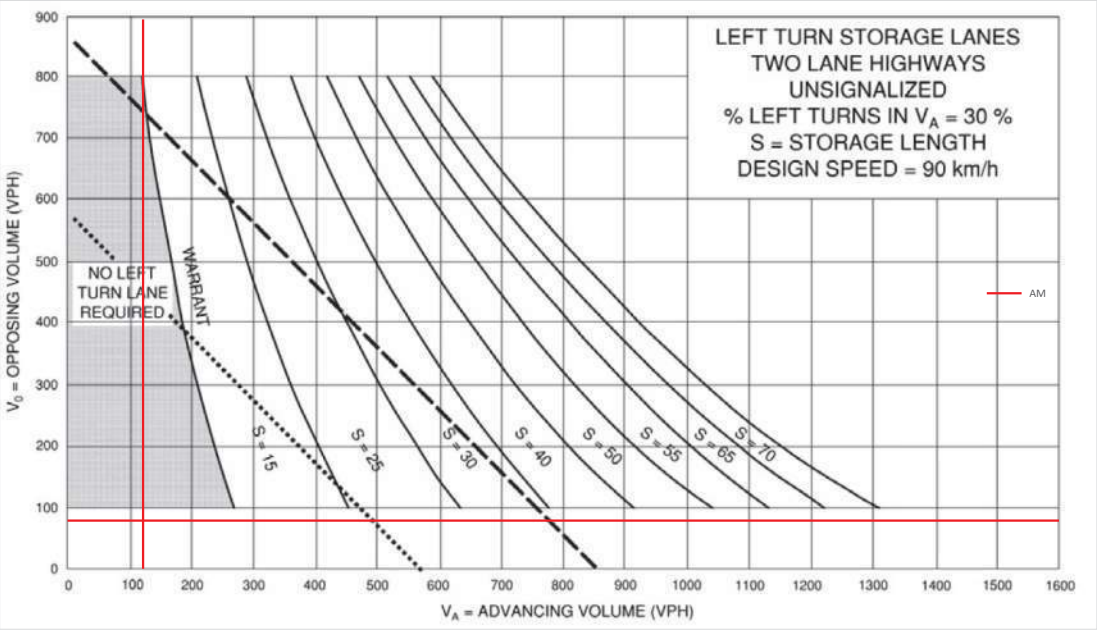
Future Total 2030

Design Speed																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	38	164	15	19	145	168	17	232	17	99	259	53	24.1%	411	266
	PM	44	130	14	14	195	169	27	234	26	176	272	47	35.6%	495	287

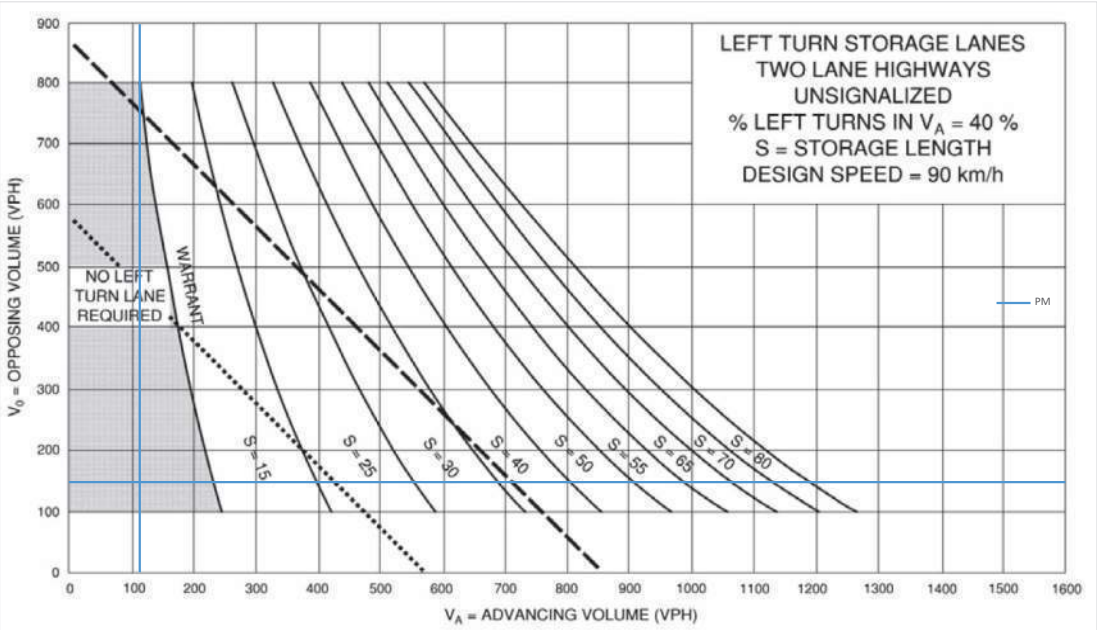
Future Total 2035

Design Speed																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	38	164	15	19	155	168	17	240	17	99	269	53	23.5%	421	274
	PM	44	141	14	14	195	169	27	245	26	176	281	47	34.9%	504	298

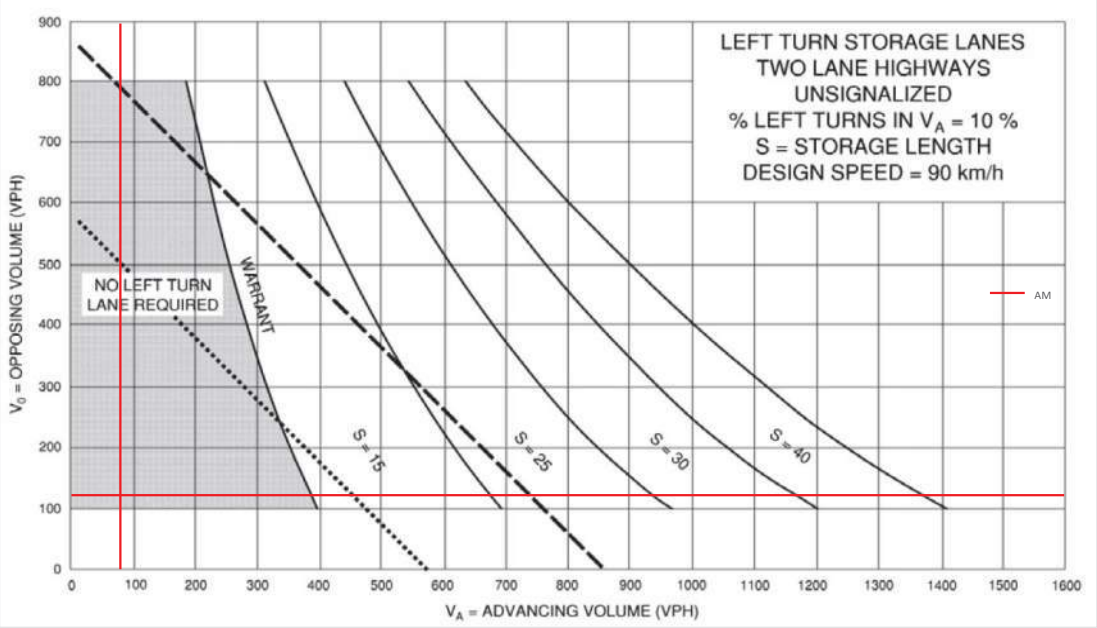
Existing - Eastbound Left



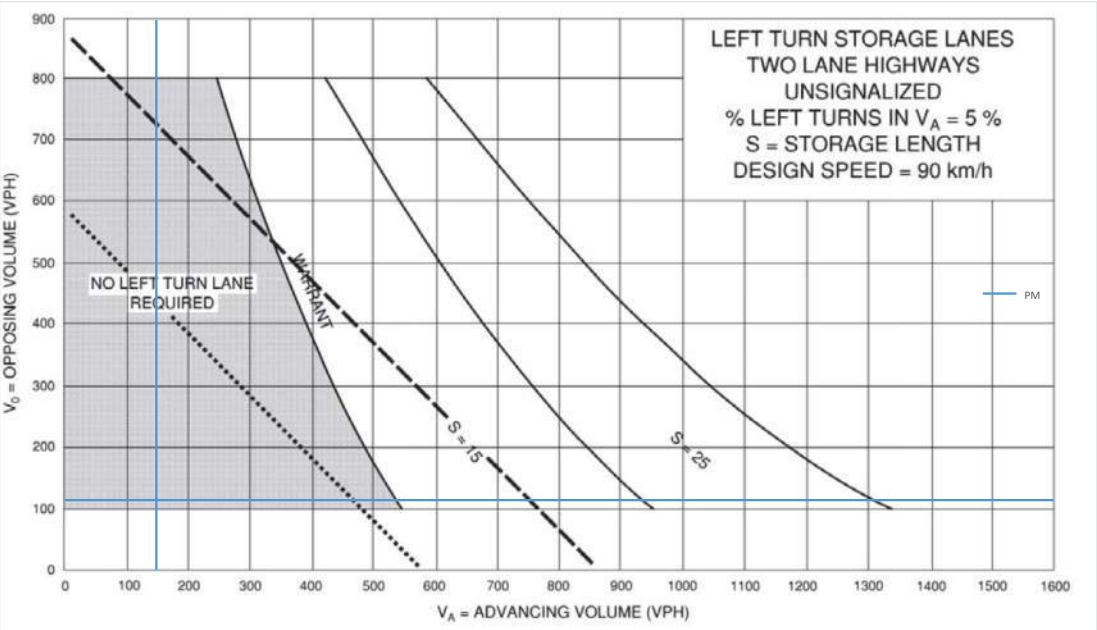
Existing - Eastbound Left



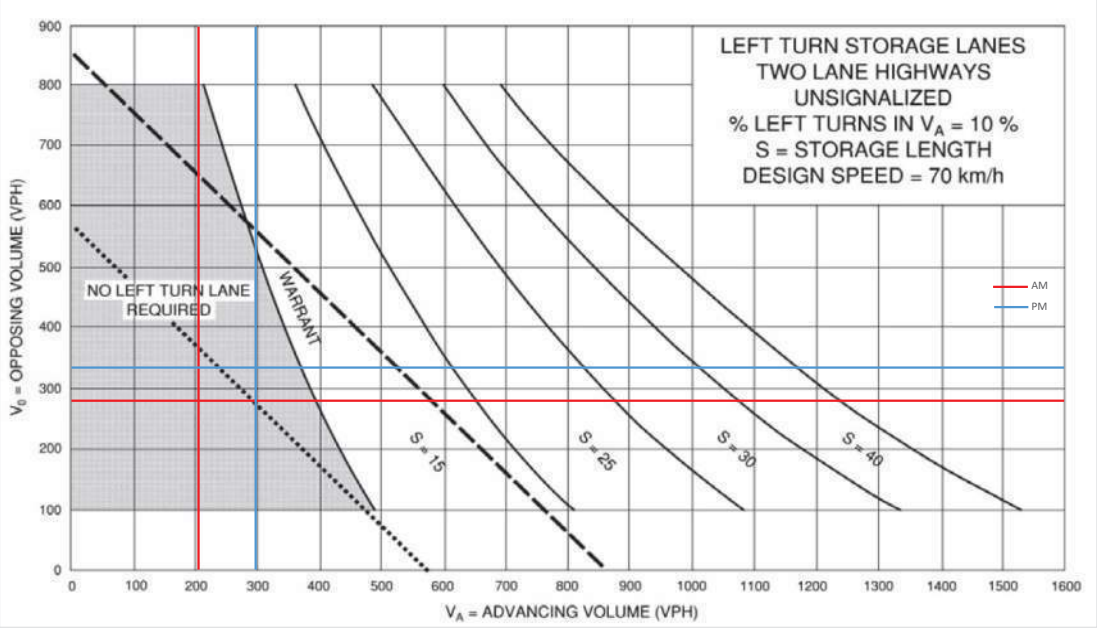
Existing - Westbound Left



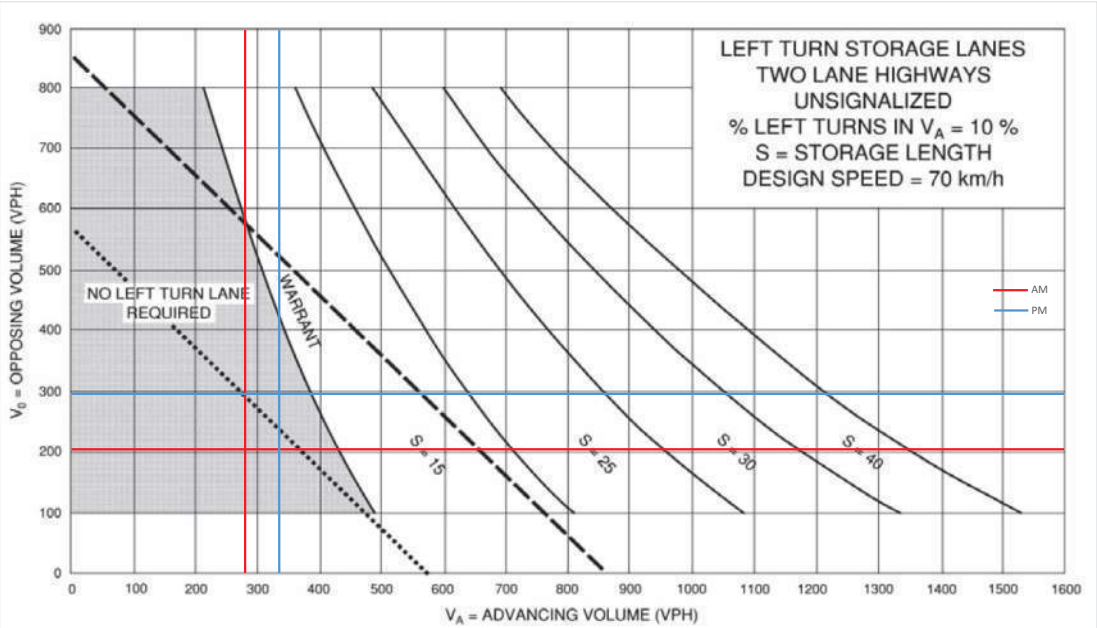
Existing - Westbound Left



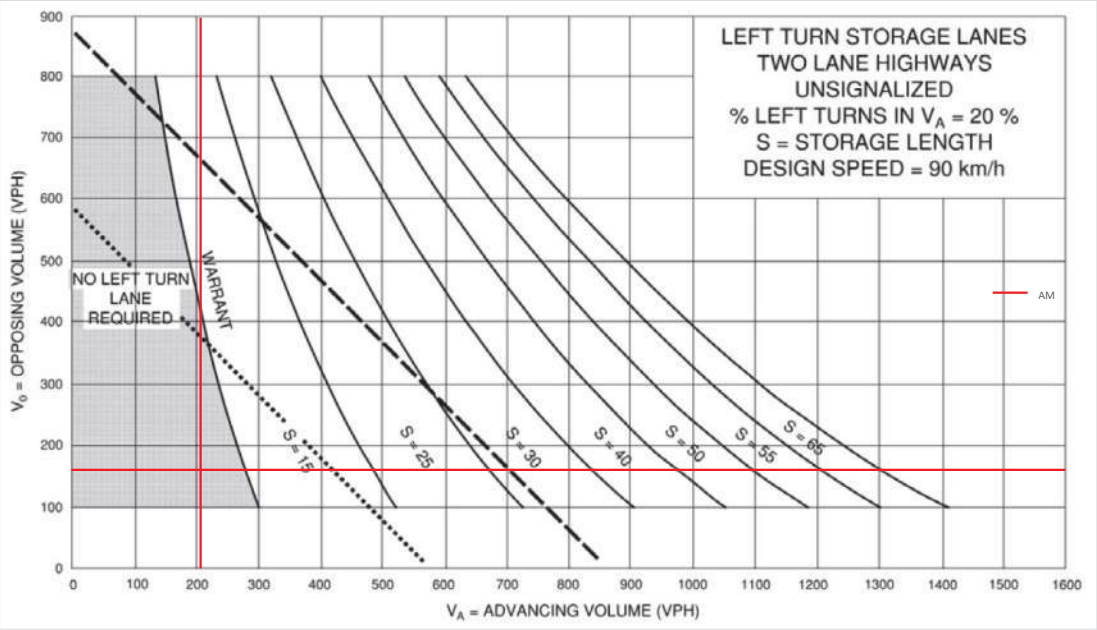
Existing - Northbound Left



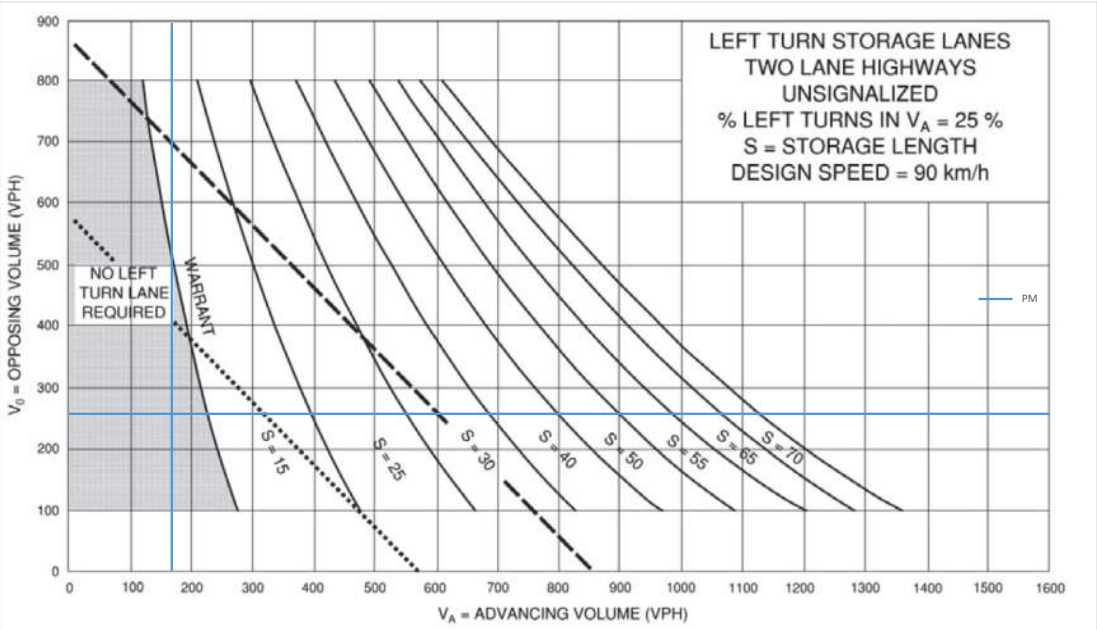
Existing - Southbound Left



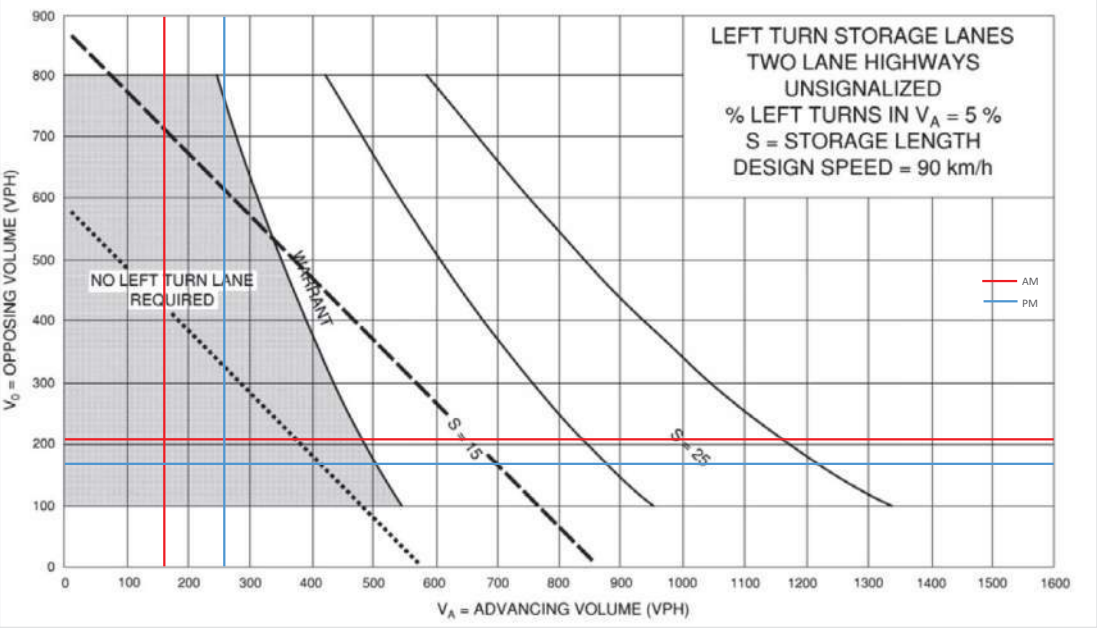
Future Background 2030 - Eastbound Left



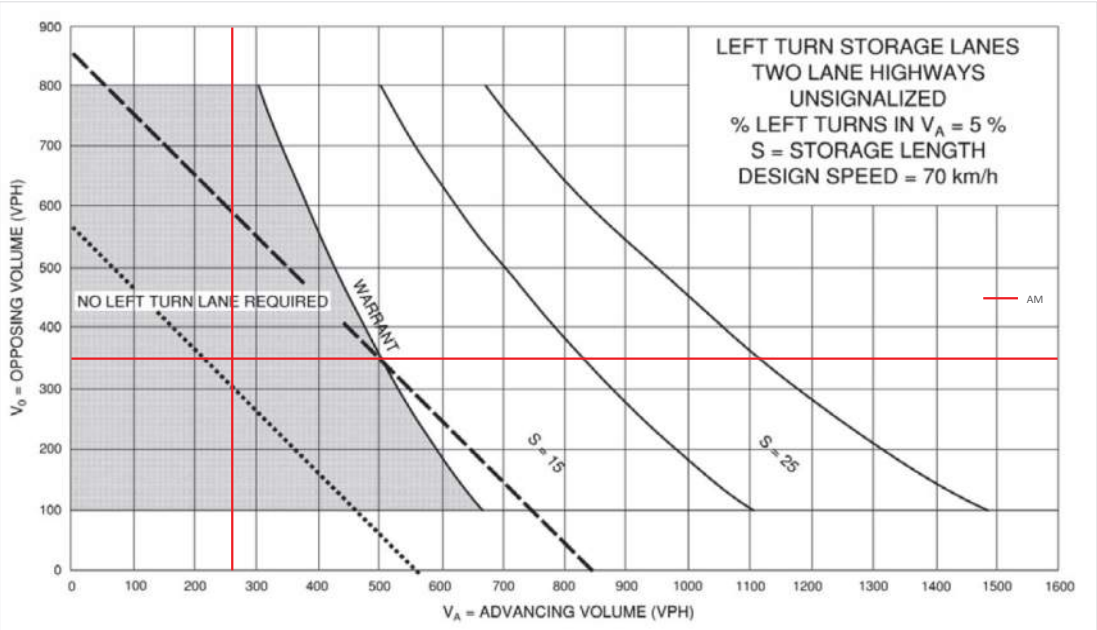
Future Background 2030 - Eastbound Left



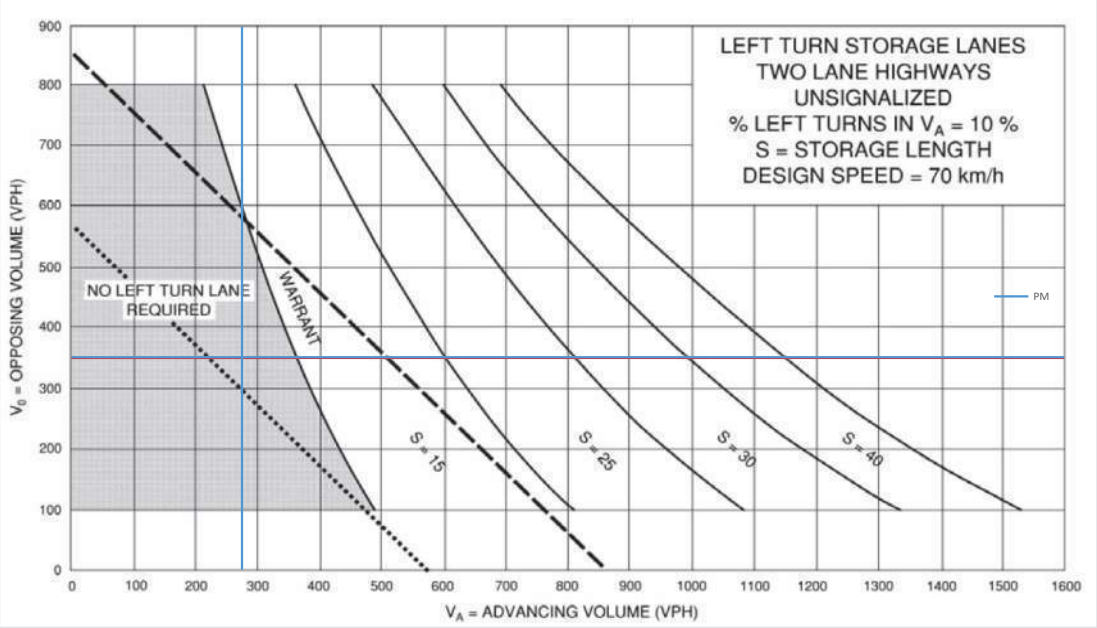
Future Background 2030 - Westbound Left



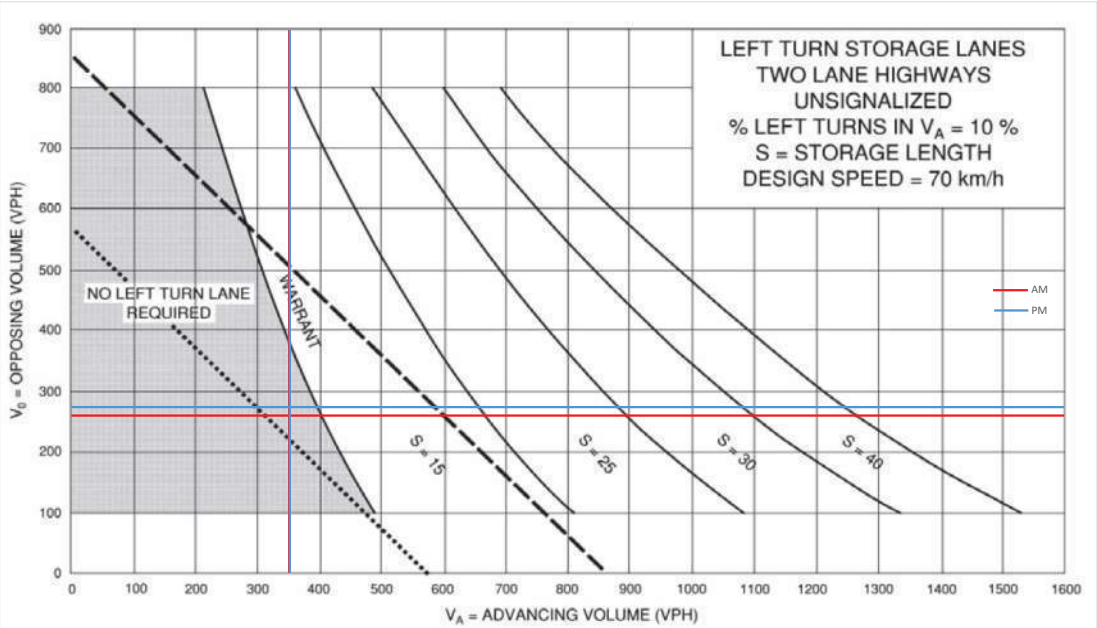
Future Background 2030 - Northbound Left



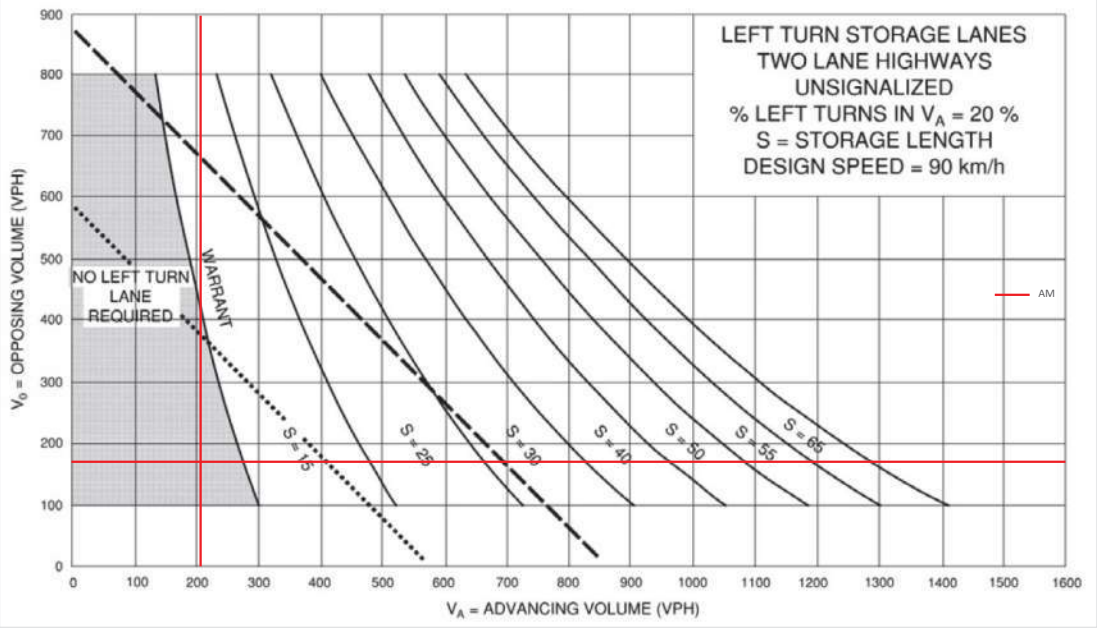
Future Background 2030 - Northbound Left



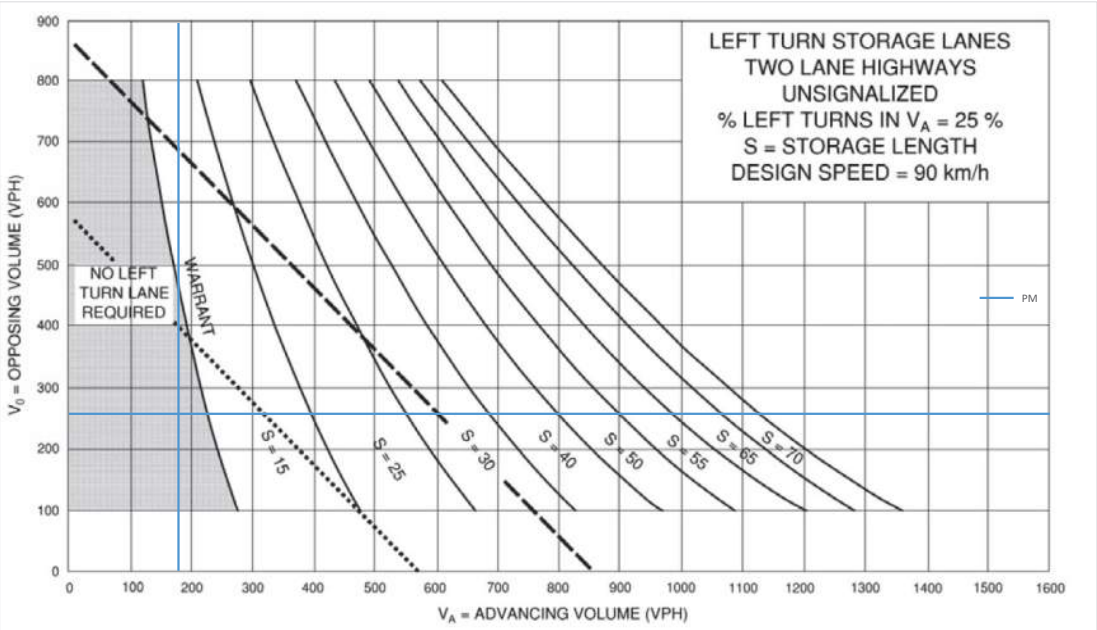
Future Background 2030 - Southbound Left



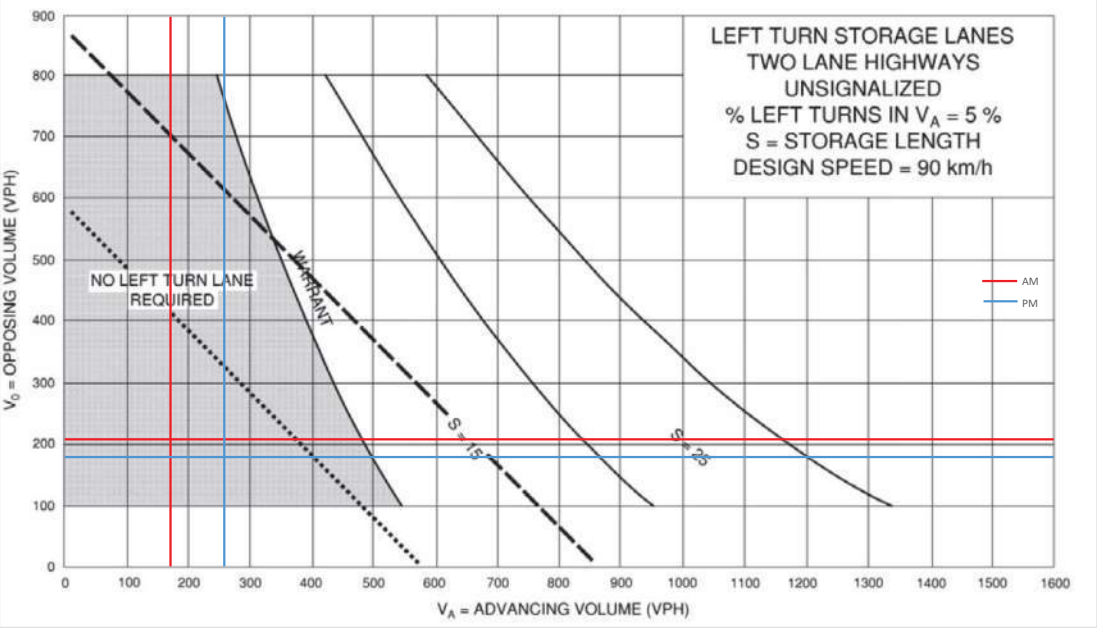
Future Background 2035 - Eastbound Left



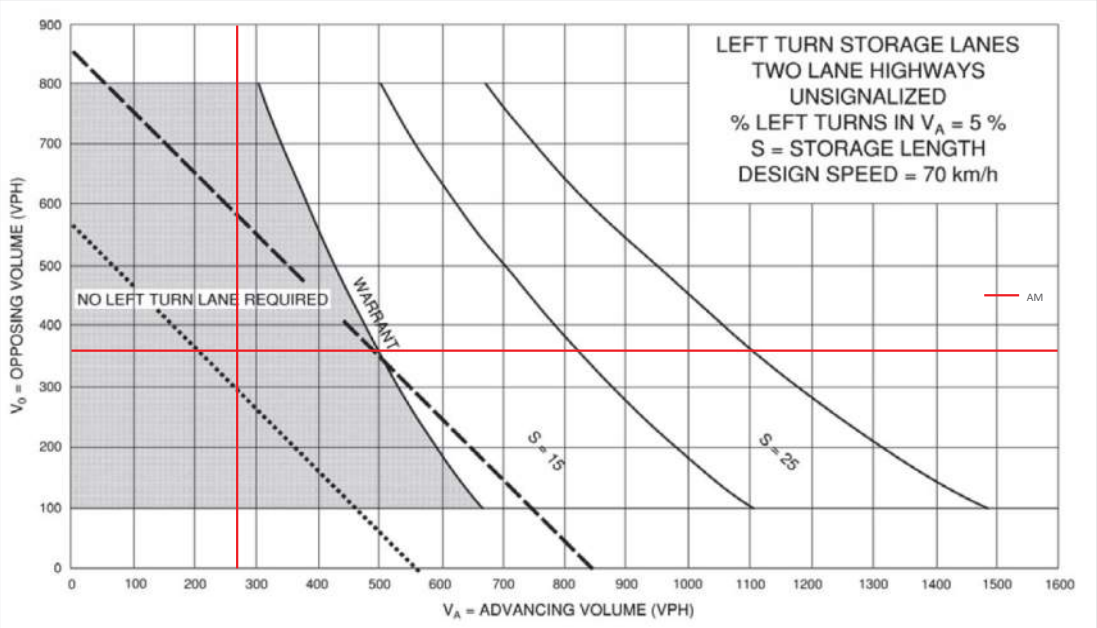
Future Background 2035 - Eastbound Left



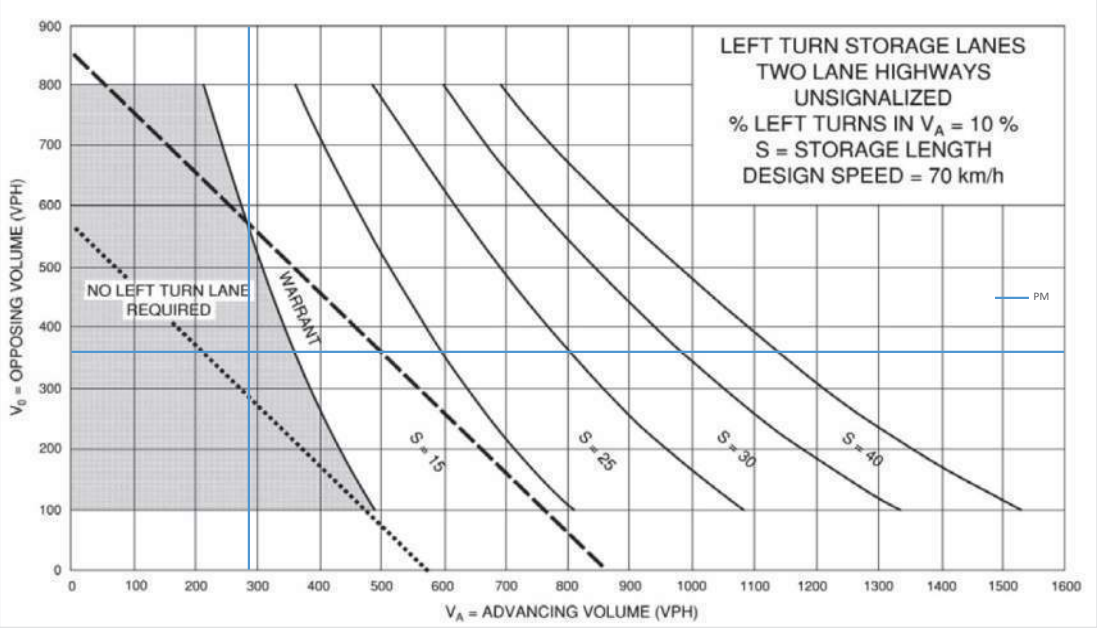
Future Background 2035 - Westbound Left



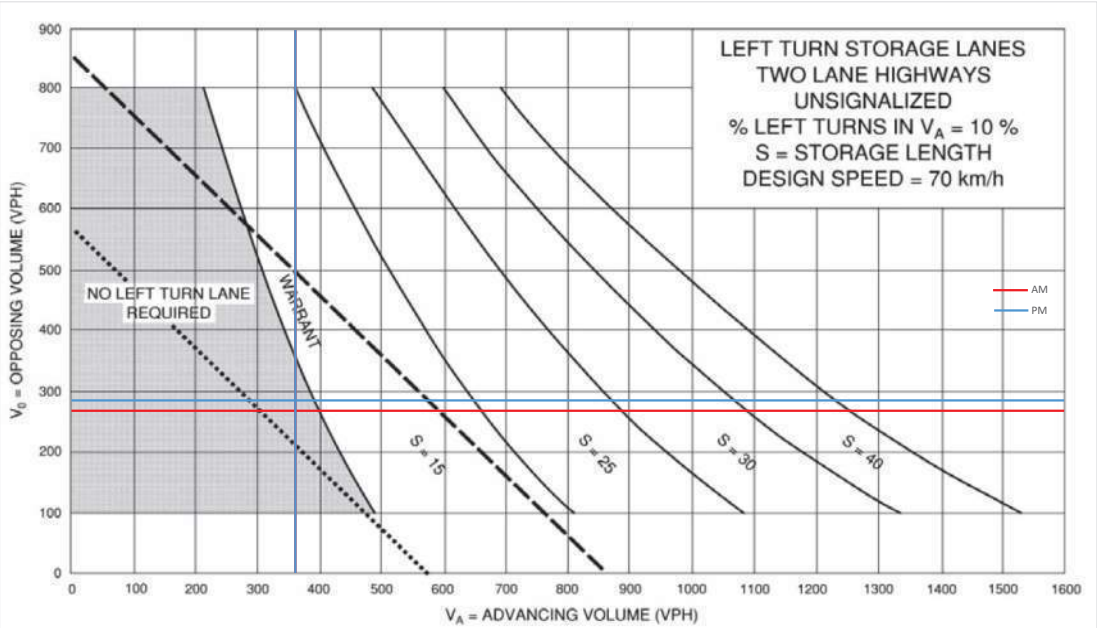
Future Background 2035 - Northbound Left



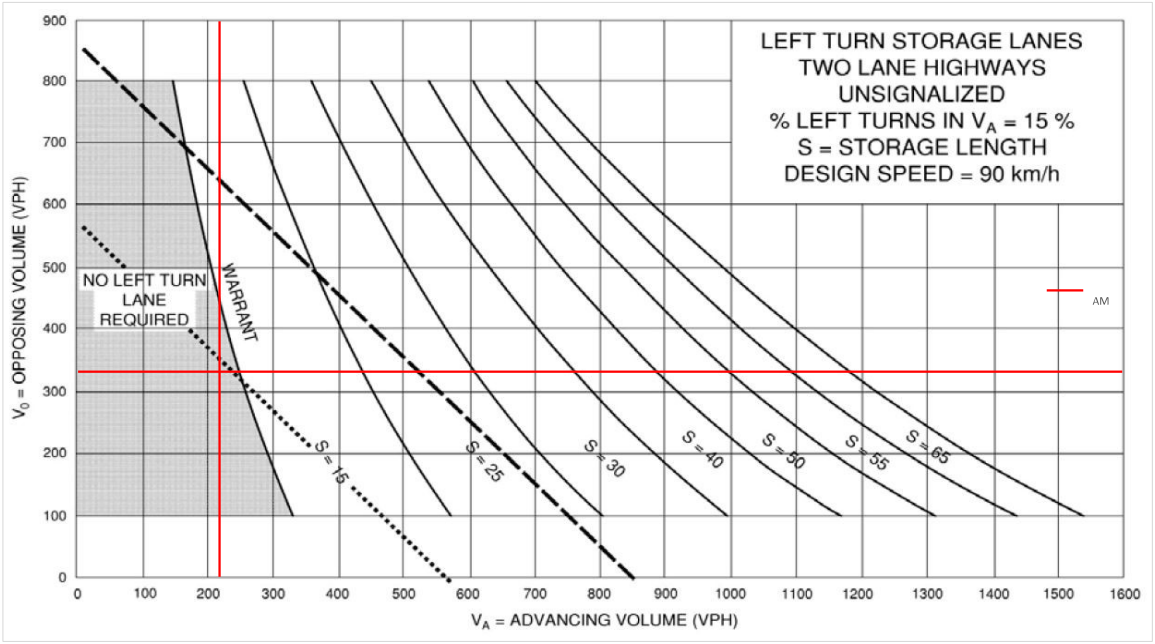
Future Background 2035 - Northbound Left



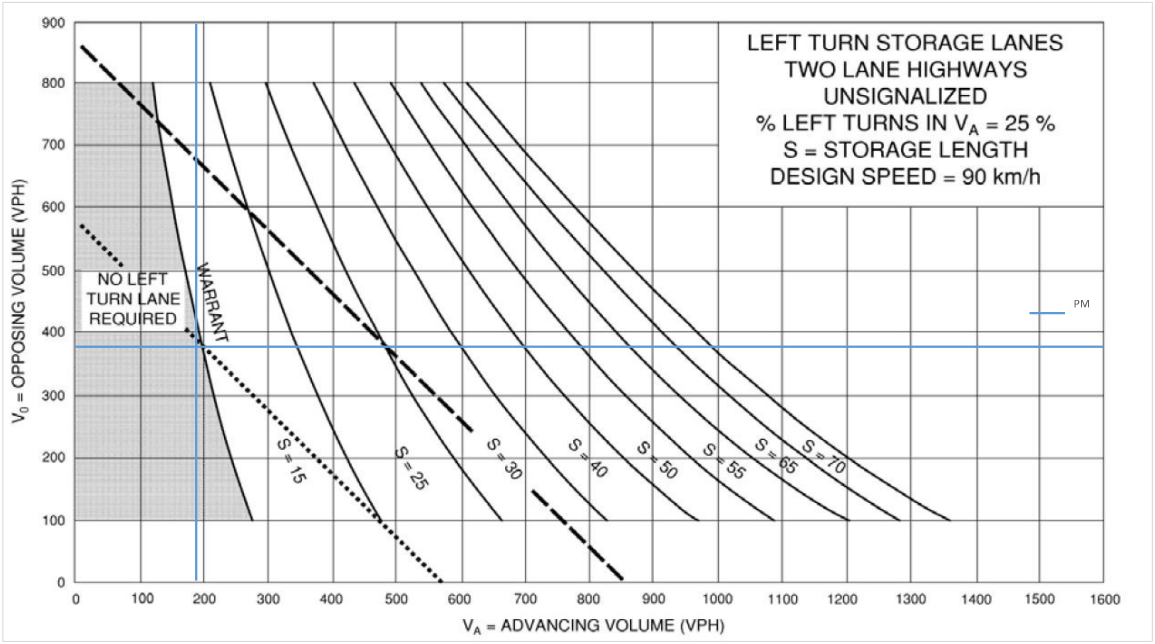
Future Background 2035 - Southbound Left



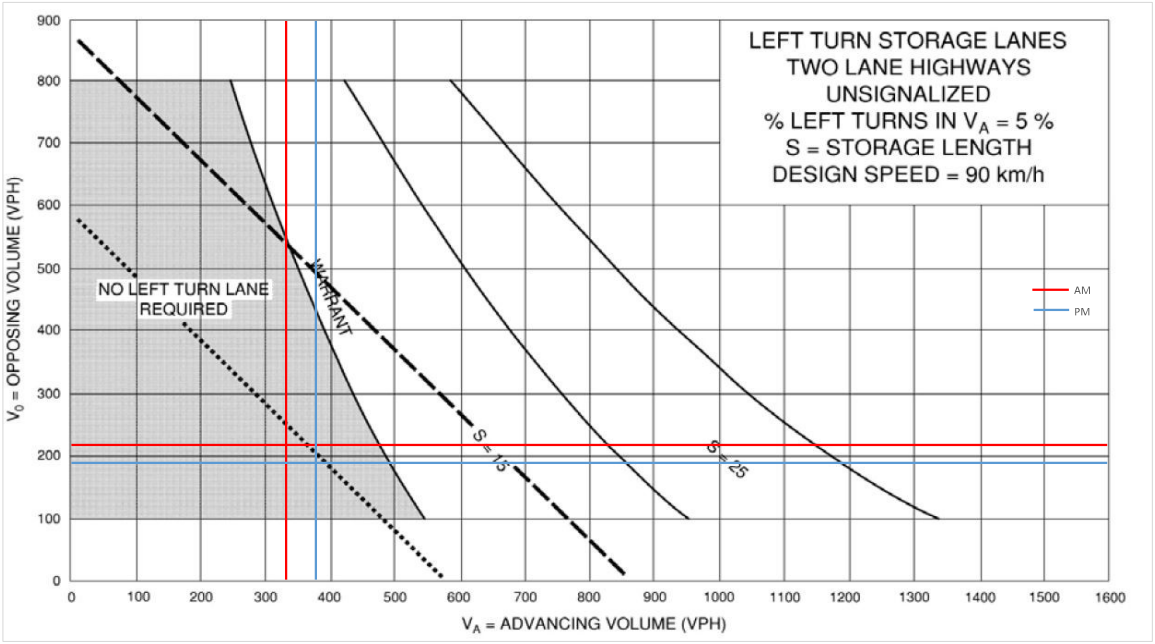
Future Total 2030 - Eastbound Left



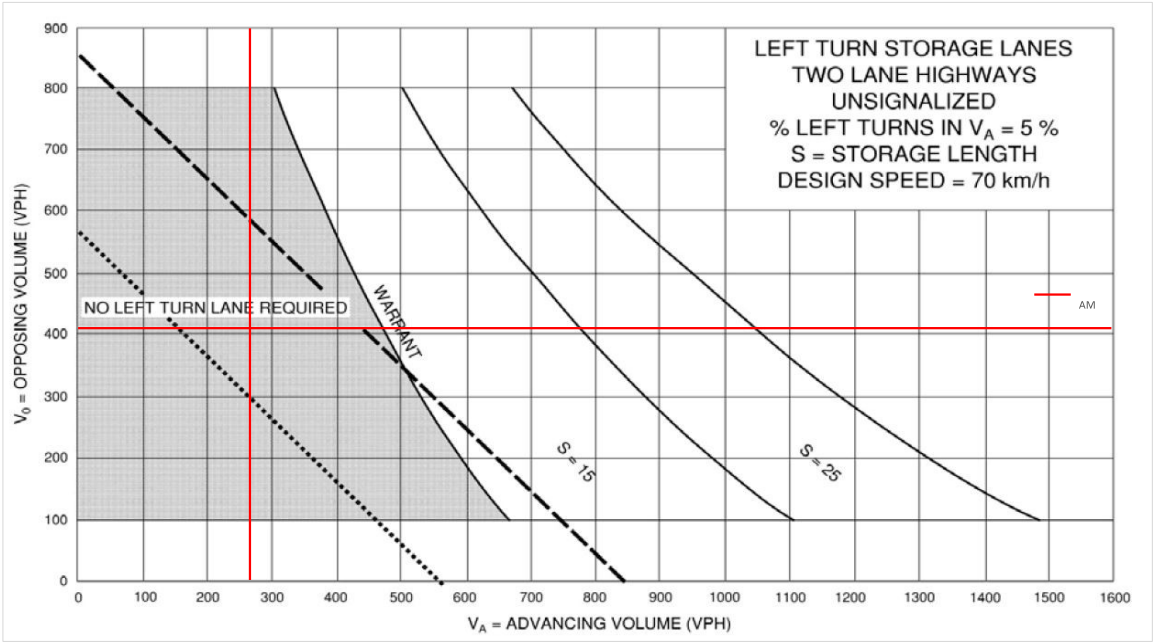
Future Total 2030 - Eastbound Left



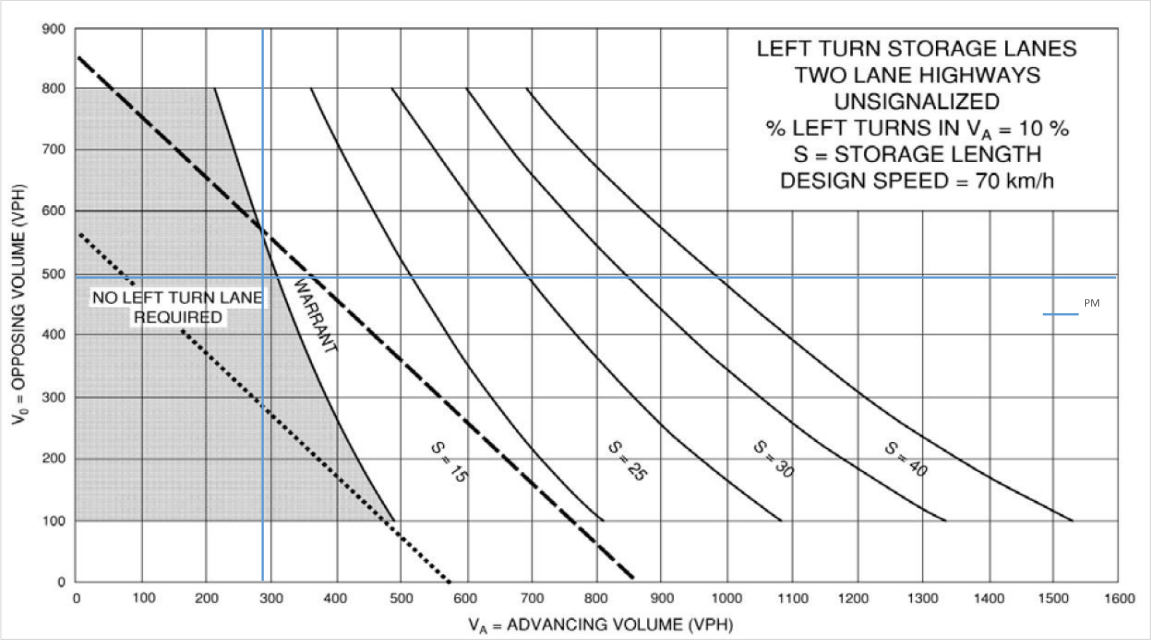
Future Total 2030 - Westbound Left



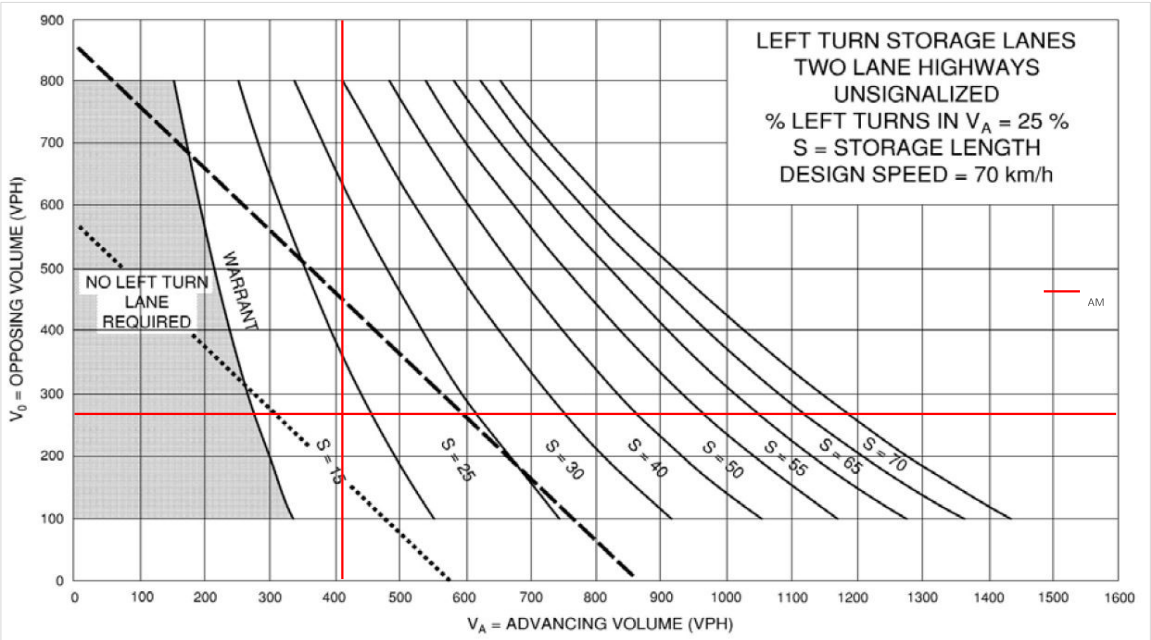
Future Total 2030 - Northbound Left



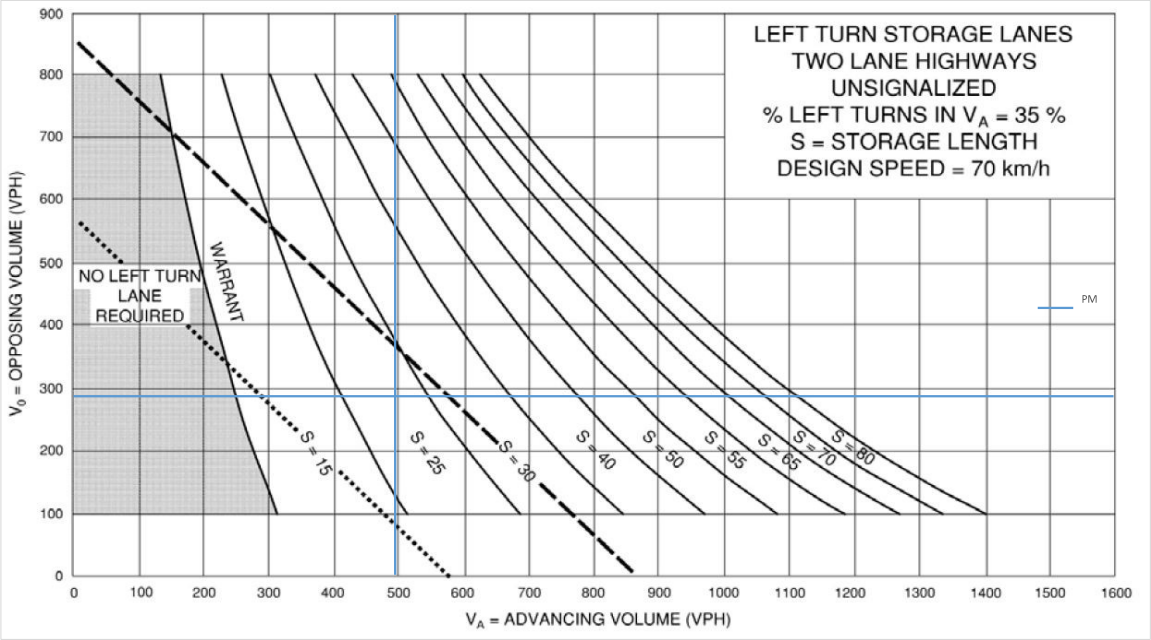
Future Total 2030 - Northbound Left



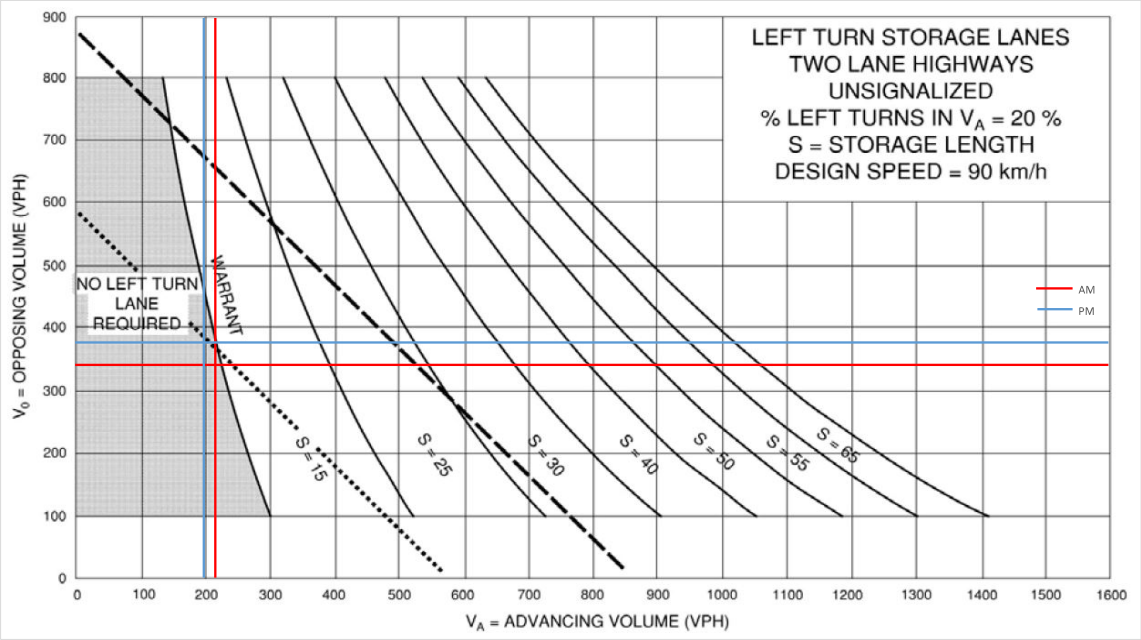
Future Total 2030 - Southbound Left



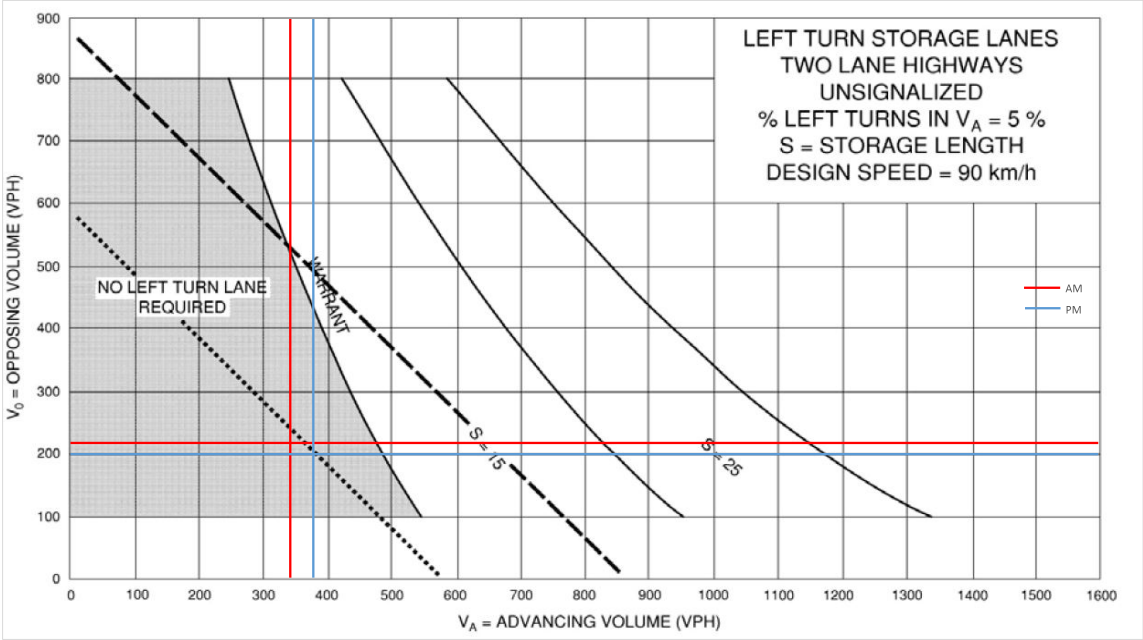
Future Total 2030 - Southbound Left



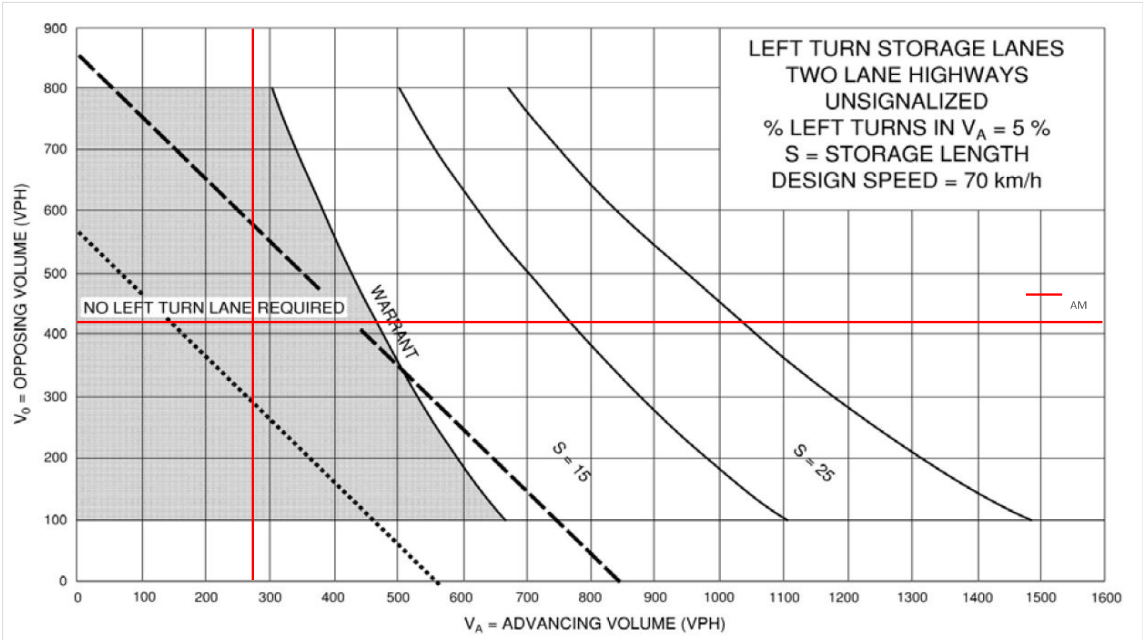
Future Total 2035 - Eastbound Left



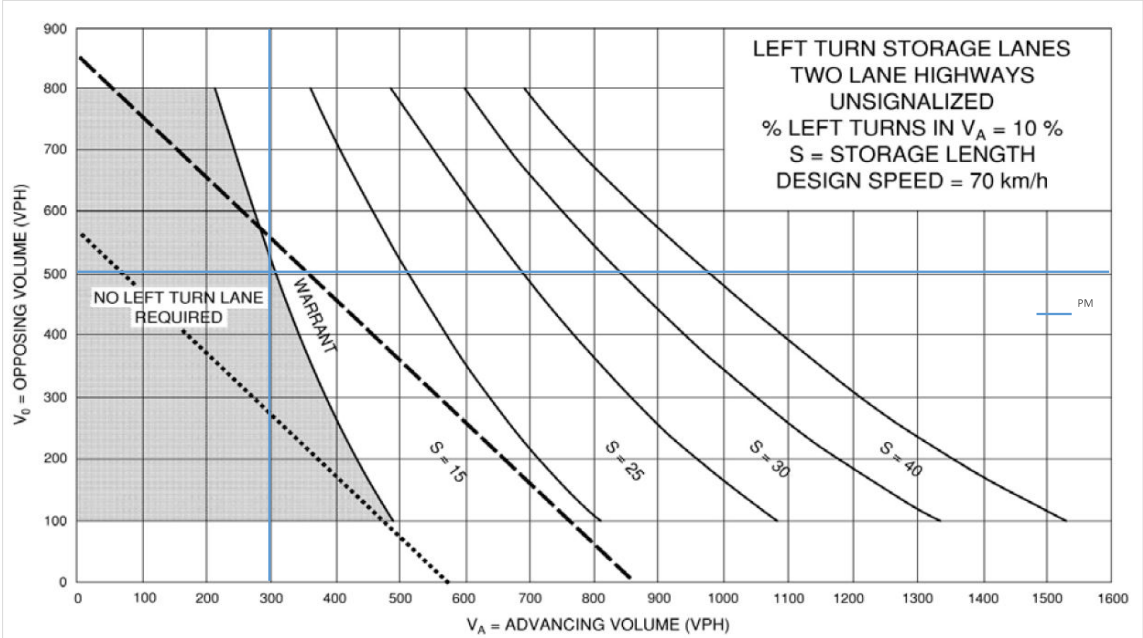
Future Total 2035 - Westbound Left



Future Total 2035 - Northbound Left



Future Total 2035 - Northbound Left



Shea Road at Cosanti Drive

Existing

Design Speed: Yes

50 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	39	0	19	0	0	0	5	225	0	0	101	11	67.2%	58	0
PM	22	0	11	0	0	0	19	169	0	0	114	39	66.7%	33	0

Future Background 2030

Design Speed: Yes

50 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	43	0	21	0	0	0	6	255	0	0	248	12	67.2%	64	0
PM	24	0	12	0	0	0	21	284	0	0	328	43	66.7%	36	0

Future Background 2035

Design Speed: Yes

50 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	43	0	21	0	0	0	6	278	0	0	296	12	67.2%	64	0
PM	24	0	12	0	0	0	21	331	0	0	358	43	66.7%	36	0

Future Total 2030

Design Speed: Yes

50 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	43	0	21	0	0	0	6	295	0	0	265	12	67.2%	64	0
PM	24	0	12	0	0	0	21	312	0	0	369	43	66.7%	36	0

Future Total 2035

Design Speed: Yes

50 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	43	0	21	0	0	0	6	318	0	0	313	12	67.2%	64	0
PM	24	0	12	0	0	0	21	359	0	0	399	43	66.7%	36	0

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	39	0	19	0	0	0	5	225	0	0	101	11	2.2%	230	112
	PM	22	0	11	0	0	0	19	169	0	0	114	39	10.1%	188	153

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	43	0	21	0	0	0	6	255	0	0	248	12	2.3%	261	260
	PM	24	0	12	0	0	0	21	284	0	0	328	43	6.9%	305	371

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	43	0	21	0	0	0	6	278	0	0	296	12	2.1%	284	308
	PM	24	0	12	0	0	0	21	331	0	0	358	43	6.0%	352	401

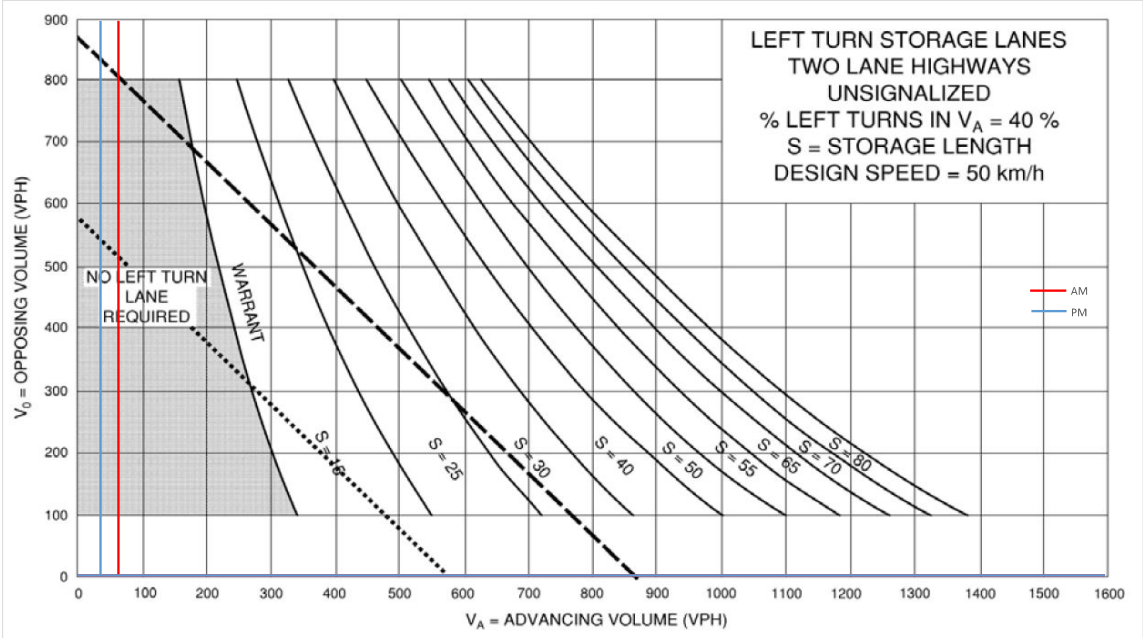
Future Total 2030

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	43	0	21	0	0	0	6	295	0	0	265	12	2.0%	301	277
	PM	24	0	12	0	0	0	21	312	0	0	369	43	6.3%	333	412

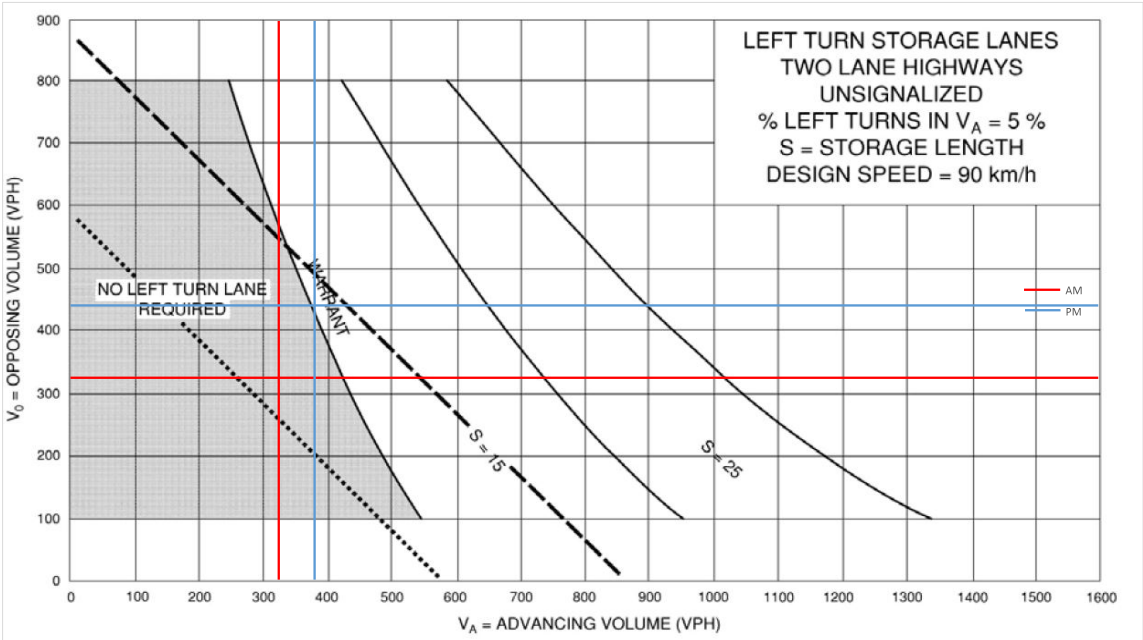
Future Total 2035

Design Speed																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	43	0	21	0	0	0	6	318	0	0	313	12	1.9%	324	325
	PM	24	0	12	0	0	0	21	359	0	0	399	43	5.5%	380	442

Future Total 2035 - Eastbound Left



Future Total 2035 - Northbound Left



Shea Road at Street 21

Future Total 2030

Design Speed	Yes															
50 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
AM	40	0	12				5	261	0	0	269	17	76.9%	52	0	
PM	28	0	8				12	305	0	0	340	41	77.8%	36	0	

Future Total 2035

Design Speed	Yes															
50 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
AM	40	0	12				5	284	0	0	317	17	76.9%	52	0	
PM	28	0	8				12	352	0	0	370	41	77.8%	36	0	

Future Total 2035 - Sensitivity

Design Speed																
50 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
AM	52	0	15	0	0	0	6	284	0	0	317	22	77.6%	67	0	
PM	36	0	10	0	0	0	15	352	0	0	370	52	78.3%	46	0	

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	40	0	12				5	261	0	0	269	17	1.9%	266	286
	PM	28	0	8				12	305	0	0	340	41	3.8%	317	381

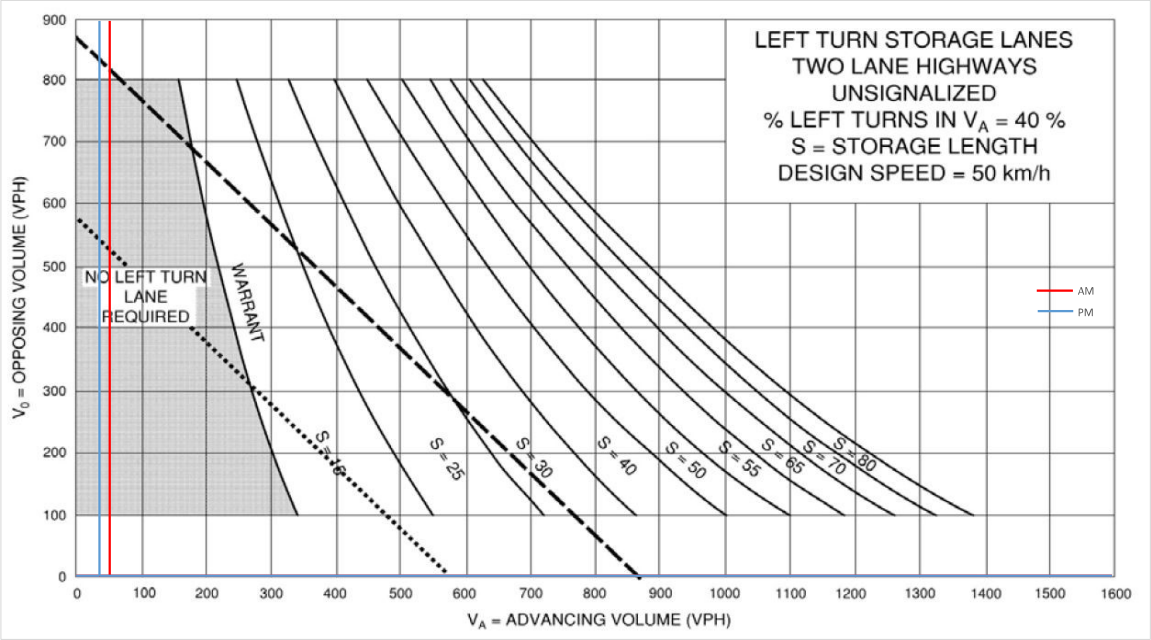
Future Total 2035

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	40	0	12				5	284	0	0	317	17	1.7%	289	334
	PM	28	0	8				12	352	0	0	370	41	3.3%	364	411

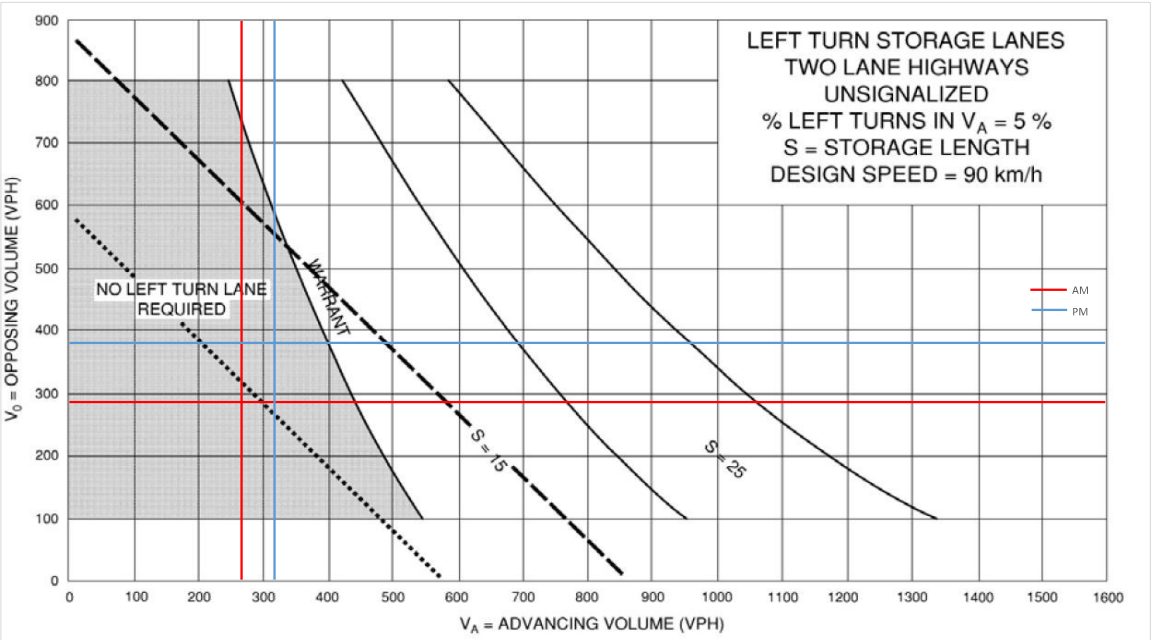
Future Total 2035 - Sensitivity

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	52	0	15	0	0	0	6	284	0	0	317	22	2.1%	290	339
	PM	36	0	10	0	0	0	15	352	0	0	370	52	4.1%	367	422

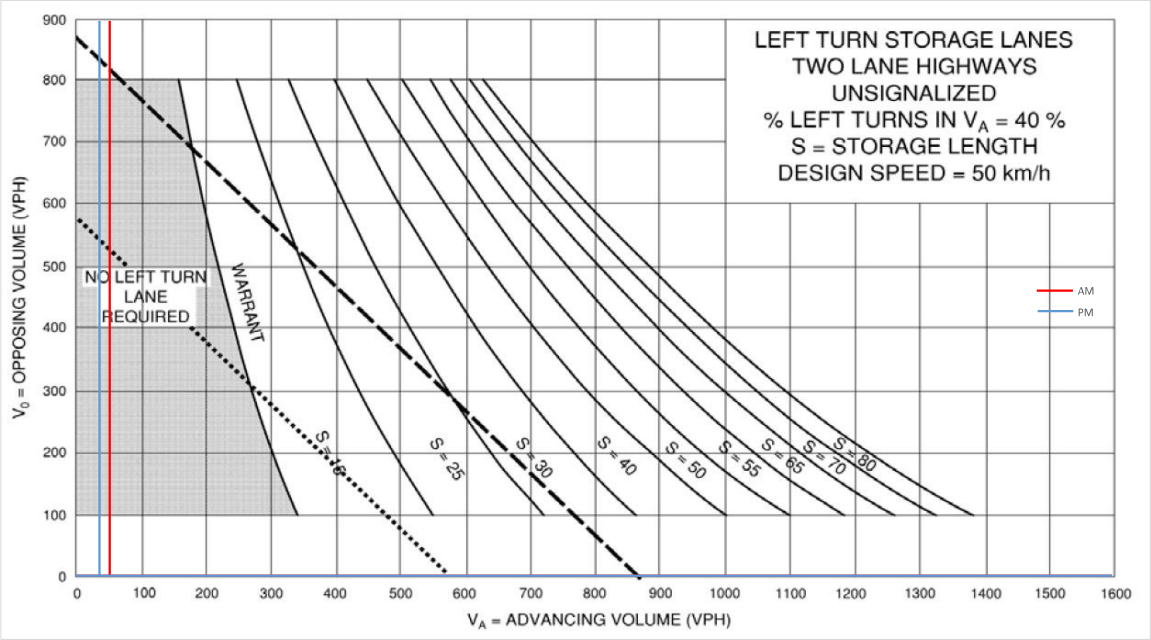
Future Total 2030 - Eastbound Left



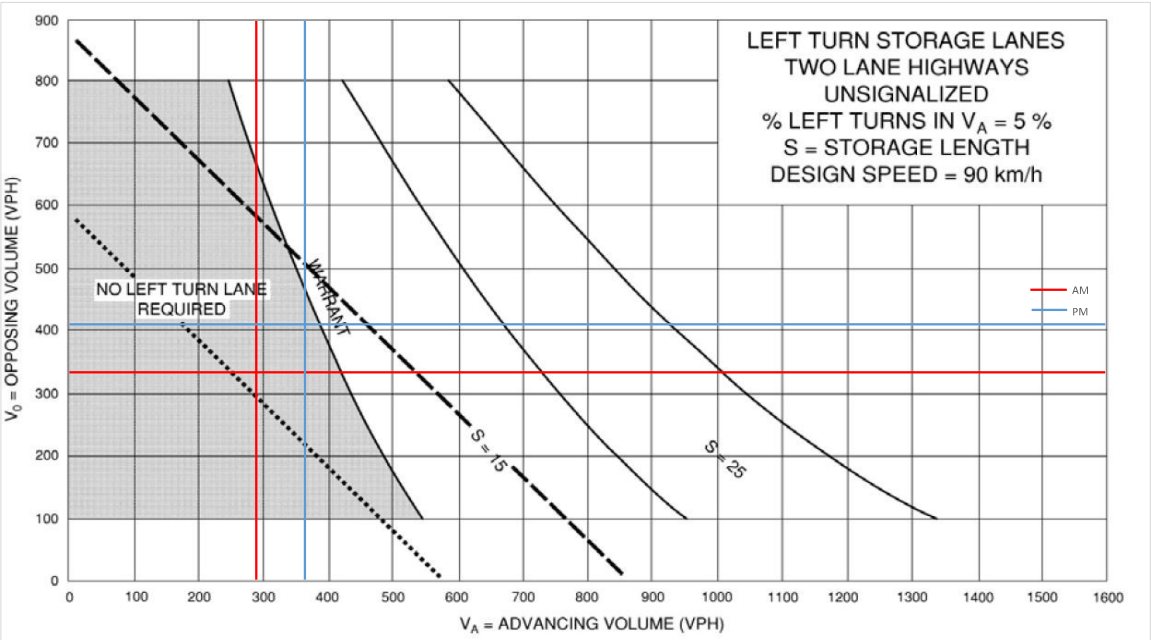
Future Total 2030 - Northbound Left



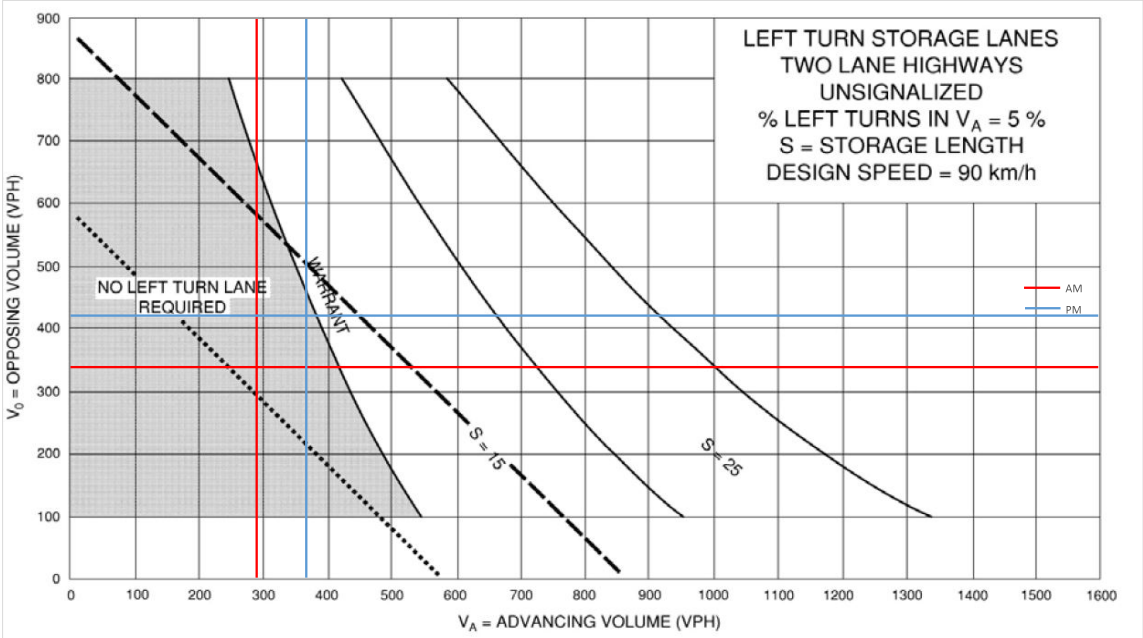
Future Total 2035 - Eastbound Left



Future Total 2035 - Northbound Left



Future Total 2035 - Sensitivity - Northbound Left



Flewellyn Road at Street 12

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	51	233	0	0	210	51	0	0	0	115	0	111	18.0%	284	261
PM	122	230	0	0	295	122	0	0	0	81	0	79	34.7%	352	417

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	51	233	0	0	220	51	0	0	0	115	0	111	18.0%	284	271
PM	122	241	0	0	295	122	0	0	0	81	0	79	33.6%	363	417

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	51	254	0	0	269	51	0	0	0	115	0	111	16.7%	305	320
PM	122	289	0	0	330	122	0	0	0	81	0	79	29.7%	411	452

Future Total 2030

Design Speed																
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	51	233	0	0	210	51	0	0	0	115	0	111	50.9%	226	0
	PM	122	230	0	0	295	122	0	0	0	81	0	79	50.6%	160	0

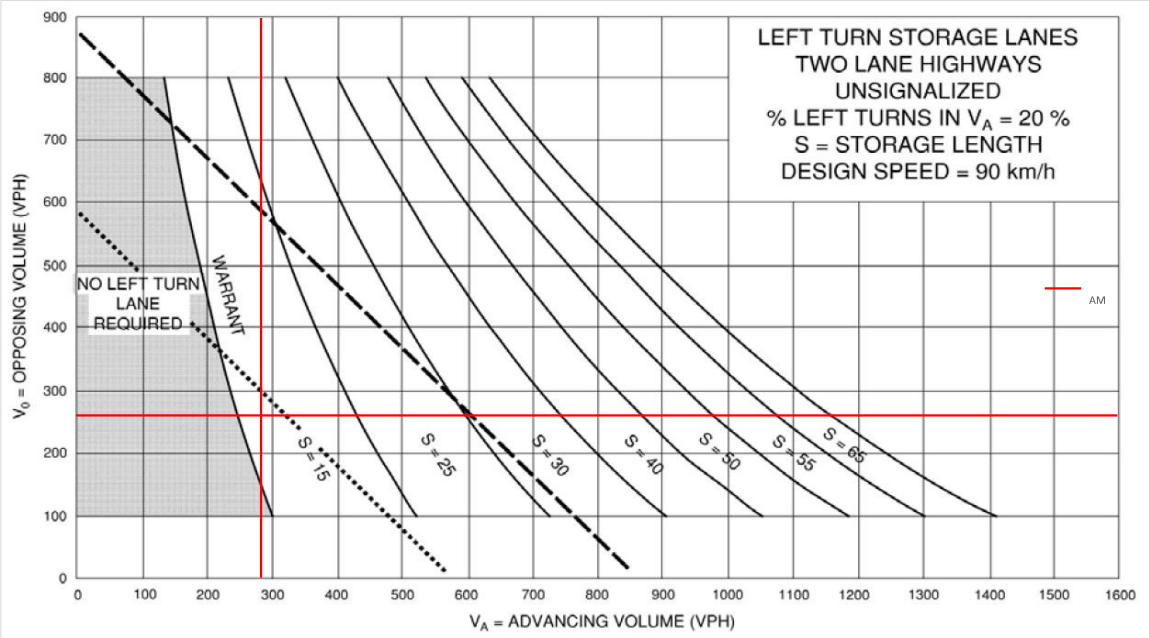
Future Total 2035

Design Speed																
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	51	233	0	0	220	51	0	0	0	115	0	111	50.9%	226	0
	PM	122	241	0	0	295	122	0	0	0	81	0	79	50.6%	160	0

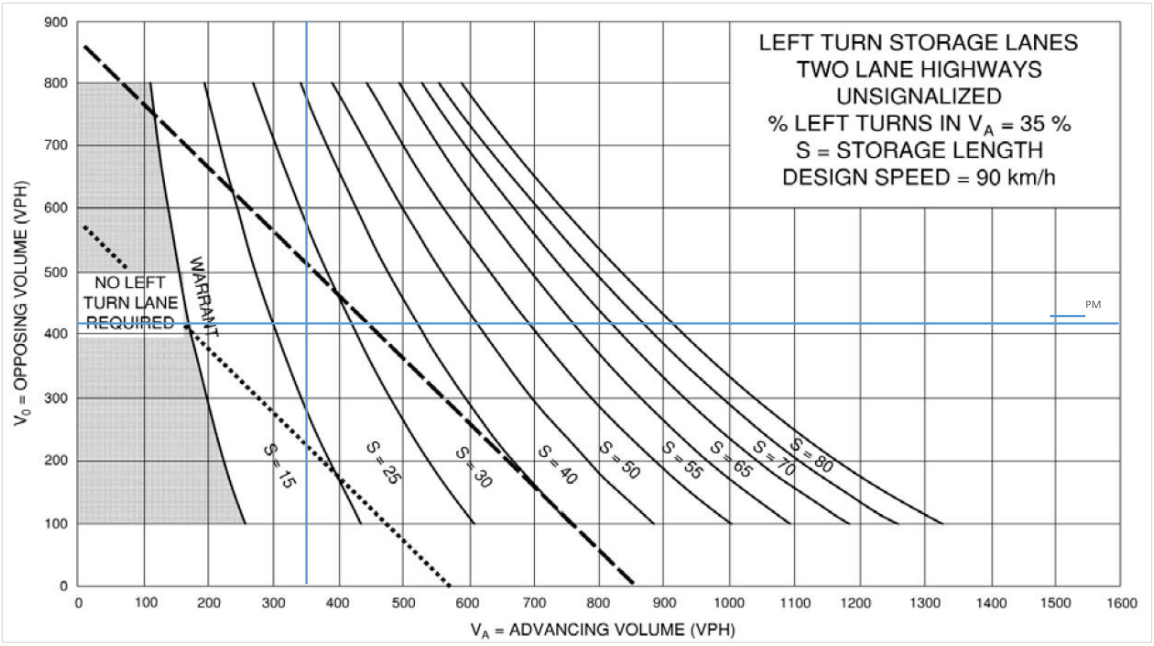
Future Total 2035 - Sensitivity

Design Speed																
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	51	254	0	0	269	51	0	0	0	115	0	111	50.9%	226	0
	PM	122	289	0	0	330	122	0	0	0	81	0	79	50.6%	160	0

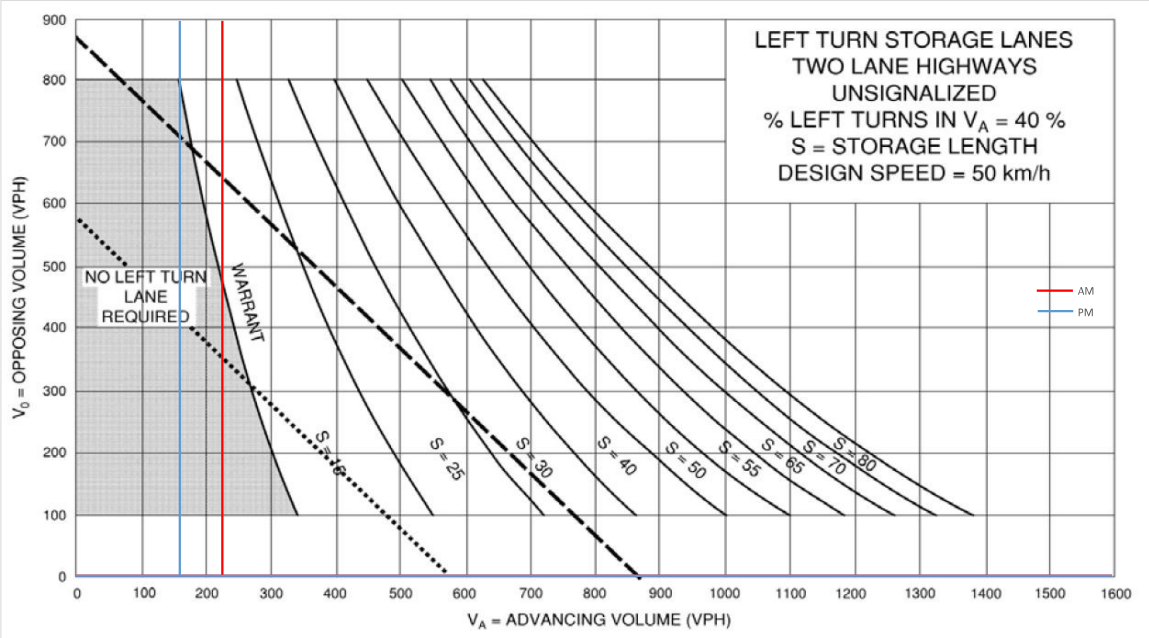
Future Total 2030 - Eastbound Left



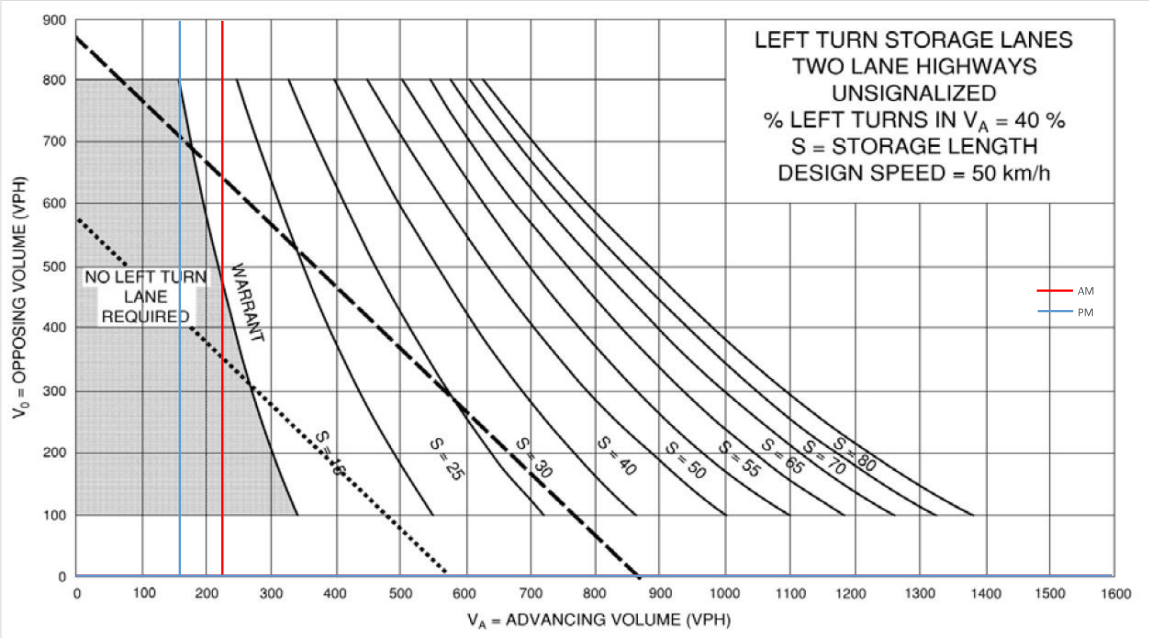
Future Total 2030 - Eastbound Left



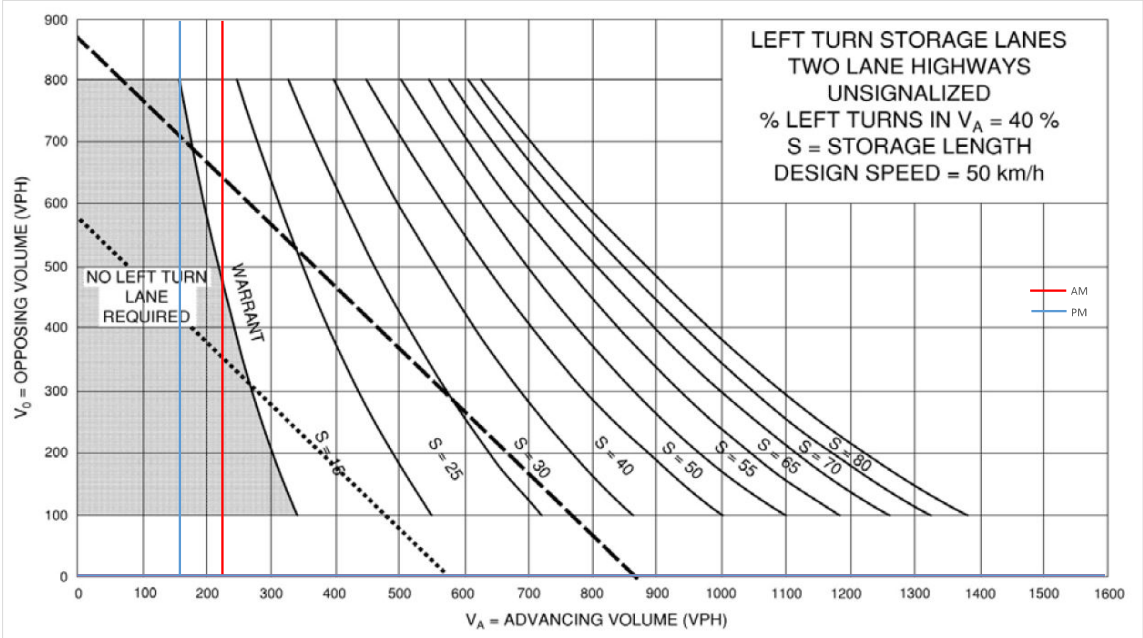
Future Total 2030 - Southbound Left



Future Total 2035 - Southbound Left



Future Total 2035 - Sensitivity - Southbound Left



Flewellyn Road at Street 16

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	22	326	0	0	202	24	0	0	0	59	0	59	6.3%	348	226
	PM	53	258	0	0	375	57	0	0	0	42	0	42	17.0%	311	432

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	22	326	0	0	212	24	0	0	0	59	0	59	6.3%	348	236
	PM	53	269	0	0	375	57	0	0	0	42	0	42	16.5%	322	432

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	43	326	0	0	212	46	0	0	0	110	0	108	11.7%	369	258
	PM	101	269	0	0	375	106	0	0	0	78	0	77	27.3%	370	481

Future Total 2030

Design Speed										Yes						
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	22	326	0	0	202	24	0	0	0	59	0	59	50.0%	118	0
	PM	53	258	0	0	375	57	0	0	0	42	0	42	50.0%	84	0

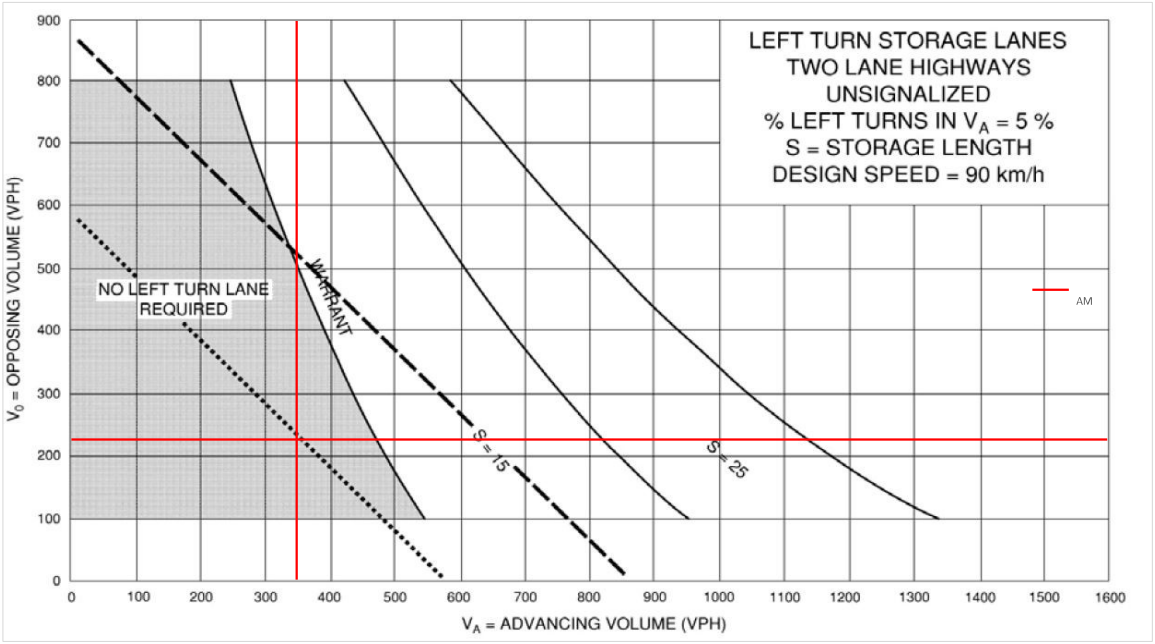
Future Total 2035

Design Speed										Yes						
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	22	326	0	0	212	24	0	0	0	59	0	59	50.0%	118	0
	PM	53	269	0	0	375	57	0	0	0	42	0	42	50.0%	84	0

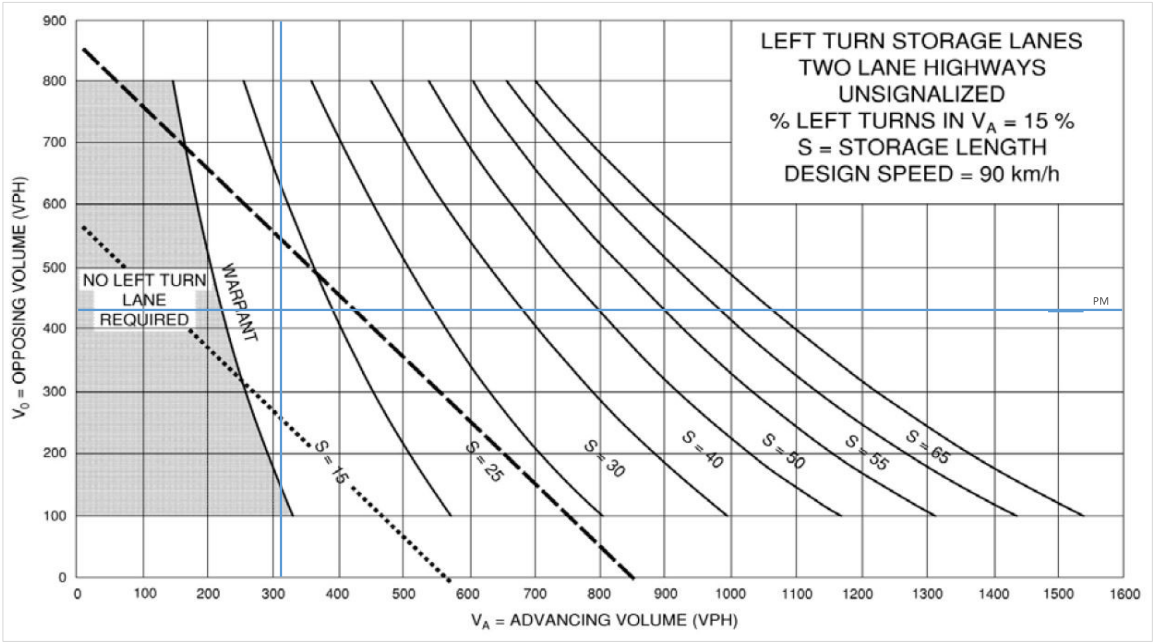
Future Total 2035 - Sensitivity

Design Speed										Yes						
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
	AM	43	326	0	0	212	46	0	0	0	110	0	108	50.5%	218	0
	PM	101	269	0	0	375	106	0	0	0	78	0	77	50.3%	155	0

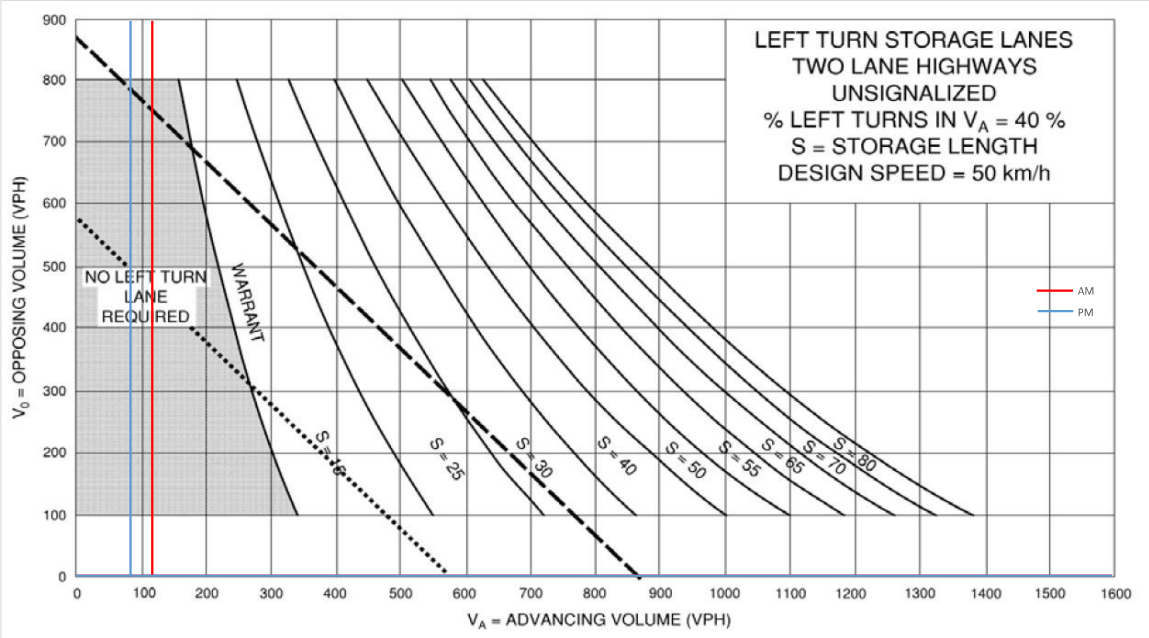
Future Total 2030 - Eastbound Left



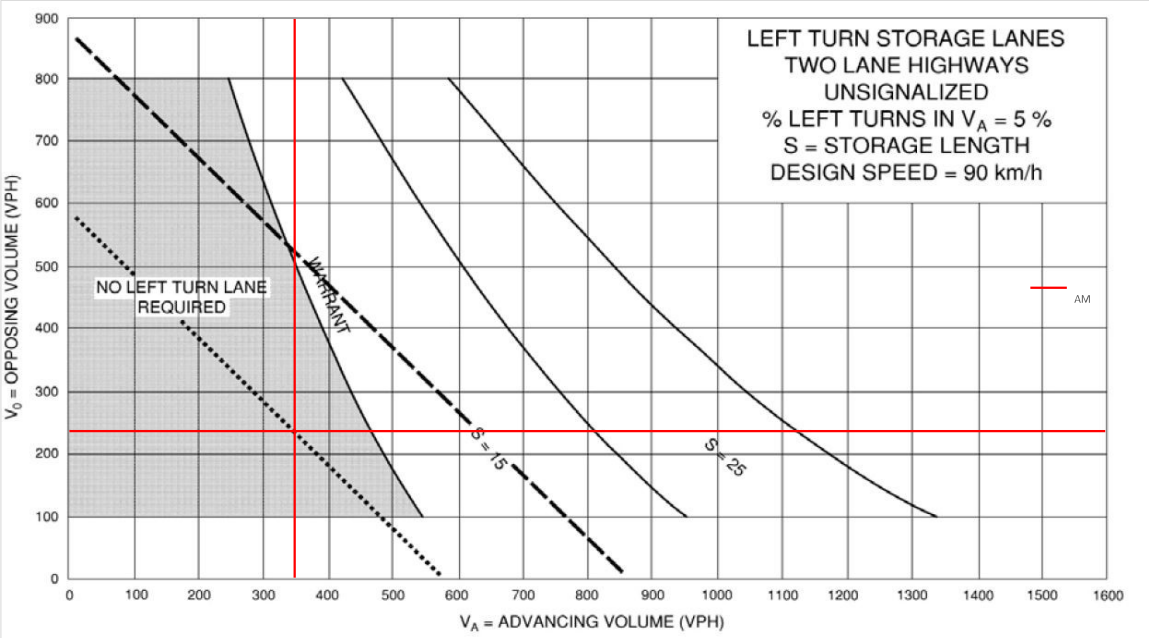
Future Total 2030 - Eastbound Left



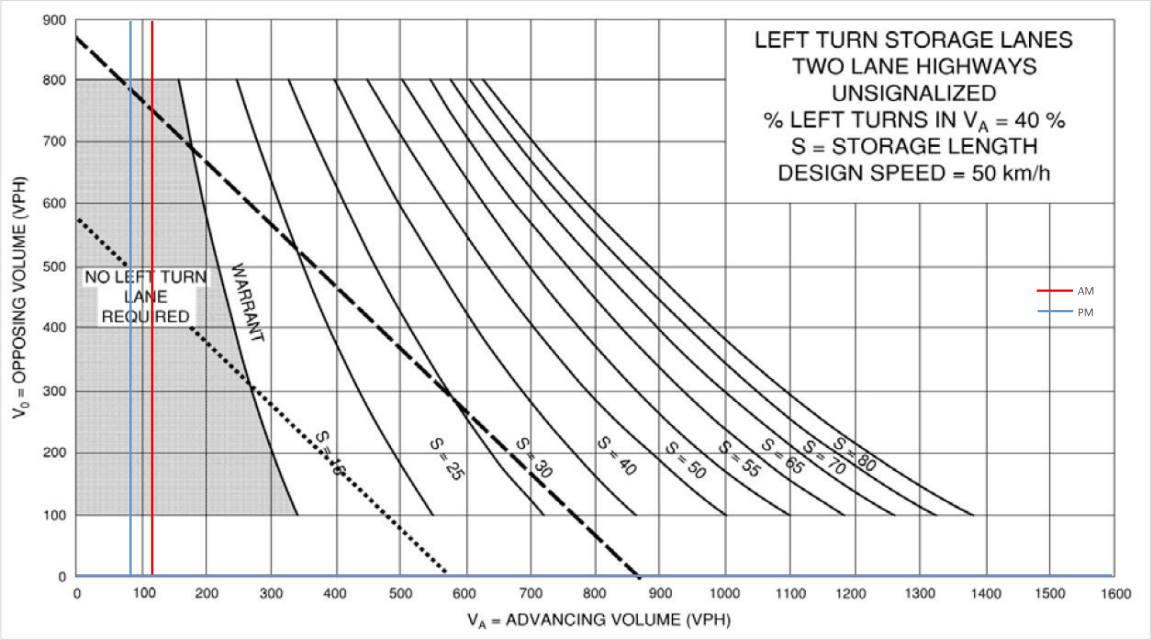
Future Total 2030 - Southbound Left



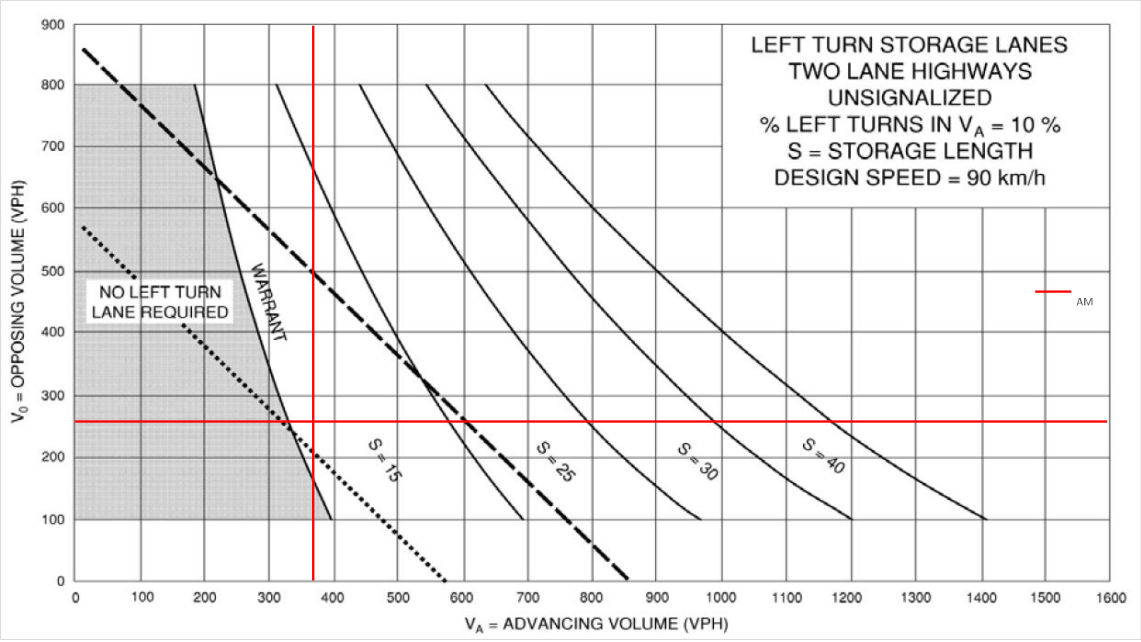
Future Total 2035 - Eastbound Left



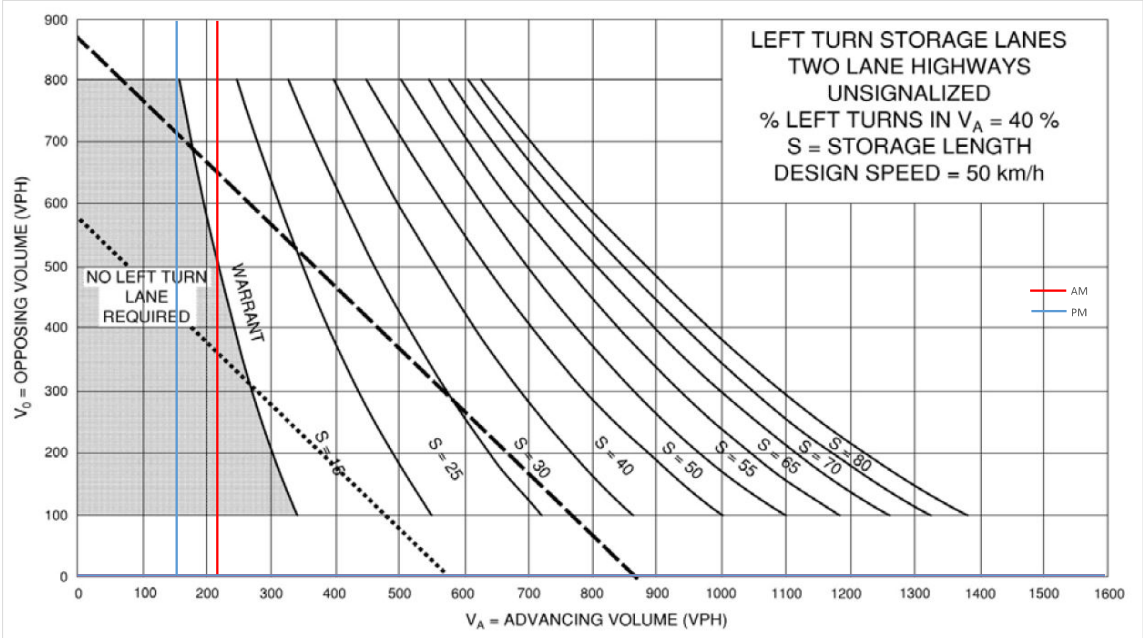
Future Total 2035 - Southbound Left



Future Total 2035 - Sensitivity - Eastbound Left



Future Total 2035 - Sensitivity - Southbound 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
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
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
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
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
11/28/2018	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
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
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
1/14/2022	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
4/4/2018	2018	20:24	FLEWELLYN RD btwn FORESTGROVE DR & POPLARWOOD AVE (__3ZA1X5)	06 - Strong wind	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
1/12/2019	2019	17:26	FLEWELLYN RD btwn FORESTGROVE DR & STITTSVILLE MAIN ST (__3ZA1CW)	01 - Clear	05 - Dusk	10 - No control	0	03 - P.D. only	99 - Other	03 - Loose snow	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
5/3/2018	2018	9:59	STITTSVILLE MAIN ST/HUNTLEY RD @ FLEWELLYN RD (0004602)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	02 - Wet	0	0	0	0
8/8/2018	2018	6:56	STITTSVILLE MAIN ST/HUNTLEY RD @ FLEWELLYN RD (0004602)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
10/29/2018	2018	18:01	STITTSVILLE MAIN ST/HUNTLEY RD @ FLEWELLYN RD (0004602)	02 - Rain	07 - Dark	02 - Stop sign	0	03 - P.D. only	05 - Turning movement	02 - Wet	0	0	0	0
1/20/2020	2020	10:22	STITTSVILLE MAIN ST/HUNTLEY RD @ FLEWELLYN RD (0004602)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	02 - Wet	0	0	0	0
3/9/2022	2022	12:54	STITTSVILLE MAIN ST/HUNTLEY RD @ FLEWELLYN RD (0004602)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: FLEWELLYN RD @ SHEA RD

Traffic Control: Stop sign **Total Collisions:** 20

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Mar-30, Thu,17:03	Clear	Angle	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Pick-up truck	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: FLEWELLYN RD @ SHEA RD

Traffic Control: Stop sign **Total Collisions:** 20

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Aug-18, Fri,18:57	Clear	SMV other	P.D. only	Dry	West	Turning left	Automobile, station wagon	Steel guide rail	0
2017-Oct-24, Tue,18:26	Clear	SMV other	P.D. only	Dry	South	Turning right	Automobile, station wagon	Ran off road	0
2017-Nov-05, Sun,14:18	Rain	Angle	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Apr-22, Sun,11:30	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-May-15, Tue,13:45	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2018-Jul-30, Mon,17:09	Clear	Angle	Non-fatal injury	Dry	South	Turning right	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Aug-31, Fri,17:29	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Nov-16, Fri,09:35	Snow	Rear end	P.D. only	Loose snow	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Nov-28, Wed,18:43	Clear	Angle	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jan-31, Thu,16:50	Clear	Angle	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Passenger van	Other motor vehicle	
2019-Mar-29, Fri,17:26	Clear	Angle	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-May-04, Sat,15:59	Clear	Angle	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jun-03, Mon,13:50	Rain	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Passenger van	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2017 **To:** December 31, 2021

Location: FLEWELLYN RD @ SHEA RD

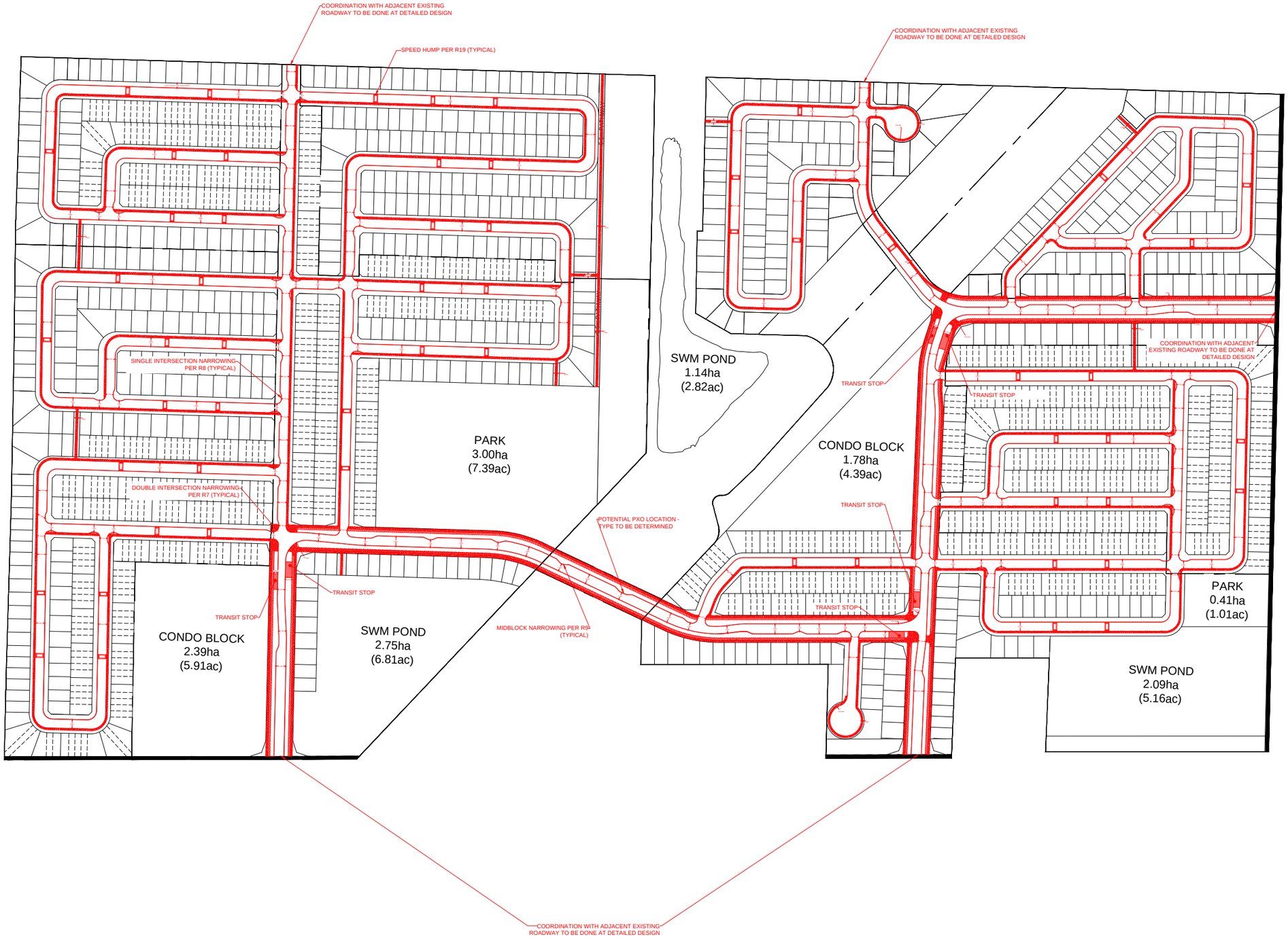
Traffic Control: Stop sign **Total Collisions:** 20

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Nov-07, Thu,07:51	Snow	Angle	P.D. only	Ice	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Feb-13, Thu,07:08	Snow	Angle	P.D. only	Wet	South	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Pick-up truck	Other motor vehicle	
2020-Nov-01, Sun,12:17	Rain	SMV other	P.D. only	Wet	South	Turning right	Pick-up truck	Skidding/sliding	0
2021-Jun-16, Wed,15:15	Clear	Angle	P.D. only	Dry	South	Turning left	Truck - dump	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2021-Sep-21, Tue,16:17	Clear	Angle	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2021-Oct-23, Sat,14:48	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

Appendix H

Conceptual Traffic Calming Plan

CGH TRANSPORTATION



Notes:

LEGEND:

CONCRETE SIDEWALK
2.00m ON COLLECTOR ROADS
1.80m ON LOCAL ROADS

2.00m ASPHALT CYCLE TRACK

Transit Stops

NOTES:

1. THIS TRAFFIC CALMING CONCEPT IS SUBJECT TO SERVICING AND ILLUSTRATES THE PHILOSOPHY OF THE 30KM/H TRAFFIC CALMING GUIDELINES.
2. CENTERLINE SHIFTS HAVE BEEN INCORPORATED ON THE COLLECTOR ROADS AS PER CITY COMMENTS, THIS WILL RESULT IN THE LOSS OF APPROXIMATELY 45m OF POTENTIAL PARKING OPPORTUNITY PER LATERAL SHIFT.

REV:	DESCRIPTION:	BY:	DATE:
02	Issued for Review	EA	2025-10-10
01	Issued for Review	BB	2025-03-03

STATUS:

CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT: Caivan Communities
3713 Borrisokane Road
Ottawa, ON
K2J 4J4

ARCHITECT:

SITE: Stittsville South Subdivision

TITLE: GRDD Redline

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2025-10-10	EA	AL
PROJECT NO:	DRAWING NO:		REVISION:
2025-005	001		02

Appendix I

MMLOS Analysis

Multi-Modal Level of Service - Segments Form

Consultant	**CGH Transportation Inc.**	**Project**	**5993, 6115, 6141, 6159 Flewellyn & 6070 Fernbank**
Scenario	**Existing/Future**	**Date**	**2025-10-28**
Comments			

SEGMENTS			Shea Road Ex	Shea Road Interim	Shea Road Ultimate	Flewellyn Road Ex	Flewellyn Road Fu	New Local Road Fu	New Collector Road Fu	Section 10
Pedestrian	Sidewalk Width Boulevard Width	**F**	no sidewalk n/a	≥ 2 m 0.5 - 2 m	≥ 2 m 0.5 - 2 m	no sidewalk n/a		≥ 2 m < 0.5	≥ 2 m 0.5 - 2 m	
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000	≤ 3000		≤ 3000	≤ 3000	
	Operating Speed On-Street Parking		> 60 km/h no	> 60 km/h no	> 60 km/h no	> 60 km/h no		≤ 30 km/h yes	> 30 to 50 km/h yes	
	Exposure to Traffic PLoS		**F**	**E**	**E**	**F**	**-**	**A**	**A**	**-**
	Effective Sidewalk Width									
	Pedestrian Volume									
	Crowding PLoS		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Level of Service		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Bicycle	Type of Cycling Facility	**F**	Mixed Traffic		Physically Separated	Curbside Bike Lane		Mixed Traffic	Physically Separated	
	Number of Travel Lanes		2-3 lanes total			≤ 1 each direction		2-3 lanes total		
	Operating Speed		≥ 60 km/h			> 70 km/h		≤ 40 km/h		
	# of Lanes & Operating Speed LoS		**F**	**-**	**-**	**E**	**-**	**B**	**-**	**-**
	Bike Lane (+ Parking Lane) Width									
	Bike Lane Width LoS		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	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		**-**	**-**	**A**	**-**	**-**	**-**	**A**	**-**
	Level of Service		**F**	**-**	**A**	**-**	**-**	**-**	**A**	**-**
Transit	Facility Type	**D**		Mixed Traffic	Mixed Traffic		Mixed Traffic		Mixed Traffic	
	Friction or Ratio Transit:Posted Speed			Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8		Vt/Vp ≥ 0.8		Vt/Vp ≥ 0.8	
	Level of Service		**-**	**D**	**D**	**-**	**D**	**-**	**D**	**-**
Truck	Truck Lane Width	**-**								
	Travel Lanes per Direction									
	Level of Service		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Auto	**Level of Service**	**Not Applicable**								

Appendix J

TDM Checklist

CGH TRANSPORTATION

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 K

TRANS Model

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

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

STITTSVILLE

STANLEY CORNERS

David Manchester Rd

Fernbank Road

Flewellyn Road

Shea Road

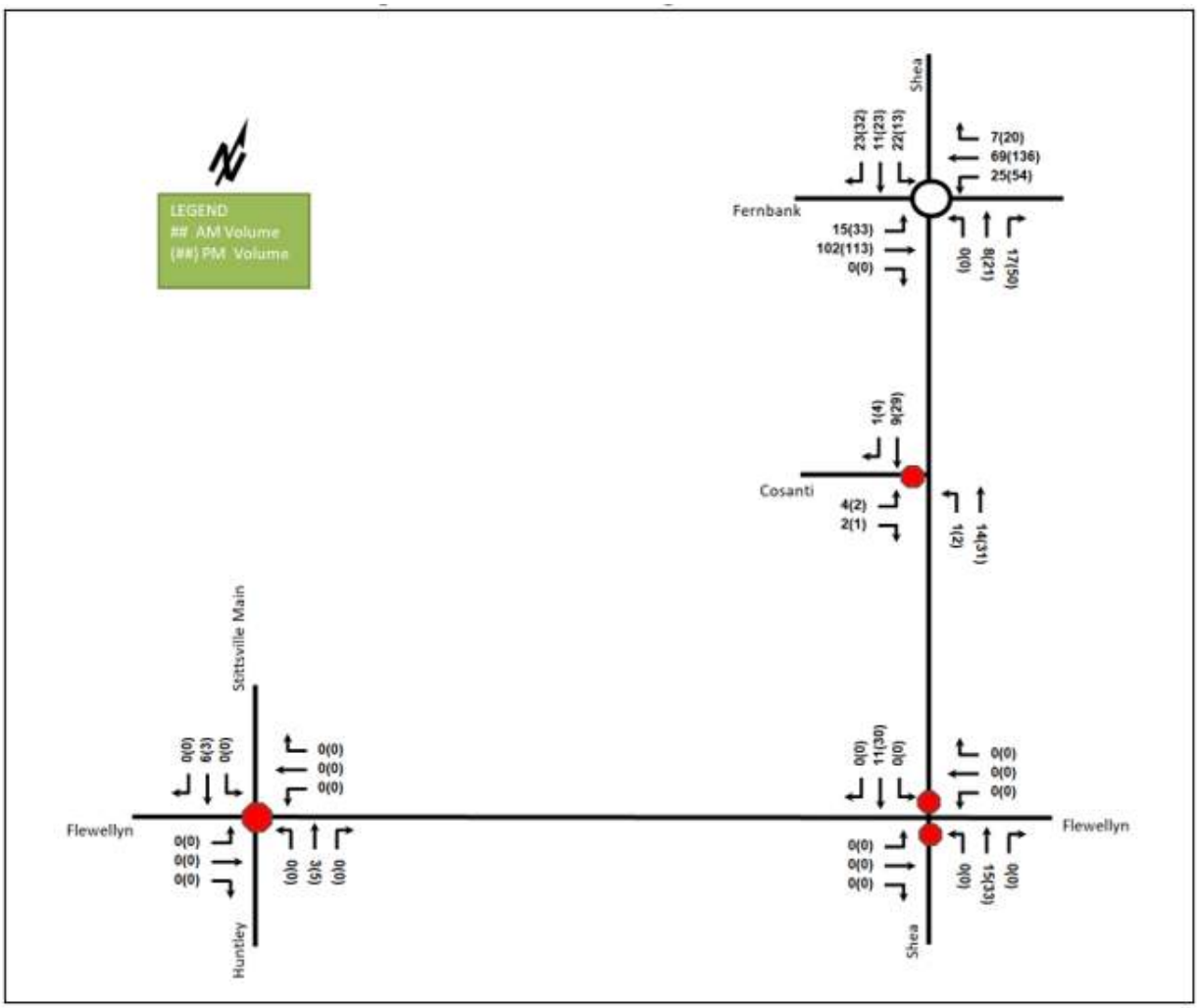
Highway 7

Appendix L

Background Development

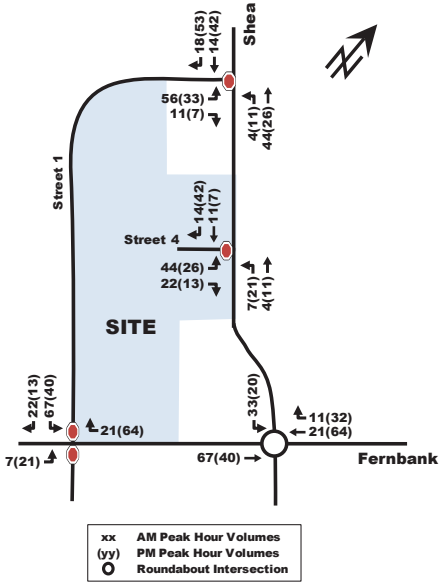
CGH TRANSPORTATION

Figure K1: Total Background Development Volumes

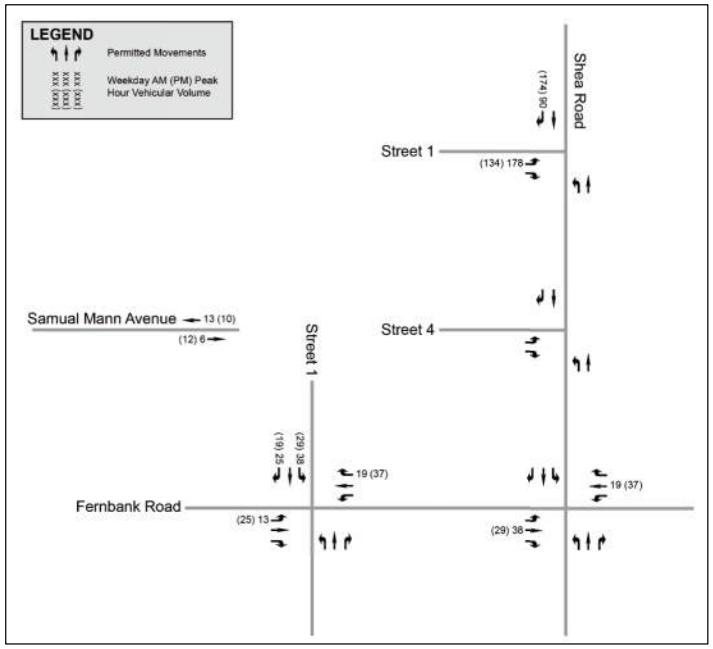


5957 & 5969 Fernbank Road

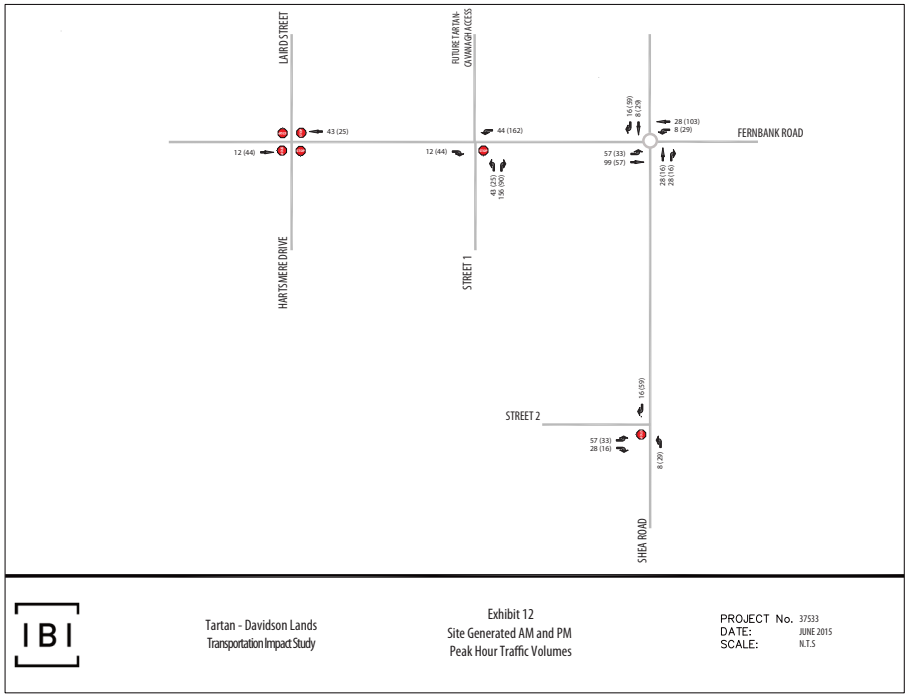
Figure 3: Total 'New' Auto Trips



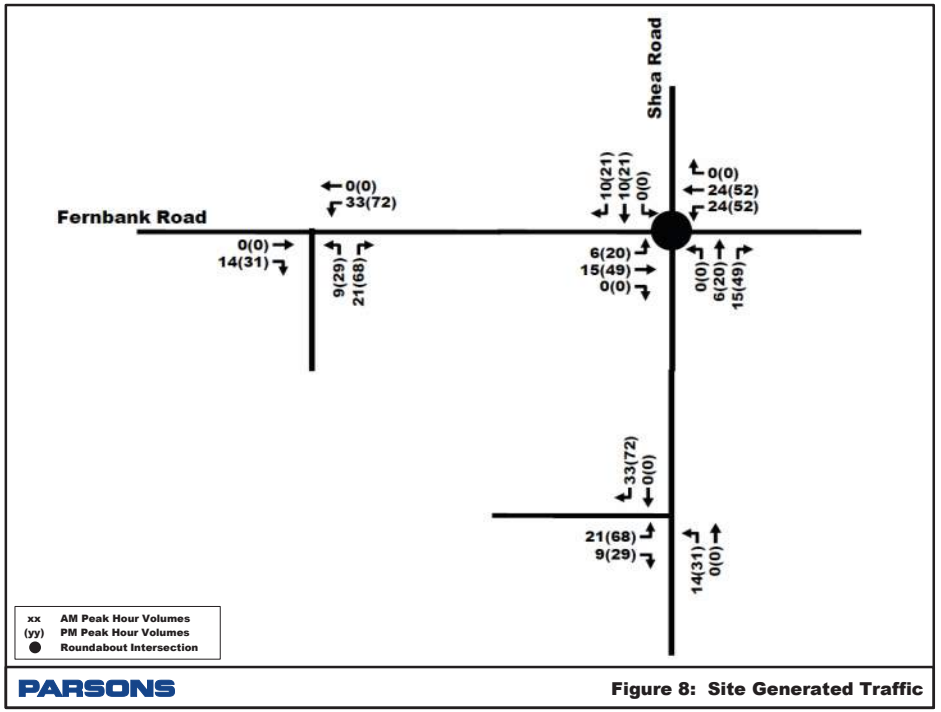
6041 Fernbank Road



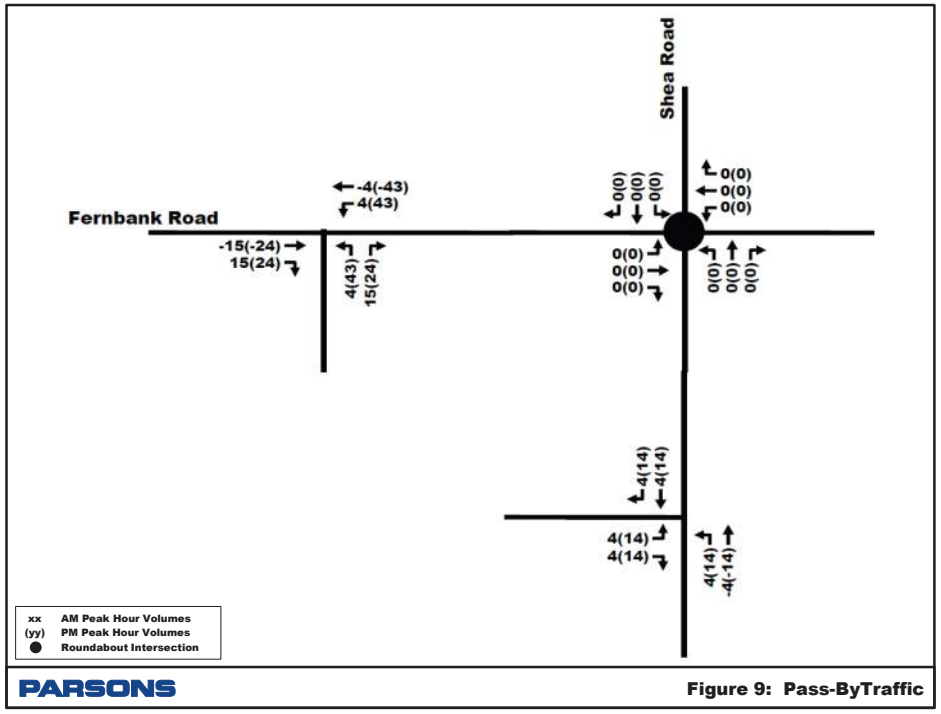
5993 Flewellyn Road



5960 Fernbank Road



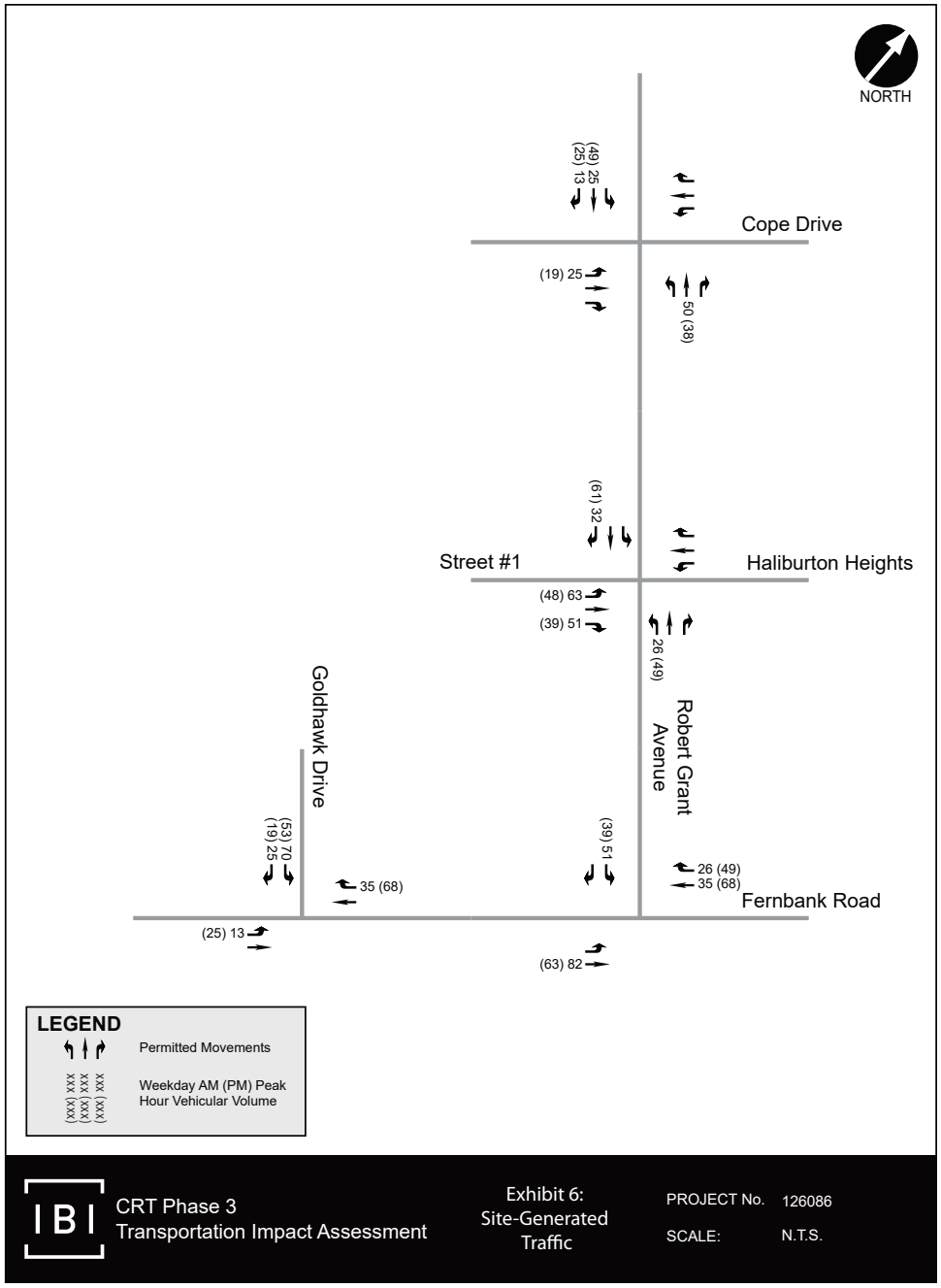
5960 Fernbank Road



PARSONS

Figure 9: Pass-ByTraffic

5725 Fernbank Road



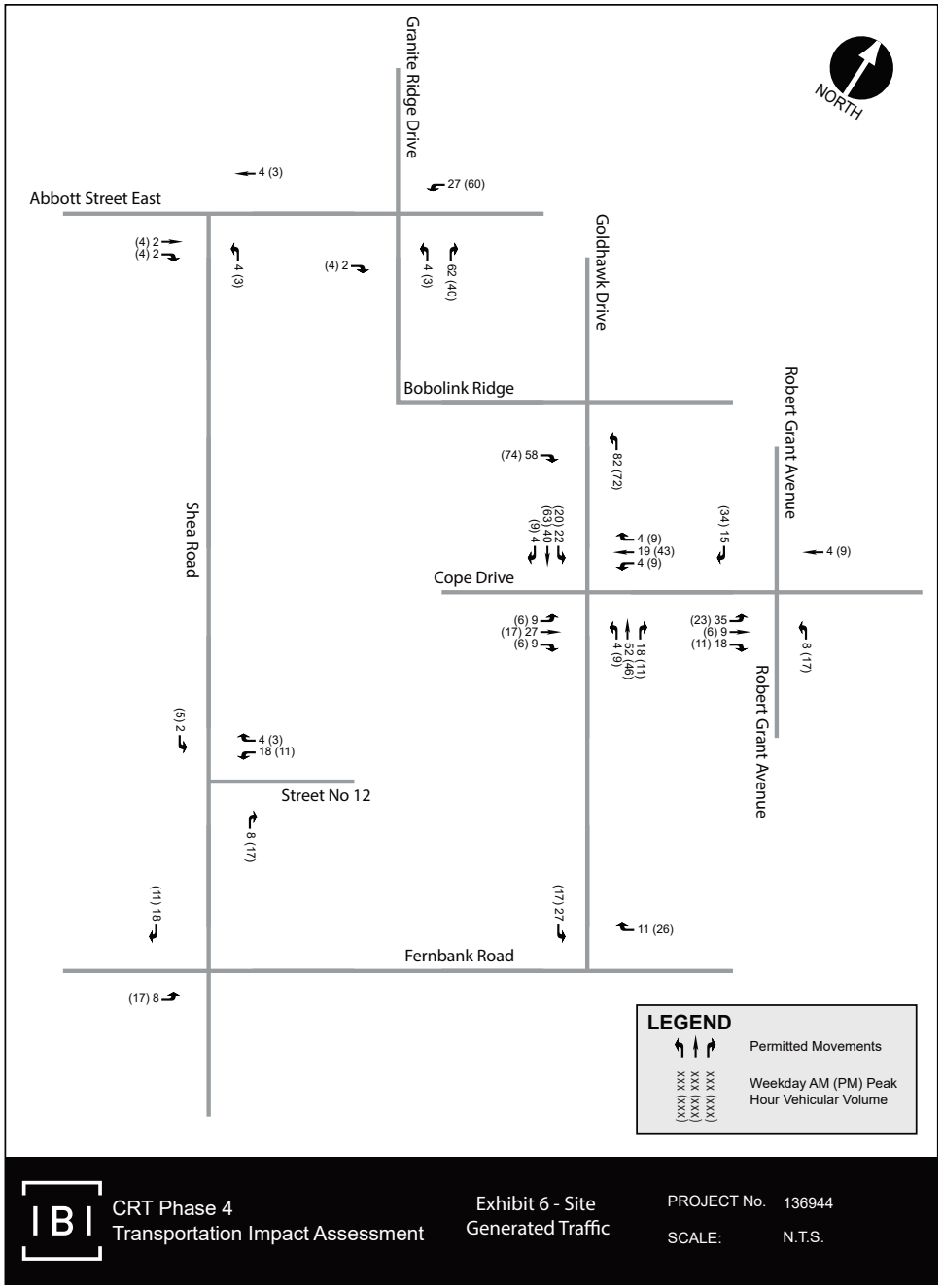
IBI

CRT Phase 3
Transportation Impact Assessment

Exhibit 6:
Site-Generated Traffic

PROJECT No. 126086

SCALE: N.T.S.



IBI

CRT Phase 4
Transportation Impact Assessment

Exhibit 6 - Site Generated Traffic

PROJECT No. 136944

SCALE: N.T.S.

Appendix M

Synchro and Sidra Intersection Worksheets – 2030 Future Background Conditions

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	0.579	18.5	LOS C	3.3	24.8	0.81	0.90	1.22	42.5
2	T1	All MCs	195	5.0	195	5.0	0.579	18.3	LOS C	3.3	24.8	0.81	0.90	1.22	43.2
3	R2	All MCs	92	13.0	92	13.0	0.579	19.9	LOS C	3.3	24.8	0.81	0.90	1.22	42.8
Approach			305	7.5	305	7.5	0.579	18.8	LOS C	3.3	24.8	0.81	0.90	1.22	43.0
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.551	13.1	LOS B	4.2	30.5	0.75	0.75	1.10	45.3
5	T1	All MCs	265	4.0	265	4.0	0.551	13.0	LOS B	4.2	30.5	0.75	0.75	1.10	46.0
6	R2	All MCs	75	2.0	75	2.0	0.551	12.7	LOS B	4.2	30.5	0.75	0.75	1.10	45.8
Approach			427	3.9	427	3.9	0.551	13.0	LOS B	4.2	30.5	0.75	0.75	1.10	45.8
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.578	12.1	LOS B	5.3	38.8	0.73	0.66	1.03	45.5
8	T1	All MCs	166	7.0	166	7.0	0.578	12.4	LOS B	5.3	38.8	0.73	0.66	1.03	46.2
9	R2	All MCs	222	5.0	222	5.0	0.578	12.2	LOS B	5.3	38.8	0.73	0.66	1.03	45.9
Approach			519	5.4	519	5.4	0.578	12.2	LOS B	5.3	38.8	0.73	0.66	1.03	45.9
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.824	24.7	LOS C	17.2	124.1	1.00	1.23	2.17	39.3
11	T1	All MCs	401	3.0	401	3.0	0.824	24.6	LOS C	17.2	124.1	1.00	1.23	2.17	39.9
12	R2	All MCs	33	3.0	33	3.0	0.824	24.6	LOS C	17.2	124.1	1.00	1.23	2.17	39.7
Approach			739	3.4	739	3.4	0.824	24.7	LOS C	17.2	124.1	1.00	1.23	2.17	39.6
All Vehicles			1990	4.6	1990	4.6	0.824	18.0	LOS C	17.2	124.1	0.85	0.93	1.50	42.9

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

Organisation: CGH TRANSPORTATION | Licence: NETWORK / FLOATING | Processed: Tuesday, December 17, 2024 11:14:16 AM
Project: C:\Users\MichelleChen\CGH TRANSPORTATION\CGH Active Projects - Documents\2021\2021-128 Caivan Flewellyn\DATA\W-4 Report\Sidra - W-4 Report\2021-128 Shea Road at Fernbank Road - 2024-12-13.sip9

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	38	155	15	7	125	29	17	232	12	39	259	53
Future Vol, veh/h	38	155	15	7	125	29	17	232	12	39	259	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	155	15	7	125	29	17	232	12	39	259	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	12.2	11.3	13.3	14.7
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	18%	4%	11%
Vol Thru, %	89%	75%	78%	74%
Vol Right, %	5%	7%	18%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	261	208	161	351
LT Vol	17	38	7	39
Through Vol	232	155	125	259
RT Vol	12	15	29	53
Lane Flow Rate	261	208	161	351
Geometry Grp	1	1	1	1
Degree of Util (X)	0.427	0.345	0.268	0.533
Departure Headway (Hd)	5.894	5.968	5.982	5.462
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	608	599	596	656
Service Time	3.968	4.046	4.065	3.528
HCM Lane V/C Ratio	0.429	0.347	0.27	0.535
HCM Control Delay	13.3	12.2	11.3	14.7
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.1	1.5	1.1	3.2

Intersection	
Int Delay, s/veh	10.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	60	125	26	2	92	17	8	184	13	25	193	51
Future Vol, veh/h	60	125	26	2	92	17	8	184	13	25	193	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	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	125	26	2	92	17	8	184	13	25	193	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	109	0	0	151	0	0	485	371	138	462	376	101
Stage 1	-	-	-	-	-	-	258	258	-	105	105	-
Stage 2	-	-	-	-	-	-	227	113	-	357	271	-
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	1451	-	-	1430	-	-	475	554	910	510	554	938
Stage 1	-	-	-	-	-	-	723	689	-	901	806	-
Stage 2	-	-	-	-	-	-	752	796	-	661	683	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1451	-	-	1430	-	-	311	529	910	355	529	938
Mov Cap-2 Maneuver	-	-	-	-	-	-	311	529	-	355	529	-
Stage 1	-	-	-	-	-	-	690	658	-	860	805	-
Stage 2	-	-	-	-	-	-	540	795	-	448	652	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0.1	16	17.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	529	1451	-	-	1430	-	-	549
HCM Lane V/C Ratio	0.388	0.041	-	-	0.001	-	-	0.49
HCM Control Delay (s)	16	7.6	0	-	7.5	0	-	17.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.8	0.1	-	-	0	-	-	2.7

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰			↰	↱	
Traffic Vol, veh/h	43	21	6	255	248	12
Future Vol, veh/h	43	21	6	255	248	12
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	5	3	2
Mvmt Flow	43	21	6	255	248	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	521	254	260	0	-	0
Stage 1	254	-	-	-	-	-
Stage 2	267	-	-	-	-	-
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	516	785	1304	-	-	-
Stage 1	788	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	513	785	1304	-	-	-
Mov Cap-2 Maneuver	513	-	-	-	-	-
Stage 1	784	-	-	-	-	-
Stage 2	778	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1304	-	579	-	-
HCM Lane V/C Ratio	0.005	-	0.111	-	-
HCM Control Delay (s)	7.8	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

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	0.535	14.3	LOS B	3.4	24.5	0.77	0.81	1.11	44.8
2	T1	All MCs	217	3.0	217	3.0	0.535	14.3	LOS B	3.4	24.5	0.77	0.81	1.11	45.5
3	R2	All MCs	99	6.0	99	6.0	0.535	14.8	LOS B	3.4	24.5	0.77	0.81	1.11	45.1
Approach			346	3.9	346	3.9	0.535	14.5	LOS B	3.4	24.5	0.77	0.81	1.11	45.3
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.883	32.4	LOS D	24.3	175.5	1.00	1.50	2.66	36.8
5	T1	All MCs	551	3.0	551	3.0	0.883	31.9	LOS D	24.3	175.5	1.00	1.50	2.66	37.4
6	R2	All MCs	115	2.0	115	2.0	0.883	31.8	LOS D	24.3	175.5	1.00	1.50	2.66	37.2
Approach			796	3.7	796	3.7	0.883	31.9	LOS D	24.3	175.5	1.00	1.50	2.66	37.3
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.725	23.1	LOS C	6.4	46.2	0.89	1.04	1.60	40.3
8	T1	All MCs	251	2.0	251	2.0	0.725	23.1	LOS C	6.4	46.2	0.89	1.04	1.60	40.9
9	R2	All MCs	144	9.0	144	9.0	0.725	24.3	LOS C	6.4	46.2	0.89	1.04	1.60	40.5
Approach			455	4.2	455	4.2	0.725	23.5	LOS C	6.4	46.2	0.89	1.04	1.60	40.7
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.782	22.2	LOS C	12.6	90.5	0.94	1.11	1.91	40.8
11	T1	All MCs	495	3.0	495	3.0	0.782	22.0	LOS C	12.6	90.5	0.94	1.11	1.91	41.4
12	R2	All MCs	34	3.0	34	3.0	0.782	22.0	LOS C	12.6	90.5	0.94	1.11	1.91	41.2
Approach			662	3.4	662	3.4	0.782	22.1	LOS C	12.6	90.5	0.94	1.11	1.91	41.3
All Vehicles			2259	3.7	2259	3.7	0.883	24.7	LOS C	24.3	175.5	0.93	1.19	1.99	40.2

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

Organisation: CGH TRANSPORTATION | Licence: NETWORK / FLOATING | Processed: Tuesday, December 17, 2024 11:14:17 AM
Project: C:\Users\MichelleChen\CGH TRANSPORTATION\CGH Active Projects - Documents\2021\2021-128 Caivan Flewellyn\DATA\W-4 Report\Sidra - W-4 Report\2021-128 Shea Road at Fernbank Road - 2024-12-13.sip9

Intersection	
Intersection Delay, s/veh	14.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	110	14	6	181	71	27	234	14	33	272	47
Future Vol, veh/h	44	110	14	6	181	71	27	234	14	33	272	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	110	14	6	181	71	27	234	14	33	272	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	12.1	13.5	14	15.7
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	26%	2%	9%
Vol Thru, %	85%	65%	70%	77%
Vol Right, %	5%	8%	28%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	275	168	258	352
LT Vol	27	44	6	33
Through Vol	234	110	181	272
RT Vol	14	14	71	47
Lane Flow Rate	275	168	258	352
Geometry Grp	1	1	1	1
Degree of Util (X)	0.457	0.297	0.431	0.554
Departure Headway (Hd)	5.985	6.37	6.013	5.792
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	564	601	627
Service Time	4.002	4.398	4.028	3.792
HCM Lane V/C Ratio	0.455	0.298	0.429	0.561
HCM Control Delay	14	12.1	13.5	15.7
HCM Lane LOS	B	B	B	C
HCM 95th-tile Q	2.4	1.2	2.2	3.4

Intersection	
Int Delay, s/veh	14.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	59	107	11	2	166	33	16	213	17	14	255	71
Future Vol, veh/h	59	107	11	2	166	33	16	213	17	14	255	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	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	59	107	11	2	166	33	16	213	17	14	255	71

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	199	0	0	118	0	0	581	434	113	533	423	183
Stage 1	-	-	-	-	-	-	231	231	-	187	187	-
Stage 2	-	-	-	-	-	-	350	203	-	346	236	-
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	1356	-	-	1470	-	-	419	515	929	458	522	857
Stage 1	-	-	-	-	-	-	763	713	-	815	745	-
Stage 2	-	-	-	-	-	-	658	733	-	670	710	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1356	-	-	1470	-	-	221	490	929	287	496	857
Mov Cap-2 Maneuver	-	-	-	-	-	-	221	490	-	287	496	-
Stage 1	-	-	-	-	-	-	727	679	-	777	744	-
Stage 2	-	-	-	-	-	-	396	732	-	430	677	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.1	20.9	23.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	468	1356	-	-	1470	-	-	527
HCM Lane V/C Ratio	0.526	0.044	-	-	0.001	-	-	0.645
HCM Control Delay (s)	20.9	7.8	0	-	7.5	0	-	23.4
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	3	0.1	-	-	0	-	-	4.6

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑			↰	↱	
Traffic Vol, veh/h	24	12	21	284	328	43
Future Vol, veh/h	24	12	21	284	328	43
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	3	2	2
Mvmt Flow	24	12	21	284	328	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	676	350	371	0	-	0
Stage 1	350	-	-	-	-	-
Stage 2	326	-	-	-	-	-
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	419	693	1188	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	410	693	1188	-	-	-
Mov Cap-2 Maneuver	410	-	-	-	-	-
Stage 1	698	-	-	-	-	-
Stage 2	731	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1188	-	475	-	-
HCM Lane V/C Ratio	0.018	-	0.076	-	-
HCM Control Delay (s)	8.1	0	13.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Appendix N

Synchro and Sidra Intersection Worksheets – 2035 Future Background Conditions

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	0.621	20.4	LOS C	3.8	28.3	0.83	0.94	1.31	41.7
2	T1	All MCs	218	5.0	218	5.0	0.621	20.2	LOS C	3.8	28.3	0.83	0.94	1.31	42.3
3	R2	All MCs	92	13.0	92	13.0	0.621	21.8	LOS C	3.8	28.3	0.83	0.94	1.31	41.9
Approach			328	7.3	328	7.3	0.621	20.7	LOS C	3.8	28.3	0.83	0.94	1.31	42.2
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.592	14.5	LOS B	4.9	35.2	0.79	0.81	1.22	44.5
5	T1	All MCs	285	4.0	285	4.0	0.592	14.4	LOS B	4.9	35.2	0.79	0.81	1.22	45.2
6	R2	All MCs	75	2.0	75	2.0	0.592	14.2	LOS B	4.9	35.2	0.79	0.81	1.22	45.0
Approach			447	3.9	447	3.9	0.592	14.4	LOS B	4.9	35.2	0.79	0.81	1.22	45.0
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.646	14.4	LOS B	7.1	52.1	0.79	0.78	1.26	44.3
8	T1	All MCs	214	7.0	214	7.0	0.646	14.6	LOS B	7.1	52.1	0.79	0.78	1.26	45.0
9	R2	All MCs	222	5.0	222	5.0	0.646	14.5	LOS B	7.1	52.1	0.79	0.78	1.26	44.7
Approach			567	5.5	567	5.5	0.646	14.5	LOS B	7.1	52.1	0.79	0.78	1.26	44.7
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.868	31.3	LOS D	19.9	143.2	1.00	1.44	2.56	36.8
11	T1	All MCs	401	3.0	401	3.0	0.868	31.2	LOS D	19.9	143.2	1.00	1.44	2.56	37.3
12	R2	All MCs	33	3.0	33	3.0	0.868	31.2	LOS D	19.9	143.2	1.00	1.44	2.56	37.1
Approach			739	3.4	739	3.4	0.868	31.2	LOS D	19.9	143.2	1.00	1.44	2.56	37.1
All Vehicles			2081	4.7	2081	4.7	0.868	21.4	LOS C	19.9	143.2	0.87	1.05	1.72	41.3

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

Organisation: CGH TRANSPORTATION | Licence: NETWORK / FLOATING | Processed: Tuesday, December 17, 2024 11:14:17 AM
Project: C:\Users\MichelleChen\CGH TRANSPORTATION\CGH Active Projects - Documents\2021\2021-128 Caivan Flewellyn\DATA\W-4 Report\Sidra - W-4 Report\2021-128 Shea Road at Fernbank Road - 2024-12-13.sip9

Intersection	
Intersection Delay, s/veh	13.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	155	15	7	135	29	17	240	12	39	269	53
Future Vol, veh/h	38	155	15	7	135	29	17	240	12	39	269	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	155	15	7	135	29	17	240	12	39	269	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	12.4	11.6	13.8	15.4
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	18%	4%	11%
Vol Thru, %	89%	75%	79%	75%
Vol Right, %	4%	7%	17%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	269	208	171	361
LT Vol	17	38	7	39
Through Vol	240	155	135	269
RT Vol	12	15	29	53
Lane Flow Rate	269	208	171	361
Geometry Grp	1	1	1	1
Degree of Util (X)	0.446	0.35	0.288	0.555
Departure Headway (Hd)	5.969	6.064	6.065	5.532
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	600	589	587	646
Service Time	4.048	4.153	4.158	3.604
HCM Lane V/C Ratio	0.448	0.353	0.291	0.559
HCM Control Delay	13.8	12.4	11.6	15.4
HCM Lane LOS	B	B	B	C
HCM 95th-tile Q	2.3	1.6	1.2	3.4

Intersection	
Int Delay, s/veh	12.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	60	125	26	2	102	17	8	207	13	25	241	51
Future Vol, veh/h	60	125	26	2	102	17	8	207	13	25	241	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	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	125	26	2	102	17	8	207	13	25	241	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	119	0	0	151	0	0	519	381	138	483	386	111
Stage 1	-	-	-	-	-	-	258	258	-	115	115	-
Stage 2	-	-	-	-	-	-	261	123	-	368	271	-
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	1438	-	-	1430	-	-	450	547	910	494	547	926
Stage 1	-	-	-	-	-	-	723	689	-	890	798	-
Stage 2	-	-	-	-	-	-	720	788	-	652	683	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1438	-	-	1430	-	-	262	521	910	325	521	926
Mov Cap-2 Maneuver	-	-	-	-	-	-	262	521	-	325	521	-
Stage 1	-	-	-	-	-	-	690	657	-	849	796	-
Stage 2	-	-	-	-	-	-	473	786	-	420	652	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0.1	17.4	21.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	516	1438	-	-	1430	-	-	533
HCM Lane V/C Ratio	0.442	0.042	-	-	0.001	-	-	0.595
HCM Control Delay (s)	17.4	7.6	0	-	7.5	0	-	21.2
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	2.2	0.1	-	-	0	-	-	3.9

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↓			↰	↱	
Traffic Vol, veh/h	43	21	6	278	296	12
Future Vol, veh/h	43	21	6	278	296	12
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	5	3	2
Mvmt Flow	43	21	6	278	296	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	592	302	308	0	-	0
Stage 1	302	-	-	-	-	-
Stage 2	290	-	-	-	-	-
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	469	738	1253	-	-	-
Stage 1	750	-	-	-	-	-
Stage 2	759	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	466	738	1253	-	-	-
Mov Cap-2 Maneuver	466	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	759	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1253	-	530	-	-
HCM Lane V/C Ratio	0.005	-	0.121	-	-
HCM Control Delay (s)	7.9	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

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	0.633	18.4	LOS C	4.6	33.0	0.83	0.92	1.33	42.7
2	T1	All MCs	264	3.0	264	3.0	0.633	18.4	LOS C	4.6	33.0	0.83	0.92	1.33	43.3
3	R2	All MCs	99	6.0	99	6.0	0.633	18.9	LOS C	4.6	33.0	0.83	0.92	1.33	43.0
Approach			393	3.8	393	3.8	0.633	18.5	LOS C	4.6	33.0	0.83	0.92	1.33	43.2
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.928	43.2	LOS E	29.2	210.6	1.00	1.82	3.30	33.3
5	T1	All MCs	551	3.0	551	3.0	0.928	42.6	LOS E	29.2	210.6	1.00	1.82	3.30	33.8
6	R2	All MCs	115	2.0	115	2.0	0.928	42.5	LOS E	29.2	210.6	1.00	1.82	3.30	33.6
Approach			796	3.7	796	3.7	0.928	42.7	LOS E	29.2	210.6	1.00	1.82	3.30	33.7
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.772	26.8	LOS D	7.6	55.2	0.92	1.13	1.80	38.8
8	T1	All MCs	281	2.0	281	2.0	0.772	26.8	LOS D	7.6	55.2	0.92	1.13	1.80	39.3
9	R2	All MCs	144	9.0	144	9.0	0.772	28.0	LOS D	7.6	55.2	0.92	1.13	1.80	39.0
Approach			485	4.1	485	4.1	0.772	27.1	LOS D	7.6	55.2	0.92	1.13	1.80	39.1
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.855	30.3	LOS D	17.2	124.0	1.00	1.38	2.45	37.5
11	T1	All MCs	534	3.0	534	3.0	0.855	30.1	LOS D	17.2	124.0	1.00	1.38	2.45	38.0
12	R2	All MCs	34	3.0	34	3.0	0.855	30.1	LOS D	17.2	124.0	1.00	1.38	2.45	37.8
Approach			701	3.4	701	3.4	0.855	30.2	LOS D	17.2	124.0	1.00	1.38	2.45	37.9
All Vehicles			2375	3.7	2375	3.7	0.928	31.8	LOS D	29.2	210.6	0.95	1.40	2.42	37.3

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

Organisation: CGH TRANSPORTATION | Licence: NETWORK / FLOATING | Processed: Tuesday, December 17, 2024 11:14:18 AM
Project: C:\Users\MichelleChen\CGH TRANSPORTATION\CGH Active Projects - Documents\2021\2021-128 Caivan Flewellyn\DATA\W-4 Report\Sidra - W-4 Report\2021-128 Shea Road at Fernbank Road - 2024-12-13.sip9

Intersection	
Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	121	14	6	181	71	27	245	14	33	281	47
Future Vol, veh/h	44	121	14	6	181	71	27	245	14	33	281	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	121	14	6	181	71	27	245	14	33	281	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	12.6	14	14.7	17.1
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	25%	2%	9%
Vol Thru, %	86%	68%	70%	78%
Vol Right, %	5%	8%	28%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	286	179	258	361
LT Vol	27	44	6	33
Through Vol	245	121	181	281
RT Vol	14	14	71	47
Lane Flow Rate	286	179	258	361
Geometry Grp	1	1	1	1
Degree of Util (X)	0.483	0.322	0.44	0.591
Departure Headway (Hd)	6.075	6.479	6.133	5.898
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	592	553	586	617
Service Time	4.123	4.538	4.186	3.898
HCM Lane V/C Ratio	0.483	0.324	0.44	0.585
HCM Control Delay	14.7	12.6	14	17.1
HCM Lane LOS	B	B	B	C
HCM 95th-tile Q	2.6	1.4	2.2	3.9

Intersection	
Int Delay, s/veh	17.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	59	118	11	2	166	33	16	260	17	14	285	71
Future Vol, veh/h	59	118	11	2	166	33	16	260	17	14	285	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	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	59	118	11	2	166	33	16	260	17	14	285	71

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	199	0	0	129	0	0	607	445	124	567	434	183
Stage 1	-	-	-	-	-	-	242	242	-	187	187	-
Stage 2	-	-	-	-	-	-	365	203	-	380	247	-
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	1356	-	-	1457	-	-	403	508	916	434	515	857
Stage 1	-	-	-	-	-	-	753	705	-	815	745	-
Stage 2	-	-	-	-	-	-	646	733	-	642	702	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1356	-	-	1457	-	-	192	483	916	237	490	857
Mov Cap-2 Maneuver	-	-	-	-	-	-	192	483	-	237	490	-
Stage 1	-	-	-	-	-	-	718	672	-	777	744	-
Stage 2	-	-	-	-	-	-	365	732	-	368	669	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0.1	25.8	28.4
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	458	1356	-	-	1457	-	-	511
HCM Lane V/C Ratio	0.64	0.044	-	-	0.001	-	-	0.724
HCM Control Delay (s)	25.8	7.8	0	-	7.5	0	-	28.4
HCM Lane LOS	D	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	4.4	0.1	-	-	0	-	-	5.9

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕	↕	
Traffic Vol, veh/h	24	12	21	331	358	43
Future Vol, veh/h	24	12	21	331	358	43
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	3	2	2
Mvmt Flow	24	12	21	331	358	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	753	380	401	0	-	0
Stage 1	380	-	-	-	-	-
Stage 2	373	-	-	-	-	-
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	377	667	1158	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	369	667	1158	-	-	-
Mov Cap-2 Maneuver	369	-	-	-	-	-
Stage 1	676	-	-	-	-	-
Stage 2	696	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1158	-	434	-	-
HCM Lane V/C Ratio	0.018	-	0.083	-	-
HCM Control Delay (s)	8.2	0	14	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Appendix O

Synchro and Sidra Intersection Worksheets – 2030 Future Total Conditions

CGH TRANSPORTATION

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	0.653	22.0	LOS C	4.2	31.3	0.84	0.97	1.38	40.9
2	T1	All MCs	235	5.0	235	5.0	0.653	21.8	LOS C	4.2	31.3	0.84	0.97	1.38	41.6
3	R2	All MCs	92	13.0	92	13.0	0.653	23.5	LOS C	4.2	31.3	0.84	0.97	1.38	41.2
Approach			345	7.2	345	7.2	0.653	22.3	LOS C	4.2	31.3	0.84	0.97	1.38	41.4
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.576	14.3	LOS B	4.5	32.5	0.78	0.80	1.19	44.6
5	T1	All MCs	265	4.0	265	4.0	0.576	14.1	LOS B	4.5	32.5	0.78	0.80	1.19	45.4
6	R2	All MCs	75	2.0	75	2.0	0.576	13.9	LOS B	4.5	32.5	0.78	0.80	1.19	45.1
Approach			427	3.9	427	3.9	0.576	14.1	LOS B	4.5	32.5	0.78	0.80	1.19	45.2
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.597	12.6	LOS B	5.8	42.4	0.74	0.69	1.08	45.3
8	T1	All MCs	183	7.0	183	7.0	0.597	12.9	LOS B	5.8	42.4	0.74	0.69	1.08	45.9
9	R2	All MCs	222	5.0	222	5.0	0.597	12.7	LOS B	5.8	42.4	0.74	0.69	1.08	45.7
Approach			536	5.4	536	5.4	0.597	12.7	LOS B	5.8	42.4	0.74	0.69	1.08	45.7
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.840	26.7	LOS D	18.1	130.2	1.00	1.30	2.29	38.5
11	T1	All MCs	401	3.0	401	3.0	0.840	26.6	LOS D	18.1	130.2	1.00	1.30	2.29	39.0
12	R2	All MCs	33	3.0	33	3.0	0.840	26.6	LOS D	18.1	130.2	1.00	1.30	2.29	38.8
Approach			739	3.4	739	3.4	0.840	26.7	LOS D	18.1	130.2	1.00	1.30	2.29	38.8
All Vehicles			2047	4.7	2047	4.7	0.840	19.7	LOS C	18.1	130.2	0.86	0.98	1.59	42.1

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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	20.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	164	15	19	145	168	17	232	17	99	259	53
Future Vol, veh/h	38	164	15	19	145	168	17	232	17	99	259	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	164	15	19	145	168	17	232	17	99	259	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	15.6	19.4	18	26.8
HCM LOS	C	C	C	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	18%	6%	24%
Vol Thru, %	87%	76%	44%	63%
Vol Right, %	6%	7%	51%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	266	217	332	411
LT Vol	17	38	19	99
Through Vol	232	164	145	259
RT Vol	17	15	168	53
Lane Flow Rate	266	217	332	411
Geometry Grp	1	1	1	1
Degree of Util (X)	0.528	0.432	0.609	0.75
Departure Headway (Hd)	7.142	7.173	6.605	6.57
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	503	501	548	551
Service Time	5.201	5.238	4.631	4.594
HCM Lane V/C Ratio	0.529	0.433	0.606	0.746
HCM Control Delay	18	15.6	19.4	26.8
HCM Lane LOS	C	C	C	D
HCM 95th-tile Q	3	2.2	4.1	6.5

Intersection	
Int Delay, s/veh	15.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	60	299	26	2	167	22	8	184	13	37	193	51
Future Vol, veh/h	60	299	26	2	167	22	8	184	13	37	193	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	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	299	26	2	167	22	8	184	13	37	193	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	189	0	0	325	0	0	736	625	312	713	627	178
Stage 1	-	-	-	-	-	-	432	432	-	182	182	-
Stage 2	-	-	-	-	-	-	304	193	-	531	445	-
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	1355	-	-	1235	-	-	321	397	728	347	399	850
Stage 1	-	-	-	-	-	-	581	577	-	820	747	-
Stage 2	-	-	-	-	-	-	683	735	-	532	573	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1355	-	-	1235	-	-	173	375	728	201	377	850
Mov Cap-2 Maneuver	-	-	-	-	-	-	173	375	-	201	377	-
Stage 1	-	-	-	-	-	-	550	546	-	776	746	-
Stage 2	-	-	-	-	-	-	475	734	-	328	542	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.1	26.2	39.1
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	370	1355	-	-	1235	-	-	372
HCM Lane V/C Ratio	0.554	0.044	-	-	0.002	-	-	0.755
HCM Control Delay (s)	26.2	7.8	0	-	7.9	0	-	39.1
HCM Lane LOS	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	3.2	0.1	-	-	0	-	-	6

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	12	5	261	269	17
Future Vol, veh/h	40	12	5	261	269	17
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	40	12	5	261	269	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	549	278	286	0	-	0
Stage 1	278	-	-	-	-	-
Stage 2	271	-	-	-	-	-
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	497	761	1276	-	-	-
Stage 1	769	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	495	761	1276	-	-	-
Mov Cap-2 Maneuver	495	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	775	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1276	-	538	-	-
HCM Lane V/C Ratio	0.004	-	0.097	-	-
HCM Control Delay (s)	7.8	0	12.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	326	202	24	59	59
Future Vol, veh/h	22	326	202	24	59	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	326	202	24	59	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	226	0	-	0	584	214
Stage 1	-	-	-	-	214	-
Stage 2	-	-	-	-	370	-
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	1342	-	-	-	474	826
Stage 1	-	-	-	-	822	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1342	-	-	-	465	826
Mov Cap-2 Maneuver	-	-	-	-	465	-
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1342	-	-	-	595
HCM Lane V/C Ratio	0.016	-	-	-	0.198
HCM Control Delay (s)	7.7	0	-	-	12.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	51	233	210	51	115	111
Future Vol, veh/h	51	233	210	51	115	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	233	210	51	115	111

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	261	0	-	0	571	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	335	-
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	1303	-	-	-	482	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	725	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1303	-	-	-	460	803
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	725	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1303	-	-	-	582
HCM Lane V/C Ratio	0.039	-	-	-	0.388
HCM Control Delay (s)	7.9	0	-	-	15.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.8

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	295	265	12
Future Vol, veh/h	43	21	6	295	265	12
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	5	3	2
Mvmt Flow	43	21	6	295	265	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	578	271	277	0	-	0
Stage 1	271	-	-	-	-	-
Stage 2	307	-	-	-	-	-
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	478	768	1286	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	746	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	475	768	1286	-	-	-
Mov Cap-2 Maneuver	475	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	746	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1286	-	543	-	-
HCM Lane V/C Ratio	0.005	-	0.118	-	-
HCM Control Delay (s)	7.8	0	12.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	0.579	15.7	LOS C	3.9	28.5	0.80	0.85	1.20	44.0
2	T1	All MCs	217	3.0	217	3.0	0.579	15.7	LOS C	3.9	28.5	0.80	0.85	1.20	44.7
3	R2	All MCs	127	6.0	127	6.0	0.579	16.2	LOS C	3.9	28.5	0.80	0.85	1.20	44.4
Approach			374	4.0	374	4.0	0.579	15.9	LOS C	3.9	28.5	0.80	0.85	1.20	44.5
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.883	32.4	LOS D	24.3	175.4	1.00	1.50	2.65	36.8
5	T1	All MCs	551	3.0	551	3.0	0.883	31.9	LOS D	24.3	175.4	1.00	1.50	2.65	37.4
6	R2	All MCs	115	2.0	115	2.0	0.883	31.8	LOS D	24.3	175.4	1.00	1.50	2.65	37.2
Approach			796	3.7	796	3.7	0.883	31.9	LOS D	24.3	175.4	1.00	1.50	2.65	37.3
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.789	28.4	LOS D	8.2	59.1	0.93	1.16	1.89	38.2
8	T1	All MCs	292	2.0	292	2.0	0.789	28.4	LOS D	8.2	59.1	0.93	1.16	1.89	38.6
9	R2	All MCs	144	9.0	144	9.0	0.789	29.6	LOS D	8.2	59.1	0.93	1.16	1.89	38.4
Approach			496	4.0	496	4.0	0.789	28.8	LOS D	8.2	59.1	0.93	1.16	1.89	38.5
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.817	26.2	LOS D	13.8	99.6	0.98	1.23	2.16	39.1
11	T1	All MCs	495	3.0	495	3.0	0.817	25.9	LOS D	13.8	99.6	0.98	1.23	2.16	39.7
12	R2	All MCs	34	3.0	34	3.0	0.817	25.9	LOS D	13.8	99.6	0.98	1.23	2.16	39.5
Approach			662	3.4	662	3.4	0.817	26.0	LOS D	13.8	99.6	0.98	1.23	2.16	39.6
All Vehicles			2328	3.7	2328	3.7	0.883	27.0	LOS D	24.3	175.4	0.95	1.25	2.12	39.2

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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	34.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	44	130	14	14	195	169	27	234	26	176	272	47
Future Vol, veh/h	44	130	14	14	195	169	27	234	26	176	272	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	130	14	14	195	169	27	234	26	176	272	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	16.9	28.2	21.4	54.6
HCM LOS	C	D	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	23%	4%	36%
Vol Thru, %	82%	69%	52%	55%
Vol Right, %	9%	7%	45%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	287	188	378	495
LT Vol	27	44	14	176
Through Vol	234	130	195	272
RT Vol	26	14	169	47
Lane Flow Rate	287	188	378	495
Geometry Grp	1	1	1	1
Degree of Util (X)	0.603	0.423	0.743	0.95
Departure Headway (Hd)	7.562	8.095	7.185	7.008
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	479	446	507	520
Service Time	5.562	6.115	5.185	5.008
HCM Lane V/C Ratio	0.599	0.422	0.746	0.952
HCM Control Delay	21.4	16.9	28.2	54.6
HCM Lane LOS	C	C	D	F
HCM 95th-tile Q	3.9	2.1	6.2	12

Intersection	
Int Delay, s/veh	41.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	59	231	11	2	346	45	16	213	17	22	255	71
Future Vol, veh/h	59	231	11	2	346	45	16	213	17	22	255	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	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	59	231	11	2	346	45	16	213	17	22	255	71

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	391	0	0	242	0	0	891	750	237	843	733	369
Stage 1	-	-	-	-	-	-	355	355	-	373	373	-
Stage 2	-	-	-	-	-	-	536	395	-	470	360	-
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	1151	-	-	1324	-	-	259	340	792	284	348	674
Stage 1	-	-	-	-	-	-	654	630	-	648	618	-
Stage 2	-	-	-	-	-	-	521	605	-	574	626	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1151	-	-	1324	-	-	80	319	792	123	327	674
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	319	-	123	327	-
Stage 1	-	-	-	-	-	-	615	593	-	610	617	-
Stage 2	-	-	-	-	-	-	273	604	-	339	589	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0	69.2	104.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	277	1151	-	-	1324	-	-	327
HCM Lane V/C Ratio	0.888	0.051	-	-	0.002	-	-	1.064
HCM Control Delay (s)	69.2	8.3	0	-	7.7	0	-	104.5
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	7.9	0.2	-	-	0	-	-	12.8

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	8	12	305	340	41
Future Vol, veh/h	28	8	12	305	340	41
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	28	8	12	305	340	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	690	361	381	0	-	0
Stage 1	361	-	-	-	-	-
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	411	684	1177	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	729	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	406	684	1177	-	-	-
Mov Cap-2 Maneuver	406	-	-	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	729	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1177	-	446	-	-
HCM Lane V/C Ratio	0.01	-	0.081	-	-
HCM Control Delay (s)	8.1	0	13.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	258	375	57	42	42
Future Vol, veh/h	53	258	375	57	42	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	258	375	57	42	42

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	432	0	-	0	768	404
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	364	-
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	1128	-	-	-	370	647
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	703	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1128	-	-	-	350	647
Mov Cap-2 Maneuver	-	-	-	-	350	-
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	703	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	14.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1128	-	-	-	454
HCM Lane V/C Ratio	0.047	-	-	-	0.185
HCM Control Delay (s)	8.3	0	-	-	14.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	122	230	295	122	81	79
Future Vol, veh/h	122	230	295	122	81	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	122	230	295	122	81	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	417	0	-	0	830	356
Stage 1	-	-	-	-	356	-
Stage 2	-	-	-	-	474	-
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	1142	-	-	-	340	688
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1142	-	-	-	299	688
Mov Cap-2 Maneuver	-	-	-	-	299	-
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	SB
HCM Control Delay, s	3	0	19
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1142	-	-	-	415
HCM Lane V/C Ratio	0.107	-	-	-	0.386
HCM Control Delay (s)	8.5	0	-	-	19
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	1.8

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	312	369	43
Future Vol, veh/h	24	12	21	312	369	43
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	3	2	2
Mvmt Flow	24	12	21	312	369	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	745	391	412	0	-	0
Stage 1	391	-	-	-	-	-
Stage 2	354	-	-	-	-	-
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	382	658	1147	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	374	658	1147	-	-	-
Mov Cap-2 Maneuver	374	-	-	-	-	-
Stage 1	668	-	-	-	-	-
Stage 2	710	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1147	-	437	-	-
HCM Lane V/C Ratio	0.018	-	0.082	-	-
HCM Control Delay (s)	8.2	0	14	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Appendix P

Synchro and Sidra Intersection Worksheets – 2030 Future Total Conditions – Mitigation Measures

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	8	13.0	8	13.0	0.234	7.1	LOS A	1.0	7.6	0.54	0.40	0.54	55.9
2	T1	All MCs	184	5.0	184	5.0	0.234	6.5	LOS A	1.0	7.6	0.54	0.40	0.54	59.2
3	R2	All MCs	13	2.0	13	2.0	0.234	6.3	LOS A	1.0	7.6	0.54	0.40	0.54	59.4
Approach			205	5.1	205	5.1	0.234	6.5	LOS A	1.0	7.6	0.54	0.40	0.54	59.1
East: Flewellyn															
4	L2	All MCs	2	12.0	2	12.0	0.183	5.7	LOS A	0.8	6.0	0.43	0.27	0.43	57.4
5	T1	All MCs	167	2.0	167	2.0	0.183	5.1	LOS A	0.8	6.0	0.43	0.27	0.43	61.4
6	R2	All MCs	22	2.0	22	2.0	0.183	5.1	LOS A	0.8	6.0	0.43	0.27	0.43	60.9
Approach			191	2.1	191	2.1	0.183	5.1	LOS A	0.8	6.0	0.43	0.27	0.43	61.3
North: Shea															
7	L2	All MCs	37	8.0	37	8.0	0.250	5.7	LOS A	1.3	9.1	0.38	0.21	0.38	57.6
8	T1	All MCs	193	3.0	193	3.0	0.250	5.5	LOS A	1.3	9.1	0.38	0.21	0.38	60.3
9	R2	All MCs	51	2.0	51	2.0	0.250	5.4	LOS A	1.3	9.1	0.38	0.21	0.38	60.0
Approach			281	3.5	281	3.5	0.250	5.5	LOS A	1.3	9.1	0.38	0.21	0.38	59.9
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.363	7.3	LOS A	2.0	14.4	0.49	0.30	0.49	56.4
11	T1	All MCs	299	2.0	299	2.0	0.363	7.0	LOS A	2.0	14.4	0.49	0.30	0.49	58.9
12	R2	All MCs	26	4.0	26	4.0	0.363	7.1	LOS A	2.0	14.4	0.49	0.30	0.49	57.9
Approach			385	2.9	385	2.9	0.363	7.1	LOS A	2.0	14.4	0.49	0.30	0.49	58.4
All Vehicles			1062	3.3	1062	3.3	0.363	6.2	LOS A	2.0	14.4	0.46	0.29	0.46	59.4

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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	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	164	15	19	145	168	17	232	17	99	259	53
Future Vol, veh/h	38	164	15	19	145	168	17	232	17	99	259	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	164	15	19	145	168	17	232	17	99	259	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	15	18.3	17.7	17.7
HCM LOS	B	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	18%	6%	100%	0%
Vol Thru, %	87%	76%	44%	0%	83%
Vol Right, %	6%	7%	51%	0%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	266	217	332	99	312
LT Vol	17	38	19	99	0
Through Vol	232	164	145	0	259
RT Vol	17	15	168	0	53
Lane Flow Rate	266	217	332	99	312
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.522	0.419	0.589	0.206	0.598
Departure Headway (Hd)	7.06	6.958	6.385	7.499	6.9
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	508	514	564	477	521
Service Time	5.137	5.037	4.452	5.269	4.67
HCM Lane V/C Ratio	0.524	0.422	0.589	0.208	0.599
HCM Control Delay	17.7	15	18.3	12.2	19.5
HCM Lane LOS	C	B	C	B	C
HCM 95th-tile Q	3	2.1	3.8	0.8	3.9

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	16	6.0	16	6.0	0.251	6.4	LOS A	1.2	8.6	0.49	0.34	0.49	57.8
2	T1	All MCs	213	2.0	213	2.0	0.251	6.1	LOS A	1.2	8.6	0.49	0.34	0.49	60.1
3	R2	All MCs	17	6.0	17	6.0	0.251	6.4	LOS A	1.2	8.6	0.49	0.34	0.49	58.6
Approach			246	2.5	246	2.5	0.251	6.1	LOS A	1.2	8.6	0.49	0.34	0.49	59.9
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.390	7.7	LOS A	2.2	15.4	0.55	0.36	0.55	57.6
5	T1	All MCs	346	2.0	346	2.0	0.390	7.7	LOS A	2.2	15.4	0.55	0.36	0.55	58.9
6	R2	All MCs	45	2.0	45	2.0	0.390	7.7	LOS A	2.2	15.4	0.55	0.36	0.55	58.4
Approach			393	2.0	393	2.0	0.390	7.7	LOS A	2.2	15.4	0.55	0.36	0.55	58.8
North: Shea															
7	L2	All MCs	22	3.0	22	3.0	0.373	8.1	LOS A	2.0	14.0	0.59	0.42	0.59	56.9
8	T1	All MCs	255	2.0	255	2.0	0.373	8.0	LOS A	2.0	14.0	0.59	0.42	0.59	58.4
9	R2	All MCs	71	2.0	71	2.0	0.373	8.0	LOS A	2.0	14.0	0.59	0.42	0.59	57.9
Approach			348	2.1	348	2.1	0.373	8.0	LOS A	2.0	14.0	0.59	0.42	0.59	58.2
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.298	6.6	LOS A	1.5	10.8	0.49	0.32	0.49	57.2
11	T1	All MCs	231	2.0	231	2.0	0.298	6.5	LOS A	1.5	10.8	0.49	0.32	0.49	59.2
12	R2	All MCs	11	18.0	11	18.0	0.298	7.5	LOS A	1.5	10.8	0.49	0.32	0.49	55.1
Approach			301	3.2	301	3.2	0.298	6.5	LOS A	1.5	10.8	0.49	0.32	0.49	58.6
All Vehicles			1288	2.4	1288	2.4	0.390	7.2	LOS A	2.2	15.4	0.53	0.36	0.53	58.8

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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	19.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	130	14	14	195	169	27	234	26	176	272	47
Future Vol, veh/h	44	130	14	14	195	169	27	234	26	176	272	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	130	14	14	195	169	27	234	26	176	272	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	15.3	23.5	19.4	19
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	23%	4%	100%	0%
Vol Thru, %	82%	69%	52%	0%	85%
Vol Right, %	9%	7%	45%	0%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	287	188	378	176	319
LT Vol	27	44	14	176	0
Through Vol	234	130	195	0	272
RT Vol	26	14	169	0	47
Lane Flow Rate	287	188	378	176	319
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.573	0.392	0.693	0.376	0.626
Departure Headway (Hd)	7.192	7.514	6.704	7.79	7.171
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	505	481	544	465	507
Service Time	5.192	5.532	4.704	5.49	4.871
HCM Lane V/C Ratio	0.568	0.391	0.695	0.378	0.629
HCM Control Delay	19.4	15.3	23.5	15.1	21.1
HCM Lane LOS	C	C	C	C	C
HCM 95th-tile Q	3.6	1.8	5.4	1.7	4.3

Appendix Q

Synchro and Sidra Intersection Worksheets – 2030 Future Total - EBL at Flewellyn Road at Street 12 & at Street 16

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	326	202	24	59	59
Future Vol, veh/h	22	326	202	24	59	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	15	-	-	-	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	22	326	202	24	59	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	226	0	-	0	584	214
Stage 1	-	-	-	-	214	-
Stage 2	-	-	-	-	370	-
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	1342	-	-	-	474	826
Stage 1	-	-	-	-	822	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1342	-	-	-	466	826
Mov Cap-2 Maneuver	-	-	-	-	466	-
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1342	-	-	-	596
HCM Lane V/C Ratio	0.016	-	-	-	0.198
HCM Control Delay (s)	7.7	-	-	-	12.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	51	233	210	51	115	111
Future Vol, veh/h	51	233	210	51	115	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	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	51	233	210	51	115	111

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	261	0	-	0	571	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	335	-
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	1303	-	-	-	482	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	725	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1303	-	-	-	463	803
Mov Cap-2 Maneuver	-	-	-	-	463	-
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	725	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	15
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1303	-	-	-	585
HCM Lane V/C Ratio	0.039	-	-	-	0.386
HCM Control Delay (s)	7.9	-	-	-	15
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.8

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	258	375	57	42	42
Future Vol, veh/h	53	258	375	57	42	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	15	-	-	-	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	258	375	57	42	42

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	432	0	-	0	768	404
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	364	-
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	1128	-	-	-	370	647
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	703	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1128	-	-	-	353	647
Mov Cap-2 Maneuver	-	-	-	-	353	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	703	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	14.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1128	-	-	-	457
HCM Lane V/C Ratio	0.047	-	-	-	0.184
HCM Control Delay (s)	8.3	-	-	-	14.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	122	230	295	122	81	79
Future Vol, veh/h	122	230	295	122	81	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	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	122	230	295	122	81	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	417	0	-	0	830	356
Stage 1	-	-	-	-	356	-
Stage 2	-	-	-	-	474	-
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	1142	-	-	-	340	688
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1142	-	-	-	304	688
Mov Cap-2 Maneuver	-	-	-	-	304	-
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	SB
HCM Control Delay, s	3	0	18.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1142	-	-	-	420
HCM Lane V/C Ratio	0.107	-	-	-	0.381
HCM Control Delay (s)	8.5	-	-	-	18.8
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	1.8

Appendix R

Synchro and Sidra Intersection Worksheets – 2035 Future Total Conditions

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	0.695	24.6	LOS C	4.8	36.0	0.86	1.03	1.50	39.8
2	T1	All MCs	258	5.0	258	5.0	0.695	24.4	LOS C	4.8	36.0	0.86	1.03	1.50	40.4
3	R2	All MCs	92	13.0	92	13.0	0.695	26.1	LOS D	4.8	36.0	0.86	1.03	1.50	40.1
Approach			368	7.0	368	7.0	0.695	24.8	LOS C	4.8	36.0	0.86	1.03	1.50	40.3
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.618	16.0	LOS C	5.2	37.5	0.81	0.87	1.31	43.8
5	T1	All MCs	285	4.0	285	4.0	0.618	15.8	LOS C	5.2	37.5	0.81	0.87	1.31	44.5
6	R2	All MCs	75	2.0	75	2.0	0.618	15.6	LOS C	5.2	37.5	0.81	0.87	1.31	44.2
Approach			447	3.9	447	3.9	0.618	15.8	LOS C	5.2	37.5	0.81	0.87	1.31	44.3
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.665	15.1	LOS C	7.8	56.9	0.81	0.82	1.33	44.0
8	T1	All MCs	231	7.0	231	7.0	0.665	15.4	LOS C	7.8	56.9	0.81	0.82	1.33	44.6
9	R2	All MCs	222	5.0	222	5.0	0.665	15.2	LOS C	7.8	56.9	0.81	0.82	1.33	44.4
Approach			584	5.6	584	5.6	0.665	15.2	LOS C	7.8	56.9	0.81	0.82	1.33	44.4
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.885	34.4	LOS D	21.1	151.9	1.00	1.52	2.73	35.7
11	T1	All MCs	401	3.0	401	3.0	0.885	34.2	LOS D	21.1	151.9	1.00	1.52	2.73	36.2
12	R2	All MCs	33	3.0	33	3.0	0.885	34.2	LOS D	21.1	151.9	1.00	1.52	2.73	36.0
Approach			739	3.4	739	3.4	0.885	34.3	LOS D	21.1	151.9	1.00	1.52	2.73	36.0
All Vehicles			2138	4.7	2138	4.7	0.885	23.6	LOS C	21.1	151.9	0.89	1.11	1.84	40.4

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	8	13.0	8	13.0	0.234	7.1	LOS A	1.0	7.6	0.54	0.40	0.54	55.9
2	T1	All MCs	184	5.0	184	5.0	0.234	6.5	LOS A	1.0	7.6	0.54	0.40	0.54	59.2
3	R2	All MCs	13	2.0	13	2.0	0.234	6.3	LOS A	1.0	7.6	0.54	0.40	0.54	59.4
Approach			205	5.1	205	5.1	0.234	6.5	LOS A	1.0	7.6	0.54	0.40	0.54	59.1
East: Flewellyn															
4	L2	All MCs	2	12.0	2	12.0	0.183	5.7	LOS A	0.8	6.0	0.43	0.27	0.43	57.4
5	T1	All MCs	167	2.0	167	2.0	0.183	5.1	LOS A	0.8	6.0	0.43	0.27	0.43	61.4
6	R2	All MCs	22	2.0	22	2.0	0.183	5.1	LOS A	0.8	6.0	0.43	0.27	0.43	60.9
Approach			191	2.1	191	2.1	0.183	5.1	LOS A	0.8	6.0	0.43	0.27	0.43	61.3
North: Shea															
7	L2	All MCs	37	8.0	37	8.0	0.250	5.7	LOS A	1.3	9.1	0.38	0.21	0.38	57.6
8	T1	All MCs	193	3.0	193	3.0	0.250	5.5	LOS A	1.3	9.1	0.38	0.21	0.38	60.3
9	R2	All MCs	51	2.0	51	2.0	0.250	5.4	LOS A	1.3	9.1	0.38	0.21	0.38	60.0
Approach			281	3.5	281	3.5	0.250	5.5	LOS A	1.3	9.1	0.38	0.21	0.38	59.9
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.363	7.3	LOS A	2.0	14.4	0.49	0.30	0.49	56.4
11	T1	All MCs	299	2.0	299	2.0	0.363	7.0	LOS A	2.0	14.4	0.49	0.30	0.49	58.9
12	R2	All MCs	26	4.0	26	4.0	0.363	7.1	LOS A	2.0	14.4	0.49	0.30	0.49	57.9
Approach			385	2.9	385	2.9	0.363	7.1	LOS A	2.0	14.4	0.49	0.30	0.49	58.4
All Vehicles			1062	3.3	1062	3.3	0.363	6.2	LOS A	2.0	14.4	0.46	0.29	0.46	59.4

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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	18.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	164	15	19	155	168	17	240	17	99	269	53
Future Vol, veh/h	38	164	15	19	155	168	17	240	17	99	269	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	164	15	19	155	168	17	240	17	99	269	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	15.5	19.6	18.6	18.9
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	18%	6%	100%	0%
Vol Thru, %	88%	76%	45%	0%	84%
Vol Right, %	6%	7%	49%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	274	217	342	99	322
LT Vol	17	38	19	99	0
Through Vol	240	164	155	0	269
RT Vol	17	15	168	0	53
Lane Flow Rate	274	217	342	99	322
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.546	0.428	0.617	0.209	0.626
Departure Headway (Hd)	7.168	7.096	6.491	7.597	7.001
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	501	503	554	470	512
Service Time	5.258	5.188	4.57	5.379	4.783
HCM Lane V/C Ratio	0.547	0.431	0.617	0.211	0.629
HCM Control Delay	18.6	15.5	19.6	12.4	20.9
HCM Lane LOS	C	C	C	B	C
HCM 95th-tile Q	3.2	2.1	4.2	0.8	4.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	12	5	284	317	17
Future Vol, veh/h	40	12	5	284	317	17
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	40	12	5	284	317	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	620	326	334	0	-	0
Stage 1	326	-	-	-	-	-
Stage 2	294	-	-	-	-	-
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	452	715	1225	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	756	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	450	715	1225	-	-	-
Mov Cap-2 Maneuver	450	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	756	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1225	-	492	-	-
HCM Lane V/C Ratio	0.004	-	0.106	-	-
HCM Control Delay (s)	8	0	13.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	326	212	24	59	59
Future Vol, veh/h	22	326	212	24	59	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	326	212	24	59	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	236	0	-	0	594	224
Stage 1	-	-	-	-	224	-
Stage 2	-	-	-	-	370	-
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	1331	-	-	-	468	815
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1331	-	-	-	459	815
Mov Cap-2 Maneuver	-	-	-	-	459	-
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1331	-	-	-	587
HCM Lane V/C Ratio	0.017	-	-	-	0.201
HCM Control Delay (s)	7.8	0	-	-	12.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	51	233	220	51	115	111
Future Vol, veh/h	51	233	220	51	115	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	233	220	51	115	111

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	271	0	-	0	581	246
Stage 1	-	-	-	-	246	-
Stage 2	-	-	-	-	335	-
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	1292	-	-	-	476	793
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	725	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1292	-	-	-	455	793
Mov Cap-2 Maneuver	-	-	-	-	455	-
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	725	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	15.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1292	-	-	-	575
HCM Lane V/C Ratio	0.039	-	-	-	0.393
HCM Control Delay (s)	7.9	0	-	-	15.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.9

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	318	313	12
Future Vol, veh/h	43	21	6	318	313	12
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	5	3	2
Mvmt Flow	43	21	6	318	313	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	649	319	325	0	-	0
Stage 1	319	-	-	-	-	-
Stage 2	330	-	-	-	-	-
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	434	722	1235	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	431	722	1235	-	-	-
Mov Cap-2 Maneuver	431	-	-	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	728	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1235	-	497	-	-
HCM Lane V/C Ratio	0.005	-	0.129	-	-
HCM Control Delay (s)	7.9	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	0.679	20.7	LOS C	5.3	38.7	0.86	0.98	1.45	41.6
2	T1	All MCs	264	3.0	264	3.0	0.679	20.7	LOS C	5.3	38.7	0.86	0.98	1.45	42.2
3	R2	All MCs	127	6.0	127	6.0	0.679	21.2	LOS C	5.3	38.7	0.86	0.98	1.45	41.9
Approach			421	3.9	421	3.9	0.679	20.8	LOS C	5.3	38.7	0.86	0.98	1.45	42.1
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.928	43.2	LOS E	29.1	210.4	1.00	1.82	3.30	33.3
5	T1	All MCs	551	3.0	551	3.0	0.928	42.6	LOS E	29.1	210.4	1.00	1.82	3.30	33.7
6	R2	All MCs	115	2.0	115	2.0	0.928	42.5	LOS E	29.1	210.4	1.00	1.82	3.30	33.6
Approach			796	3.7	796	3.7	0.928	42.7	LOS E	29.1	210.4	1.00	1.82	3.30	33.7
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.836	34.0	LOS D	10.0	72.5	0.96	1.28	2.19	36.1
8	T1	All MCs	322	2.0	322	2.0	0.836	34.0	LOS D	10.0	72.5	0.96	1.28	2.19	36.6
9	R2	All MCs	144	9.0	144	9.0	0.836	35.2	LOS E	10.0	72.5	0.96	1.28	2.19	36.3
Approach			526	3.9	526	3.9	0.836	34.3	LOS D	10.0	72.5	0.96	1.28	2.19	36.4
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.893	37.7	LOS E	19.7	142.1	1.00	1.57	2.85	34.9
11	T1	All MCs	534	3.0	534	3.0	0.893	37.5	LOS E	19.7	142.1	1.00	1.57	2.85	35.4
12	R2	All MCs	34	3.0	34	3.0	0.893	37.5	LOS E	19.7	142.1	1.00	1.57	2.85	35.2
Approach			701	3.4	701	3.4	0.893	37.5	LOS E	19.7	142.1	1.00	1.57	2.85	35.3
All Vehicles			2444	3.7	2444	3.7	0.928	35.6	LOS E	29.1	210.4	0.97	1.49	2.61	36.0

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	16	6.0	16	6.0	0.302	7.0	LOS A	1.5	10.8	0.53	0.36	0.53	57.3
2	T1	All MCs	260	2.0	260	2.0	0.302	6.8	LOS A	1.5	10.8	0.53	0.36	0.53	59.5
3	R2	All MCs	17	6.0	17	6.0	0.302	7.0	LOS A	1.5	10.8	0.53	0.36	0.53	58.1
Approach			293	2.5	293	2.5	0.302	6.8	LOS A	1.5	10.8	0.53	0.36	0.53	59.3
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.409	8.3	LOS A	2.3	16.1	0.59	0.41	0.59	57.1
5	T1	All MCs	346	2.0	346	2.0	0.409	8.3	LOS A	2.3	16.1	0.59	0.41	0.59	58.3
6	R2	All MCs	45	2.0	45	2.0	0.409	8.3	LOS A	2.3	16.1	0.59	0.41	0.59	57.8
Approach			393	2.0	393	2.0	0.409	8.3	LOS A	2.3	16.1	0.59	0.41	0.59	58.3
North: Shea															
7	L2	All MCs	22	3.0	22	3.0	0.406	8.5	LOS A	2.2	15.6	0.60	0.43	0.60	56.5
8	T1	All MCs	285	2.0	285	2.0	0.406	8.5	LOS A	2.2	15.6	0.60	0.43	0.60	58.0
9	R2	All MCs	71	2.0	71	2.0	0.406	8.5	LOS A	2.2	15.6	0.60	0.43	0.60	57.5
Approach			378	2.1	378	2.1	0.406	8.5	LOS A	2.2	15.6	0.60	0.43	0.60	57.8
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.318	7.1	LOS A	1.6	11.6	0.52	0.35	0.52	56.8
11	T1	All MCs	242	2.0	242	2.0	0.318	6.9	LOS A	1.6	11.6	0.52	0.35	0.52	58.8
12	R2	All MCs	11	18.0	11	18.0	0.318	8.0	LOS A	1.6	11.6	0.52	0.35	0.52	54.8
Approach			312	3.1	312	3.1	0.318	7.0	LOS A	1.6	11.6	0.52	0.35	0.52	58.3
All Vehicles			1376	2.4	1376	2.4	0.409	7.7	LOS A	2.3	16.1	0.56	0.39	0.56	58.4

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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	21.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	141	14	14	195	169	27	245	26	176	281	47
Future Vol, veh/h	44	141	14	14	195	169	27	245	26	176	281	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	141	14	14	195	169	27	245	26	176	281	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	16.3	25.7	21.1	20.7
HCM LOS	C	D	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	22%	4%	100%	0%
Vol Thru, %	82%	71%	52%	0%	86%
Vol Right, %	9%	7%	45%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	298	199	378	176	328
LT Vol	27	44	14	176	0
Through Vol	245	141	195	0	281
RT Vol	26	14	169	0	47
Lane Flow Rate	298	199	378	176	328
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.606	0.423	0.721	0.388	0.666
Departure Headway (Hd)	7.319	7.66	6.865	7.931	7.314
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	492	470	529	454	495
Service Time	5.378	5.726	4.882	5.659	5.042
HCM Lane V/C Ratio	0.606	0.423	0.715	0.388	0.663
HCM Control Delay	21.1	16.3	25.7	15.6	23.5
HCM Lane LOS	C	C	D	C	C
HCM 95th-tile Q	4	2.1	5.9	1.8	4.8

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	8	12	352	370	41
Future Vol, veh/h	28	8	12	352	370	41
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	28	8	12	352	370	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	767	391	411	0	-	0
Stage 1	391	-	-	-	-	-
Stage 2	376	-	-	-	-	-
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	370	658	1148	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	365	658	1148	-	-	-
Mov Cap-2 Maneuver	365	-	-	-	-	-
Stage 1	674	-	-	-	-	-
Stage 2	694	-	-	-	-	-

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)	1148	-	405	-	-
HCM Lane V/C Ratio	0.01	-	0.089	-	-
HCM Control Delay (s)	8.2	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	269	375	57	42	42
Future Vol, veh/h	53	269	375	57	42	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	269	375	57	42	42

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	432	0	-	0	779	404
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	375	-
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	1128	-	-	-	364	647
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	695	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1128	-	-	-	344	647
Mov Cap-2 Maneuver	-	-	-	-	344	-
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	695	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1128	-	-	-	449
HCM Lane V/C Ratio	0.047	-	-	-	0.187
HCM Control Delay (s)	8.3	0	-	-	14.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	122	241	295	122	81	79
Future Vol, veh/h	122	241	295	122	81	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	122	241	295	122	81	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	417	0	-	0	841	356
Stage 1	-	-	-	-	356	-
Stage 2	-	-	-	-	485	-
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	1142	-	-	-	335	688
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	619	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1142	-	-	-	294	688
Mov Cap-2 Maneuver	-	-	-	-	294	-
Stage 1	-	-	-	-	622	-
Stage 2	-	-	-	-	619	-

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	19.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1142	-	-	-	410
HCM Lane V/C Ratio	0.107	-	-	-	0.39
HCM Control Delay (s)	8.5	0	-	-	19.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	1.8

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	359	399	43
Future Vol, veh/h	24	12	21	359	399	43
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	3	2	2
Mvmt Flow	24	12	21	359	399	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	822	421	442	0	-	0
Stage 1	421	-	-	-	-	-
Stage 2	401	-	-	-	-	-
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	344	632	1118	-	-	-
Stage 1	662	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	336	632	1118	-	-	-
Mov Cap-2 Maneuver	336	-	-	-	-	-
Stage 1	647	-	-	-	-	-
Stage 2	676	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1118	-	398	-	-
HCM Lane V/C Ratio	0.019	-	0.09	-	-
HCM Control Delay (s)	8.3	0	14.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Appendix S

Synchro and Sidra Intersection Worksheets – 2035 Future Total - EBL at Flewellyn Road at Street 12 & at Street 16

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	326	212	24	59	59
Future Vol, veh/h	22	326	212	24	59	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	15	-	-	-	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	22	326	212	24	59	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	236	0	-	0	594	224
Stage 1	-	-	-	-	224	-
Stage 2	-	-	-	-	370	-
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	1331	-	-	-	468	815
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1331	-	-	-	460	815
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	799	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1331	-	-	-	588
HCM Lane V/C Ratio	0.017	-	-	-	0.201
HCM Control Delay (s)	7.8	-	-	-	12.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	51	233	220	51	115	111
Future Vol, veh/h	51	233	220	51	115	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	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	51	233	220	51	115	111

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	271	0	-	0	581	246
Stage 1	-	-	-	-	246	-
Stage 2	-	-	-	-	335	-
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	1292	-	-	-	476	793
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	725	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1292	-	-	-	457	793
Mov Cap-2 Maneuver	-	-	-	-	457	-
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	725	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1292	-	-	-	577
HCM Lane V/C Ratio	0.039	-	-	-	0.392
HCM Control Delay (s)	7.9	-	-	-	15.2
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.9

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	269	375	57	42	42
Future Vol, veh/h	53	269	375	57	42	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	15	-	-	-	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	269	375	57	42	42

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	432	0	-	0	779	404
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	375	-
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	1128	-	-	-	364	647
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	695	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1128	-	-	-	347	647
Mov Cap-2 Maneuver	-	-	-	-	347	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	695	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	14.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1128	-	-	-	452
HCM Lane V/C Ratio	0.047	-	-	-	0.186
HCM Control Delay (s)	8.3	-	-	-	14.8
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	122	241	295	122	81	79
Future Vol, veh/h	122	241	295	122	81	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	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	122	241	295	122	81	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	417	0	-	0	841	356
Stage 1	-	-	-	-	356	-
Stage 2	-	-	-	-	485	-
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	1142	-	-	-	335	688
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	619	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1142	-	-	-	299	688
Mov Cap-2 Maneuver	-	-	-	-	299	-
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	619	-

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	19
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1142	-	-	-	415
HCM Lane V/C Ratio	0.107	-	-	-	0.386
HCM Control Delay (s)	8.5	-	-	-	19
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	1.8

Appendix T

Synchro and Sidra Intersection Worksheets – 2035 Future Total Conditions Sensitivity

CGH TRANSPORTATION

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	0.717	26.2	LOS D	5.2	38.8	0.87	1.06	1.57	39.2
2	T1	All MCs	270	5.0	270	5.0	0.717	26.0	LOS D	5.2	38.8	0.87	1.06	1.57	39.7
3	R2	All MCs	92	13.0	92	13.0	0.717	27.7	LOS D	5.2	38.8	0.87	1.06	1.57	39.4
Approach			380	7.0	380	7.0	0.717	26.4	LOS D	5.2	38.8	0.87	1.06	1.57	39.6
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.626	16.4	LOS C	5.3	38.2	0.82	0.88	1.34	43.5
5	T1	All MCs	285	4.0	285	4.0	0.626	16.3	LOS C	5.3	38.2	0.82	0.88	1.34	44.2
6	R2	All MCs	75	2.0	75	2.0	0.626	16.0	LOS C	5.3	38.2	0.82	0.88	1.34	44.0
Approach			447	3.9	447	3.9	0.626	16.3	LOS C	5.3	38.2	0.82	0.88	1.34	44.0
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.671	15.3	LOS C	8.0	58.4	0.82	0.83	1.35	43.9
8	T1	All MCs	236	7.0	236	7.0	0.671	15.6	LOS C	8.0	58.4	0.82	0.83	1.35	44.5
9	R2	All MCs	222	5.0	222	5.0	0.671	15.4	LOS C	8.0	58.4	0.82	0.83	1.35	44.3
Approach			589	5.6	589	5.6	0.671	15.5	LOS C	8.0	58.4	0.82	0.83	1.35	44.3
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.890	35.4	LOS E	21.5	154.7	1.00	1.55	2.79	35.4
11	T1	All MCs	401	3.0	401	3.0	0.890	35.3	LOS E	21.5	154.7	1.00	1.55	2.79	35.8
12	R2	All MCs	33	3.0	33	3.0	0.890	35.3	LOS E	21.5	154.7	1.00	1.55	2.79	35.7
Approach			739	3.4	739	3.4	0.890	35.3	LOS E	21.5	154.7	1.00	1.55	2.79	35.6
All Vehicles			2155	4.7	2155	4.7	0.890	24.4	LOS C	21.5	154.7	0.89	1.13	1.88	40.1

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FT2035 AM - Sensitivity (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	8	13.0	8	13.0	0.276	8.1	LOS A	1.2	9.1	0.58	0.45	0.58	55.2
2	T1	All MCs	207	5.0	207	5.0	0.276	7.4	LOS A	1.2	9.1	0.58	0.45	0.58	58.4
3	R2	All MCs	13	2.0	13	2.0	0.276	7.1	LOS A	1.2	9.1	0.58	0.45	0.58	58.6
Approach			228	5.1	228	5.1	0.276	7.4	LOS A	1.2	9.1	0.58	0.45	0.58	58.3
East: Flewellyn															
4	L2	All MCs	2	12.0	2	12.0	0.220	6.2	LOS A	1.0	7.4	0.46	0.30	0.46	57.0
5	T1	All MCs	199	2.0	199	2.0	0.220	5.6	LOS A	1.0	7.4	0.46	0.30	0.46	60.9
6	R2	All MCs	23	2.0	23	2.0	0.220	5.6	LOS A	1.0	7.4	0.46	0.30	0.46	60.4
Approach			224	2.1	224	2.1	0.220	5.6	LOS A	1.0	7.4	0.46	0.30	0.46	60.8
North: Shea															
7	L2	All MCs	40	8.0	40	8.0	0.306	6.5	LOS A	1.6	11.6	0.44	0.26	0.44	57.0
8	T1	All MCs	241	3.0	241	3.0	0.306	6.2	LOS A	1.6	11.6	0.44	0.26	0.44	59.6
9	R2	All MCs	51	2.0	51	2.0	0.306	6.2	LOS A	1.6	11.6	0.44	0.26	0.44	59.3
Approach			332	3.4	332	3.4	0.306	6.3	LOS A	1.6	11.6	0.44	0.26	0.44	59.2
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.433	8.7	LOS A	2.5	18.0	0.57	0.38	0.57	55.3
11	T1	All MCs	350	2.0	350	2.0	0.433	8.4	LOS A	2.5	18.0	0.57	0.38	0.57	57.7
12	R2	All MCs	26	4.0	26	4.0	0.433	8.5	LOS A	2.5	18.0	0.57	0.38	0.57	56.8
Approach			436	2.8	436	2.8	0.433	8.4	LOS A	2.5	18.0	0.57	0.38	0.57	57.3
All Vehicles			1220	3.3	1220	3.3	0.433	7.1	LOS A	2.5	18.0	0.52	0.34	0.52	58.6

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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	21.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	166	15	22	161	208	17	240	18	116	269	53
Future Vol, veh/h	38	166	15	22	161	208	17	240	18	116	269	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	166	15	22	161	208	17	240	18	116	269	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	16.8	26.1	20.7	20.8
HCM LOS	C	D	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	17%	6%	100%	0%
Vol Thru, %	87%	76%	41%	0%	84%
Vol Right, %	7%	7%	53%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	275	219	391	116	322
LT Vol	17	38	22	116	0
Through Vol	240	166	161	0	269
RT Vol	18	15	208	0	53
Lane Flow Rate	275	219	391	116	322
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.58	0.456	0.733	0.257	0.66
Departure Headway (Hd)	7.592	7.501	6.749	7.971	7.374
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	473	480	540	450	489
Service Time	5.658	5.57	4.749	5.73	5.132
HCM Lane V/C Ratio	0.581	0.456	0.724	0.258	0.658
HCM Control Delay	20.7	16.8	26.1	13.5	23.4
HCM Lane LOS	C	C	D	B	C
HCM 95th-tile Q	3.6	2.3	6.1	1	4.7

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	52	15	6	284	317	22
Future Vol, veh/h	52	15	6	284	317	22
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	52	15	6	284	317	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	624	328	339	0	-	0
Stage 1	328	-	-	-	-	-
Stage 2	296	-	-	-	-	-
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	449	713	1220	-	-	-
Stage 1	730	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	446	713	1220	-	-	-
Mov Cap-2 Maneuver	446	-	-	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.6	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1220	-	487	-	-
HCM Lane V/C Ratio	0.005	-	0.138	-	-
HCM Control Delay (s)	8	0	13.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	43	326	212	46	110	108
Future Vol, veh/h	43	326	212	46	110	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	326	212	46	110	108

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	258	0	-	0	647	235
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	412	-
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	1307	-	-	-	436	804
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	669	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	1307	-	-	-	419	804
Mov Cap-2 Maneuver	-	-	-	-	419	-
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	669	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	15.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1307	-	-	-	549
HCM Lane V/C Ratio	0.033	-	-	-	0.397
HCM Control Delay (s)	7.8	0	-	-	15.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.9

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	51	254	269	51	115	111
Future Vol, veh/h	51	254	269	51	115	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	254	269	51	115	111

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	320	0	-	0	651	295
Stage 1	-	-	-	-	295	-
Stage 2	-	-	-	-	356	-
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	1240	-	-	-	433	744
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	709	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1240	-	-	-	412	744
Mov Cap-2 Maneuver	-	-	-	-	412	-
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	709	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	16.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1240	-	-	-	528
HCM Lane V/C Ratio	0.041	-	-	-	0.428
HCM Control Delay (s)	8	0	-	-	16.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	330	318	12
Future Vol, veh/h	43	21	6	330	318	12
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	5	3	2
Mvmt Flow	43	21	6	330	318	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	666	324	330	0	-	0
Stage 1	324	-	-	-	-	-
Stage 2	342	-	-	-	-	-
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	425	717	1229	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	422	717	1229	-	-	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	719	-	-	-	-	-

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)	1229	-	488	-	-
HCM Lane V/C Ratio	0.005	-	0.131	-	-
HCM Control Delay (s)	7.9	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	0.692	21.4	LOS C	5.6	40.5	0.86	1.00	1.49	41.3
2	T1	All MCs	264	3.0	264	3.0	0.692	21.4	LOS C	5.6	40.5	0.86	1.00	1.49	41.9
3	R2	All MCs	135	6.0	135	6.0	0.692	21.9	LOS C	5.6	40.5	0.86	1.00	1.49	41.6
Approach			429	3.9	429	3.9	0.692	21.6	LOS C	5.6	40.5	0.86	1.00	1.49	41.7
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.928	43.2	LOS E	29.1	210.3	1.00	1.82	3.30	33.3
5	T1	All MCs	551	3.0	551	3.0	0.928	42.6	LOS E	29.1	210.3	1.00	1.82	3.30	33.7
6	R2	All MCs	115	2.0	115	2.0	0.928	42.5	LOS E	29.1	210.3	1.00	1.82	3.30	33.6
Approach			796	3.7	796	3.7	0.928	42.7	LOS E	29.1	210.3	1.00	1.82	3.30	33.7
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.853	36.5	LOS E	10.9	78.7	0.98	1.34	2.32	35.3
8	T1	All MCs	333	2.0	333	2.0	0.853	36.5	LOS E	10.9	78.7	0.98	1.34	2.32	35.7
9	R2	All MCs	144	9.0	144	9.0	0.853	37.8	LOS E	10.9	78.7	0.98	1.34	2.32	35.4
Approach			537	3.9	537	3.9	0.853	36.9	LOS E	10.9	78.7	0.98	1.34	2.32	35.6
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.903	40.2	LOS E	20.6	148.2	1.00	1.62	2.98	34.2
11	T1	All MCs	534	3.0	534	3.0	0.903	39.9	LOS E	20.6	148.2	1.00	1.62	2.98	34.6
12	R2	All MCs	34	3.0	34	3.0	0.903	39.9	LOS E	20.6	148.2	1.00	1.62	2.98	34.4
Approach			701	3.4	701	3.4	0.903	40.0	LOS E	20.6	148.2	1.00	1.62	2.98	34.5
All Vehicles			2463	3.7	2463	3.7	0.928	37.0	LOS E	29.1	210.3	0.97	1.51	2.68	35.5

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FT2035 PM - Sensitivity (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	16	6.0	16	6.0	0.315	7.4	LOS A	1.6	11.2	0.55	0.40	0.55	56.9
2	T1	All MCs	260	2.0	260	2.0	0.315	7.1	LOS A	1.6	11.2	0.55	0.40	0.55	59.2
3	R2	All MCs	17	6.0	17	6.0	0.315	7.4	LOS A	1.6	11.2	0.55	0.40	0.55	57.7
Approach			293	2.5	293	2.5	0.315	7.2	LOS A	1.6	11.2	0.55	0.40	0.55	59.0
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.463	9.2	LOS A	2.9	20.6	0.62	0.45	0.66	56.3
5	T1	All MCs	395	2.0	395	2.0	0.463	9.2	LOS A	2.9	20.6	0.62	0.45	0.66	57.5
6	R2	All MCs	48	2.0	48	2.0	0.463	9.2	LOS A	2.9	20.6	0.62	0.45	0.66	57.0
Approach			445	2.0	445	2.0	0.463	9.2	LOS A	2.9	20.6	0.62	0.45	0.66	57.5
North: Shea															
7	L2	All MCs	24	3.0	24	3.0	0.429	9.3	LOS A	2.5	17.8	0.64	0.50	0.70	55.9
8	T1	All MCs	285	2.0	285	2.0	0.429	9.2	LOS A	2.5	17.8	0.64	0.50	0.70	57.3
9	R2	All MCs	71	2.0	71	2.0	0.429	9.2	LOS A	2.5	17.8	0.64	0.50	0.70	56.8
Approach			380	2.1	380	2.1	0.429	9.2	LOS A	2.5	17.8	0.64	0.50	0.70	57.1
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.356	7.6	LOS A	1.9	13.5	0.54	0.37	0.54	56.5
11	T1	All MCs	278	2.0	278	2.0	0.356	7.4	LOS A	1.9	13.5	0.54	0.37	0.54	58.4
12	R2	All MCs	11	18.0	11	18.0	0.356	8.5	LOS A	1.9	13.5	0.54	0.37	0.54	54.5
Approach			348	3.0	348	3.0	0.356	7.5	LOS A	1.9	13.5	0.54	0.37	0.54	58.0
All Vehicles			1466	2.3	1466	2.3	0.463	8.4	LOS A	2.9	20.6	0.60	0.43	0.62	57.8

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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	25.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	147	14	16	199	197	27	245	29	215	281	47
Future Vol, veh/h	44	147	14	16	199	197	27	245	29	215	281	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	147	14	16	199	197	27	245	29	215	281	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	17.7	33.2	23.5	22.9
HCM LOS	C	D	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	21%	4%	100%	0%
Vol Thru, %	81%	72%	48%	0%	86%
Vol Right, %	10%	7%	48%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	301	205	412	215	328
LT Vol	27	44	16	215	0
Through Vol	245	147	199	0	281
RT Vol	29	14	197	0	47
Lane Flow Rate	301	205	412	215	328
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.641	0.456	0.805	0.49	0.691
Departure Headway (Hd)	7.669	8.012	7.035	8.201	7.583
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	470	449	515	439	476
Service Time	5.731	6.082	5.089	5.96	5.341
HCM Lane V/C Ratio	0.64	0.457	0.8	0.49	0.689
HCM Control Delay	23.5	17.7	33.2	18.6	25.7
HCM Lane LOS	C	C	D	C	D
HCM 95th-tile Q	4.4	2.3	7.7	2.6	5.2

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	36	10	15	352	370	52
Future Vol, veh/h	36	10	15	352	370	52
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	36	10	15	352	370	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	778	396	422	0	-	0
Stage 1	396	-	-	-	-	-
Stage 2	382	-	-	-	-	-
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	365	653	1137	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	690	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	359	653	1137	-	-	-
Mov Cap-2 Maneuver	359	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	690	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1137	-	398	-	-
HCM Lane V/C Ratio	0.013	-	0.116	-	-
HCM Control Delay (s)	8.2	0	15.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	101	269	375	106	78	77
Future Vol, veh/h	101	269	375	106	78	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	269	375	106	78	77

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	481	0	-	0	899	428
Stage 1	-	-	-	-	428	-
Stage 2	-	-	-	-	471	-
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	1082	-	-	-	309	627
Stage 1	-	-	-	-	657	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1082	-	-	-	275	627
Mov Cap-2 Maneuver	-	-	-	-	275	-
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	628	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	20.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1082	-	-	-	381
HCM Lane V/C Ratio	0.093	-	-	-	0.407
HCM Control Delay (s)	8.7	0	-	-	20.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	1.9

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	122	289	330	122	81	79
Future Vol, veh/h	122	289	330	122	81	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	122	289	330	122	81	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	452	0	-	0	924	391
Stage 1	-	-	-	-	391	-
Stage 2	-	-	-	-	533	-
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	1109	-	-	-	299	658
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	588	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1109	-	-	-	260	658
Mov Cap-2 Maneuver	-	-	-	-	260	-
Stage 1	-	-	-	-	594	-
Stage 2	-	-	-	-	588	-

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	21.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1109	-	-	-	371
HCM Lane V/C Ratio	0.11	-	-	-	0.431
HCM Control Delay (s)	8.6	0	-	-	21.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	2.1

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	367	410	43
Future Vol, veh/h	24	12	21	367	410	43
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	3	2	2
Mvmt Flow	24	12	21	367	410	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	841	432	453	0	-	0
Stage 1	432	-	-	-	-	-
Stage 2	409	-	-	-	-	-
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	335	624	1108	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	327	624	1108	-	-	-
Mov Cap-2 Maneuver	327	-	-	-	-	-
Stage 1	639	-	-	-	-	-
Stage 2	671	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1108	-	389	-	-
HCM Lane V/C Ratio	0.019	-	0.093	-	-
HCM Control Delay (s)	8.3	0	15.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Appendix U

Synchro and Sidra Intersection Worksheets – 2035 Future Total – Sensitivity with Eder Lands, EBL at Flewellyn Road at Street 12 & at Street 16

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	43	326	212	46	110	108
Future Vol, veh/h	43	326	212	46	110	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	25	-	-	-	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	43	326	212	46	110	108

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	258	0	-	0	647	235
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	412	-
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	1307	-	-	-	436	804
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	669	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1307	-	-	-	422	804
Mov Cap-2 Maneuver	-	-	-	-	422	-
Stage 1	-	-	-	-	777	-
Stage 2	-	-	-	-	669	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	15.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1307	-	-	-	552
HCM Lane V/C Ratio	0.033	-	-	-	0.395
HCM Control Delay (s)	7.8	-	-	-	15.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.9

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	51	254	269	51	115	111
Future Vol, veh/h	51	254	269	51	115	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	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	51	254	269	51	115	111

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	320	0	-	0	651	295
Stage 1	-	-	-	-	295	-
Stage 2	-	-	-	-	356	-
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	1240	-	-	-	433	744
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	709	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1240	-	-	-	415	744
Mov Cap-2 Maneuver	-	-	-	-	415	-
Stage 1	-	-	-	-	724	-
Stage 2	-	-	-	-	709	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1240	-	-	-	530
HCM Lane V/C Ratio	0.041	-	-	-	0.426
HCM Control Delay (s)	8	-	-	-	16.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	101	269	375	106	78	77
Future Vol, veh/h	101	269	375	106	78	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	25	-	-	-	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	101	269	375	106	78	77

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	481	0	-	0	899	428
Stage 1	-	-	-	-	428	-
Stage 2	-	-	-	-	471	-
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	1082	-	-	-	309	627
Stage 1	-	-	-	-	657	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1082	-	-	-	280	627
Mov Cap-2 Maneuver	-	-	-	-	280	-
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	628	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	20.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1082	-	-	-	386
HCM Lane V/C Ratio	0.093	-	-	-	0.402
HCM Control Delay (s)	8.7	-	-	-	20.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	1.9

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	122	289	330	122	81	79
Future Vol, veh/h	122	289	330	122	81	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	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	122	289	330	122	81	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	452	0	-	0	924	391
Stage 1	-	-	-	-	391	-
Stage 2	-	-	-	-	533	-
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	1109	-	-	-	299	658
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	588	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1109	-	-	-	266	658
Mov Cap-2 Maneuver	-	-	-	-	266	-
Stage 1	-	-	-	-	608	-
Stage 2	-	-	-	-	588	-

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	21.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1109	-	-	-	377
HCM Lane V/C Ratio	0.11	-	-	-	0.424
HCM Control Delay (s)	8.6	-	-	-	21.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	2.1

Appendix V

Synchro and Sidra Intersection Worksheets – 2035 Future Total – Sensitivity with RIRO Restriction at Flewellyn Road at Street 16, EBL at Flewellyn Road at Street 12

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	32	5	284	317	17
Future Vol, veh/h	40	32	5	284	317	17
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	40	32	5	284	317	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	620	326	334	0	-	0
Stage 1	326	-	-	-	-	-
Stage 2	294	-	-	-	-	-
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	452	715	1225	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	756	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	450	715	1225	-	-	-
Mov Cap-2 Maneuver	450	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	756	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1225	-	539	-	-
HCM Lane V/C Ratio	0.004	-	0.134	-	-
HCM Control Delay (s)	8	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	365	212	24	0	59
Future Vol, veh/h	0	365	212	24	0	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	365	212	24	0	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	224
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	815
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	815
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	815
HCM Lane V/C Ratio	-	-	-	0.072
HCM Control Delay (s)	-	-	-	9.8
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	0.2

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	73	211	220	51	154	111
Future Vol, veh/h	73	211	220	51	154	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	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	73	211	220	51	154	111

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	271	0	-	0	603	246
Stage 1	-	-	-	-	246	-
Stage 2	-	-	-	-	357	-
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	1292	-	-	-	462	793
Stage 1	-	-	-	-	795	-
Stage 2	-	-	-	-	708	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1292	-	-	-	436	793
Mov Cap-2 Maneuver	-	-	-	-	436	-
Stage 1	-	-	-	-	750	-
Stage 2	-	-	-	-	708	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	18.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1292	-	-	-	537
HCM Lane V/C Ratio	0.057	-	-	-	0.493
HCM Control Delay (s)	8	-	-	-	18.1
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	2.7

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	318	313	12
Future Vol, veh/h	43	21	6	318	313	12
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	5	3	2
Mvmt Flow	43	21	6	318	313	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	649	319	325	0	-	0
Stage 1	319	-	-	-	-	-
Stage 2	330	-	-	-	-	-
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	434	722	1235	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	431	722	1235	-	-	-
Mov Cap-2 Maneuver	431	-	-	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	728	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1235	-	497	-	-
HCM Lane V/C Ratio	0.005	-	0.129	-	-
HCM Control Delay (s)	7.9	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FT2035 AM - RIRO (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	8	13.0	8	13.0	0.260	7.5	LOS A	1.2	8.7	0.55	0.41	0.55	55.6
2	T1	All MCs	207	5.0	207	5.0	0.260	6.8	LOS A	1.2	8.7	0.55	0.41	0.55	58.9
3	R2	All MCs	13	2.0	13	2.0	0.260	6.6	LOS A	1.2	8.7	0.55	0.41	0.55	59.1
Approach			228	5.1	228	5.1	0.260	6.8	LOS A	1.2	8.7	0.55	0.41	0.55	58.8
East: Flewellyn															
4	L2	All MCs	2	12.0	2	12.0	0.197	6.0	LOS A	0.9	6.5	0.45	0.29	0.45	57.2
5	T1	All MCs	177	2.0	177	2.0	0.197	5.4	LOS A	0.9	6.5	0.45	0.29	0.45	61.2
6	R2	All MCs	22	2.0	22	2.0	0.197	5.4	LOS A	0.9	6.5	0.45	0.29	0.45	60.6
Approach			201	2.1	201	2.1	0.197	5.4	LOS A	0.9	6.5	0.45	0.29	0.45	61.1
North: Shea															
7	L2	All MCs	57	8.0	57	8.0	0.314	6.5	LOS A	1.7	12.2	0.42	0.24	0.42	56.8
8	T1	All MCs	241	3.0	241	3.0	0.314	6.2	LOS A	1.7	12.2	0.42	0.24	0.42	59.4
9	R2	All MCs	51	2.0	51	2.0	0.314	6.2	LOS A	1.7	12.2	0.42	0.24	0.42	59.1
Approach			349	3.7	349	3.7	0.314	6.3	LOS A	1.7	12.2	0.42	0.24	0.42	58.9
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.370	7.9	LOS A	2.0	14.2	0.55	0.37	0.55	55.9
11	T1	All MCs	279	2.0	279	2.0	0.370	7.5	LOS A	2.0	14.2	0.55	0.37	0.55	58.4
12	R2	All MCs	26	4.0	26	4.0	0.370	7.7	LOS A	2.0	14.2	0.55	0.37	0.55	57.4
Approach			365	3.0	365	3.0	0.370	7.6	LOS A	2.0	14.2	0.55	0.37	0.55	57.9
All Vehicles			1143	3.5	1143	3.5	0.370	6.6	LOS A	2.0	14.2	0.49	0.32	0.49	58.9

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	22	12	352	370	41
Future Vol, veh/h	28	22	12	352	370	41
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	28	22	12	352	370	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	767	391	411	0	-	0
Stage 1	391	-	-	-	-	-
Stage 2	376	-	-	-	-	-
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	370	658	1148	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	365	658	1148	-	-	-
Mov Cap-2 Maneuver	365	-	-	-	-	-
Stage 1	674	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.9	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1148	-	454	-	-
HCM Lane V/C Ratio	0.01	-	0.11	-	-
HCM Control Delay (s)	8.2	0	13.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	298	375	57	0	42
Future Vol, veh/h	0	298	375	57	0	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	298	375	57	0	42

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	404
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	-	0	647
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	647
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	647
HCM Lane V/C Ratio	-	-	-	0.065
HCM Control Delay (s)	-	-	-	11
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.2

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	175	188	295	122	110	79
Future Vol, veh/h	175	188	295	122	110	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	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	175	188	295	122	110	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	417	0	-	0	894	356
Stage 1	-	-	-	-	356	-
Stage 2	-	-	-	-	538	-
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	1142	-	-	-	312	688
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	585	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1142	-	-	-	264	688
Mov Cap-2 Maneuver	-	-	-	-	264	-
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	585	-

Approach	EB	WB	SB
HCM Control Delay, s	4.2	0	26
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1142	-	-	-	356
HCM Lane V/C Ratio	0.153	-	-	-	0.531
HCM Control Delay (s)	8.7	-	-	-	26
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.5	-	-	-	3

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	359	399	43
Future Vol, veh/h	24	12	21	359	399	43
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	3	2	2
Mvmt Flow	24	12	21	359	399	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	822	421	442	0	-	0
Stage 1	421	-	-	-	-	-
Stage 2	401	-	-	-	-	-
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	344	632	1118	-	-	-
Stage 1	662	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	336	632	1118	-	-	-
Mov Cap-2 Maneuver	336	-	-	-	-	-
Stage 1	647	-	-	-	-	-
Stage 2	676	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1118	-	398	-	-
HCM Lane V/C Ratio	0.019	-	0.09	-	-
HCM Control Delay (s)	8.3	0	14.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FT2035 PM - RIRO (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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	16	6.0	16	6.0	0.302	7.0	LOS A	1.5	10.8	0.53	0.36	0.53	57.3
2	T1	All MCs	260	2.0	260	2.0	0.302	6.8	LOS A	1.5	10.8	0.53	0.36	0.53	59.5
3	R2	All MCs	17	6.0	17	6.0	0.302	7.0	LOS A	1.5	10.8	0.53	0.36	0.53	58.1
Approach			293	2.5	293	2.5	0.302	6.8	LOS A	1.5	10.8	0.53	0.36	0.53	59.3
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.409	8.3	LOS A	2.3	16.1	0.59	0.41	0.59	57.1
5	T1	All MCs	346	2.0	346	2.0	0.409	8.3	LOS A	2.3	16.1	0.59	0.41	0.59	58.3
6	R2	All MCs	45	2.0	45	2.0	0.409	8.3	LOS A	2.3	16.1	0.59	0.41	0.59	57.8
Approach			393	2.0	393	2.0	0.409	8.3	LOS A	2.3	16.1	0.59	0.41	0.59	58.3
North: Shea															
7	L2	All MCs	36	3.0	36	3.0	0.421	8.8	LOS A	2.3	16.4	0.61	0.44	0.61	56.2
8	T1	All MCs	285	2.0	285	2.0	0.421	8.7	LOS A	2.3	16.4	0.61	0.44	0.61	57.6
9	R2	All MCs	71	2.0	71	2.0	0.421	8.7	LOS A	2.3	16.4	0.61	0.44	0.61	57.2
Approach			392	2.1	392	2.1	0.421	8.7	LOS A	2.3	16.4	0.61	0.44	0.61	57.4
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.309	7.0	LOS A	1.5	11.1	0.53	0.36	0.53	56.8
11	T1	All MCs	228	2.0	228	2.0	0.309	6.8	LOS A	1.5	11.1	0.53	0.36	0.53	58.8
12	R2	All MCs	11	18.0	11	18.0	0.309	8.0	LOS A	1.5	11.1	0.53	0.36	0.53	54.8
Approach			298	3.2	298	3.2	0.309	6.9	LOS A	1.5	11.1	0.53	0.36	0.53	58.2
All Vehicles			1376	2.4	1376	2.4	0.421	7.8	LOS A	2.3	16.4	0.57	0.40	0.57	58.2

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: HCM Delay Formula (Stopline Delay: Geometric Delay is not 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.