

1770 & 1820 Shea Road and 5971 & 5993 Flewellyn Road Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Strategy Report

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1 Screening

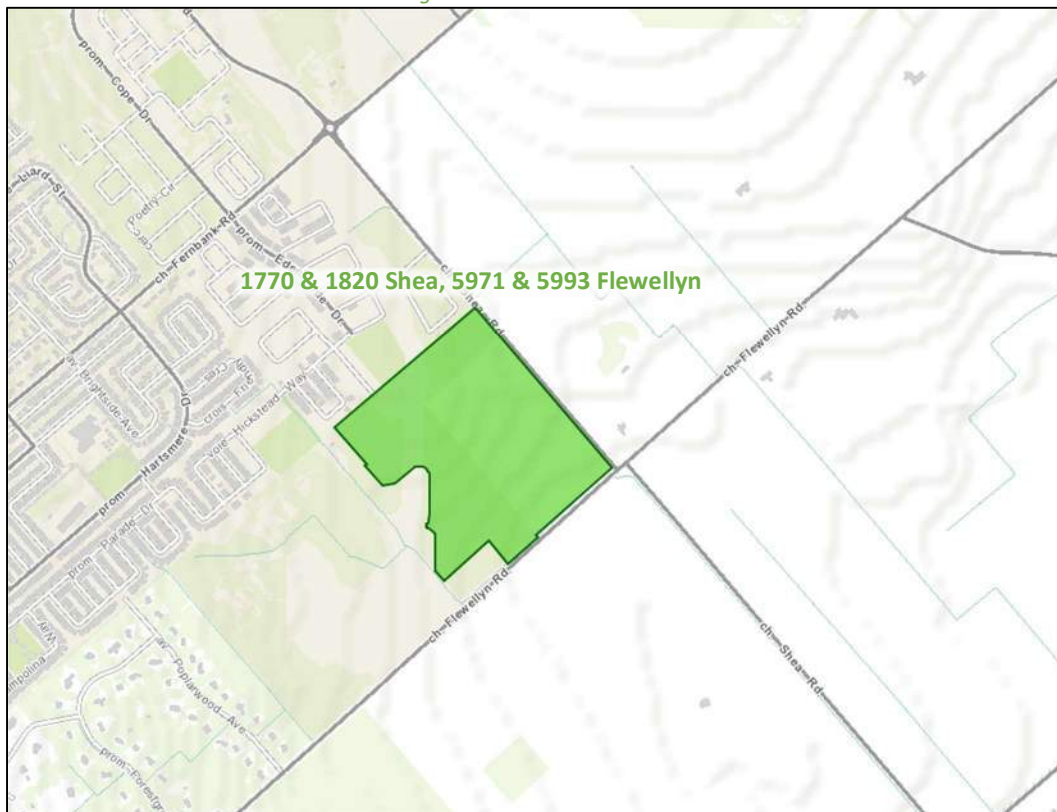
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines, incorporating the 2023 Revision to Transportation Impact Assessment Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification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

2 Existing and Planned Conditions

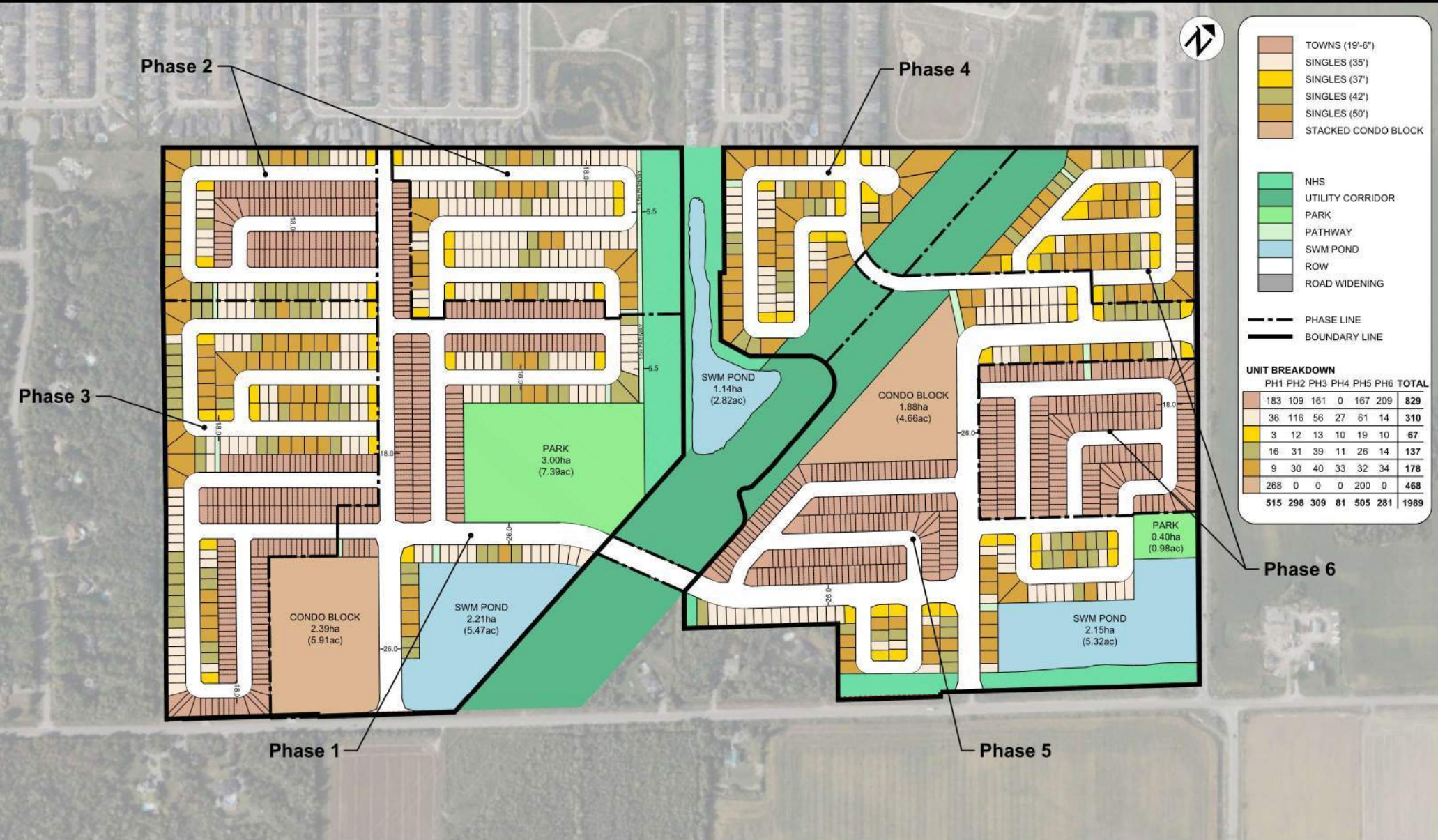
2.1 Proposed Development

The development site is located at 1770, 1820 Shea Road and 5971, 5993 Flewellyn Road. The proposed development includes 291 single-detached homes and 376 townhomes, 200 stacked townhomes a park/open space, and a stormwater maintenance pond. New collector roads are proposed to connect to Shea Road and Flewellyn Road and new local roads are proposed to connect internally to these collector roads and the adjacent subdivision. The anticipated build-out is 2030. Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: April 16, 2026



2.2 Existing Conditions

2.2.1 Area Road Network

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/Edenwyld Drive and 40 km/h between Cope Drive/Edenwyld Drive and West Ridge Drive. The City-protected right of way is 37.5 metres.

Shea Road: Shea Road is a City of Ottawa collector road with a two-lane rural cross-section, including gravel shoulders within the study area. Approximately 270.0 metres south of Fernbank Road, the posted speed limit transitions from 60 km/h to 80 km/h. The City-protected right of way is 26.0 metres between Abbott Street and Fernbank Road, and the existing right of way is 20.0 metres to the south.

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 City-protected right of way between Stittsville Main Street and Shea Road is 37.0 metres, subject to unequal widening. The result the OP update would be additional widening to the south and no impacts would be noted for the site property on its frontage. The existing right of way is 20.0 metres east of Shea Road.

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 assumed to be 40 km/h, and the existing right of way is 22.0 metres.

Painted Sky Way: Painted Sky Way is a City of Ottawa local road with a two-lane urban cross-section. The unposted 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.

2.2.2 Existing Intersections

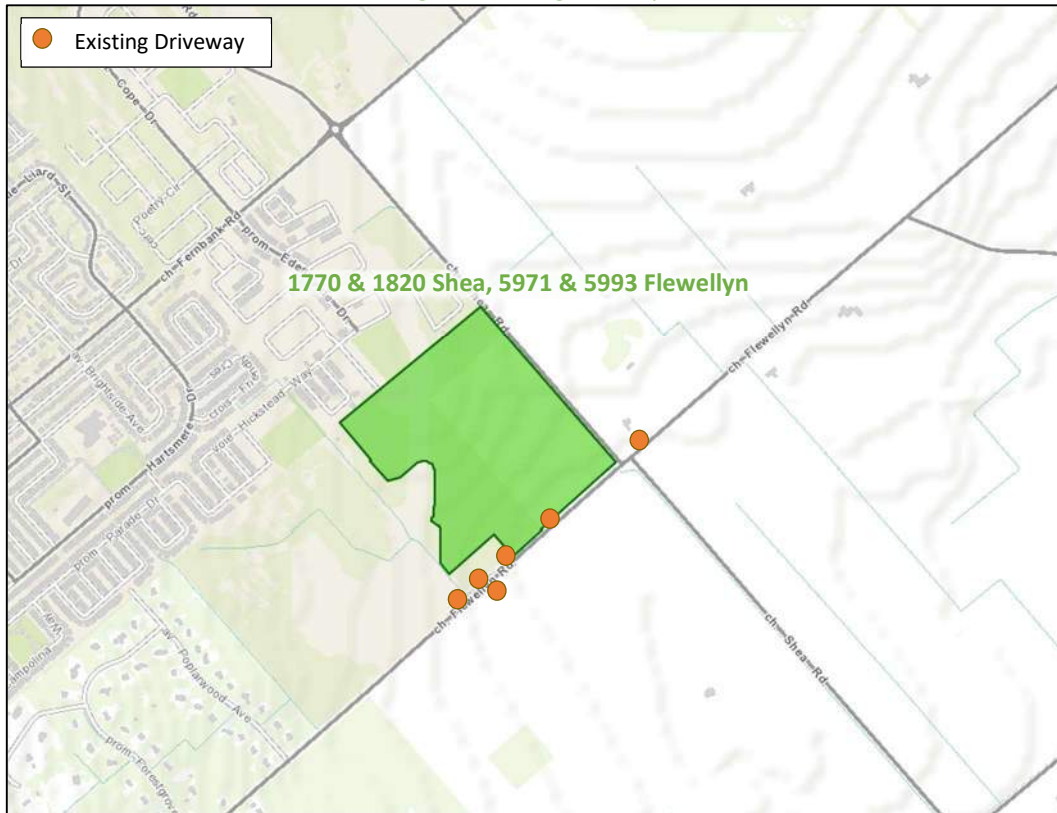
The key study area intersections within one kilometre of the site have been summarized below:

<i>Shea Road at Fernbank Road</i>	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.
<i>Shea Road at Cosanti Drive</i>	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 shared left-turn/through lane, the southbound approach consists of a shared through/right-turn lane. The eastbound approach consists of a shared left-turn/right-turn lane. No turn restrictions were noted.
<i>Shea Road at Flewellyn Road</i>	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.

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



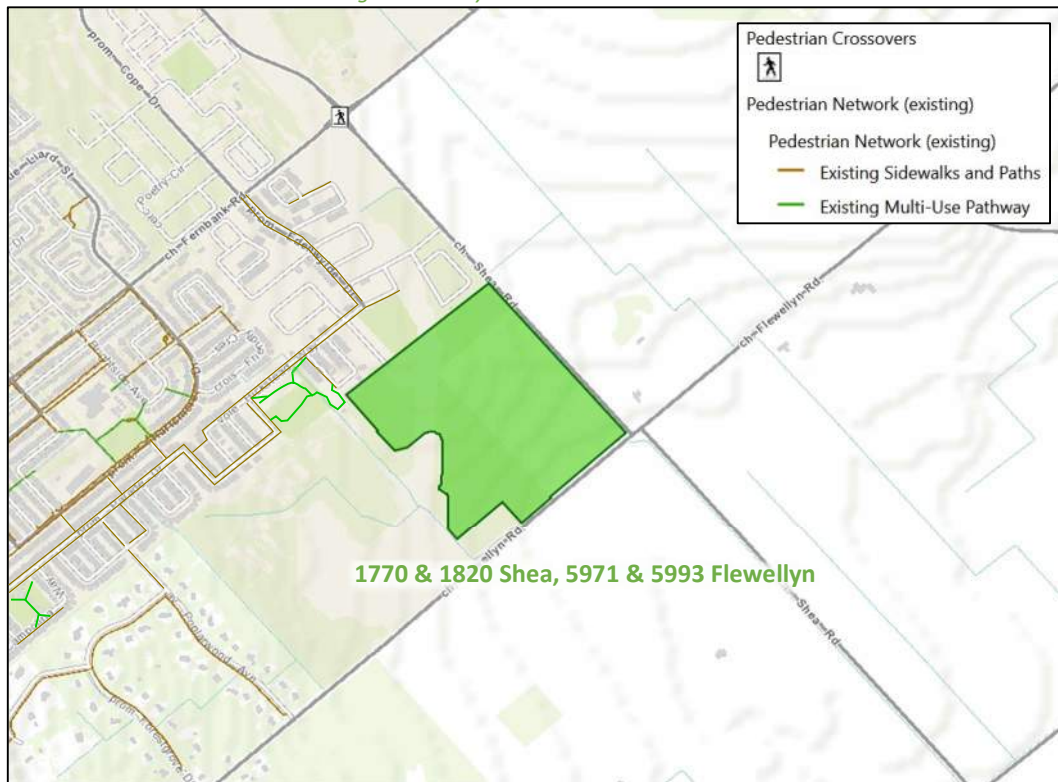
Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: April 16, 2026

2.2.4 Cycling and Pedestrian Facilities

Figure 4 illustrates the pedestrian facilities in the study area and Figure 5 illustrates the cycling facilities. Considering the plans for other developments and the newly constructed pedestrian and cycling facilities, new community sidewalks and cycling pathways have been included in the figure where possible, despite not being formalized within the City's pedestrian network in geoOttawa.

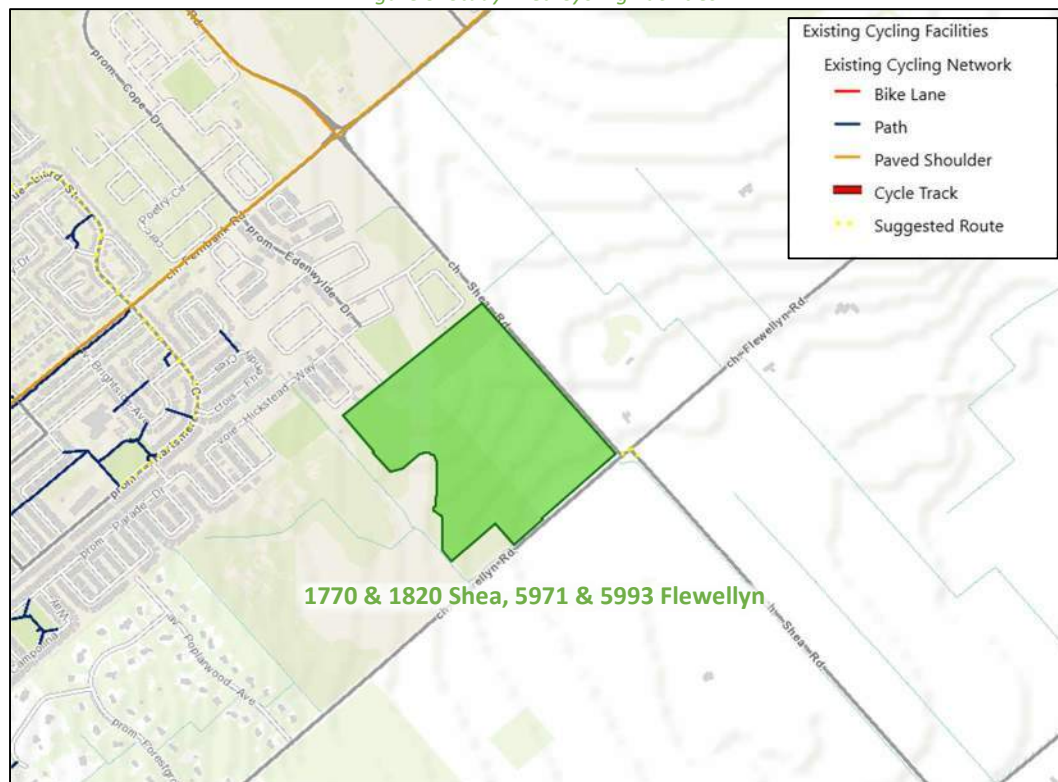
Paved shoulders are present on both sides along Fernbank Road, Shea Road north of Fernbank Road, and Flewellyn Road. A suggested route is noted at the offset Flewellyn Road and Shea Road intersection in the geoOttawa existing cycling network. The 2025 TMP identifies the implementation of new active transportation 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: April 16, 2026

Figure 5: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: April 16, 2026

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

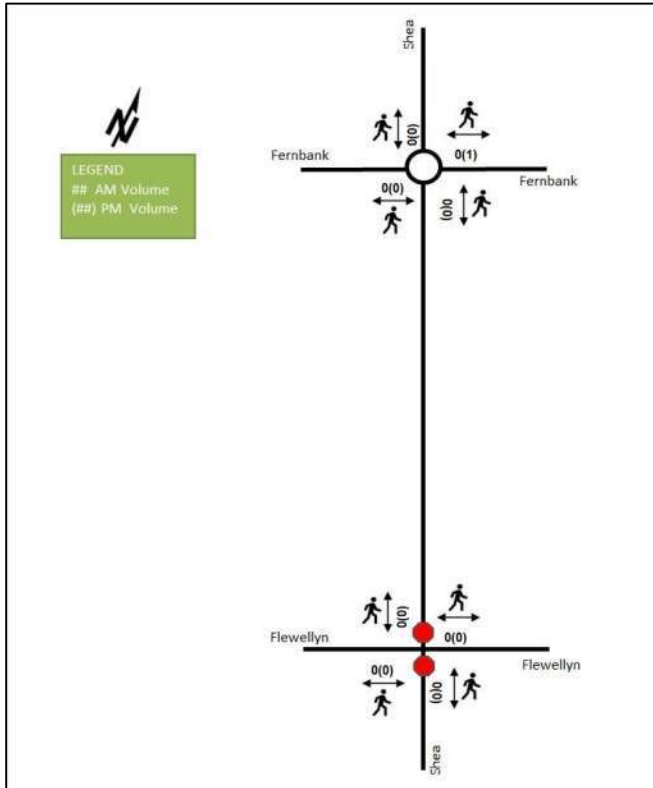
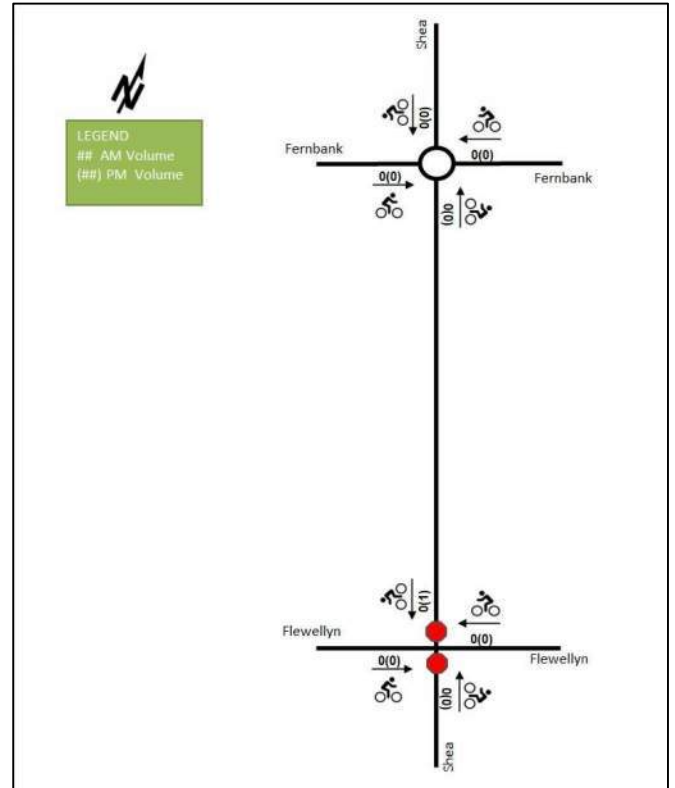


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

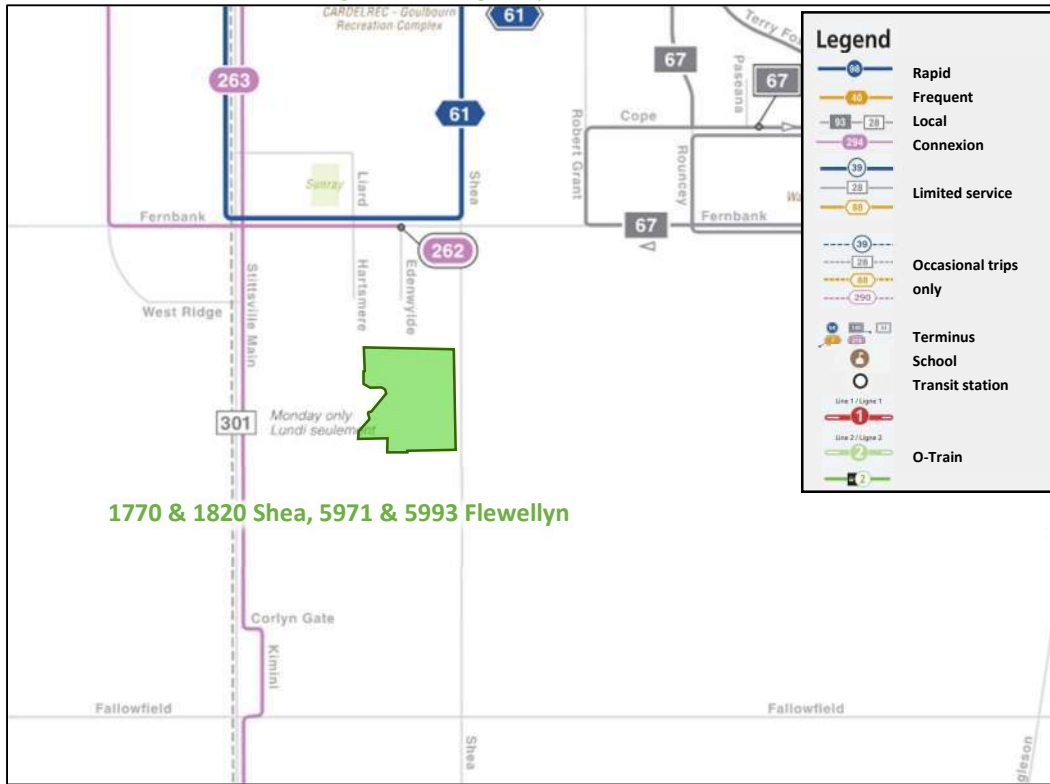
Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stops. It is noted that no transit stops are present within 400 metres of the site. All transit information is from April 16, 2026, and is included for general information purposes and context to the surrounding area.

Route #61 currently travels along Shea Road and Fernbank Road; Route #262 currently travels along Fernbank Road. All these routes continue towards the northern Stittsville area.

The frequency of routes within proximity of the site based on April 16, 2026, service levels are:

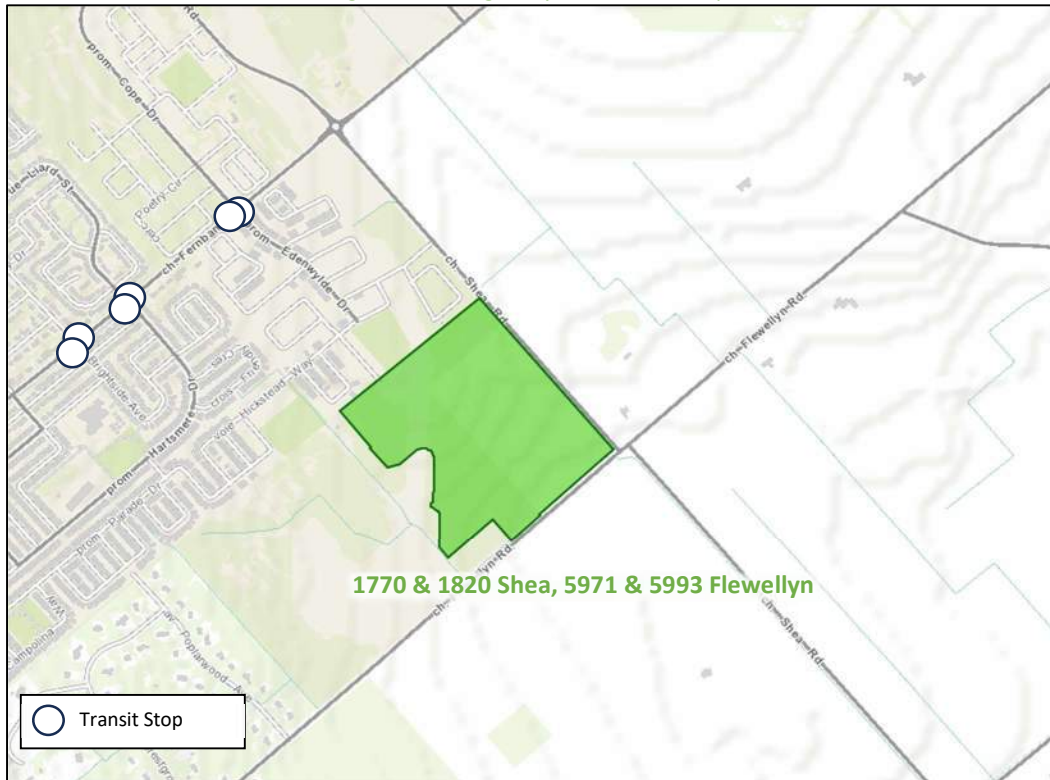
- Route # 61 – 30-minute service all day
- Route # 262 – Four morning buses and five evening buses per day

Figure 8: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: April 16, 2025

Figure 9: Existing Study Area Transit Stops



Source: <http://www.octranspo.com/> Accessed: April 16, 2026

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 for the existing study area intersections. 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
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 worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

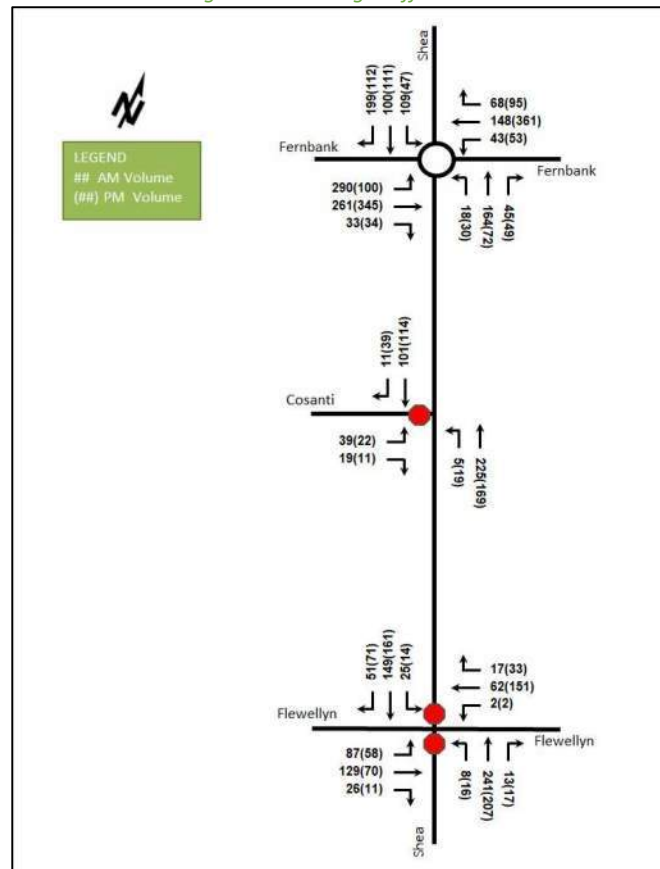


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
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	-
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 for the existing conditions and the intersection does not meet the warrants. 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 and Shea Road at Cosanti Drive for existing conditions, neither intersection met a left-turn warrant. 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 the locations analyzed. Collision data are included in Appendix G.

Table 3: Study Area Collision Summary, 2018-2022

		Number	%
Total Collisions		57	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	9	16%
	Property Damage Only	48	84%
Initial Impact Type	Approaching	0	0%
	Angle	29	51%
	Rear end	8	14%
	Sideswipe	0	0%
	Turning Movement	0	0%
	SMV Unattended	1	2%
	SMV Other	18	32%
	Other	1	2%
Road Surface Condition	Dry	36	63%
	Wet	6	11%
	Loose Snow	3	5%
	Slush	2	4%
	Packed Snow	3	5%
	Ice	7	12%
	Unknown	0	0%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

Figure 11: Study Area Collision Records

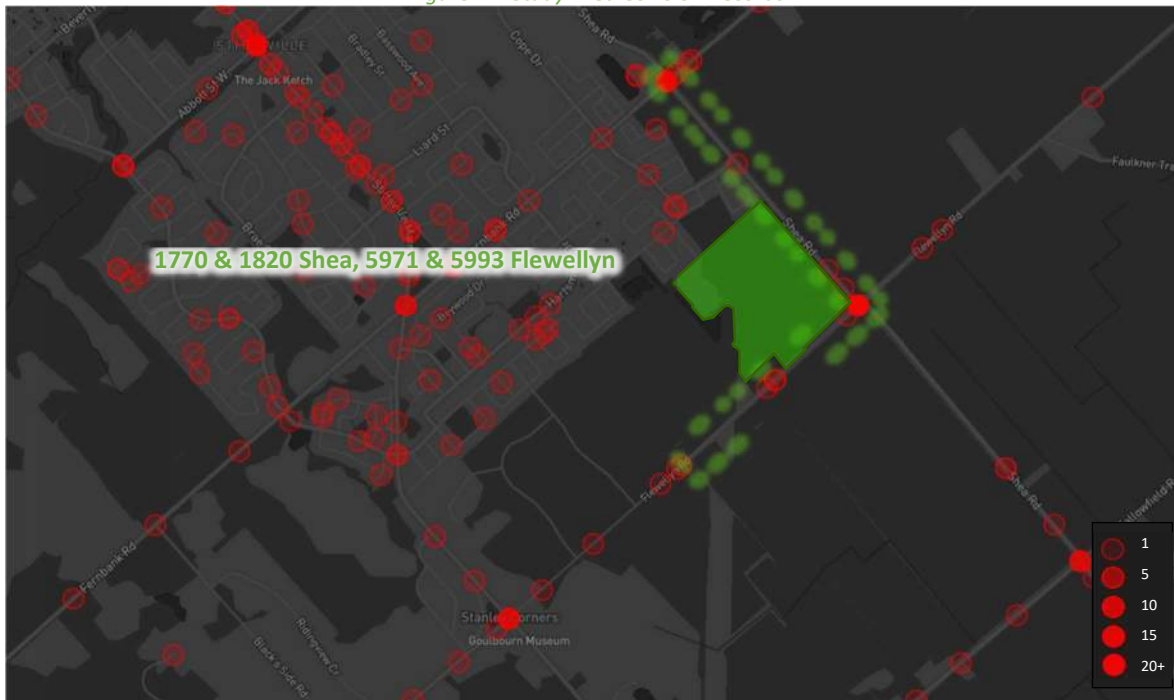


Table 4: Summary of Collision Locations, 2018-2022

	Number	%
Intersections / Segments	57	100%
Flewellyn Road at Shea Road	30	53%
Fernbank Road at Shea Road	15	26%
Flewellyn Road between Poplarwood Avenue and Shea Road	8	14%
Shea Road between Fernbank Road and Flewellyn Road	4	7%

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. Table 5 and Table 6 summarize the collision types and conditions for each location.

Table 5: Flewellyn Road at Shea Road Collision Summary

		Number	%
Total Collisions		30	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	7	23%
	Property Damage Only	23	77%
Initial Impact Type	Approaching	0	0%
	Angle	22	73%
	Rear end	3	10%
	Sideswipe	0	0%
	Turning Movement	0	0%
	SMV Unattended	0	0%
	SMV Other	5	17%
	Other	0	0%
Road Surface Condition	Dry	21	70%
	Wet	4	13%
	Loose Snow	1	3%
	Slush	1	3%
	Packed Snow	1	3%
	Ice	2	7%
	Unknown	0	0%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Flewellyn Road at Shea Road intersection had a total of 30 collisions during the 2018-2022 time period, with 23 involving property damage only and the remaining seven having non-fatal injuries. The collision types are most represented by angle with 22, followed by SMV Other with five, and rear end with three collisions. Weather conditions do not affect collisions at this location.

Based on detailed collision records from 2019-2022 and 2024 (representing a different analysis period than the publicly available data), a total of 35 collisions were recorded, including 23 angle collisions, six SMV other and three rear end and three turning movement collisions.

Angle and turning movement collisions predominantly involved southbound vehicles conflicting with westbound through traffic (14 of 26) with nine southbound left-turn movements and five vehicles traversing the offset to continue south of Flewellyn Road. Six collisions involved southbound vehicles conflicting with eastbound through traffic (6 of 26) with four left-turning movements and two through movements. An additional three collisions involved northbound left-turning vehicles conflicting with eastbound vehicles (3 of 26). The offset configuration of this intersection is considered the primary cause of these collisions. Due to the property ownership, no ability

exists for the site to re-align Shea Road. The City is currently investigating safety improvements at this intersection until the additional property is acquired and potential long term geometric upgrades. 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.

Based on the detailed collision records, all rear end collisions involved southbound movements (3 of 3). The detailed collision data are included in Appendix G.

Table 6: Fernbank Road at Shea Road Collision Summary

		Number	%
Total Collisions		15	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	1	7%
	Property Damage Only	14	93%
Initial Impact Type	Approaching	0	0%
	Angle	7	47%
	Rear end	4	27%
	Sideswipe	0	0%
	Turning Movement	0	0%
	SMV Unattended	0	0%
	SMV Other	3	20%
	Other	1	7%
Road Surface Condition	Dry	9	60%
	Wet	1	7%
	Loose Snow	0	0%
	Slush	0	0%
	Packed Snow	1	7%
	Ice	4	27%
	Unknown	0	0%
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 14 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.

Based on detailed collision records from 2019-2022 and 2024, a total of 14 collisions were recorded, including four angle collisions, four rear end, three SMV other and one each of sideswipe, turning movement, and other collision type. Angle collisions mostly occurred during daylight under clear and dry conditions (three out of four), and all the angle collisions occurred in 2019. Rear end collisions mostly occurred under dark light conditions in the late afternoon/early evening, all occurred during fall or winter between October and February. The surface conditions and dark conditions, despite available street lighting, appear to be contributing factors for collisions at this intersection. No further examination is required as part of this study.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

2.3.1.1 Transportation Master Plan

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. Projects noted in the greater Stittsville area 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)
- 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

5957 & 5969 Fernbank Road

The proposed development application includes a draft plan of subdivision application to construct 98 single-family homes and 368 townhomes. The development was initially anticipated to be built out by 2020 and to generate 292 AM and 344 PM peak hour two-way auto trips. This development will be assumed to be built out by 2030. (Parsons, 2020)

6041 Fernbank Road

The proposed development application includes a draft plan of subdivision application to construct 234 single-family homes, 142 semi-detached homes, and 262 townhomes. The development was initially anticipated to be built out by 2023 and to generate 382 AM and 440 PM peak hour two-way auto trips. This development will be assumed to be built out by 2030. (IBI Group, 2021)

5993 Flewellyn Road

The proposed development application includes a draft plan of subdivision application to construct 329 single-family homes, 230 semi-detached homes, and 172 townhomes. The development is expected to generate 365 AM and 458 PM peak hour two-way auto trips. This development is currently being constructed and will be assumed to be built out by 2030. (IBI Group, 2015)

1650 Shea Road

The proposed development application includes a site plan application to construct 13 low-rise buildings including 116 units. No TIA is available for this development.

5960 Fernbank Road

The proposed development application includes a site plan application to construct 40,000 sq. ft grocery store, 19,250 sq. ft retail, and 5,900 sq. ft restaurant. The development was initially anticipated to be built out by 2018 and to generate 155 AM and 401 PM peak hour two-way auto trips. This development will be assumed to be built out by 2030. (Parsons, 2016)

5500 Abbott Street & 1555 Shea Road

The proposed development application includes a plan of subdivision application to construct 286 single-family homes and 324 townhomes. The development was initially anticipated to be built out by 2025 and to generate 253 AM and 276 PM peak hour two-way auto trips. This development will be assumed to be built out by 2030. (IBI Group, 2022)

5725 Fernbank Road

The proposed development application includes a plan of subdivision application to construct 206 single family homes and 391 townhomes. The development was initially anticipated to be built out by 2025 and to generate 382 AM and 440 PM peak hour two-way auto trips. This development will be assumed to be built out by 2030. (IBI Group, 2022)

5993, 6115, 6141, 6159 Flewellyn Road & 6070 Fernbank Road

The proposed development application includes a plan of subdivision application to construct 558 townhomes, 566 single-detached homes, 442 stacked townhomes. The development is anticipated to be built out by 2030 and to generate 566 AM and 689 PM peak hour two-way auto trips. This TIA includes a portion of the subject development as part of the plan of subdivision. (CGH Transportation, 2026)

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-within adjacent subdivision)

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

3.2 Time Periods

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

3.3 Horizon Years

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

4 Development-Generated Travel Demand

4.1 Mode Shares

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the subject district, 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 7.

Table 7: TRANS Trip Generation Manual Recommended Mode Shares – Kanata/Stittsville and Rural Southwest

Travel Mode	Kanata/Stittsville				Rural Southwest			
	Single Detached		Multi-Unit (Low-Rise)		Single Detached		Multi-Unit (Low-Rise)	
	AM	PM	AM	PM	AM	PM	AM	PM
Auto Driver	52%	56%	52%	58%	60%	67%	66%	62%
Auto Passenger	15%	19%	14%	17%	14%	17%	13%	19%
Transit	20%	14%	22%	17%	24%	14%	21%	16%
Cycling	1%	1%	0%	0%	2%	2%	1%	3%
Walking	12%	9%	11%	8%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Examining the above mode shares for the adjacent districts, a combined modal share for the subject development has been developed as a baseline for the expected travel modes of the development. Table 8 summarizes the expected modes shares for the development area.

Table 8: Expected Development Baseline Mode Shares

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

4.2 Trip Generation

This TIA has been prepared using the vehicle and person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020). Table 9 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 9: Trip Generation Person Trip Rates by Peak Period

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

Using the above person trip rates, the total person trip generation has been estimated. Table 10 summarizes the total person trip generation for the residential land uses.

Table 10: 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	291	179	418	597	448	274	722
Multi-Unit (Low-Rise)	576	233	545	778	510	400	910

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

Table 11: 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%	44	102	146	59%	116	71	187
	Auto Passenger	15%	13	30	43	19%	37	23	60
	Transit	24%	24	55	79	14%	29	18	47
	Cycling	2%	2	5	7	2%	4	3	7
	Walking	8%	8	20	28	6%	14	8	22
	Total	100%	91	212	303	100%	200	123	323
Multi-Unit (Low-Rise)	Auto Driver	55%	62	144	205	58%	130	102	232
	Auto Passenger	15%	17	39	56	19%	43	33	76
	Transit	21%	27	63	90	16%	39	30	69
	Cycling	2%	3	6	9	2%	5	4	9
	Walking	7%	9	22	31	5%	13	11	24
	Total	100%	118	274	391	100%	230	180	410
Total	Auto Driver	-	106	246	351	-	246	173	419
	Auto Passenger	-	30	69	99	-	80	56	136
	Transit	-	51	118	169	-	68	48	116
	Cycling	-	5	11	16	-	9	7	16
	Walking	-	17	42	59	-	27	19	46
	Total	-	209	486	694	-	430	303	733

As shown above, a total of 351 AM and 419 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

4.3 Trip Distribution

To understand the travel for the subject development, the OD Survey has been reviewed to determine the travel patterns for the Kanata/Stittsville and Rural Southwest districts. Based on the screenline review in Section 12,

Fernbank Road, east of Shea Road, during the PM peak hour in the westbound direction is expected to be over the TRANS capacity in the future background conditions, therefore, no trip assignments are distributed along Fernbank Road during the PM peak hour in the westbound direction. Table 12 below summarizes the expected distribution of trips from the proposed subdivision lands. While not explicitly detailed, it is expected that an amount of cut-through travel between the existing subdivision area and the proposed subdivision will occur, and it is assumed that the interaction of those trips on the area road network will balance through the proposed subdivision.

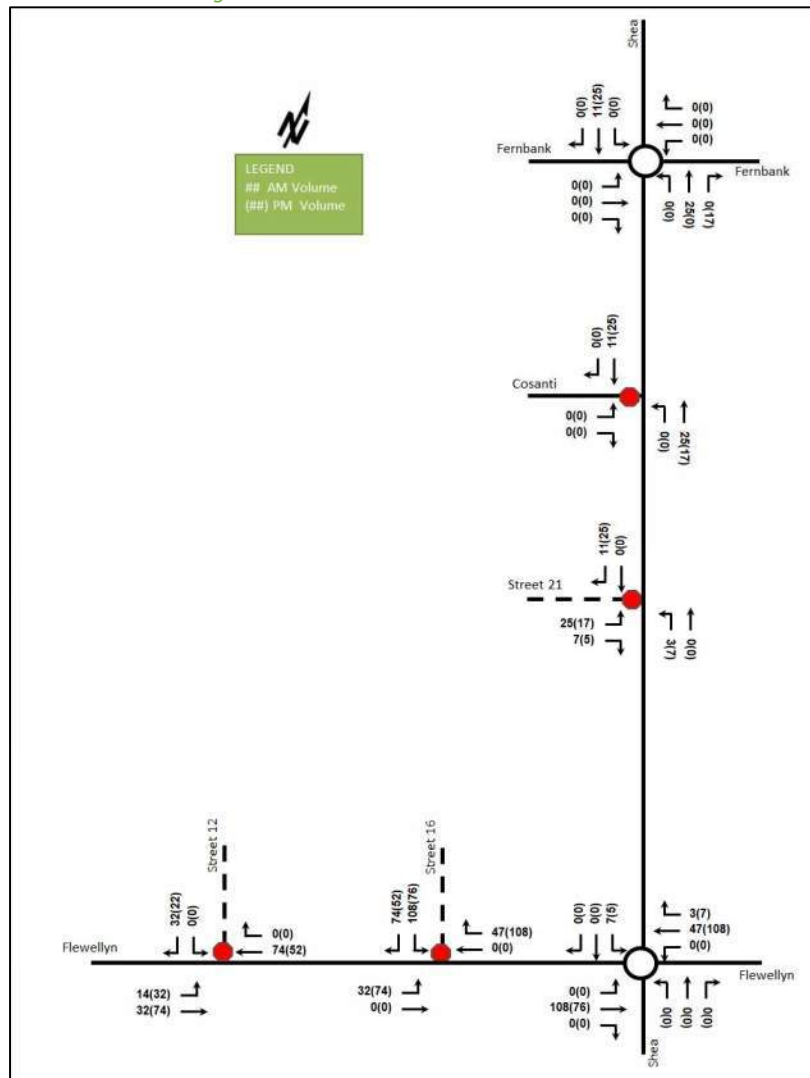
Table 12: OD Survey Distribution

To/From	Residential % of Trips	Inbound Via	Outbound Via
North	80%	35% Flewellyn (W) 10% Shea (N) 35% Flewellyn (E)	35% Flewellyn (W) 10% Shea (N) (AM)/10% Fernbank (E) (PM) 35% Flewellyn (E)
South	3%	3% Flewellyn (W)	3% Flewellyn (W)
East	12%	12% Flewellyn (E)	12% Flewellyn (E)
West	5%	5% Flewellyn (W)	5% Flewellyn (W)
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. Figure 12 illustrates the new site generated volumes.

Figure 12: New Site Generation Auto Volumes



5 Exemption Review

Table 13 summarizes the exemptions for this TIA.

Table 13: Exemption Review

Module	Element	Explanation	Exempt/Required
Site Design and TDM			
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
Parking	4.2.1 Parking Supply	Only required for site plan and zoning by-law applications	Exempt
Boundary Street Design		All applications	Required
Transportation Demand Management	All Elements	Only required when the development generates more than 60 person-trips	Required

Module	Element	Explanation	Exempt/Required
Network Impact			
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
Demand Rationalization		Only required when one or more other Network Impact Modules when the development generates more than 75 auto trips	Required
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
Transit	4.7.1 Transit Route Capacity	Only required when the development generates more than 75 transit trips	Required
	4.7.2 Transit Priority Requirements	Only required when the development generates more than 75 auto trips	Required
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
Intersection Design	4.4.1-2/4.9.1 Intersection Control	Only required when the development generates more than 75 auto trips	Required
	4.4.3/4.9.2 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 and garages for typical townhomes, and surface parking for stacked townhomes. Bicycle parking is assumed to be within the individual units.

A new proposed stormwater management pond area and a park are proposed within the subdivision. A 2.0-metre unidirectional cycletrack and 2.0-metre sidewalk are proposed along both sides of new collector roads, and a 1.8-metre sidewalk is proposed along one side of local roads within the subdivision. These facilities provide connectivity to the boundary streets of Shea Road and Flewellyn Road, adjacent subdivision, and the northern community.

Bus stops are included on Street #16 and Street #13 within the subdivision and are accessible via the sidewalk networks.

The conceptual sustainable transportation network has been provided in Appendix H.

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 2.0 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 1.8-metre-wide sidewalks on one side. The new local road is proposed to connect Painted Sky Way. 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 260 meters west of the intersection of Shea Road and Flewellyn Road, while Street 12 is 650 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 and match previous consultant with Transit Services.

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 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.

7 Boundary Street Design

Table 14 summarizes the MMLOS analysis for the boundary streets of Shea Road, Flewellyn Road, and the new internal roads of new collector and local roads. The TMP identifies the urbanization of Shea Road as a priority road project, which is assumed to include both sidewalks and cycletracks and has been incorporated into the future conditions. All roadways are within the “Suburban” area. The MMLOS worksheets has been provided in Appendix I.

Table 14: Boundary Street MMLOS Analysis

Segment	Conditions	Pedestrian LOS		Bicycle LOS		Transit LOS		Public Realm LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Shea Road	Existing	E	C	E	C	C	E	D	D
	Future	D	C	A	C	C	E	C	C
Flewellyn Road	Existing	E	C	C	C	-	E	D	D
	Future					C			
New Collector Road	Future	A	C	B	C	C	E	A	A
New Local Road	Future	B	C	A	C	-	-	B	B

Shea Road will not meet the pedestrian LOS targets in the existing and future conditions. To meet the pedestrian LOS target, either the maximum distance between controlled crossings needs to be between 291 and 400 metres, or the operating speed would require to be reduced to 60 km/h.

Flewellyn Road will not meet the pedestrian LOS targets in the existing and future conditions. To meet the pedestrian LOS target, either a 2.0 metre sidewalk with a 1.5-2.99 metre boulevard would be required, or a 2.0-metre sidewalk combined with a reduction in operating speed to 50 km/h. Given the presence of ditches and the rural conditions along Flewellyn Road, the addition of sidewalks along the site frontage is not considered feasible while the Municipal Drain is located on the north side of roadway.

Additionally, Flewellyn is located at the urban boundary, and no pedestrian connections are expected to the south and does not serve a connectivity/link purpose within the network. The pedestrian travel is focused to and from the north of the subdivision, integrating with the existing community. Therefore, it is recommended that the existing paved shoulders remain and provide the rural connectivity on Flewellyn Road.

Shea Road and Flewellyn Road will meet the bicycle, transit, and public realm LOS targets in the future conditions. The new collector and local roads will meet the pedestrian, bicycle, transit, and public realm LOS targets.

8 Transportation Demand Management

8.1 Context for TDM

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

8.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel, followed by transit, walking, and cycling, and those assumptions have been carried through the analysis. Although the intersections in the study area are anticipated to have residual capacity, Fernbank Road is expected to reach capacity in the future background conditions reviewed in Section 12. It is anticipated that future pedestrian facilities and cycling facilities provided within the adjacent 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.

8.3 TDM Program

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

9 Background Network Travel Demands

9.1 Transportation Network Plans

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

9.2 Background Growth

A review of the background projections from the City’s TRANS Regional Model for the 2022 and 2046 horizons was completed to determine the background growth for each of the study area roadways. As growth within the City is not a linear process, comparisons of existing volumes and existing plus background developments volumes to the forecasted 2046 volumes have been included to determine how regional development has occurred and the impact on the study area. Table 15 summarizes the result of the model, and the TRANS model plots are provided in Appendix K.

Table 15: Study Area Growth Rates – AM Peak Hour

Street	Directional Growth % from 2022 to 2046		Directional Growth % from Existing to 2046		Directional Growth % from Existing plus Explicit Developments to 2046	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
Flewellyn Rd	4.51%	3.76%	2.24%	-1.37%	0.16%	-3.54%
Fernbank Rd West of Shea Rd	1.28%	0.51%	0.99%	-1.09%	0.14%	-2.67%

Street	Directional Growth % from 2022 to 2046		Directional Growth % from Existing to 2046		Directional Growth % from Existing plus Explicit Developments to 2046	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
Fernbank Rd East of Shea Rd	3.85%	1.06%	-0.32%	-1.42%	-1.68%	-2.65%
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Shea Rd	2.89%	2.19%	-0.11%	-0.63%	-1.10%	-1.52%

A comparison of the existing plus explicit background development volumes with the TRANS model horizon volumes indicates that some movements exceed the 2046 forecasted volumes. Given that the roadways have finite capacity and cannot grow unconstrained, the growth rates from the existing plus explicit background development volumes to 2046 will be used to generate the study area growth rates. Growth rates will be applied to the mainline and major turning movements for the appropriate roads during the AM peak hour, rounded to the nearest 0.25% and reversed for the PM peak hour. Table 16 summarizes the suggested growth rates applied for the background road network.

Table 16: Recommended Area Growth Rates

Street	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Flewellyn Rd	0.25%	0.00%	0.00%	0.25%
Fernbank Rd West of Shea Rd	0.25%	0.00%	0.00%	0.25%
Fernbank Rd East of Shea Rd	0.00%	0.00%	0.00%	0.00%
	Northbound	Southbound	Northbound	Southbound
Shea Rd	0.00%	0.00%	0.00%	0.00%

9.3 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
- 5993, 6115, 6141, 6159 Flewellyn Road & 6070 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 90% of the development at 5993 Flewellyn Road have been completed in 2023. The development at 5993, 6115, 6141, 6159 Flewellyn Road & 6070 Fernbank Road includes a portion of the subject development, therefore the corresponding number of trips associated with this portion have been deducted from the total development trip volumes.

10 Demand Rationalization

10.1 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 13 illustrates the 2030 background volumes and Table 17 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 13: 2030 Future Background Volumes

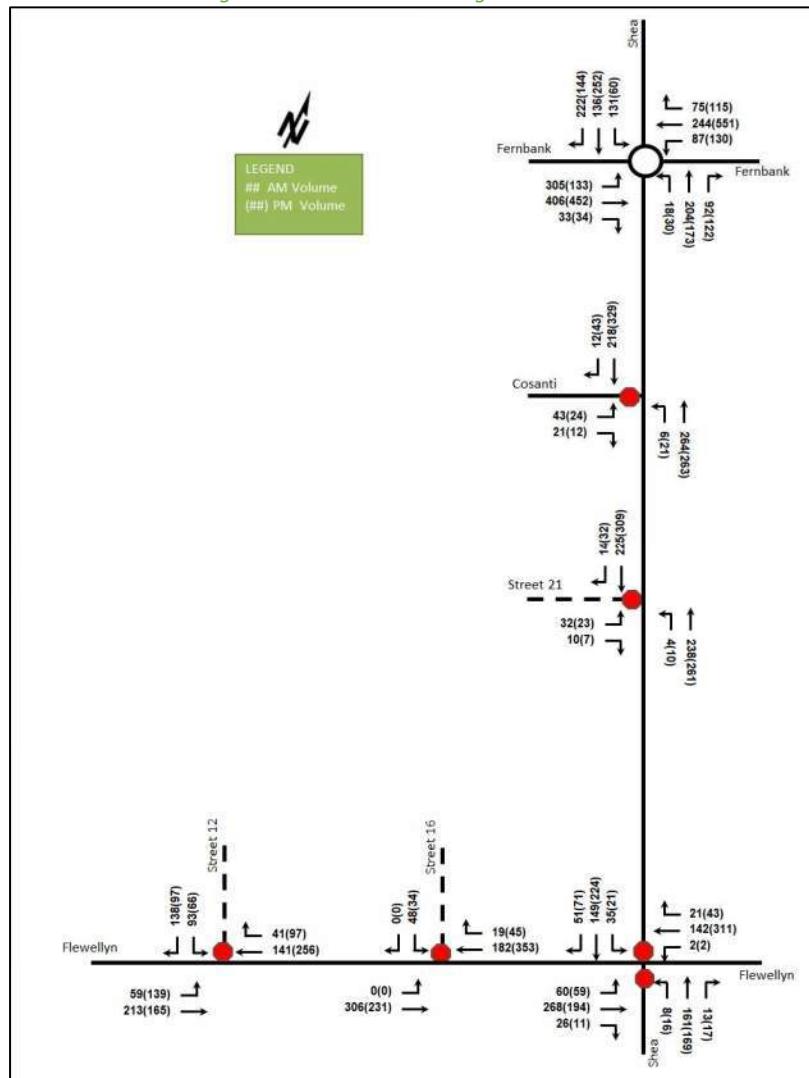


Table 17: 2030 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Fernbank Road Roundabout	EB	C	0.80	22.1	117.9	C	0.73	18.8	71.7
	WB	B	0.53	12.5	27.7	D	0.84	25.4	152.4
	NB	C	0.60	19.7	26.3	B	0.48	12.6	20.7
	SB	B	0.53	10.9	31.1	C	0.73	23.6	46.4
	Overall	C	0.80	16.9	-	C	0.84	21.3	-
Shea Road at Flewellyn Road Unsignalized	EB	A	0.04	7.7	0.8	A	0.05	8.2	1.5
	WB	A	0.00	7.8	0.0	A	0.00	7.6	0.0
	NB	C	0.45	20.9	17.3	D	0.62	32.7	29.3
	SB	C	0.57	24.3	25.5	E	0.83	46.8	57.0
	Overall	B	-	10.7	-	B	-	19.2	-
Shea Road at Cosanti Drive Unsignalized	EBL/R	B	0.11	11.8	3.0	B	0.07	13.0	1.5
	NBL/R	A	0.00	7.7	0.0	A	0.02	8.1	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	A	-	1.4	-	A	-	0.9	-
Shea Road at Street 21 Unsignalized	EBL/R	B	0.07	11.6	1.5	B	0.06	12.7	1.5
	NBL/T	A	0.00	7.7	0.0	A	0.01	8.0	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	A	-	1.0	-	A	-	0.7	-
Flewellyn Road at Street #16 Unsignalized	EBL/T	-	-	-	-	-	-	-	-
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.09	12.4	2.3	B	0.07	13.5	1.5
	Overall	A	-	1.1	-	A	-	0.7	-
Flewellyn Road at Street 12 Unsignalized	EBL/T	A	0.04	7.7	0.8	A	0.12	8.4	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.34	13.0	11.3	C	0.33	15.9	10.5
	Overall	A	-	5.1	-	A	-	4.6	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

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

During both the AM and PM peak hours, the study area intersections at the 2030 future background conditions operate acceptably. No capacity issues are noted.

The all-way stop control warrants were reviewed for the new intersection locations and the intersection of Flewellyn Road at Street 12 met the warrant for consideration of an all-way stop-control at the 2030 future background conditions. Although the warrants are met, the operations are acceptable to remain as a minor stop-controlled intersection. All-way stop control warrant calculation sheets are provided in Appendix D.

Signal warrant analysis of Justification 7 was conducted for the study area intersections for 2030 future background conditions. None of the intersections met Justification 7 for the forecasted conditions at this horizon. Signal warrant calculation sheets are provided in Appendix E.

Right turn lanes have been reviewed for the study area intersections. The need for right turn lanes is not based a warrant assessment and should be implemented to address operational needs. No operational issues are noted along either Shea Road or Flewellyn Road at these locations to require auxiliary right turn lanes and they are not recommended.

Left turn lane warrant analysis was performed for the study area intersections for 2030 future background conditions. The eastbound left turn at the intersection of Shea Road at Flewellyn Road intersection met the

warrants during both peak hours, although implementation of additional lanes is not recommended until the offset configuration has been addressed. The eastbound left turn at the intersection of Flewellyn Road at Street 12 met the warrants during both peak hours. Although the warrants were met, the operations are acceptable without the turn lane. The left-turn warrant calculation sheets are provided in Appendix F.

The inclusion of a 35.0-metre auxiliary eastbound left-turn lane at the intersection of Flewellyn Road and Street 12 has been summarized in Table 18 for informational purposes only. The addition of the lane has negligible change to the overall operations. The Synchro worksheets are provided in Appendix M.

Table 18: 2030 Future Background - EBL at Flewellyn Road at Street 12

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Flewellyn Road at Street 12 Unsignalized	EBL	A	0.04	7.7	0.8	A	0.12	8.4	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.34	12.9	11.3	C	0.33	15.8	10.5
	Overall	A	-	5.0	-	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

Based on the existing conditions and future operational constraints, a roundabout is assumed to be the solution the City will implement at the intersection of Shea Road at Flewellyn Road. Table 19 summarizes the 2030 future background operations for a roundabout condition. The Sidra worksheets are provided in Appendix M.

Table 19: 2030 Future Background - Roundabout Intersection

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Flewellyn Road Roundabout	EB	A	0.32	6.3	12.3	A	0.25	5.9	8.9
	WB	A	0.16	4.8	5.0	A	0.34	6.8	12.9
	NB	A	0.20	5.9	6.5	A	0.20	5.4	6.6
	SB	A	0.20	4.9	7.2	A	0.33	7.1	11.9
	Overall	A	0.32	5.6	-	A	0.34	6.4	-

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

10.2 2035 Future Background Intersection Operations

Figure 14 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 14: 2035 Future Background Volumes

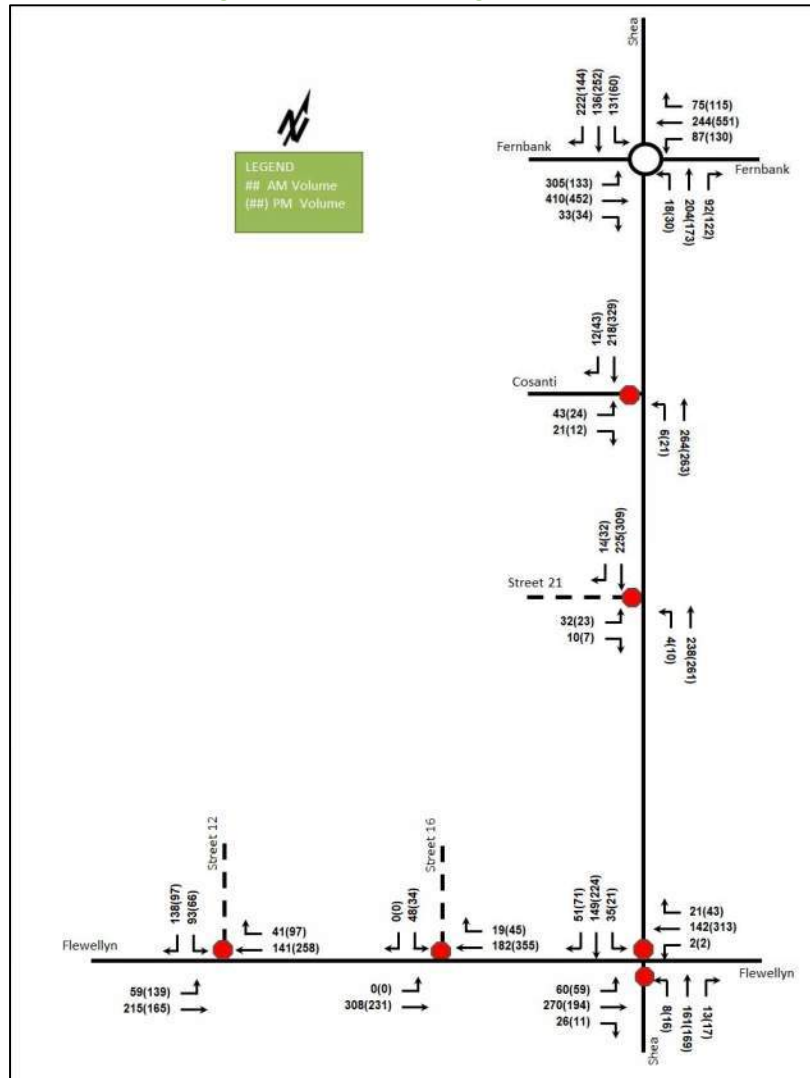


Table 20: 2035 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Fernbank Road Roundabout	EB	C	0.81	22.5	120.7	C	0.73	18.8	71.7
	WB	B	0.53	12.5	27.7	D	0.84	25.4	152.4
	NB	C	0.60	19.9	26.4	B	0.48	12.6	20.7
	SB	B	0.53	10.9	31.1	C	0.73	23.6	46.4
	Overall	C	0.81	17.1	-	C	0.84	21.3	-
Shea Road at Flewellyn Road Unsignalized	EB	A	0.04	7.7	0.8	A	0.05	8.2	1.5
	WB	A	0.00	7.8	0.0	A	0.00	7.6	0.0
	NB	C	0.45	20.9	17.3	D	0.63	33.1	30.0
	SB	C	0.57	24.4	25.5	E	0.83	47.2	57.0
	Overall	B	-	10.7	-	C	-	19.4	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Cosanti Drive Unsignalized	EBL/R	B	0.11	11.8	3.0	B	0.07	13.0	1.5
	NBL/R	A	0.00	7.7	0.0	A	0.02	8.1	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	A	-	1.4	-	A	-	0.9	-
Shea Road at Street 21 Unsignalized	EBL/R	B	0.07	11.6	1.5	B	0.06	12.7	1.5
	NBL/T	A	0.00	7.7	0.0	A	0.01	8.0	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	A	-	1.0	-	A	-	0.7	-
Flewellyn Road at Street #16 Unsignalized	EBL/T	-	-	-	-	-	-	-	-
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.09	12.5	2.3	B	0.07	13.5	1.5
	Overall	A	-	1.1	-	A	-	0.7	-
Flewellyn Road at Street 12 Unsignalized	EBL/T	A	0.04	7.7	0.8	A	0.12	8.4	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.34	13.0	11.3	C	0.33	15.9	10.5
	Overall	A	-	5.0	-	A	-	4.6	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

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

During both the AM and PM peak hours, the study area intersections at the 2035 future background conditions operate similar to the 2030 future background conditions. No capacity issues are noted.

No additional all-way stop control warrants were met, and the calculation sheets are provided in Appendix D.

Similarly, no additional signalization warrants were met, and the signal warrant calculation sheets are provided in Appendix E.

No change to the right-turn lane and left-turn lane recommendations are noted. The left-turn warrant calculation sheets are provided in Appendix F.

Similar to the 2030 background conditions, the inclusion of a 35.0-metre auxiliary eastbound left-turn lane at the intersection of Flewellyn Road and Street 12 has been summarized in Table 21. The addition of the lanes has negligible change to the overall operations. The Synchro worksheets are provided in Appendix N.

Table 21: 2035 Future Background - EBL at Flewellyn Road at Street 12

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Flewellyn Road at Street 12 Unsignalized	EBL	A	0.04	7.7	0.8	A	0.12	8.4	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.34	12.9	11.3	C	0.33	15.8	10.5
	Overall	A	-	5.0	-	A	-	4.5	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

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

Similar to the 2030 background conditions, a roundabout is assumed to be the solution the City will implement at the intersection of Shea Road at Flewellyn Road. Table 22 summarizes the 2035 future background operations for a roundabout condition. The Sidra worksheets are provided in Appendix N.

Table 22: 2035 Future Background - Roundabout Intersection

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Flewellyn Road Roundabout	EB	A	0.32	6.3	12.4	A	0.25	5.9	8.9
	WB	A	0.16	4.8	5.0	A	0.34	6.8	13.0
	NB	A	0.20	5.9	6.5	A	0.20	5.4	6.6
	SB	A	0.20	4.9	7.2	A	0.33	7.2	11.9
	Overall	A	0.32	5.6	-	A	0.34	6.4	-

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

10.3 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 development.

11 Transit

11.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 23 summarizes the transit trip generation.

Table 23: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Transit	Varies	51	118	169	68	48	116

The proposed development is anticipated to generate 169 AM and 116 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 24 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 24: 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	45	104	60	42	Bus	Two standard buses
East	6	14	8	6	Bus	One-fourth of a standard bus

In total, a 30-minute AM peak hour service level and a one-hour PM peak hour service level is estimated to be required for the proposed lands to meet the transit demand. Combined with the Phase 1 of the subdivision to the west, a 10–15-minute AM peak hour service level and a 20-minute PM peak hour service level are estimated to be required to accommodate the transit demand for the overall subdivision. The future transit stops are proposed within the subdivision, as illustrated in Figure 15, 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 15: Conceptual Subdivision Transit Stop Locations



11.2 Transit Priority

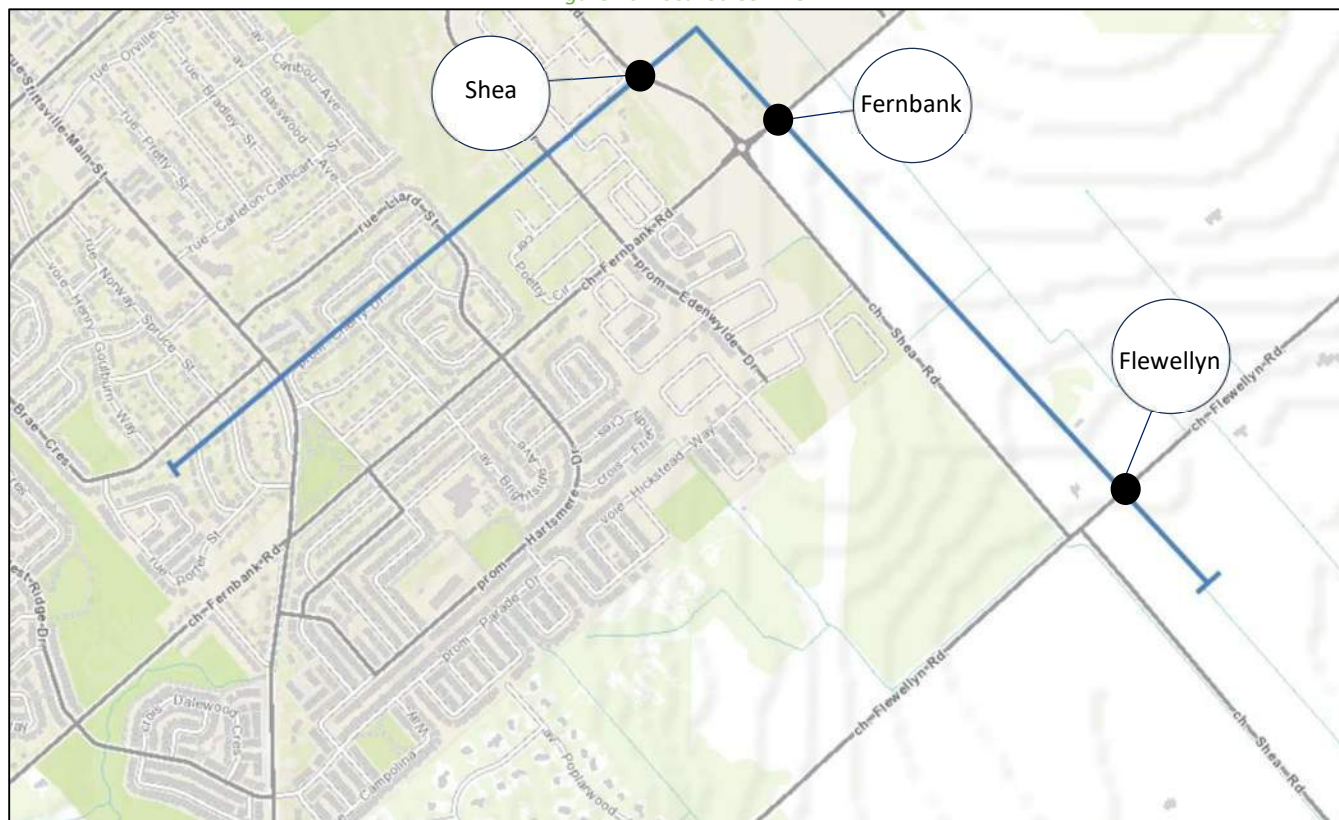
No transit priority is required along the boundary or within the subdivision. Within the regional network, the westbound road capacity along Fernbank Road may require localized widening to improve transit service from Robert Grant Avenue to Shea Road to maintain service times along this segment of roadway. 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.

12 Network Concept

A high-level review of the key roadway lane capacities and utilizations was completed to assess the networks' ability to accommodate additional growth. The lane capacity estimates are assembled from a review of the TRANS Regional Model and Screenline 44, which is located between Stittsville and Kanata from Richardson Side to Flewellyn Road in a north-south direction. 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 16. Table 25 summarizes the high-level capacity, existing and future volumes, and utilization of the roadway corridors in the immediate study area, and the existing volumes are included in Appendix B.

Figure 16: Local Screenline



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: May 05, 2026

Table 25: Local Area Screenline Road Capacity

Horizon	Roadway	Classification	Estimated Lane Capacity	Volumes	Percent Utilization
Existing	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	Shea Road	Collector	800 cars/hour	387-584	48-73%
	Fernbank Road	Arterial	800 cars/hour	341-796	43-100%
	Flewellyn Road	Collector	800 cars/hour	139-356	17-45%
2035 Future Background	Shea Road	Collector	800 cars/hour	387-584	48-73%
	Fernbank Road	Arterial	800 cars/hour	341-796	43-100%
	Flewellyn Road	Collector	800 cars/hour	139-358	17-45%
2030 Future Total	Shea Road	Collector	800 cars/hour	387-609	48-76%
	Fernbank Road	Arterial	800 cars/hour	341-796	43-100%
	Flewellyn Road	Collector	800 cars/hour	181-471	23-59%
2035 Future Total	Shea Road	Collector	800 cars/hour	387-609	48-76%
	Fernbank Road	Arterial	800 cars/hour	341-796	43-100%
	Flewellyn Road	Collector	800 cars/hour	181-473	23-59%

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

Notes:

Based on the percent utilization, all roadways have residual capacity in both 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.

13 Intersection Design

13.1 Intersection Control

The new roadway intersections are proposed as being stop-controlled on the minor approaches of Street #16 and Street #21.

13.2 Intersection Design

13.2.1 2030 Future Total Intersection Operations

The 2030 future total intersection volumes are illustrated in Figure 17 and the intersection operations are summarized below in Table 26. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. HCM 2010 methodology was used for unsignalized intersection operations and Sidra HCM 6 was used for roundabout intersection operations. The Synchro and Sidra worksheets have been provided in Appendix O.

Figure 17: 2030 Future Total Volumes

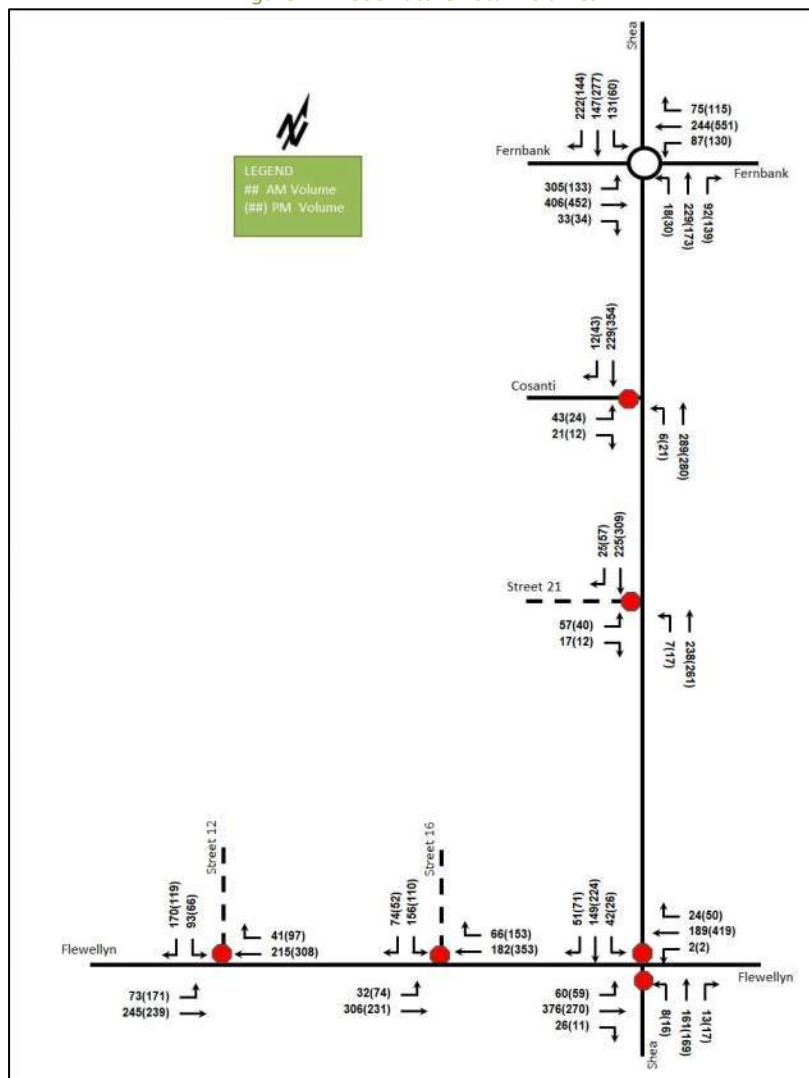


Table 26: 2030 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Fernbank Road Roundabout	EB	C	0.81	23.2	121.4	C	0.75	20.4	75.2
	WB	B	0.54	13.1	28.8	D	0.54	25.4	152.4
	NB	C	0.65	22.0	30.5	B	0.51	13.2	22.9
	SB	B	0.54	11.2	33.1	D	0.77	26.6	53.8
	Overall	C	0.81	17.9	-	C	0.84	22.4	-
Shea Road at Flewellyn Road Unsignalized	EB	A	0.05	7.8	0.8	A	0.06	8.5	1.5
	WB	A	0.00	8.1	0.0	A	0.00	7.8	0.0
	NB	D	0.56	29.5	24.0	F	0.90	81.6	55.5
	SB	E	0.76	44.5	44.3	F	1.14	137.1	103.5
	Overall	C	-	15.1	-	E	-	45.7	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Cosanti Drive Unsignalized	EBL/R	B	0.11	12.1	3.0	B	0.08	13.5	2.3
	NBL/R	A	0.01	7.7	0.0	A	0.02	8.2	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	A	-	1.4	-	A	-	0.9	-
Shea Road at Street 21 Unsignalized	EBL/R	B	0.13	12.1	3.0	B	0.11	13.4	3.0
	NBL/T	A	0.01	7.8	0.0	A	0.01	8.1	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	A	-	1.7	-	A	-	1.2	-
Flewellyn Road at Street #16 Unsignalized	EBL/T	A	0.02	7.8	0.8	A	0.07	8.7	1.5
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.43	16.7	15.8	C	0.43	21.3	15.8
	Overall	A	-	5.0	-	A	-	4.2	-
Flewellyn Road at Street 12 Unsignalized	EBL/T	A	0.06	7.9	1.5	A	0.15	8.7	3.8
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.43	15.4	16.5	C	0.45	20.4	16.5
	Overall	A	-	5.5	-	A	-	5.3	-

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 at 2030 future total conditions are anticipated to operate similar to the 2030 future background conditions, with exception of the intersection of Shea Road at Flewellyn Road.

At the intersection of Shea Road at Flewellyn Road, the northbound and southbound approaches movement are expected to operate with high delays, and the southbound movement is expected to be over theoretical capacity during the PM peak hour.

No additional all-way stop control warrants were met, and the calculation sheets are provided in Appendix D.

Signal warrant analysis of Justification 7 was conducted for the study area intersections for 2030 future total conditions. 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. 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. While it has been assumed to become a roundabout based on prior City consultation, this control could be signalization or a roundabout, depending on the property acquisition and funding allocation. Signal warrant calculation sheets are provided in Appendix E.

No change to the right-turn lane recommendations is noted.

Left turn lane warrant analysis was performed for the study area intersections for 2030 future total conditions. The westbound left turn met the warrants during the PM peak hour at the intersection of Shea Road at Flewellyn Road at this horizon. However, implementation of additional lanes is not recommended until the overall intersection solution is determined. The eastbound left turn met the warrants during the PM peak hour at the intersection of Flewellyn Road at Street #16 in the 2030 future total conditions. Although the warrants were met, the operations are acceptable without the turn lane. In addition, the ability to provide the turn lane at Street #16 is prevented by the Faulkner Municipal Drain. Therefore, no left turn lane is recommended at Street #16. The left-turn warrant calculation sheets are provided in Appendix F.

The inclusion of 40.0-metre auxiliary eastbound left-turn lane at the intersection of Flewellyn Road and Street 12 has been summarized in Table 27 for informational purposes only. The addition of the lane has negligible change to the overall operations. The Synchro worksheets are provided in Appendix O.

Table 27: 2030 Future Total - EBL at Flewellyn Road at Street 12

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Flewellyn Road at Street 12 Unsignalized	EBL	A	0.06	7.9	1.5	A	0.15	8.7	3.8
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.43	15.3	16.5	C	0.44	20.0	16.5
	Overall	A	-	5.5	-	A	-	5.2	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

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

Similar to the 2030 future background conditions, a roundabout is assumed to be the solution the City will implement at the intersection of Shea Road at Flewellyn Road. Table 28 summarizes the 2030 future total operations for a roundabout condition. In addressed the existing safety concerns and background traffic demands, an updated intersection is also expected to accommodate future development with the residual capacity. The Sidra worksheets are provided in Appendix O.

Table 28: 2030 Future Total - Roundabout Intersection

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Flewellyn Road Roundabout	EB	A	0.42	7.6	18.1	A	0.33	6.7	12.4
	WB	A	0.20	5.2	6.9	A	0.45	8.3	19.3
	NB	A	0.23	6.9	7.1	A	0.22	6.0	7.1
	SB	A	0.22	5.3	7.7	A	0.37	8.5	13.4
	Overall	A	0.42	6.5	-	A	0.45	7.6	-

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

13.2.2 2035 Future Total Intersection Operations

The 2035 future total intersection volumes are illustrated in 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 and Sidra worksheets have been provided in Appendix P.

Figure 18 and the intersection operations are summarized below in Table 29. 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. The intersection of Shea Road at Flewellyn Road will be analyzed as a roundabout intersection in the 2035 future total conditions.

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 and Sidra worksheets have been provided in Appendix P.

Figure 18: 2035 Future Total Volumes

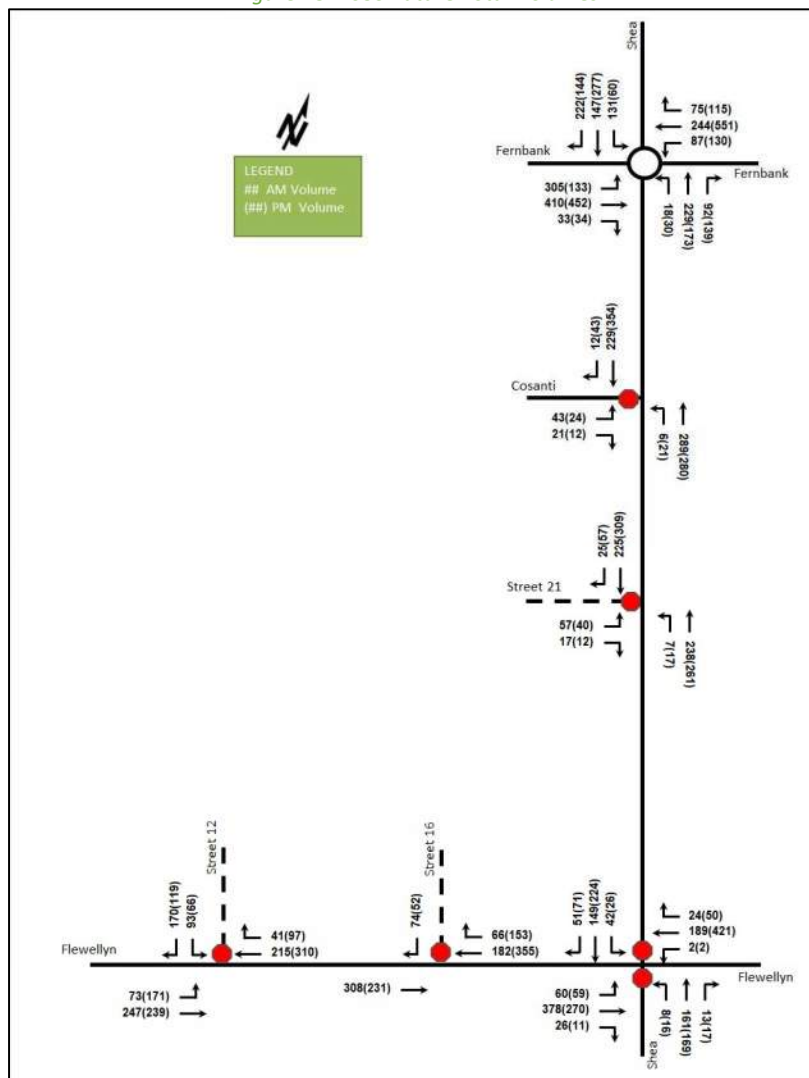


Table 29: 2035 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Fernbank Road Roundabout	EB	C	0.82	23.6	124.3	C	0.75	20.4	75.2
	WB	B	0.54	13.1	28.8	D	0.84	25.4	152.4
	NB	C	0.65	22.2	30.6	B	0.51	13.2	22.9
	SB	B	0.54	11.2	33.1	D	0.77	26.6	53.8
	Overall	C	0.82	18.1	-	C	0.84	22.4	-
Shea Road at Flewellyn Road Unsignalized	EB	A	0.05	7.8	0.8	A	0.06	8.5	1.5
	WB	A	0.00	8.1	0.0	A	0.00	7.8	0.0
	NB	D	0.56	29.5	24.0	F	0.91	83.8	56.3
	SB	E	0.76	44.5	44.3	F	1.15	138.7	103.5
	Overall	C	-	15.1	-	E	-	46.4	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Cosanti Drive Unsignalized	EBL/R	B	0.11	12.1	3.0	B	0.08	13.5	2.3
	NBL/R	A	0.01	7.7	0.0	A	0.02	8.2	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	A	-	1.4	-	A	-	0.9	-
Shea Road at Street 21 Unsignalized	EBL/R	B	0.13	12.1	3.0	B	0.11	13.4	3.0
	NBL/T	A	0.01	7.8	0.0	A	0.01	8.1	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	A	-	1.7	-	A	-	1.2	-
Flewellyn Road at Street #16 Unsignalized	EBL/T	A	0.02	7.8	0.8	A	0.07	8.7	1.5
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.43	16.7	15.8	C	0.43	21.3	15.8
	Overall	A	-	5.0	-	A	-	4.2	-
Flewellyn Road at Street 12 Unsignalized	EBL/T	A	0.06	7.9	1.5	A	0.15	8.7	3.8
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.44	15.4	16.5	C	0.45	20.5	16.5
	Overall	A	-	5.5	-	A	-	5.3	-

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 at the 2035 future total conditions are anticipated to operate similar to the 2035 future background conditions, with exception of the intersection of Shea Road at Flewellyn Road.

At the intersection of Shea Road at Flewellyn Road, the northbound and southbound movements are expected to operate with high delays, and the southbound movement is expected to be over theoretical capacity during the PM peak hour.

No additional all-way stop control warrants were met in 2035 future total conditions, and the calculation sheets are provided in Appendix D.

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

No change to the right-turn lane and left-turn lane recommendations are noted. The left-turn warrant calculation sheets are provided in Appendix F.

The inclusion of 40.0-metre auxiliary eastbound left-turn lane at the intersection of Flewellyn Road and Street 12 has been summarized in Table 30 for informational purposes only. The addition of the lane has negligible change to the overall operations. The Synchro worksheets are provided in Appendix P.

Table 30: 2035 Future Total - EBL at Flewellyn Road at Street 12

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Flewellyn Road at Street 12 <i>Unsignalized</i>	EBL	A	0.06	7.9	1.5	A	0.15	8.7	3.8
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.43	15.4	16.5	C	0.44	20.0	16.5
	Overall	A	-	5.5	-	A	-	5.2	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

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

Similar to the 2035 future background conditions, a roundabout is assumed to be the solution the City will implement at the intersection of Shea Road at Flewellyn Road. Table 31 summarizes the 2035 future total operations for a roundabout condition. In addressed the existing safety concerns and background traffic demands, an updated intersection is also expected to accommodate future development with the residual capacity. The Sidra worksheets are provided in Appendix P.

Table 31: 2035 Future Total - Roundabout Intersection

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Flewellyn Road <i>Roundabout</i>	EB	A	0.42	7.6	18.2	A	0.33	6.7	12.4
	WB	A	0.20	5.2	6.9	A	0.45	8.3	19.5
	NB	A	0.23	6.9	7.1	A	0.22	6.0	7.1
	SB	A	0.22	5.3	7.7	A	0.37	8.5	13.4
	Overall	A	0.42	6.5	-	A	0.45	7.6	-

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

13.2.3 Sensitivity Analysis – Street #16 Right-In/Right-Out

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 an eastbound left-turn lane cannot be provided at the intersection of Flewellyn Road at Street #16. As such, the alternative may be to restrict the north leg to right-in/right out (RIRO). A sensitivity analysis has been conducted examining the traffic impacts of this potential restriction. It is noted that changes to the traffic assignment will not affect the intersections of shea Road at Fernbank Road and at Cosanti Drive.

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 19 illustrates the 2035 future total horizons with the right-in/right-out restriction and the intersection operations are summarized in Table 32. The Synchro and Sidra worksheets have been provided in Appendix Q.

Figure 19: 2035 Future Total Volumes– Sensitivity with RIRO Street #16

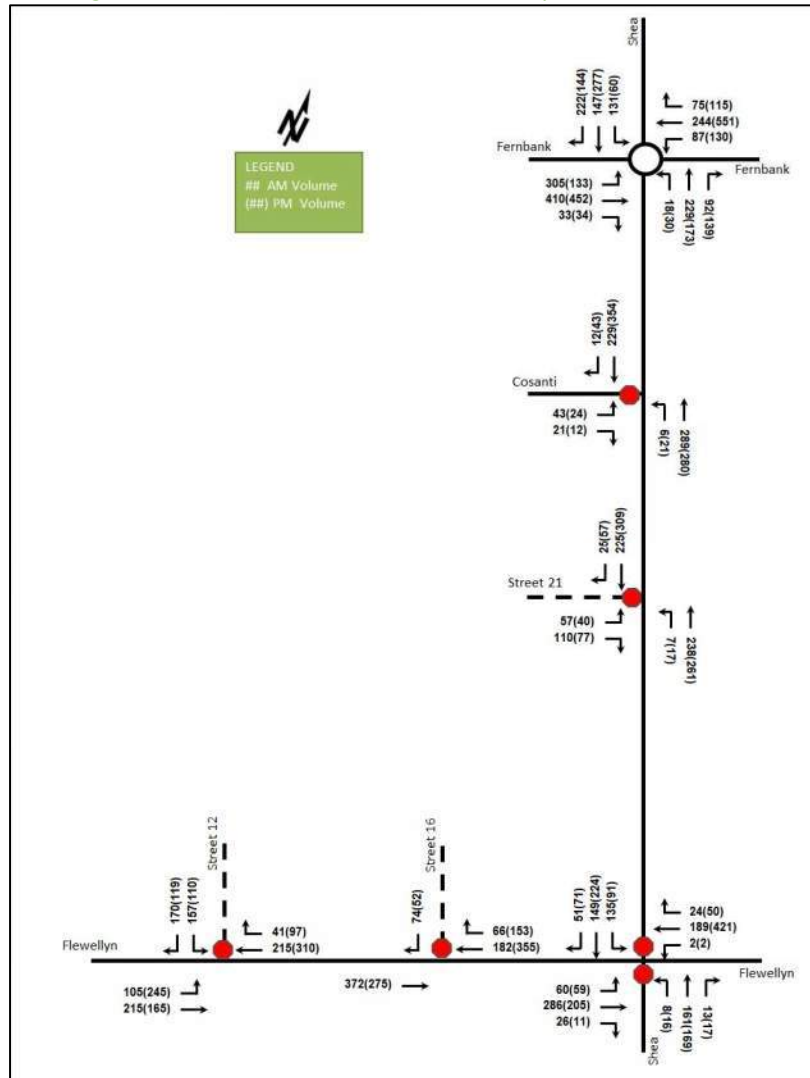


Table 32: 2035 Future Total Intersection Operations– Sensitivity with RIRO Street #16

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Flewellyn Road <i>Unsignalized</i>	EB	A	0.05	7.8	0.8	A	0.06	8.5	1.5
	WB	A	0.00	7.9	0.0	A	0.00	7.7	0.0
	NB	C	0.49	23.8	19.5	F	0.79	56.1	44.3
	SB	F	1.09	114.6	97.5	F	1.51	283.6	169.5
	Overall	E	-	39.2	-	F	-	90.8	-
Shea Road at Street 21 <i>Unsignalized</i>	EBL/R	B	0.24	12.0	7.5	B	0.20	12.7	5.3
	NBL/T	A	0.01	7.8	0.0	A	0.01	8.1	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	A	-	3.1	-	A	-	2.1	-
Flewellyn Road at Street #16 <i>Unsignalized</i>	EBL/T	-	-	-	-	-	-	-	-
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	A	0.09	9.8	2.3	B	0.08	11.3	2.3
	Overall	A	-	1.0	-	A	-	0.7	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Flewellyn Road at Street 12 Unsignalized	EBL/T	A	0.08	8.0	2.3	A	0.21	9.0	6.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.62	22.0	30.8	E	0.72	40.4	39.0
	Overall	A	-	8.9	-	B	-	11.0	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

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

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 acceptably during both the AM and PM peak hours, with exception of the intersection of Shea Road at Flewellyn Road.

At the intersection of Shea Road at Flewellyn Road, the northbound movement during the PM peak hour and the southbound movement during both peak hours are expected to operate with high delays, and the southbound movement is expected to be over theoretical capacity during both peak hours.

The inclusion of 60.0-metre auxiliary eastbound left-turn lane at the intersection of Flewellyn Road and Street 12 has been summarized in Table 33 for informational purposes only. The addition of the lane has negligible change to the overall operations. The Synchro worksheets are provided in Appendix Q.

Table 33: 2035 Future Total - EBL at Flewellyn Road at Street 12- Sensitivity with RIRO Street #16

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Flewellyn Road at Street 12 Unsignalized	EBL	A	0.08	8.0	2.3	A	0.21	9.0	6.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.61	21.7	30.8	E	0.70	38.4	37.5
	Overall	A	-	8.8	-	B	-	10.5	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

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

Similar to the 2035 future background conditions, a roundabout is assumed to be the solution the City will implement at the intersection of Shea Road at Flewellyn Road. Table 34 summarizes the 2035 future total operations for a roundabout condition. In addressed the existing safety concerns and background traffic demands, an updated intersection is also expected to accommodate future development with the residual capacity. The Sidra worksheets are provided in Appendix Q.

Table 34: 2035 Future Total - Roundabout Intersection- Sensitivity with RIRO Street #16

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Shea Road at Flewellyn Road Roundabout	EB	A	0.37	7.5	14.4	A	0.28	6.6	10.0
	WB	A	0.20	5.2	6.9	A	0.45	8.3	19.5
	NB	A	0.23	6.9	7.2	A	0.22	6.0	7.1
	SB	A	0.31	6.2	11.6	A	0.45	9.8	19.9
	Overall	A	0.37	6.6	-	A	0.45	8.0	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

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

Overall, the right-in/right-out configuration at Street #16 is considered acceptable given the geometric constraints with providing an eastbound left-turn lane.

13.2.4 Intersection MMLOS

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

13.2.5 Recommended Design Elements

Based on the operational analysis provided, the following network improvements are indicated for consideration:

- Shea Road at Flewellyn Road:
 - City led improvement and upgrading to a roundabout/signal, to be confirmed through the City's intersection control study, to address the existing safety issues and future background capacity constraints

14 Summary of Improvements Indicated and Modifications Options

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

Proposed Site and Screening

- The proposed development includes 291 single-detached homes and 376 townhomes, and 200 stacked townhomes
- New collector roadways are proposed to connect to Shea Road and Flewellyn Road, and new local roads to connect to Painted Sky Way and the adjacent subdivision
- The anticipated build-out is assumed to be 2030

TIA Screening and Exemptions

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

Existing Conditions

- Fernbank Road is arterial roads, Shea Road and Flewellyn Road are collector roads within the study area, and Cosanti Drive and Painted Sky Way are local roads
- Paved shoulders are present on both sides along Fernbank Road, Shea Road north of Fernbank Road, and Flewellyn Road
- No transit stops are currently 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
- 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 has been constructed as identified within the TMP cycling network

Development Generated Travel Demand

- The proposed development is forecasted produce 694 two-way people trips during the AM peak hour and 733 two-way people trips during the PM peak hour
- Of the forecasted people trips, 351 two-way trips will be vehicle trips during the AM peak hour, and 419 two-way trips will be vehicle trips during the PM peak hour
- Of the forecasted trips, 80% are anticipated to travel north, 12% to the east, and 5% to the west and 3% to the south

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
- A new stormwater management pond area and a new park are proposed within the subdivision
- Bus stops are included on Street #16 and Street #13 within the subdivision and are accessible via the sidewalk networks

New Street Networks

- The new 26.0-metre-wide collector road are proposed with 2.0-metre-wide sidewalk and 2.0 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 1.8-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
- Traffic calming elements are recommended within the subdivision including 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

Boundary Street Design

- Shea Road will not meet the pedestrian LOS targets in the existing and future conditions. To meet the pedestrian LOS target, either the maximum distance between controlled crossings needs to be between 291 and 400 metres, or the operating speed would require to be reduced to 60 km/h
- Flewellyn Road will not meet the pedestrian LOS targets in the existing and future conditions. To meet the pedestrian LOS target, either a 2.0 metre sidewalk with a 1.5-2.99 metre boulevard would be required, or a 2.0-metre sidewalk combined with a reduction in operating speed to 50 km/h
- Given the presence of ditches and the rural conditions along Flewellyn Road and the lack of pedestrian connectivity opportunities to the south, the existing paved shoulders are recommended to remain to provide rural pedestrian connectivity
- Shea Road and Flewellyn Road will meet the bicycle, transit, and public realm LOS targets in the future conditions
- The new collector and local roads will meet the pedestrian, bicycle, transit, and public realm LOS targets

TDM

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

Background Conditions

- The background developments were explicitly included in the background conditions, along with background growth applied on study area roadways along the mainline volumes
- During both the AM and PM peak hours, the intersections in the study area operate acceptably in the future background conditions
- No capacity constraints are noted at the study area intersections in the background conditions
- The intersection of Flewellyn Road at Street 12 meets the all-way stop control warrants at the 2030 future background conditions; however, the operations are acceptable to remain as a minor stop-controlled intersection
- No signalization warrants were met, and no right-turn lane recommendations were noted in the background conditions
- The eastbound left turn at the intersection of Shea Road at Flewellyn Road intersection met the warrants during both peak hours at the 2030 future background conditions, although implementation of additional lanes is not recommended until the offset configuration has been addressed
- The eastbound left turn at the intersection of Flewellyn Road at Street 12 met the warrants during both peak hours at the 2030 future background conditions; however, the operations are acceptable without the turn lane
- The inclusion of a 35.0-metre auxiliary eastbound left-turn lane at the intersection of Flewellyn Road results in a negligible change to the overall operations
- Based on the existing conditions and future operational constraints, a roundabout is assumed to be the solution the City will implement at the intersection of Shea Road at Flewellyn Road

Transit

- The proposed development is anticipated to generate an additional 169 AM and 116 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 30-minute AM peak hour service level and a one-hour PM peak hour service level is estimated to be required for the proposed lands to meet the transit demand
- Combined with the Phase 1 of the subdivision to the west, a 10–15-minute AM peak hour service level and a 20-minute PM peak hour service level are estimated to be required to accommodate the transit demand for the overall subdivision
- 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 are proposed as being stop-controlled on the minor approaches of Street #16 and Street #21
- The study area intersections are anticipated to operate acceptably except for the northbound and southbound movements at Shea Road at Flewellyn Road intersection during the PM peak hour in the future total conditions
- No additional all-way stop control warrants were met, and no right-turn lane recommendations were noted in the future total conditions
- The intersection of Shea Road at Flewellyn Road met Signal Justification 7 for minimum vehicular volume in the 2030 future total conditions
- To address the existing safety concerns and background traffic demands, upgrading the intersection of Shea Road at Flewellyn Road to a roundabout is also expected to accommodate future development with the residual capacity
- Although the westbound left turn during the PM peak hour meets the warrants at the intersection of Shea Road at Flewellyn Road at the 2030 future total conditions, implementation of additional lanes is not recommended until Shea Road can be realigned
- Although eastbound left turns at Flewellyn Road and Street #16 during the PM peak hour meet the left-turn warrants for consideration, no turn lane is recommended due to the acceptable operations and the presence of Faulkner Municipal Drain

- The inclusion of a 40.0-metre auxiliary eastbound left-turn lane at the intersection of Flewellyn Road results in a negligible change to the overall operations
- The right-in/right-out configuration at Street #16 is considered acceptable given the geometric constraints with providing an eastbound left-turn lane

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

City of Ottawa 2023 Revisions to 2017 TIA Guidelines		Date:	2026-05-07
Step 1 - Screening Form		Project Number:	2026-018
		Project Reference:	Caivan Magnolia East
1.1 Description of Proposed Development			
Municipal Address	1770 & 1820 Shea Road and 5971 & 5993 Flewellyn		
Description of Location	At the northwest corner of Shea Road at Flewellyn Road intersection		
Land Use Classification	Rural Countryside Zone (RU) and Development Reserve Zone (DR)		
Development Size	291 single-detached homes, 376 townhomes, and 200 stacked townhomes		
Accesses	New collector roads are proposed to connect to Shea Road and Flewellyn Road and new local roads are proposed to connect internally to these collector roads and the adjacent subdivision		
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	867	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 (23) at Fleweelny 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 registered¹ 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.

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

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: <u>6 Plaza Court</u>
City / Postal Code: <u>Ottawa, K2H 7W1</u>
Telephone / Extension: <u>613-697-3797</u>
Email Address: <u>andrew.harte@cghtransportation.com</u>

Stamp



Revision Date: June 2023

Appendix B

Turning Movement Counts



Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

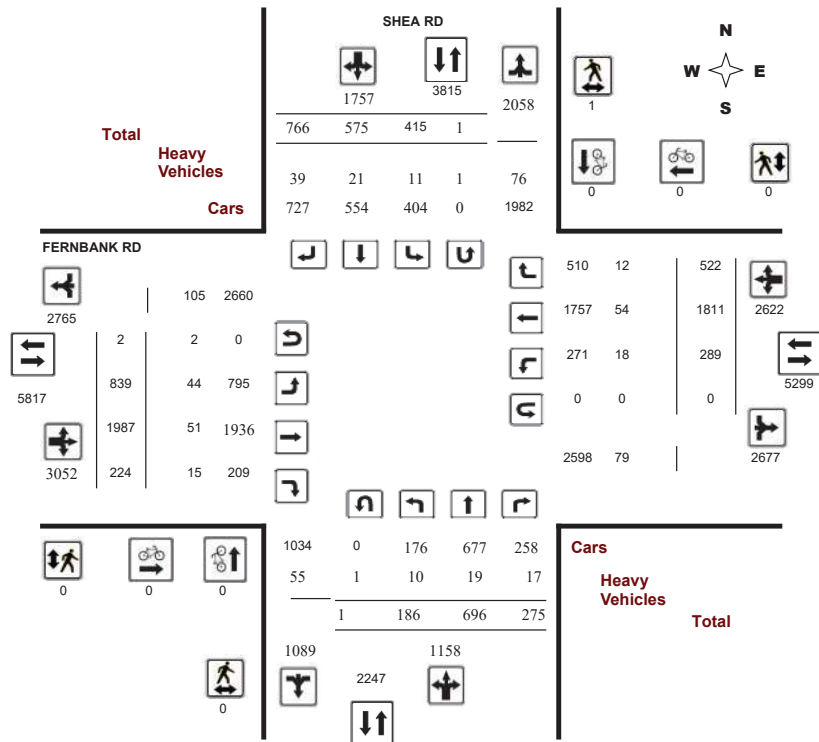
Survey Date: Wednesday, March 02, 2022

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

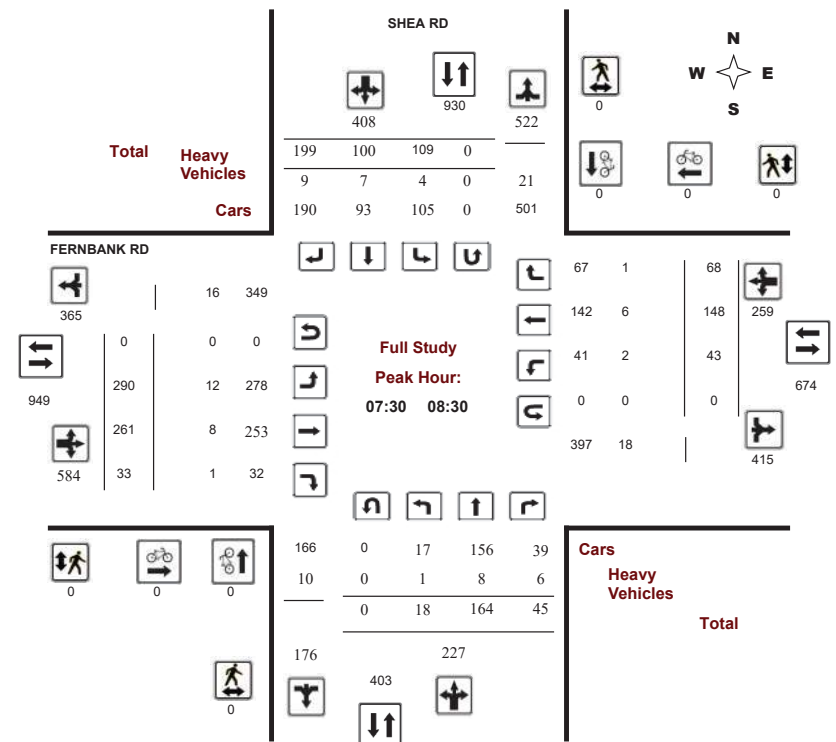
Survey Date: Wednesday, March 02, 2022

WO No: 40193

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

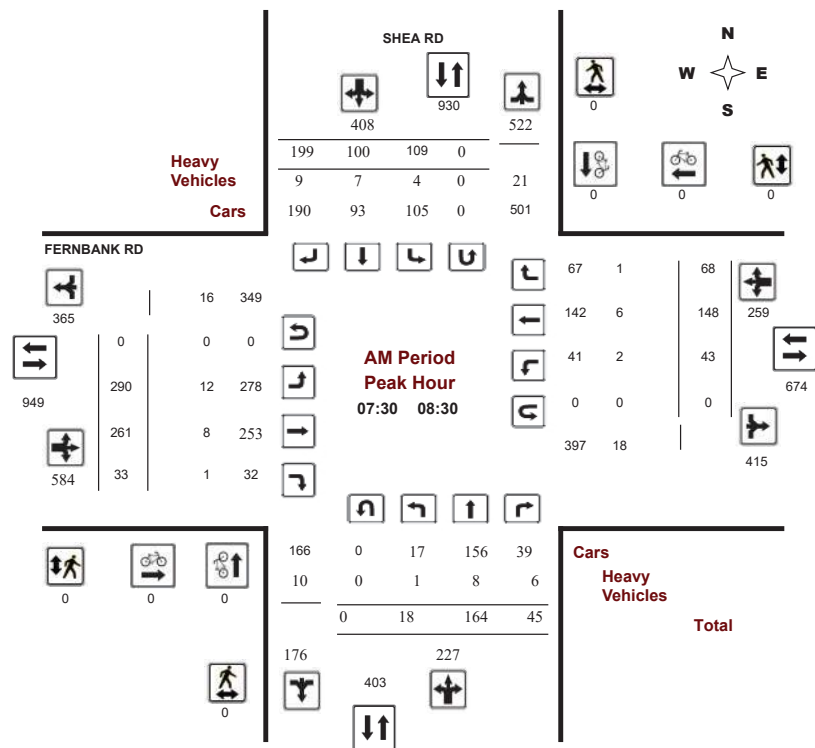
FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022

Start Time: 07:00

WO No: 40193

Device: Miovision



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

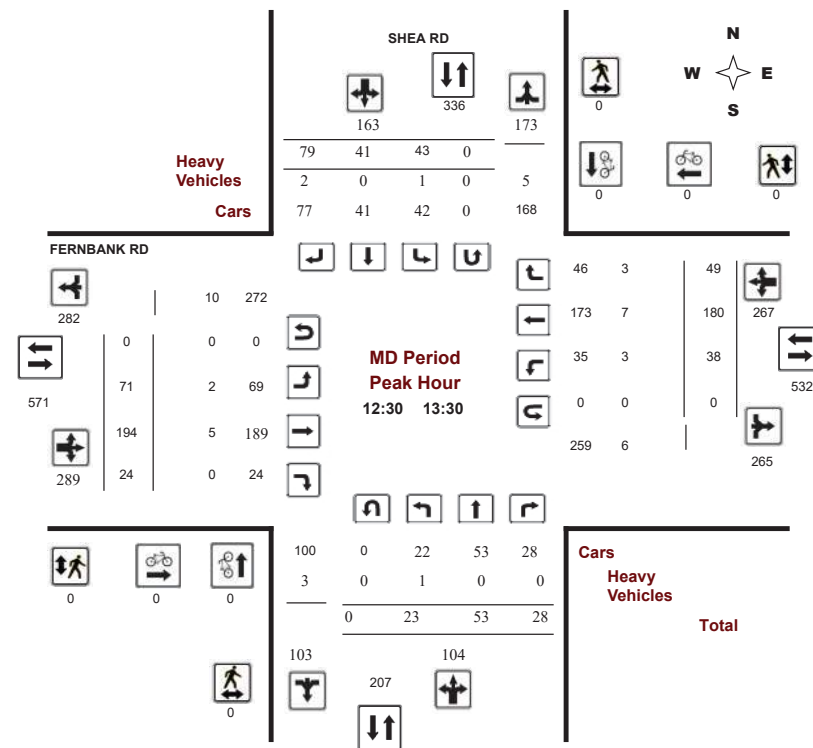
FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022

Start Time: 07:00

WO No: 40193

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

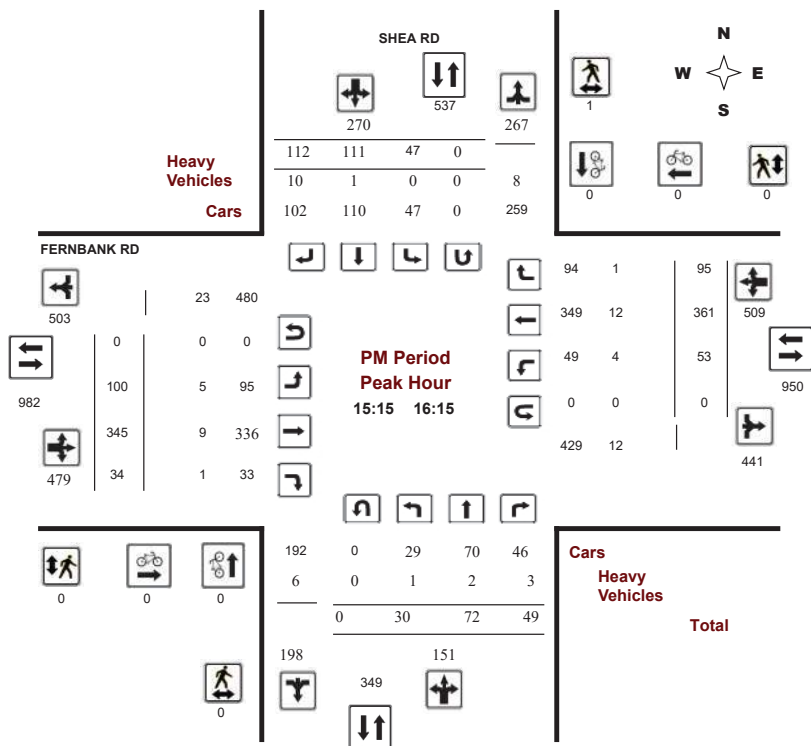
FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022

Start Time: 07:00

WO No: 40193

Device: Miovision



Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022

Start Time: 07:00

WO No: 40193

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, March 02, 2022

Total Observed U-Turns

AADT Factor

Northbound: 1 Southbound: 1
Eastbound: 2 Westbound: 0

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	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				2				2				0						
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.																			

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	48	14	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.

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

Time Period	SHEA RD		Total	FERNBANK RD		Total	Grand Total
	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)		EB Approach (N or S Crossing)	WB Approach (N or S Crossing)		
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											
Time Period	Northbound				Southbound				Eastbound				Westbound				W TOT	STR TOT	Grand Total		
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT					
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

SHEA RD

FERNBANK 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	1	0	0	1
08:45 09:00	0	0	0	0	0
09:00 09:15	0	0	1	0	1
09:15 09:30	0	0	0	0	0
09:30 09:45	0	0	0	0	0
09:45 10:00	0	0	0	0	0
11:30 11:45	0	0	0	0	0
11:45 12:00	0	0	0	0	0
12:00 12:15	0	0	0	0	0
12:15 12:30	0	0	0	0	0
12:30 12:45	0	0	0	0	0
12:45 13:00	0	0	0	0	0
13:00 13:15	0	0	0	0	0
13:15 13:30	0	0	0	0	0
15:00 15:15	0	0	0	0	0
15:15 15:30	0	0	0	0	0
15:30 15:45	0	0	0	0	0
15:45 16:00	0	0	0	0	0
16:00 16:15	0	0	0	0	0
16:15 16:30	0	0	0	0	0
16:30 16:45	0	0	0	0	0
16:45 17:00	0	0	0	0	0
17:00 17:15	0	0	0	0	0
17:15 17:30	0	0	0	0	0
17:30 17:45	1	0	0	0	1
17:45 18:00	0	0	1	0	1
Total	1	1	2	0	4



Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

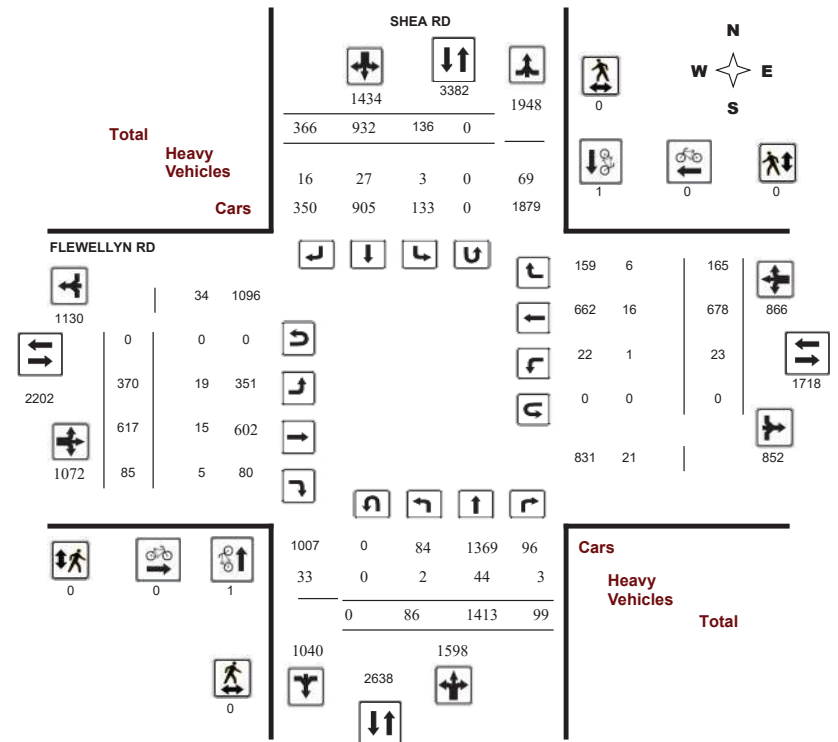
Survey Date: Wednesday, April 26, 2023

WO No: 40938

Start Time: 07:00

Device: Miovision

Full Study Diagram





Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

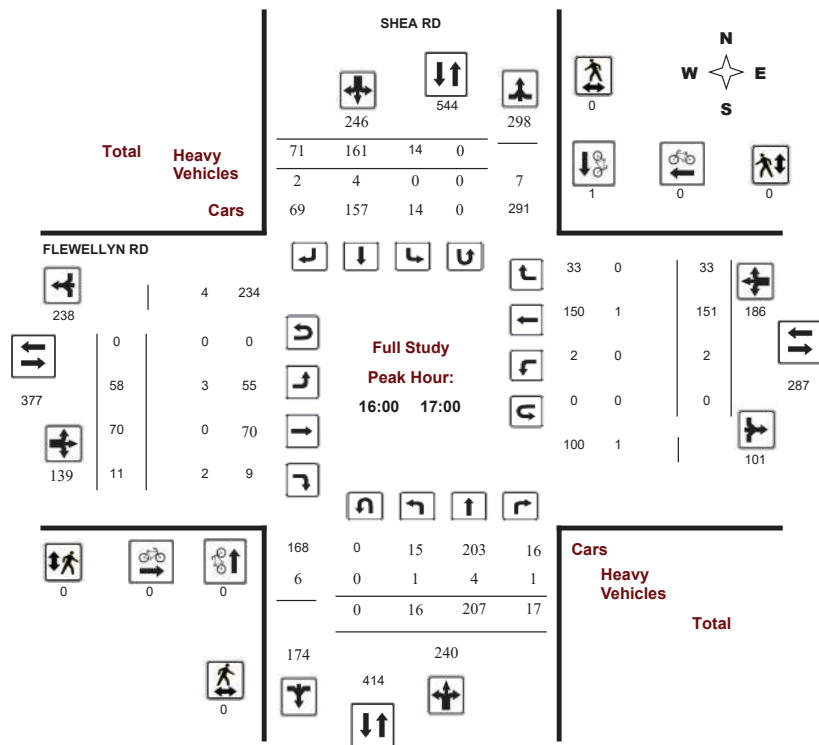
Survey Date: Wednesday, April 26, 2023

WO No: 40938

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

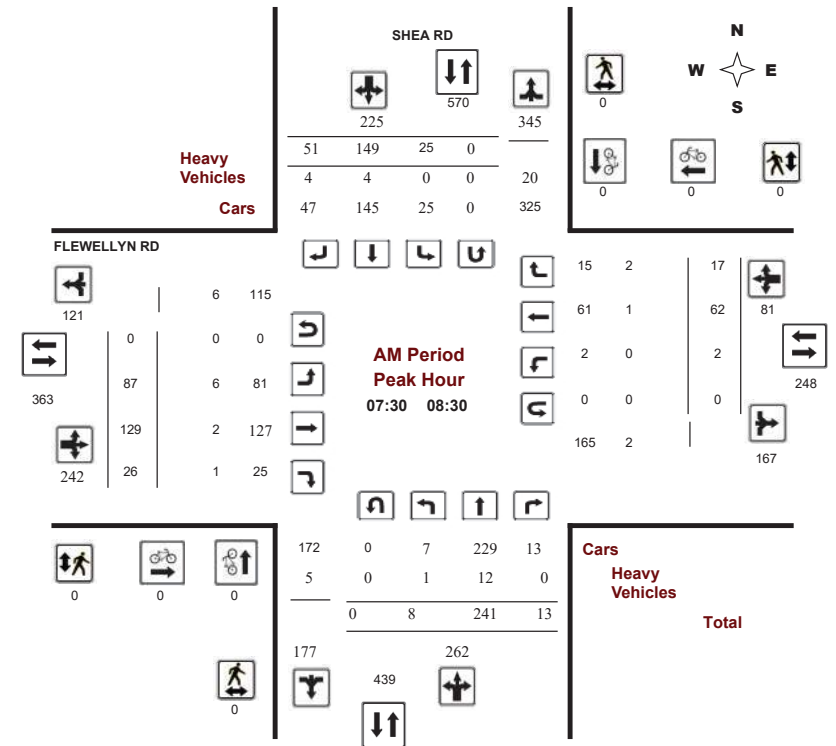
FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023

WO No: 40938

Start Time: 07:00

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

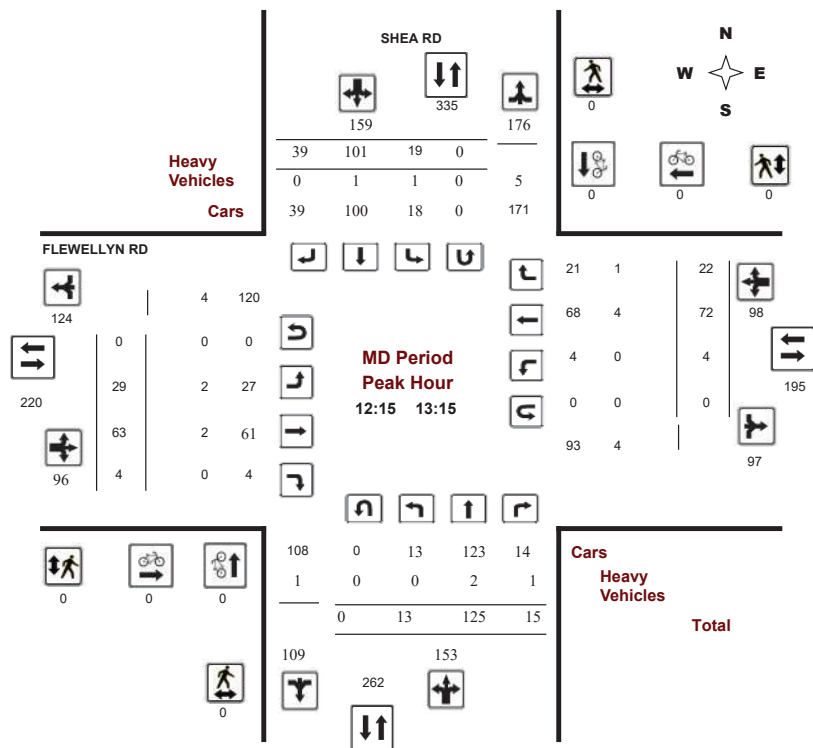
FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023

Start Time: 07:00

WO No: 40938

Device: Miovision



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

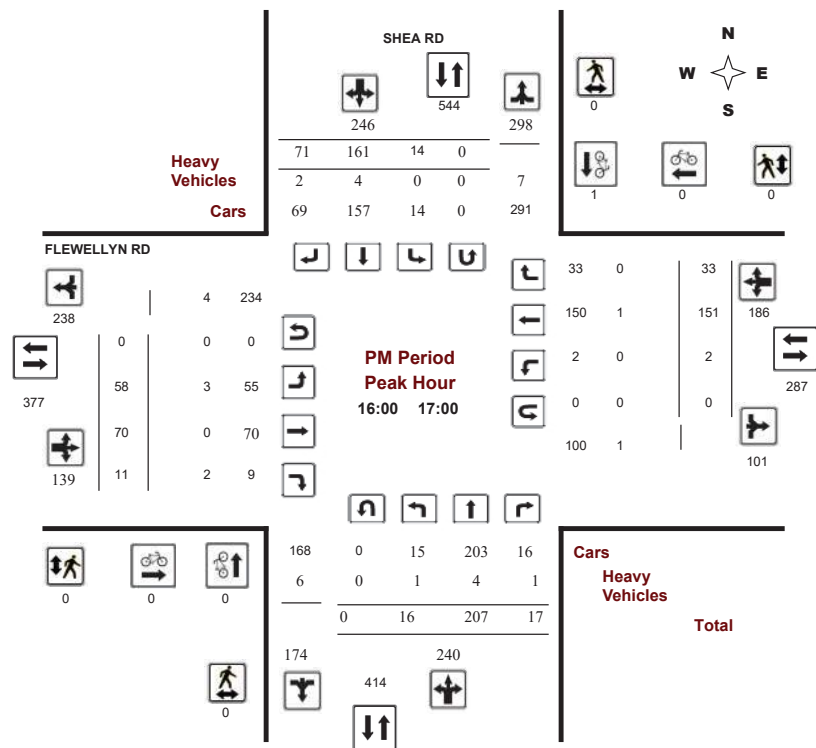
FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023

Start Time: 07:00

WO No: 40938

Device: Miovision





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

AADT Factor

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

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			FLEWELLYN RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street 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			FLEWELLYN RD			Grand Total
	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	
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			
		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	
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	

Appendix C

Synchro 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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				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: Sieglösch 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.

HCM 2010 TWSC
8: Shea & Flewellyn

Existing
AM Peak Hour

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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				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: Sieglach M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: C:\Users\MichelleChen\CGH TRANSPORTATION\CGH Active Projects - Documents\2021\2021-128 Calvan Flewellyn\DATA\W-4 Report\Sidra - W-4 Report\2021-128 Shea Road at Fernbank Road - 2024-12-13.sip9

HCM 2010 TWSC
8: Shea & Flewellyn

Existing
PM Peak Hour

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				

HCM 2010 TWSC
18: Shea & Cosanti

Existing
PM Peak Hour

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

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)
2305	309	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)
3810	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)
3810	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)
4099	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)
4068	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 (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)
3679	244	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

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

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
3679	244	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)
3833	427	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)
3833	427	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 (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)
3533	254	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 (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)
3545	254	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)
4349	1212	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	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)
4362	1212	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Fewlellyn Road at Street #12 (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)
3460	1218	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	YES	NO

Appendix E

Signal Warrant Calculation

Input Data Sheet

[Analysis Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)
[GO TO Justification:](#)

What are the intersecting roadways?

Flewellyn Road & Shea Road

What is the direction of the Main Road street?

North-South

When was the data collected?

2023-04-26

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road?

1

b.- Number of lanes on the Minor Road?

1

c.- How many approaches?

4

d.- What is the operating environment?

Rural

Population < 10,000

AND

Speed >= 70 km/hr

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

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

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Flewellyn Road & Shea Road

Count Date: 2023-04-26

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
1A	☒	☐	☐	☐	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
	480	720	600	900	713	690	515	419	483	658	811	681	787	98
1B	COMPLIANCE %				100	100	100	87	100	100	100	100		
	120	170	120	170	299	249	199	162	189	250	325	265		
COMPLIANCE %					100	100	100	100	100	100	100	100	800	100
Free Flow					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐	No ☒
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☒	No ☐

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
2A	☒	☐	☐	☐	414	441	316	257	294	408	486	416		
	COMPLIANCE %				86	92	66	54	61	85	100	87	630	79
	50	75	50	75	197	159	127	89	110	160	211	157		
2B	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
Free Flow					Both 2A and 2B 100% fulfilled each of 8 hours								Yes ☐	No ☒
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐	No ☒

Results Sheet

[Input Sheet](#)[Analysis Sheet](#)[Proposed Collision](#)[GO TO Justification:](#)

Intersection: Flewellyn Road & Shea Road

Count Date: 2023-04-26

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	98	%	☐	☒
	B Crossing Volume	100	%		
2. Delay to Cross Traffic	A Main Road	79	%	☐	☒
	B Crossing Road	100	%		
3. Combination	A Justificaton 1	98	%	☐	☒
	B Justification 2	79	%		
4. 4-Hr Volume		57	%	☐	☒

Shea Road at Flewellyn Road
FB 2030

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Entire %	Signal
		1 Lane Highway		2 or More Lanes		Sectional			
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	519	108%	108%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	285	237%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	234	49%	49%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	146	293%		

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, $AHV = PM/2 \text{ or } (AM + PM) / 4$, including amplification 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		Minimum Requirement		Compliance		Entire %	Signal
		1 Lane Highway		2 or More Lanes		Sectional			
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	520	108%	108%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	286	238%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	234	49%	49%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	147	294%		

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, $AHV = PM/2 \text{ or } (AM + PM) / 4$, including amplification 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		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	609	127%	127%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	372	310%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	237	49%	49%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	192	385%		

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 amplification 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 2035

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Entire %	Signal
		1 Lane Highway		2 or More Lanes		Sectional			
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	610	127%	127%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	373	311%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	237	49%	49%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	193	386%		

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 amplification 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 Cosanti Drive
FB 2030

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Entire %	Signal
		1 Lane Highway		2 or More Lanes		Sectional			
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	314	65%	31%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	38	31%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	289	60%	34%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	17	34%		

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, $AHV = PM/2 \text{ or } (AM + PM) / 4$, including amplification 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 Cosanti Drive
FB 2035

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	314	65%	31%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	38	31%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	289	60%	34%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	17	34%		

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, $AHV = PM/2 \text{ or } (AM + PM) / 4$, including amplification 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 Cosanti Drive
FT 2030

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	334	69%	31%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	38	31%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	309	64%	34%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	17	34%		

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 amplification 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 Cosanti Drive
FT 2035

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	334	69%	31%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	38	31%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	309	64%	34%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	17	34%		

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 amplification 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 Street #21
FB 2030

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	291	61%	23%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	27	23%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	273	57%	28%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	14	28%		

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 amplification 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 Street #21
FB 2035

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	291	61%	23%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	27	23%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	273	57%	28%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	14	28%		

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 amplification 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 Street #21
FT 2030

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	316	66%	39%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	47	39%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	285	59%	49%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	24	49%		

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 amplification 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 Street #21
FT 2035

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	316	66%	39%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	47	39%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	285	59%	49%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	24	49%		

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 amplification 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

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	376	78%	78%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	148	123%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	278	58%	58%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	40	80%		

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 amplification 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

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	377	79%	79%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	148	123%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	279	58%	58%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	40	80%		

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 amplification 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

Flewellyn Road at Street #12
FT 2030

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	459	96%	96%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	168	140%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	347	72%	72%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	40	80%		

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 amplification 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

Flewellyn Road at Street #12
FT 2035

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	460	96%	96%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	168	140%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	348	73%	73%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	40	80%		

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 amplification 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

Flewellyn Road at Street #16
FB 2030

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Entire %	Signal
		1 Lane Highway		2 or More Lanes		Sectional			
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	305	63%	26%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	31	26%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	284	59%	41%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	21	41%		

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 amplification 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

Flewellyn Road at Street #16
FB 2035

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	306	64%	26%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	31	26%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	285	59%	41%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	21	41%		

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 amplification 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

Flewellyn Road at Street #16
FT 2030

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	447	93%	93%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	147	123%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	349	73%	73%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	67	133%		

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 amplification 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

Flewellyn Road at Street #16
FT 2035

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance			Signal
		1 Lane Highway		2 or More Lanes		Sectional		Entire %	
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	448	93%	93%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	147	123%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	350	73%	73%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	67	133%		

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 amplification 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

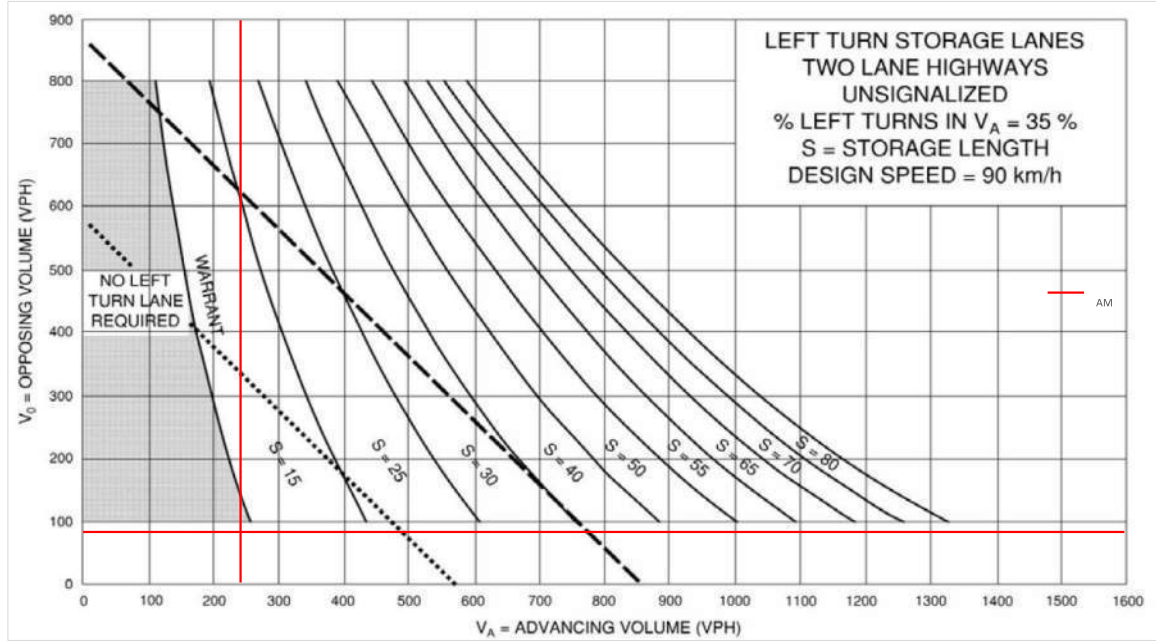
Existing																		
Design Speed		Yes																
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM		87	129	26	2	62	17	8	241	13	25	149	51	36.0%	242	81	
	PM		58	70	11	2	151	33	16	207	17	14	161	71	41.7%	139	186	
Future Background 2030																		
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	268	26	2	142	21	8	161	13	35	149	51	16.9%	354	165	
	PM		59	194	11	2	311	43	16	169	17	21	224	71	22.3%	264	356	
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	270	26	2	142	21	8	161	13	35	149	51	16.9%	356	165	
	PM		59	194	11	2	313	43	16	169	17	21	224	71	22.3%	264	358	
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	376	26	2	189	24	8	161	13	42	149	51	13.0%	462	215	
	PM		59	270	11	2	419	50	16	169	17	26	224	71	17.4%	340	471	
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	378	26	2	189	24	8	161	13	42	149	51	12.9%	464	215	
	PM		59	270	11	2	421	50	16	169	17	26	224	71	17.4%	340	473	

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	268	26	2	142	21	8	161	13	35	149	51	1.2%	165	354	
PM		59	194	11	2	311	43	16	169	17	21	224	71	0.6%	356	264	
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	270	26	2	142	21	8	161	13	35	149	51	1.2%	165	356	
PM		59	194	11	2	313	43	16	169	17	21	224	71	0.6%	358	264	
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	376	26	2	189	24	8	161	13	42	149	51	0.9%	215	462	
PM		59	270	11	2	419	50	16	169	17	26	224	71	0.4%	471	340	
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	378	26	2	189	24	8	161	13	42	149	51	0.9%	215	464	
PM		59	270	11	2	421	50	16	169	17	26	224	71	0.4%	473	340	

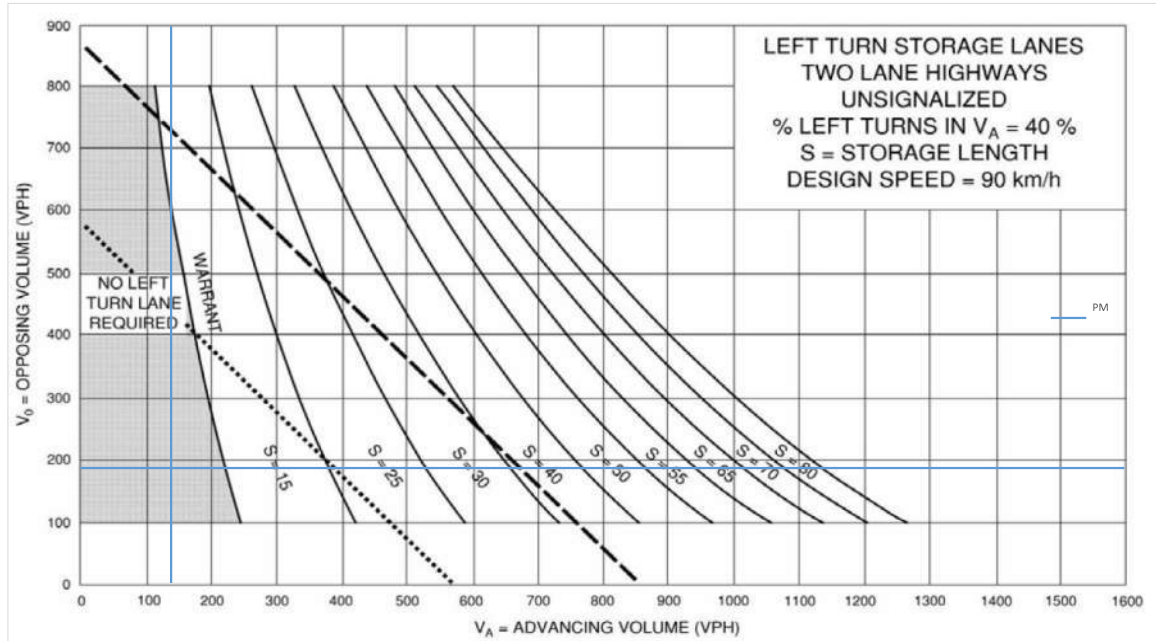
Existing																
Design Speed																
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
AM	87	129	26	2	62	17	8	241	13	25	149	51	3.1%	262	225	
PM	58	70	11	2	151	33	16	207	17	14	161	71	6.7%	240	246	
Future Background 2030																
Design Speed																
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
AM	60	268	26	2	142	21	8	161	13	35	149	51	4.4%	182	235	
PM	59	194	11	2	311	43	16	169	17	21	224	71	7.9%	202	316	
Future Background 2035																
Design Speed																
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
AM	60	270	26	2	142	21	8	161	13	35	149	51	4.4%	182	235	
PM	59	194	11	2	313	43	16	169	17	21	224	71	7.9%	202	316	
Future Total 2030																
Design Speed																
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
AM	60	376	26	2	189	24	8	161	13	42	149	51	4.4%	182	242	
PM	59	270	11	2	419	50	16	169	17	26	224	71	7.9%	202	321	
Future Total 2035																
Design Speed																
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
AM	60	378	26	2	189	24	8	161	13	42	149	51	4.4%	182	242	
PM	59	270	11	2	421	50	16	169	17	26	224	71	7.9%	202	321	

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	268	26	2	142	21	8	161	13	35	149	51	14.9%	235	182	
PM	59	194	11	2	311	43	16	169	17	21	224	71	6.6%	316	202	
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	270	26	2	142	21	8	161	13	35	149	51	14.9%	235	182	
PM	59	194	11	2	313	43	16	169	17	21	224	71	6.6%	316	202	
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	376	26	2	189	24	8	161	13	42	149	51	17.4%	242	182	
PM	59	270	11	2	419	50	16	169	17	26	224	71	8.1%	321	202	
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	378	26	2	189	24	8	161	13	42	149	51	17.4%	242	182	
PM	59	270	11	2	421	50	16	169	17	26	224	71	8.1%	321	202	

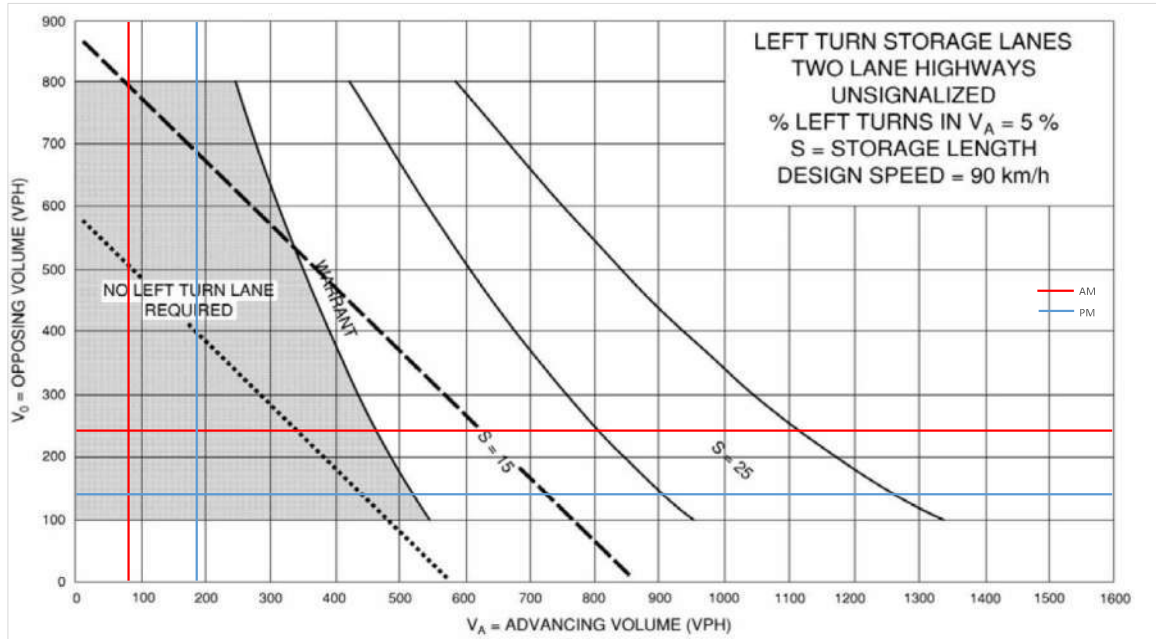
Existing - Eastbound Left



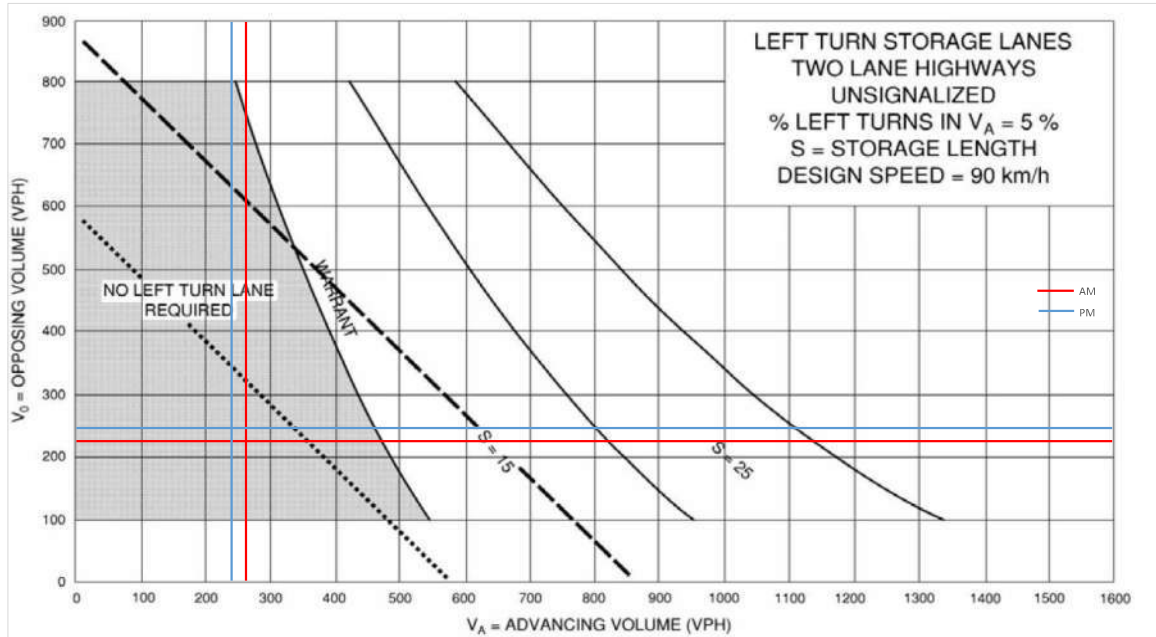
Existing - Eastbound Left



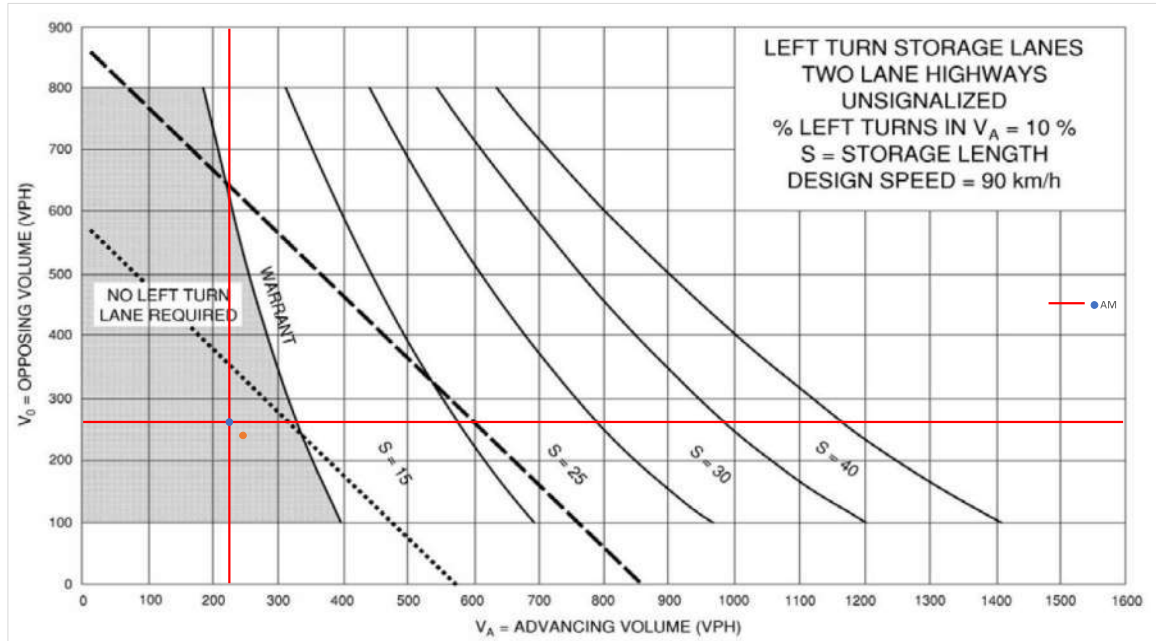
Existing - Westbound Left



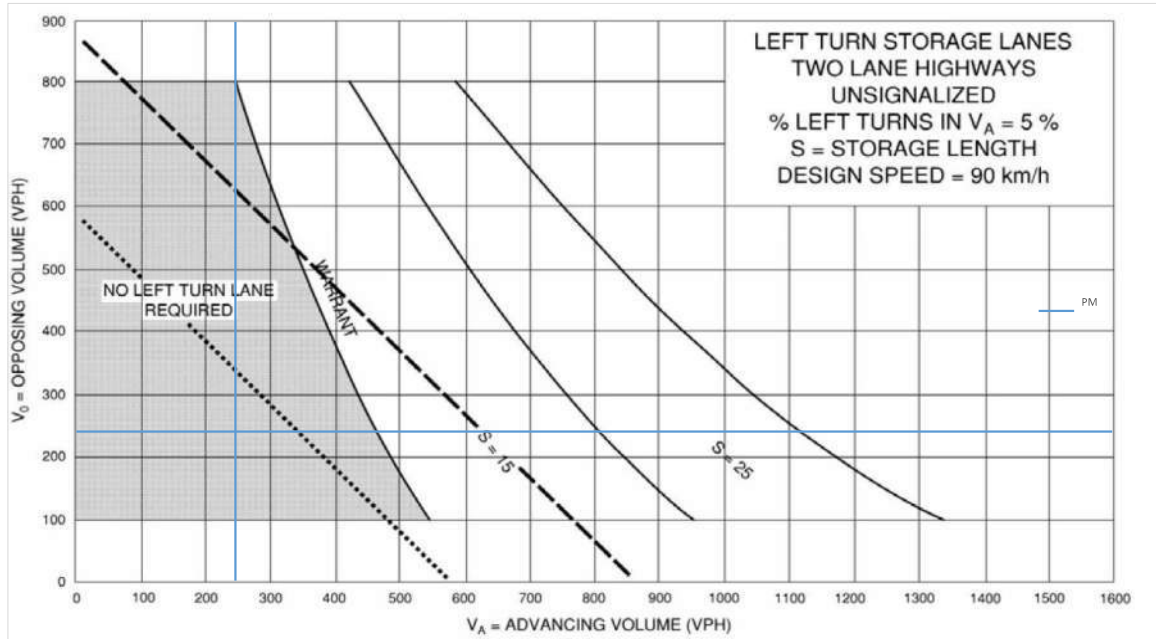
Existing - Northbound Left

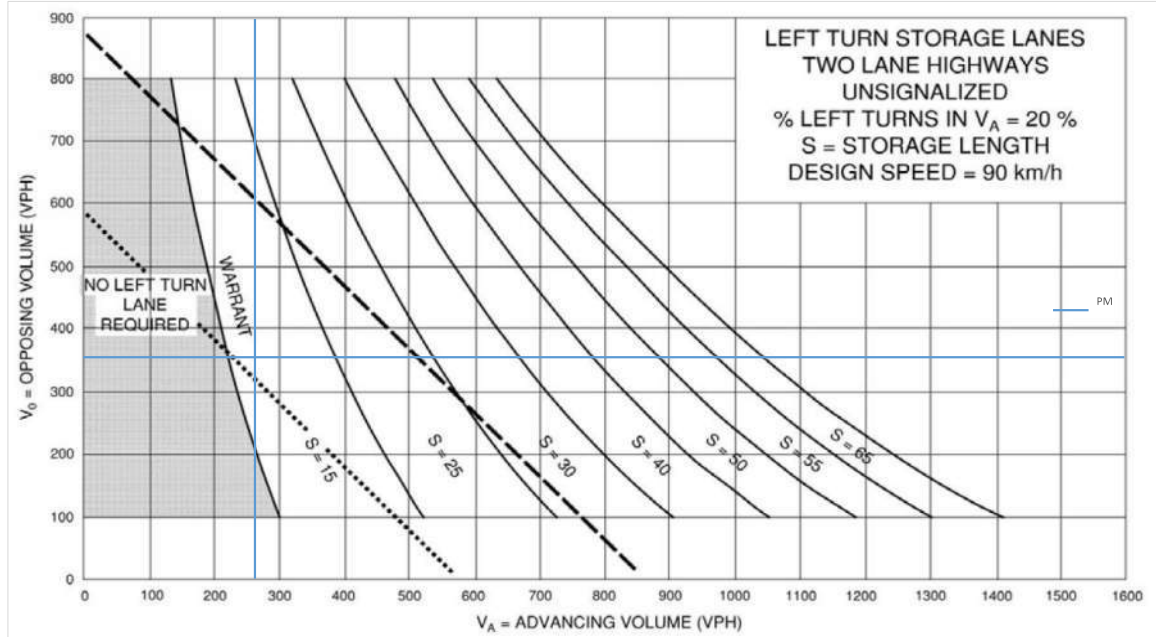
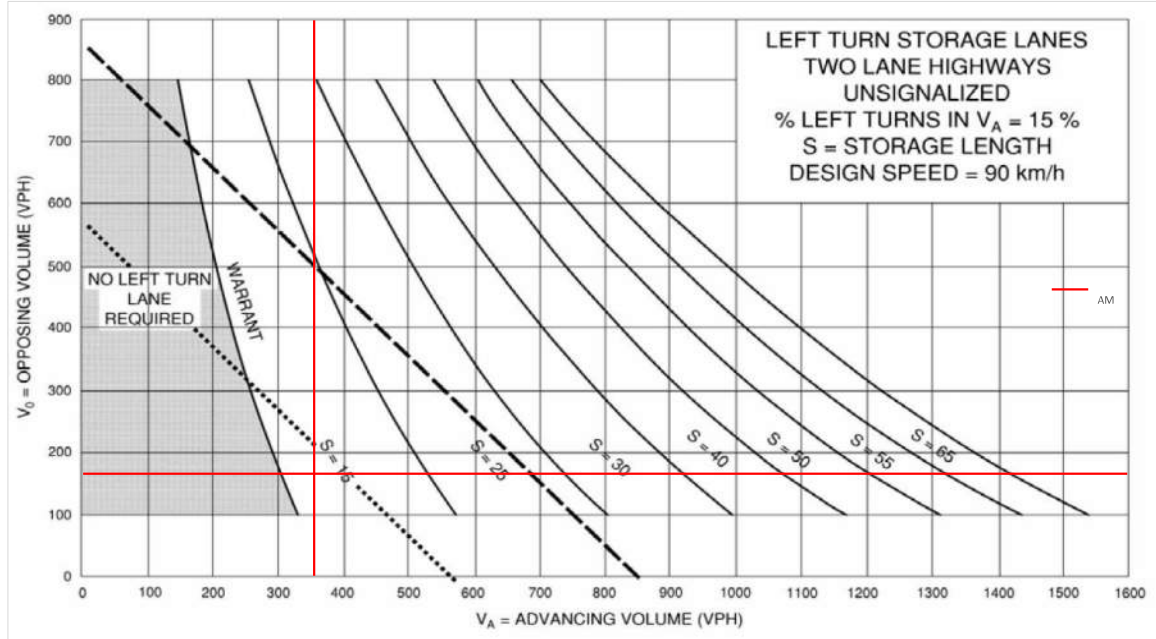


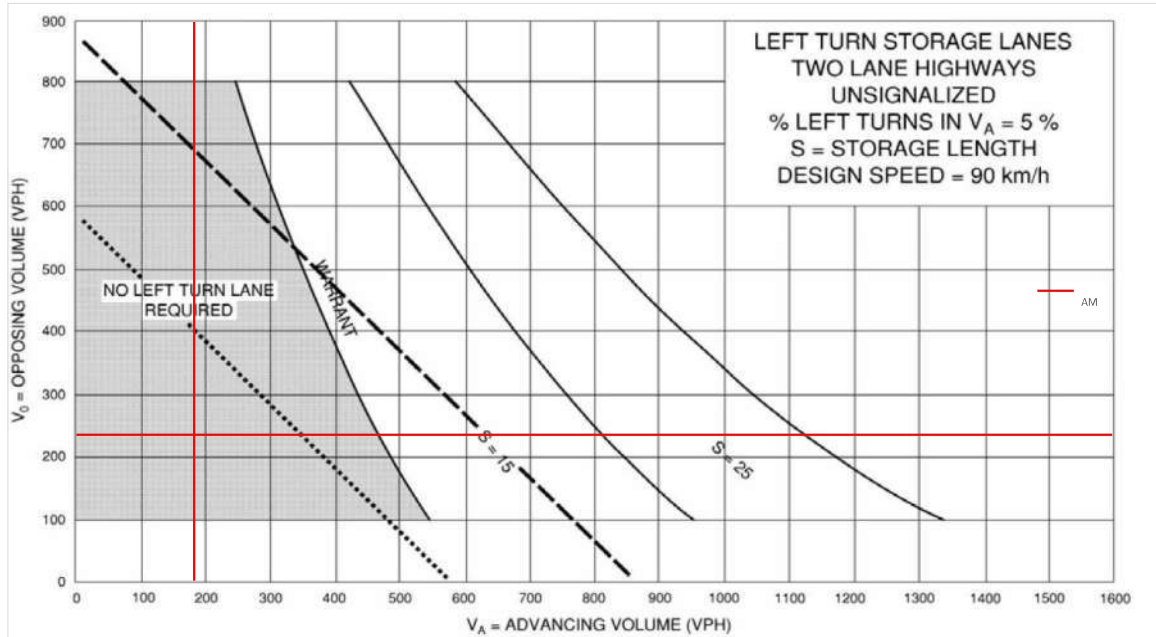
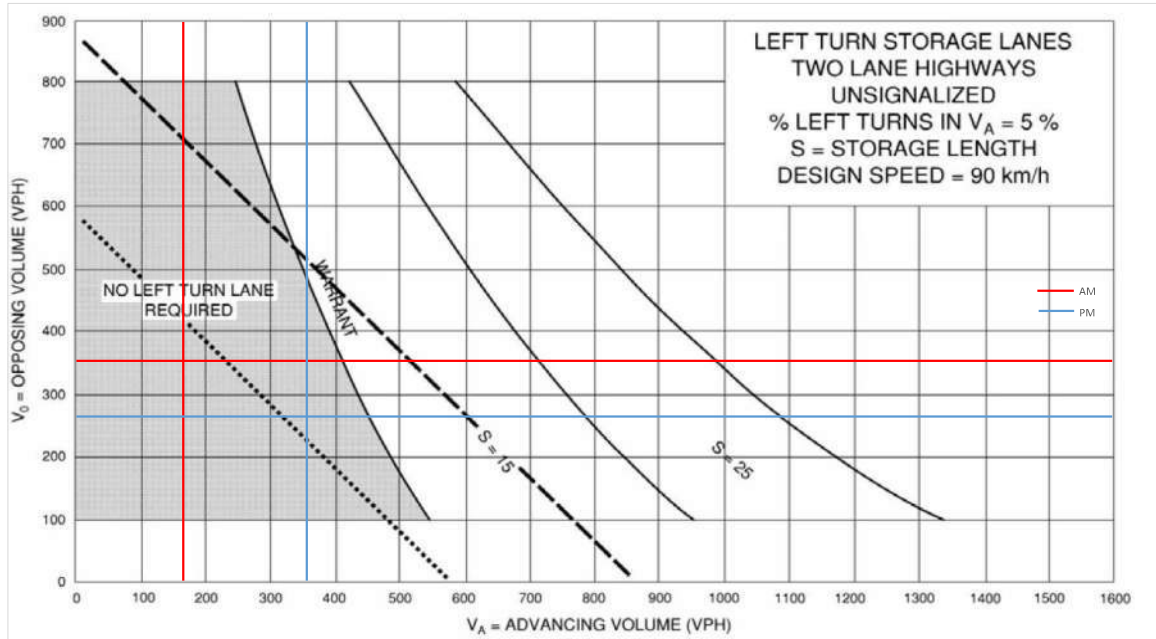
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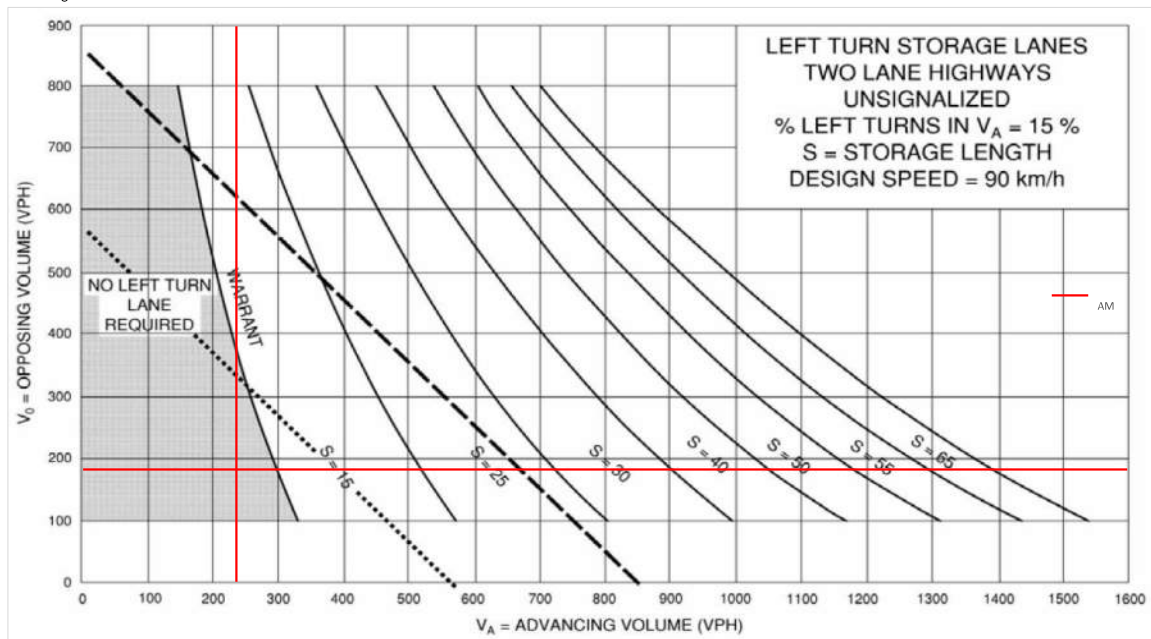
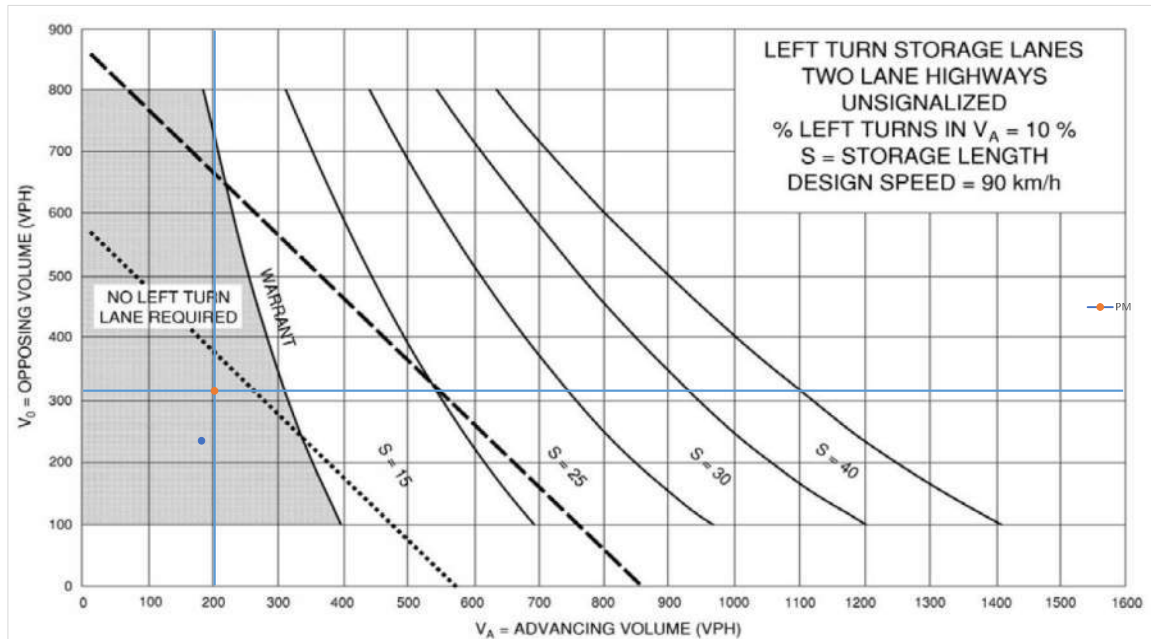


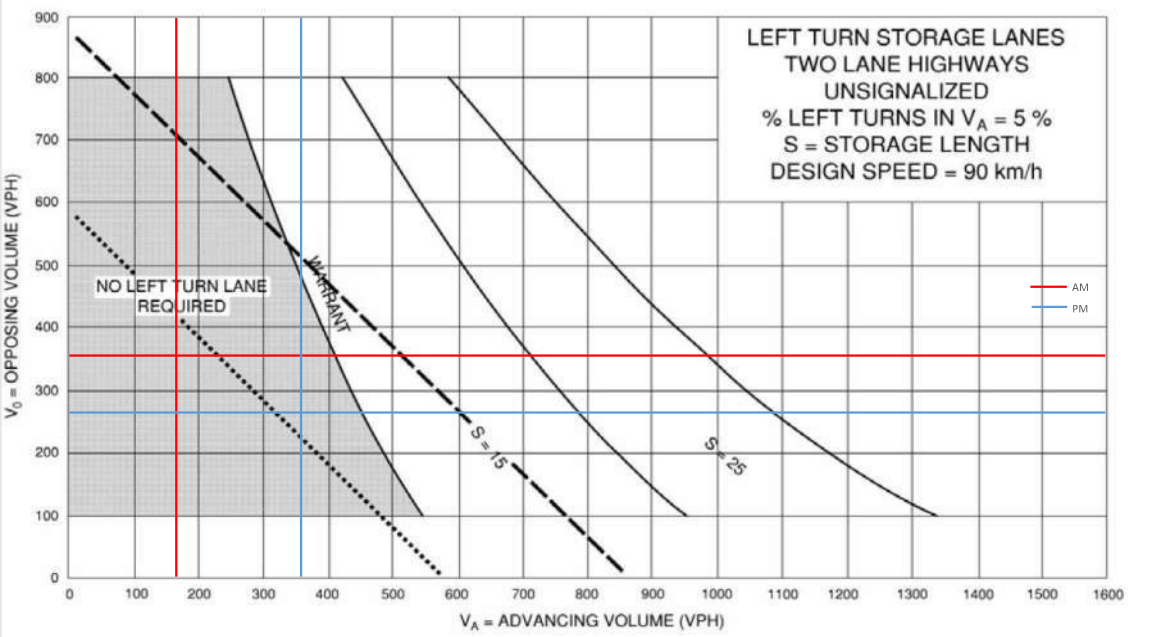
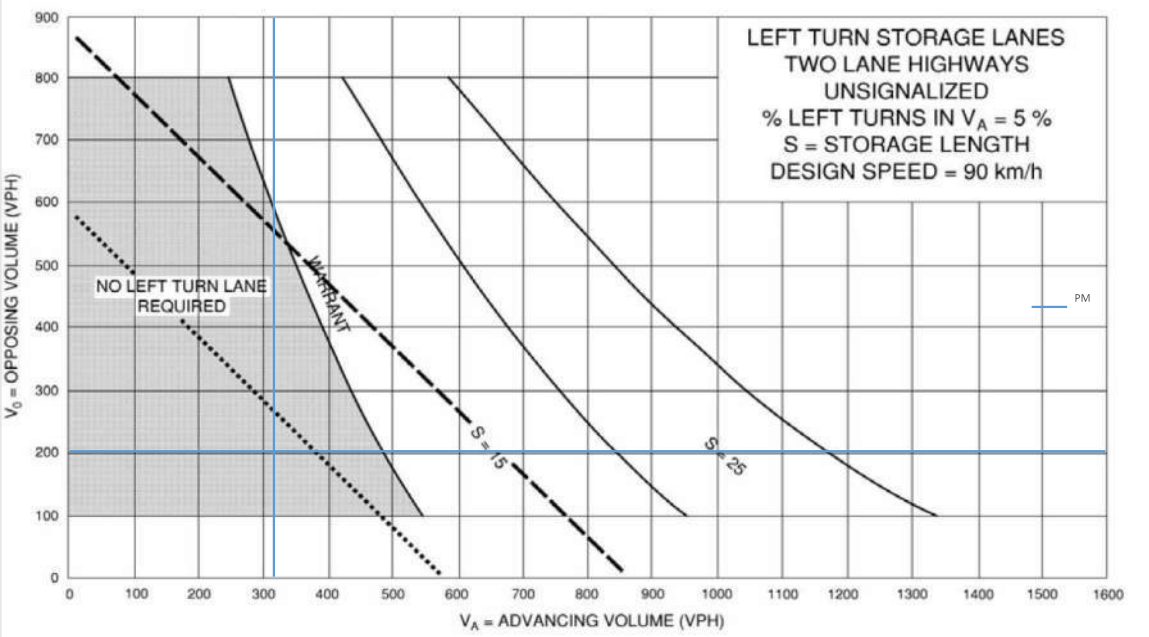
Existing - Southbound Left

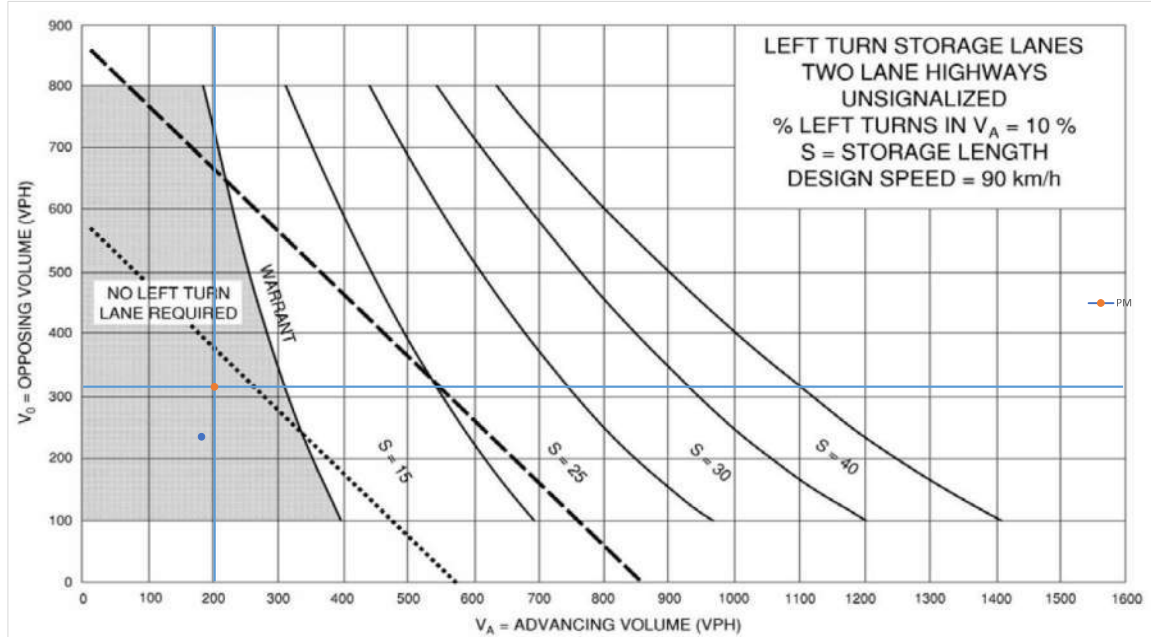
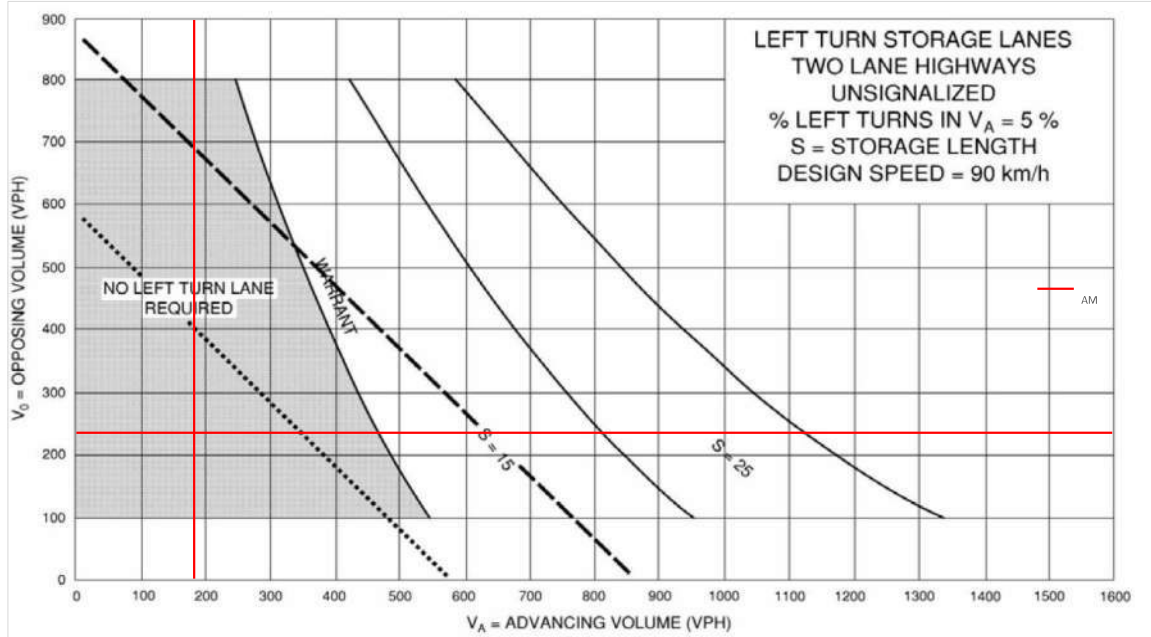


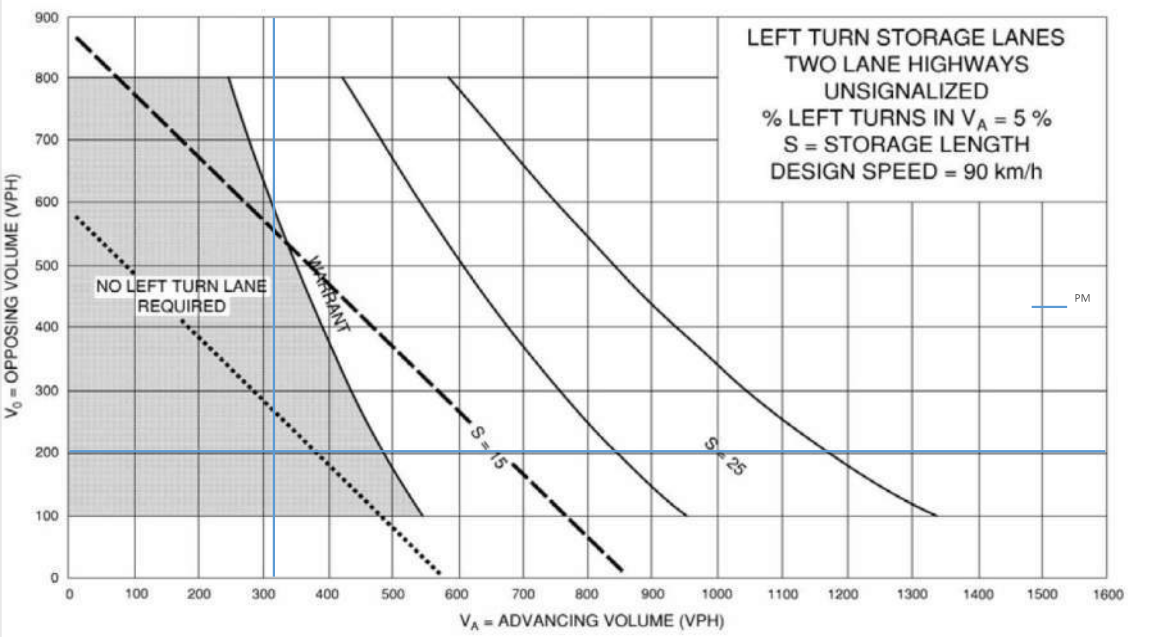
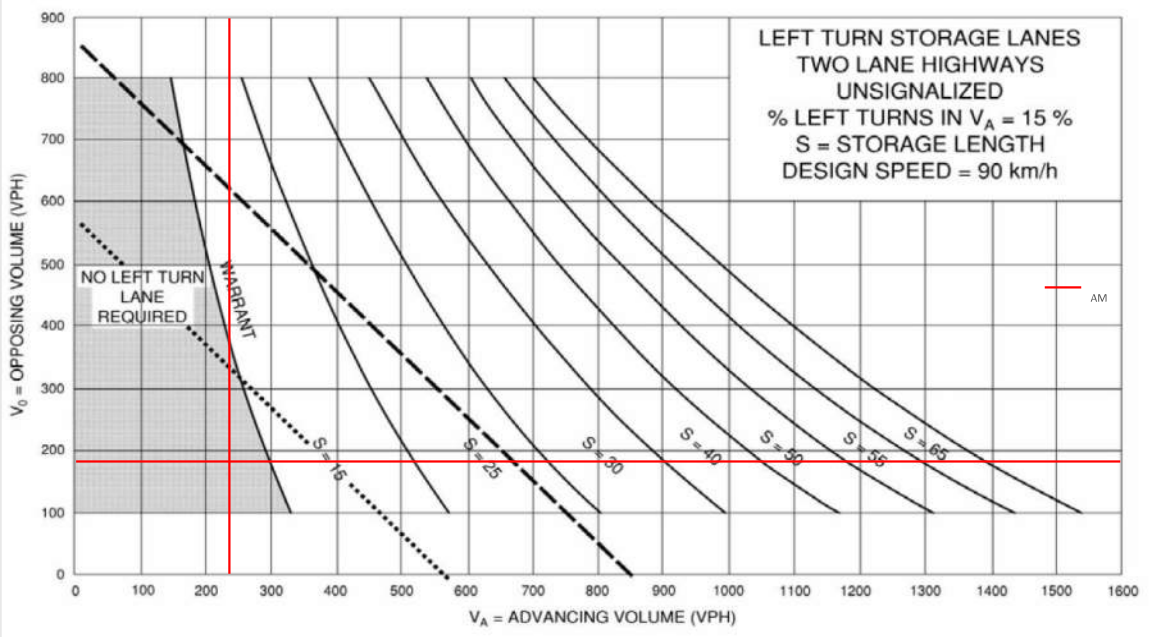


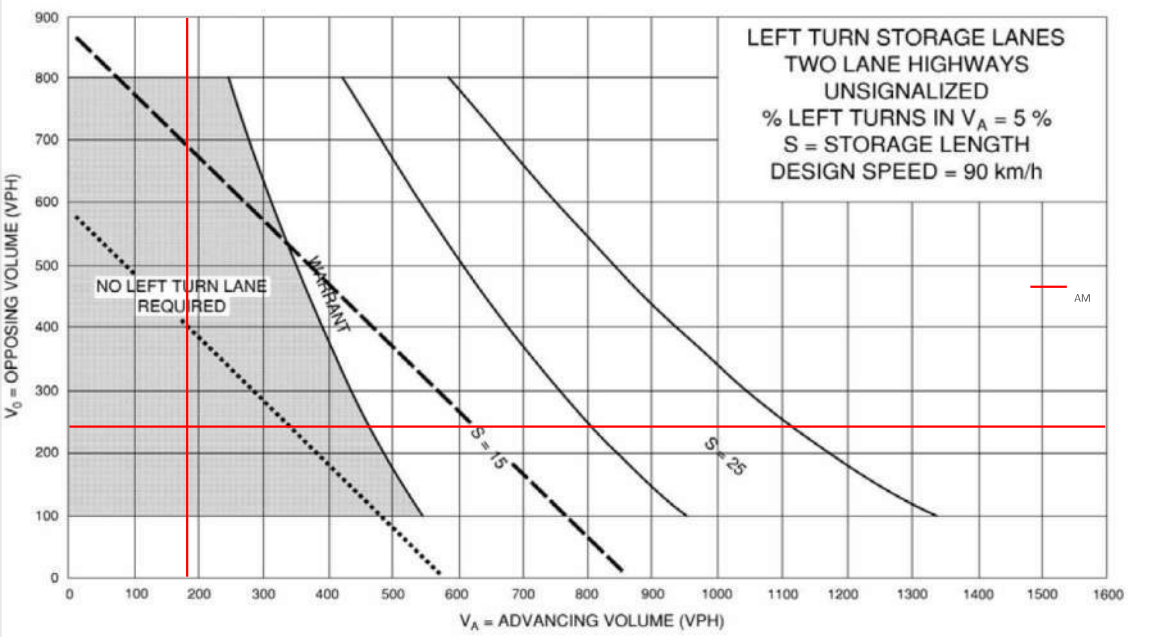
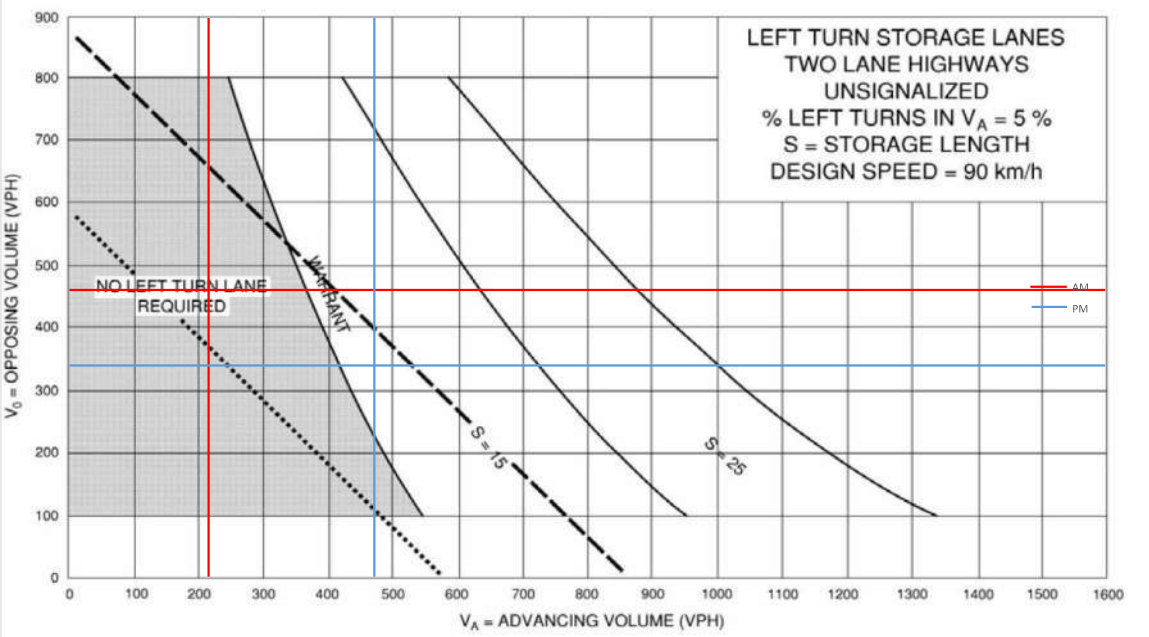


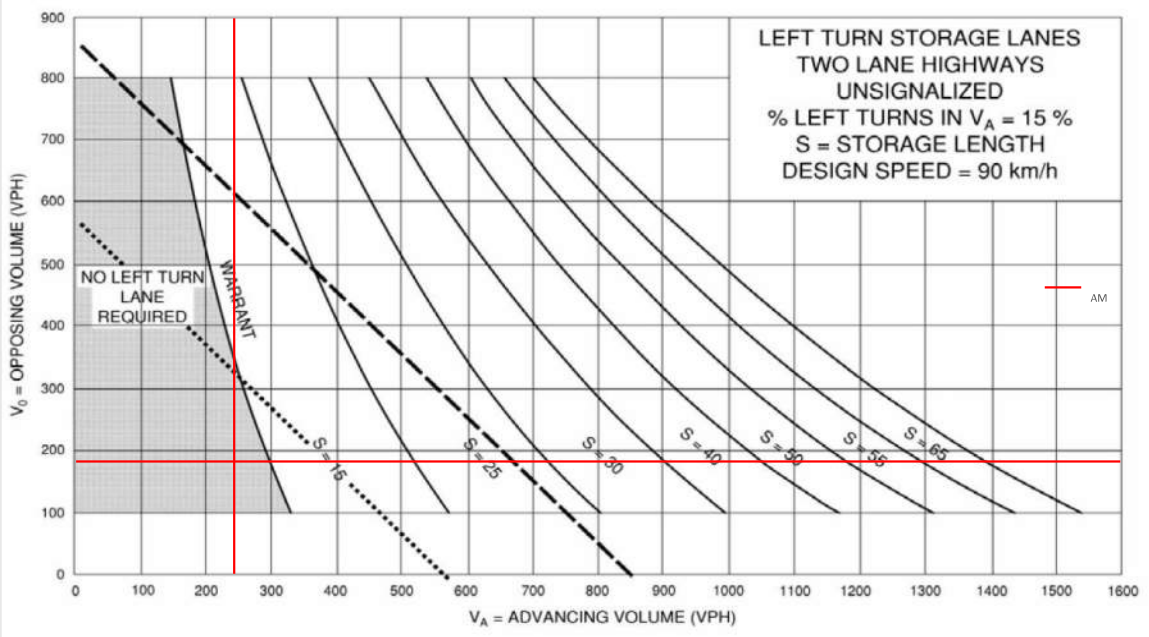
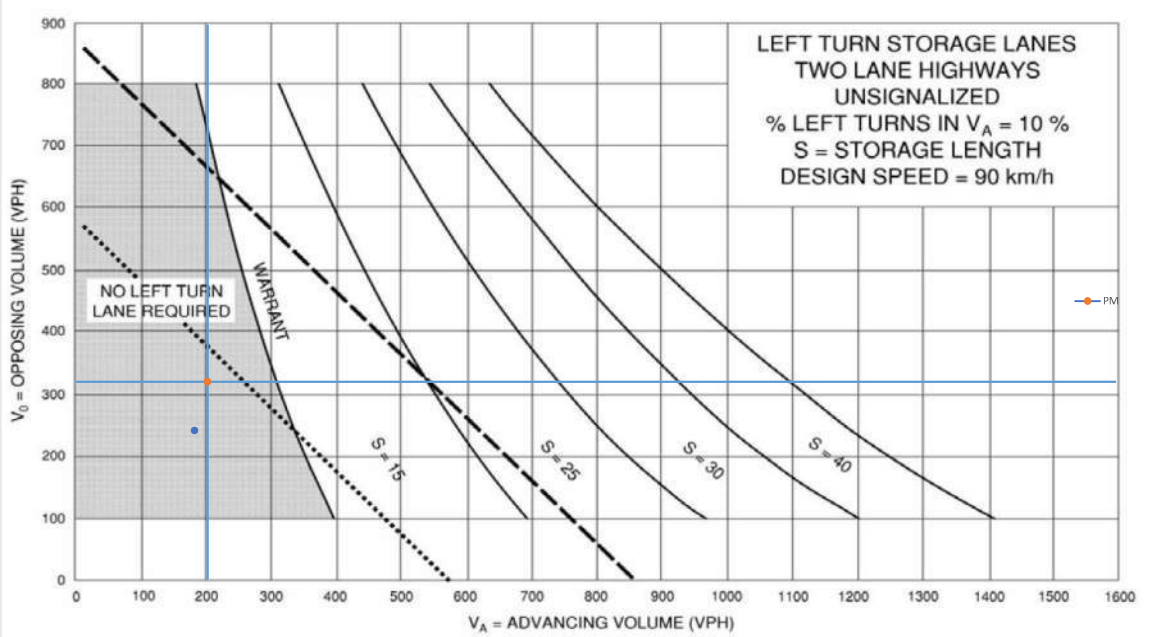


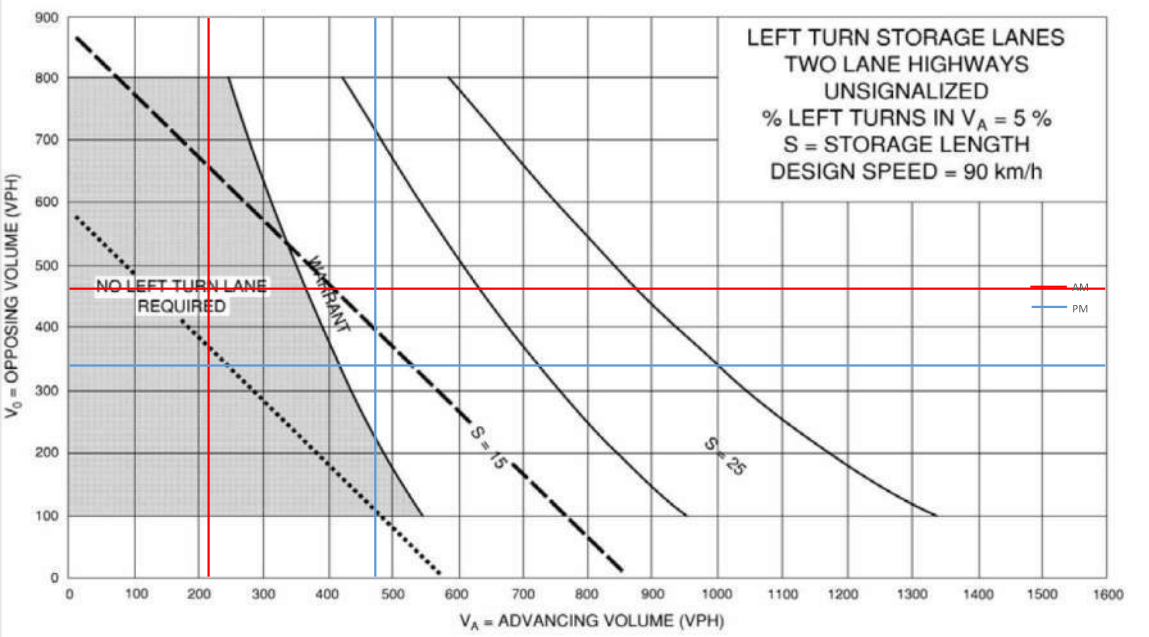
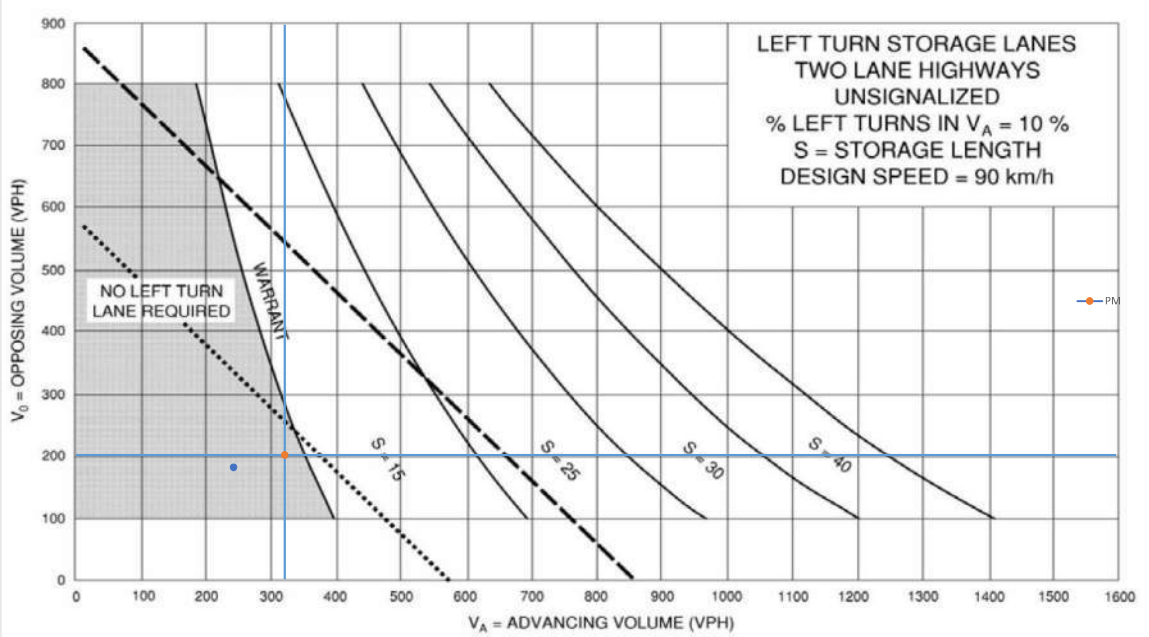


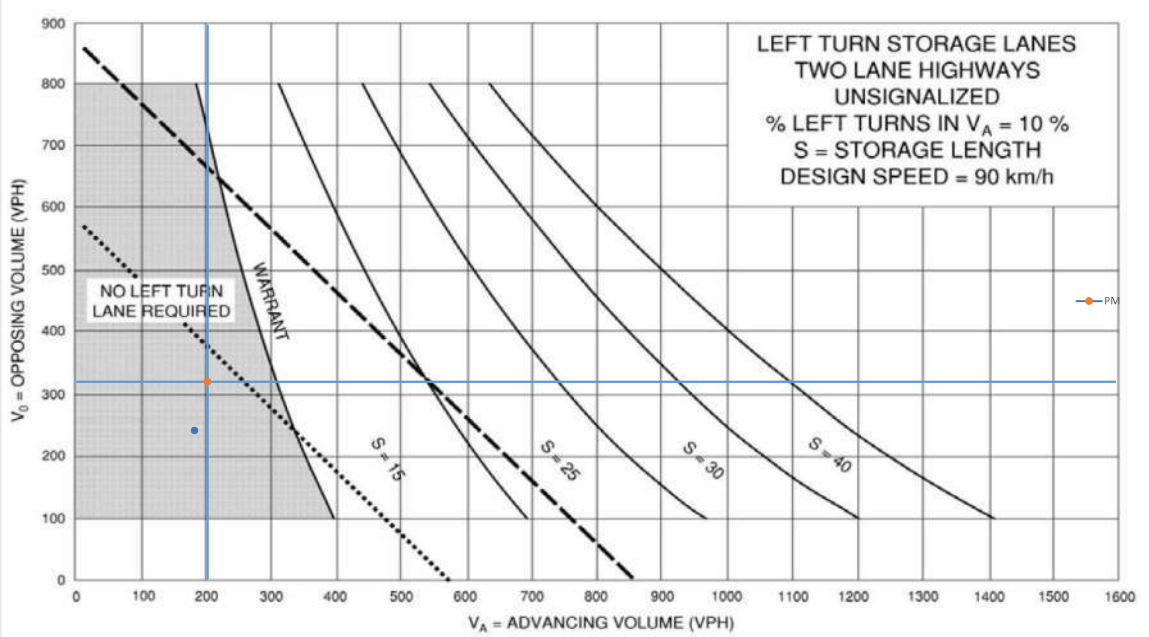
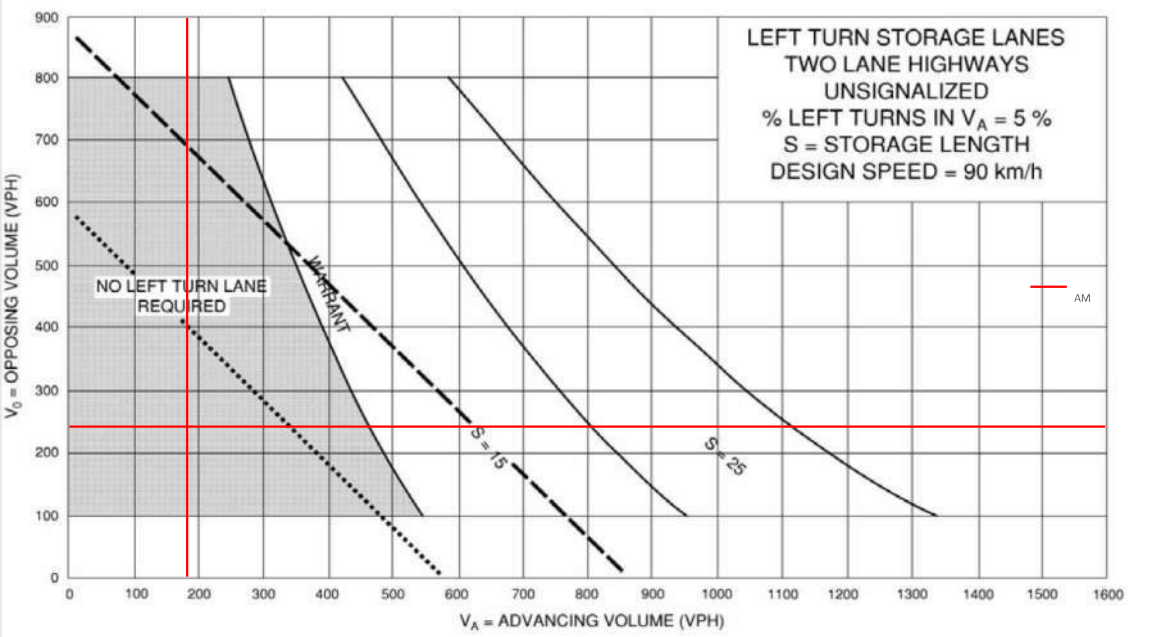


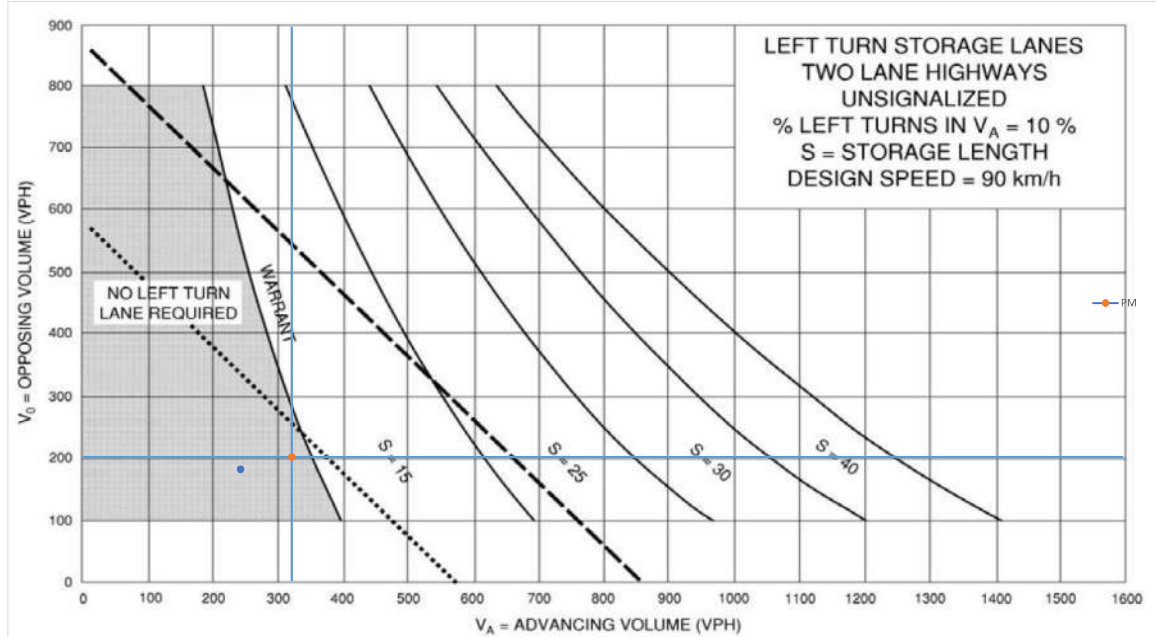
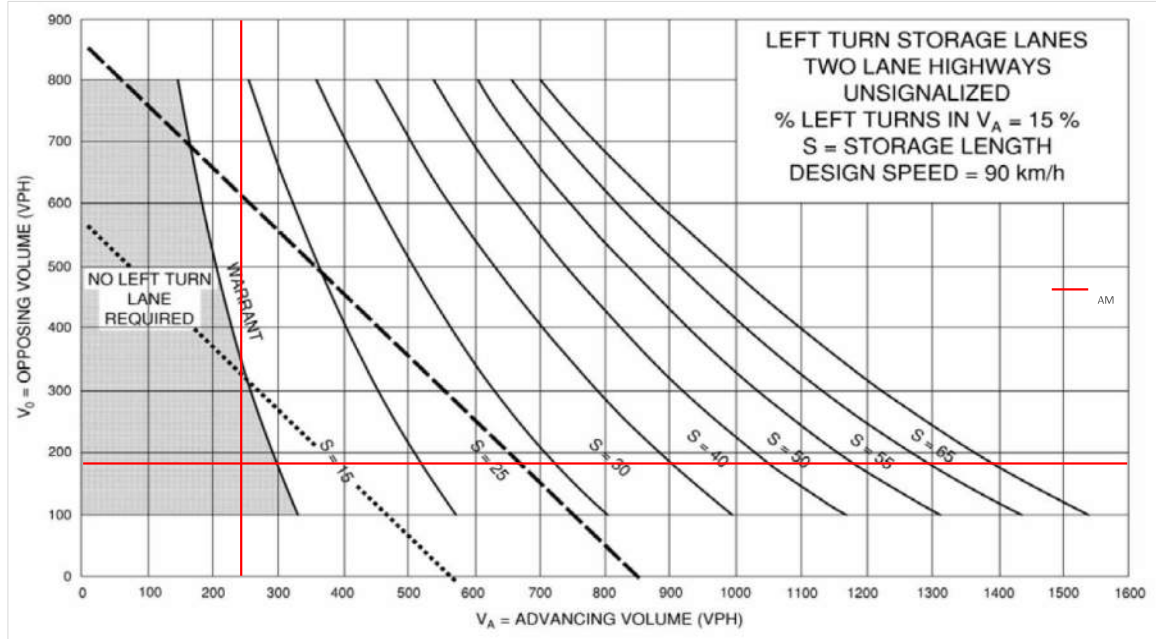








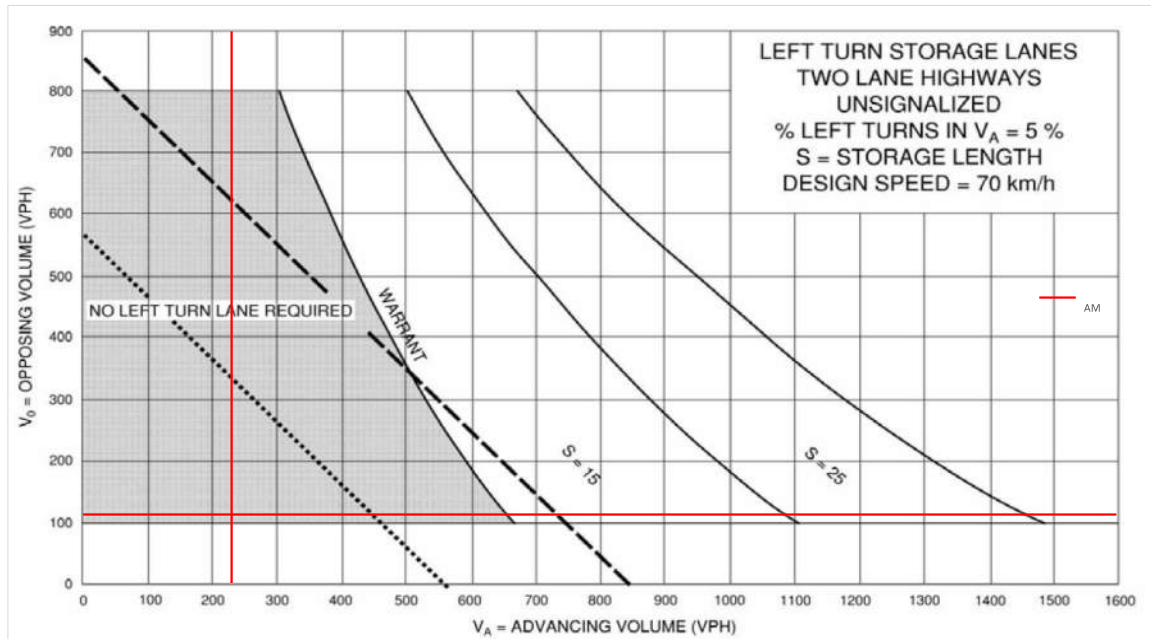




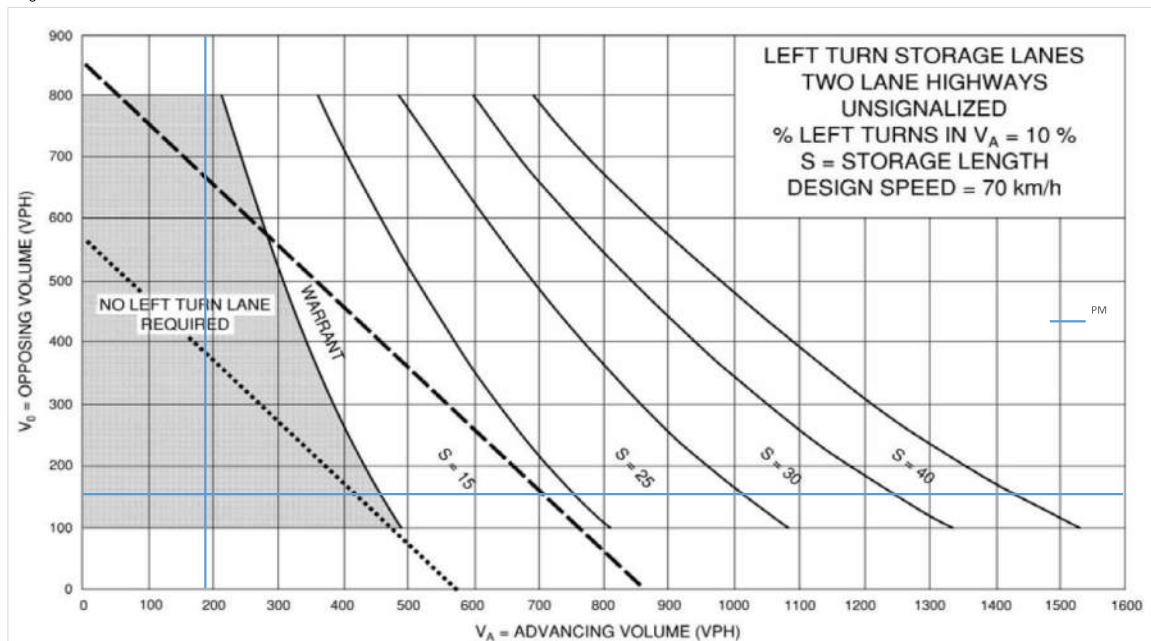
Shea Road at Cosanti Drive

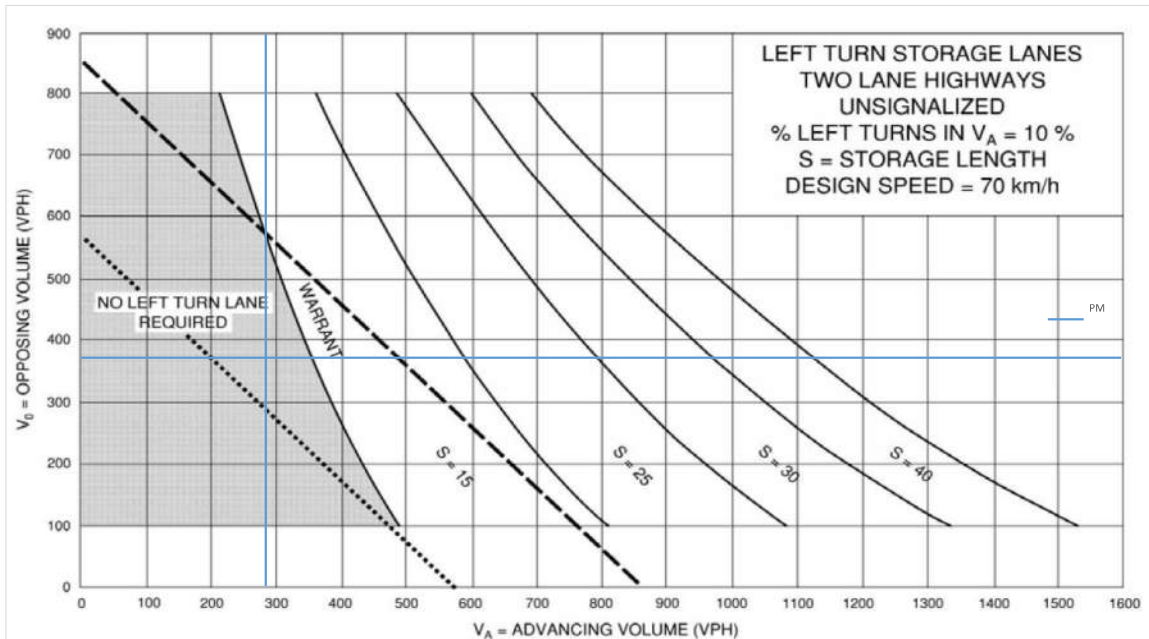
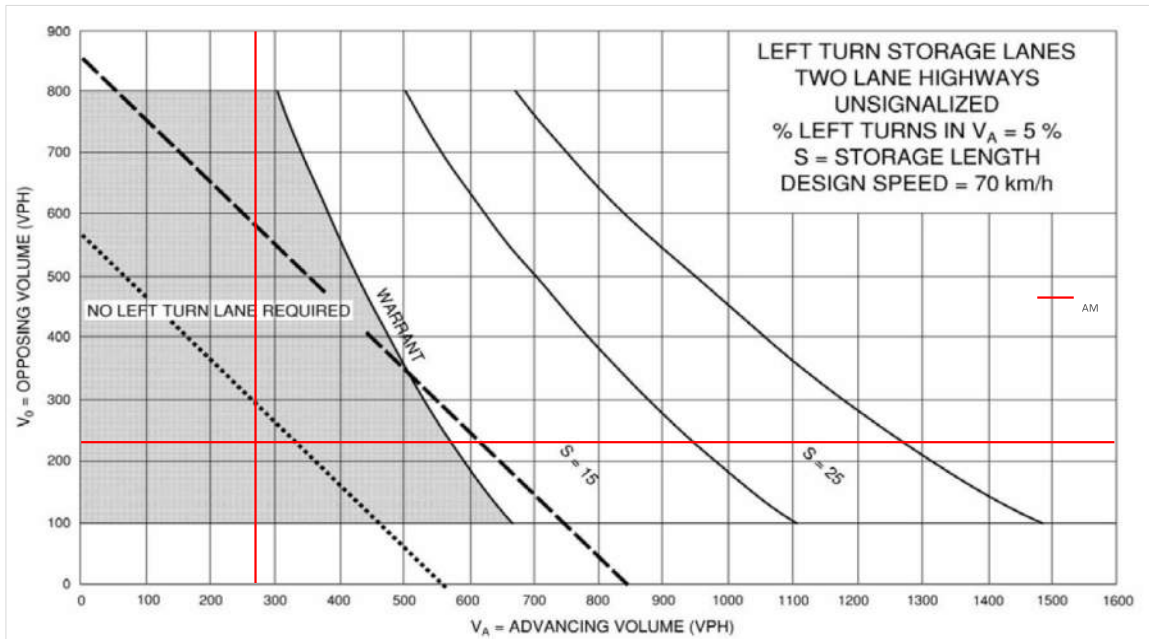
Existing																	
Design Speed																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	39	0	19	0	0	0	5	225	0	0	101	11	2.2%	230	112	
	PM	22	0	11	0	0	0	19	169	0	0	114	39	10.1%	188	153	
Future Background 2030																	
Design Speed																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	43	0	21	0	0	0	6	264	0	0	218	12	2.2%	270	230	
	PM	24	0	12	0	0	0	21	263	0	0	329	43	7.4%	284	372	
Future Background 2035																	
Design Speed																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	43	0	21	0	0	0	6	264	0	0	218	12	2.2%	270	230	
	PM	24	0	12	0	0	0	21	263	0	0	329	43	7.4%	284	372	
Future Total 2030																	
Design Speed																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	43	0	21	0	0	0	6	289	0	0	229	12	2.0%	295	241	
	PM	24	0	12	0	0	0	21	280	0	0	354	43	7.0%	301	397	
Future Total 2035																	
Design Speed																	
70 km/h		EBL	EBT	EBR	WBL	WBT	WBR	Yes NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	43	0	21	0	0	0	6	289	0	0	229	12	2.0%	295	241	
	PM	24	0	12	0	0	0	21	280	0	0	354	43	7.0%	301	397	

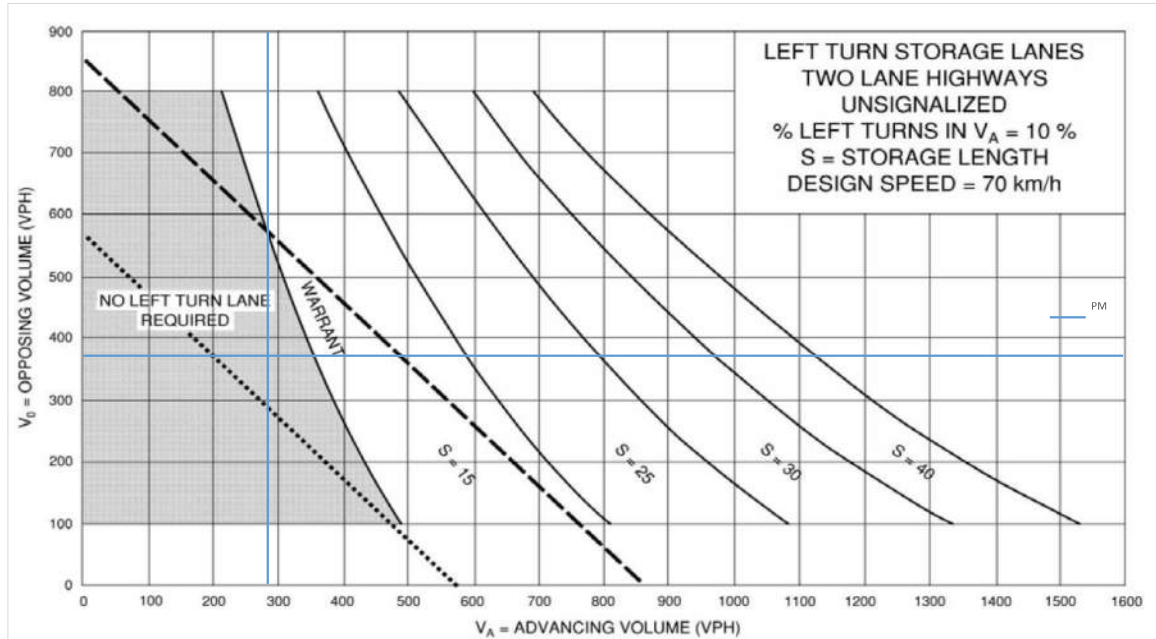
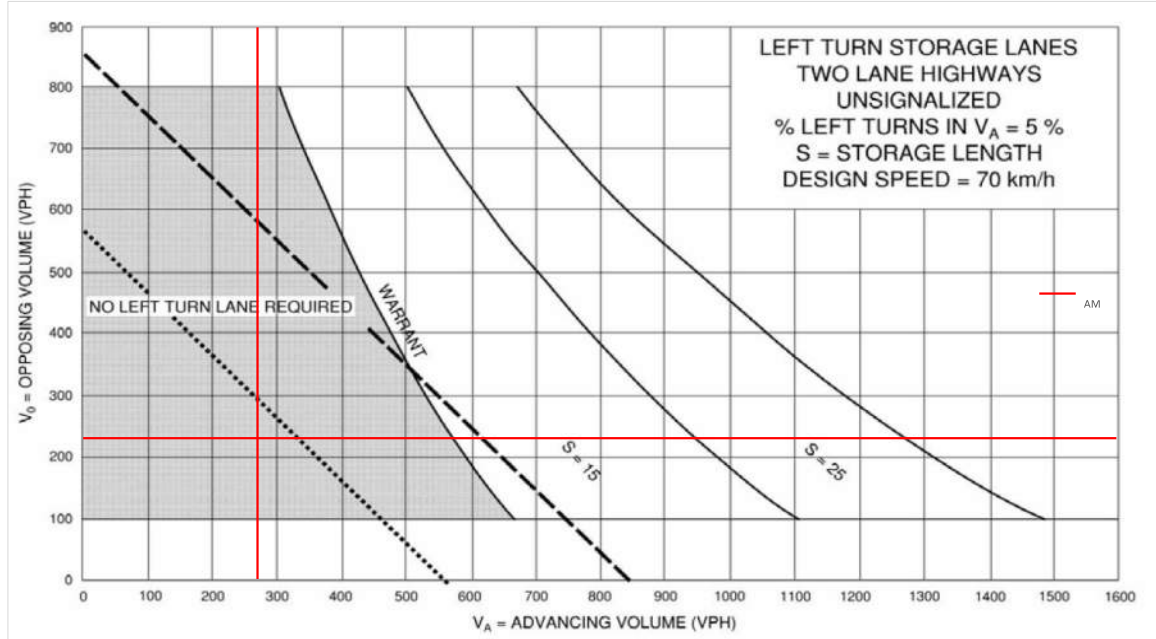
Existing - Northbound Left

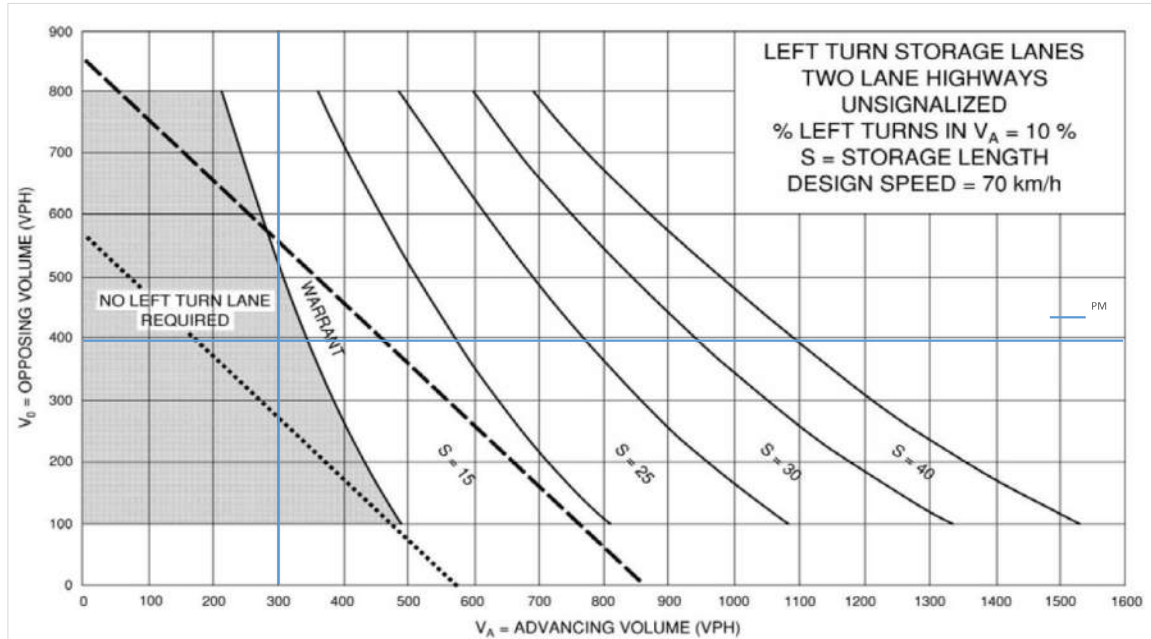
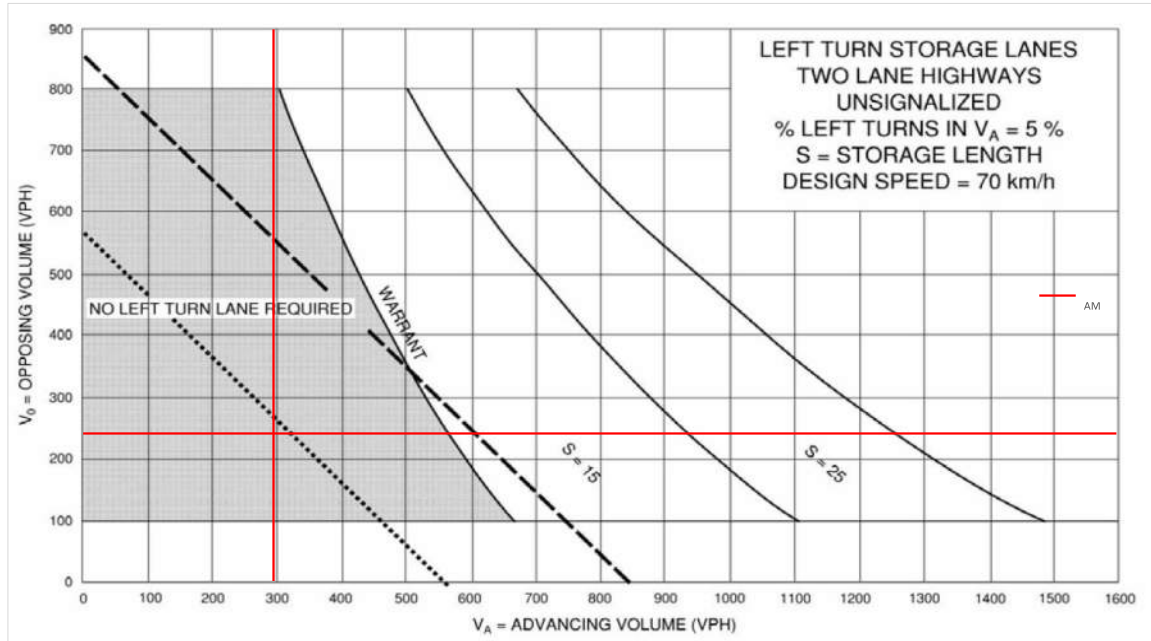


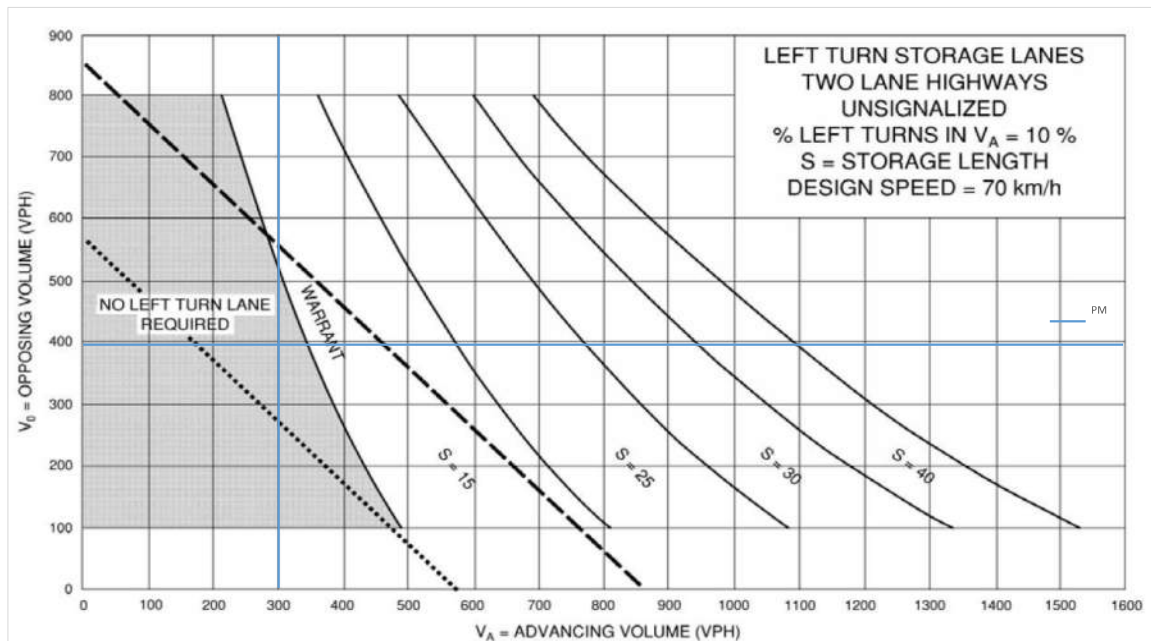
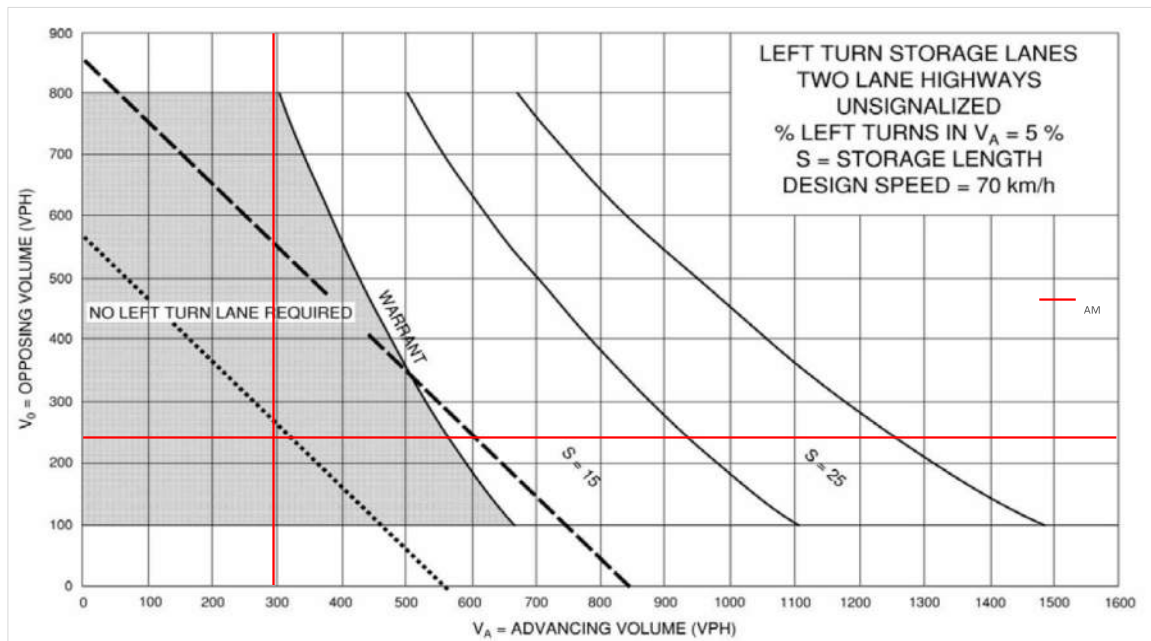
Existing - Northbound Left





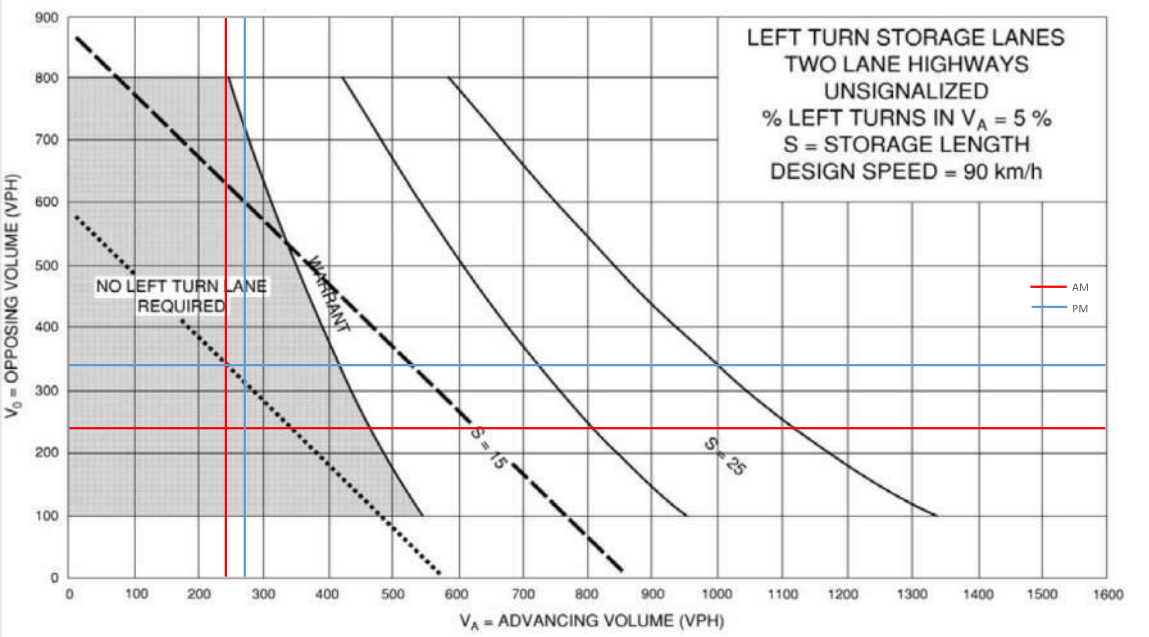
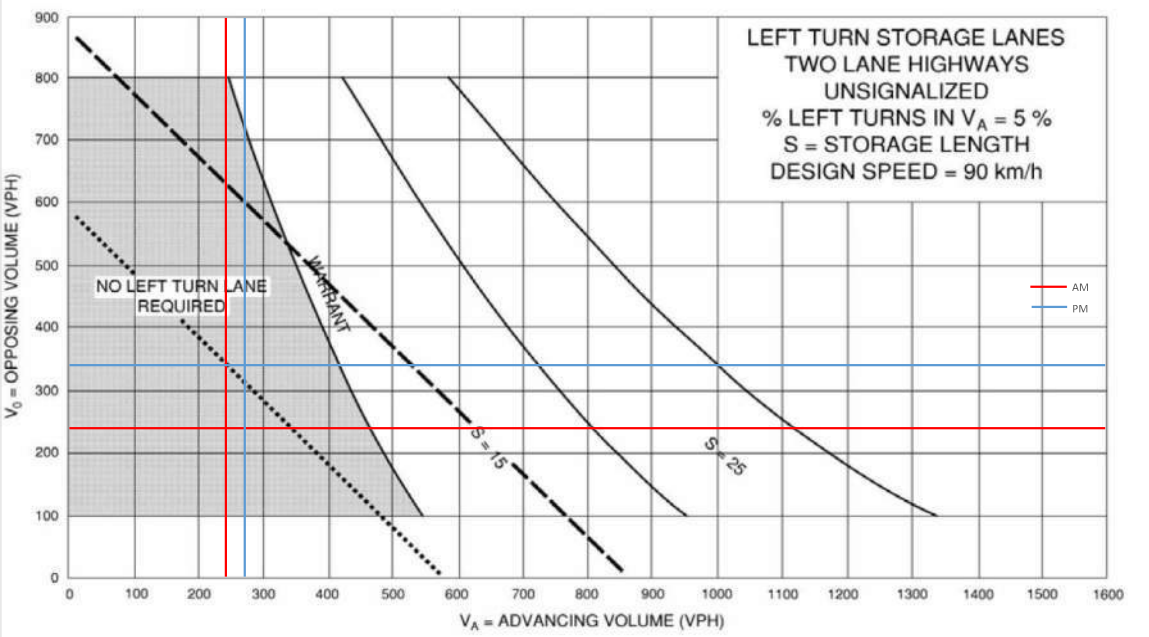




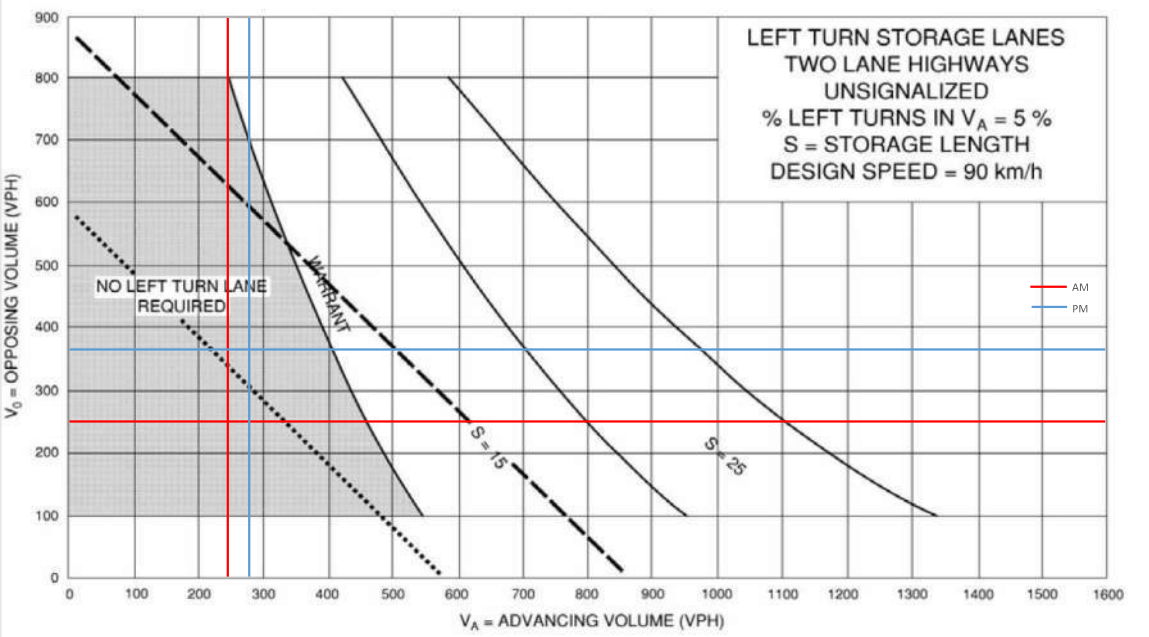


Shea Road at Street 21

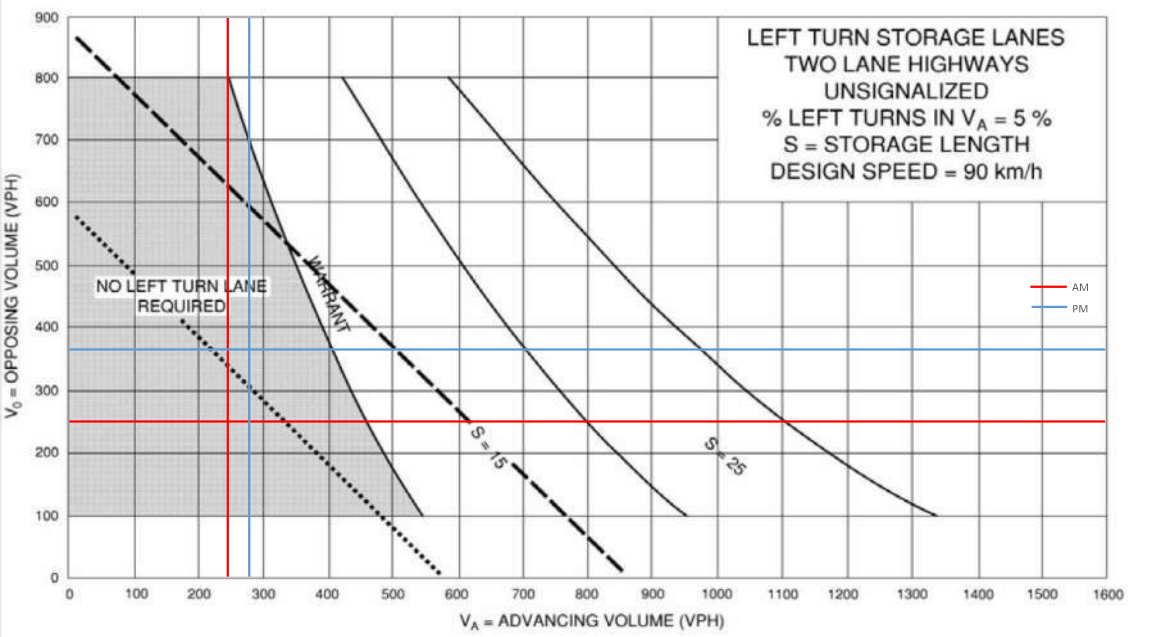
Existing																	
Design Speed		EBL	EBT	EBR	WBL	WBT	WBR	Yes	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
90 km/h		AM	0	0	0	0	0	0	0	223	0	0	214	0	0.0%	223	214
		PM	0	0	0	0	0	0	0	228	0	0	279	0	0.0%	228	279
Future Background 2030																	
Design Speed		EBL	EBT	EBR	WBL	WBT	WBR	Yes	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
90 km/h		AM	32	0	10	0	0	0	4	238	0	0	225	14	1.7%	242	239
		PM	23	0	7	0	0	0	10	261	0	0	309	32	3.7%	271	341
Future Background 2035																	
Design Speed		EBL	EBT	EBR	WBL	WBT	WBR	Yes	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
90 km/h		AM	32	0	10	0	0	0	4	238	0	0	225	14	1.7%	242	239
		PM	23	0	7	0	0	0	10	261	0	0	309	32	3.7%	271	341
Future Total 2030																	
Design Speed		EBL	EBT	EBR	WBL	WBT	WBR	Yes	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
50 km/h		AM	57	0	17	0	0	0	7	238	0	0	225	25	2.9%	245	250
		PM	40	0	12	0	0	0	17	261	0	0	309	57	6.1%	278	366
Future Total 2035																	
Design Speed		EBL	EBT	EBR	WBL	WBT	WBR	Yes	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
50 km/h		AM	57	0	17	0	0	0	7	238	0	0	225	25	2.9%	245	250
		PM	40	0	12	0	0	0	17	261	0	0	309	57	6.1%	278	366



Future Total 2030 - Northbound Left

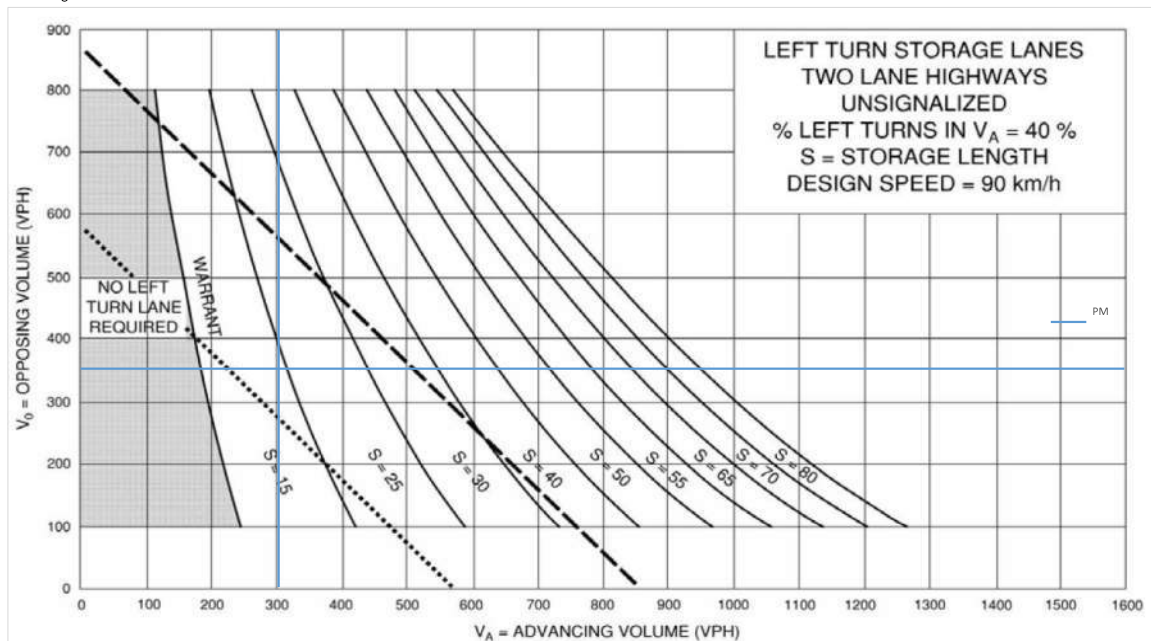
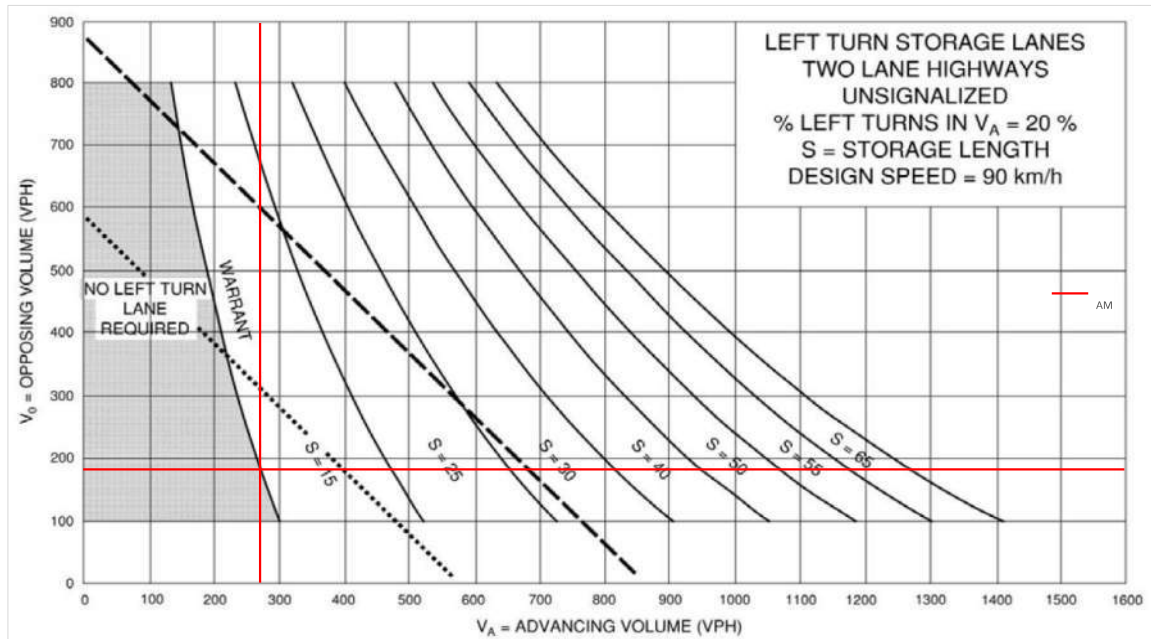


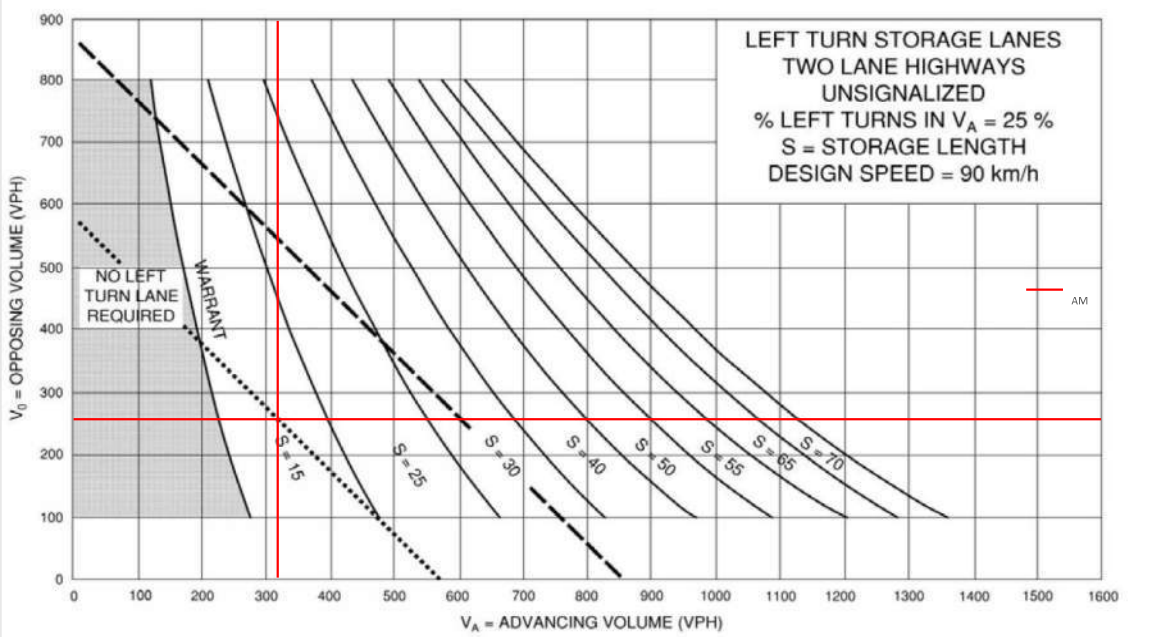
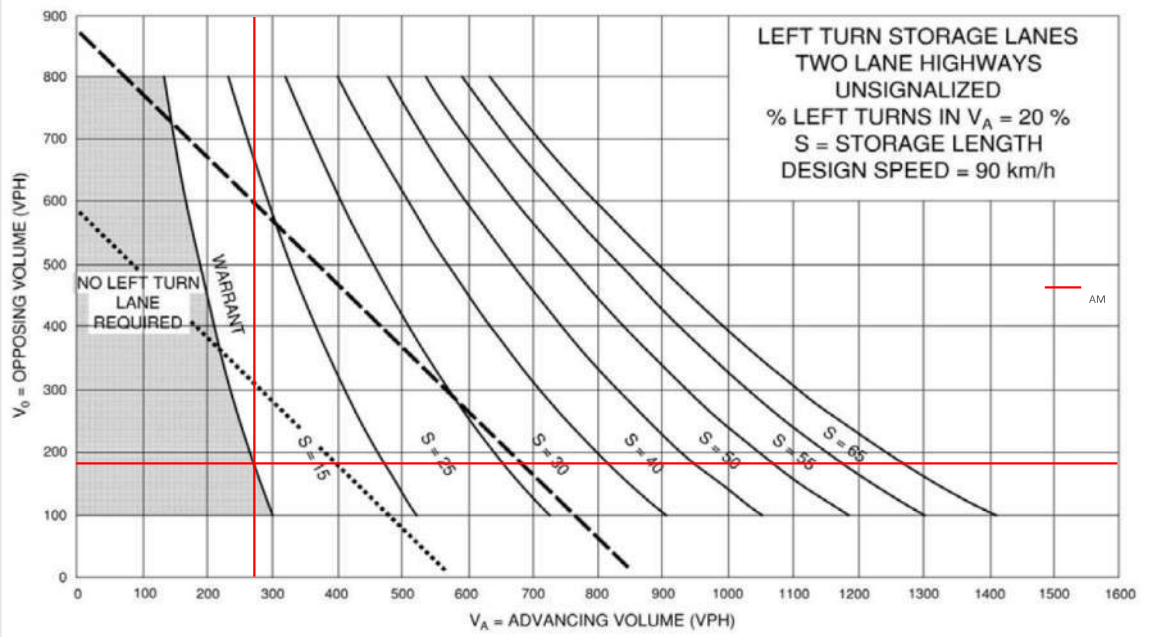
Future Total 2035 - Northbound Left



Flewellyn Road at Street 12

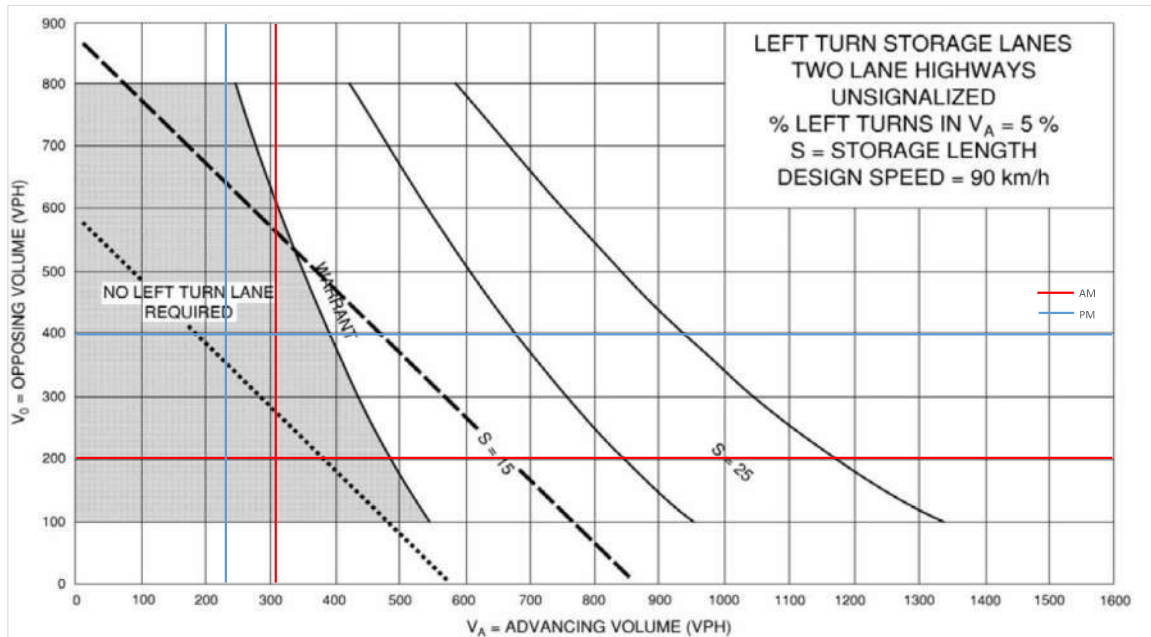
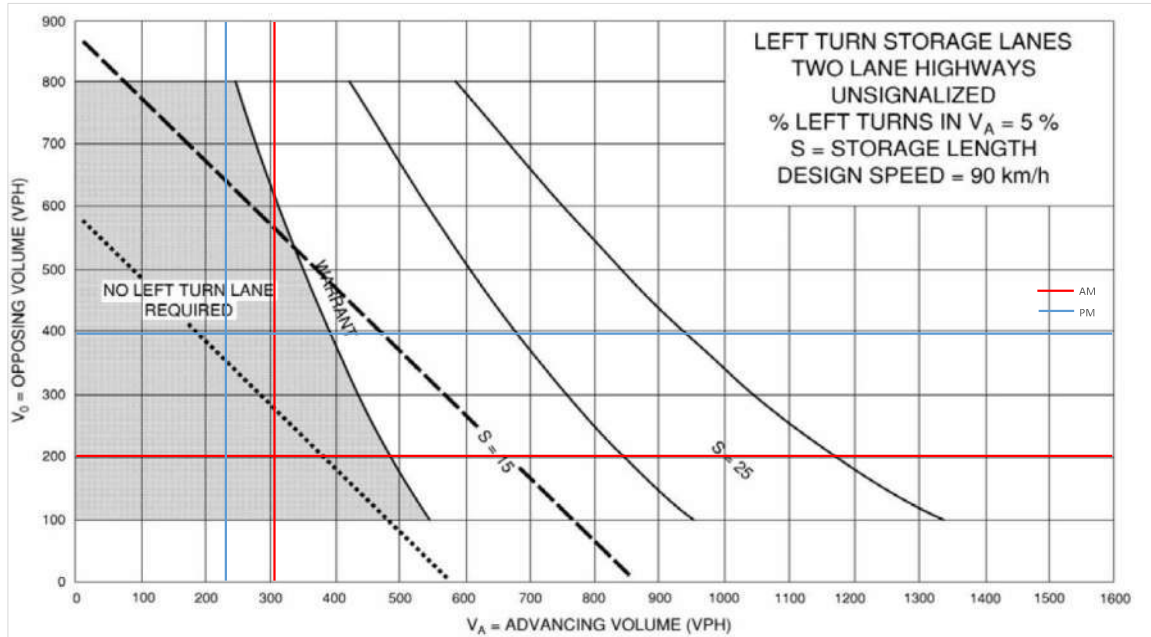
Future Background 2030																	
Design Speed		Yes															
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM		59	213	0	0	141	41	0	0	0	93	0	138	21.7%	272	182
	PM		139	165	0	0	256	97	0	0	0	66	0	97	45.7%	304	353
Future Background 2035																	
Design Speed		Yes															
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM		59	215	0	0	141	41	0	0	0	93	0	138	21.5%	274	182
	PM		139	165	0	0	258	97	0	0	0	66	0	97	45.7%	304	355
Future Total 2030																	
Design Speed		Yes															
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM		73	245	0	0	215	41	0	0	0	93	0	170	23.0%	318	256
	PM		171	239	0	0	308	97	0	0	0	66	0	119	41.7%	410	405
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		73	247	0	0	215	41	0	0	0	93	0	170	22.8%	320	256
	PM		171	239	0	0	310	97	0	0	0	66	0	119	41.7%	410	407

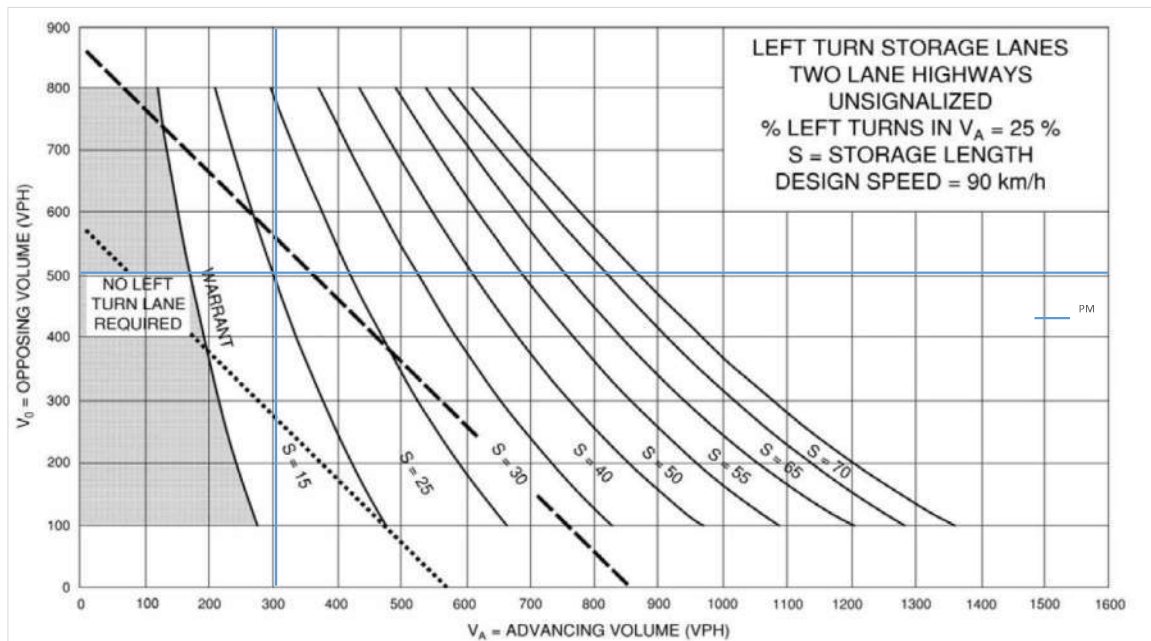
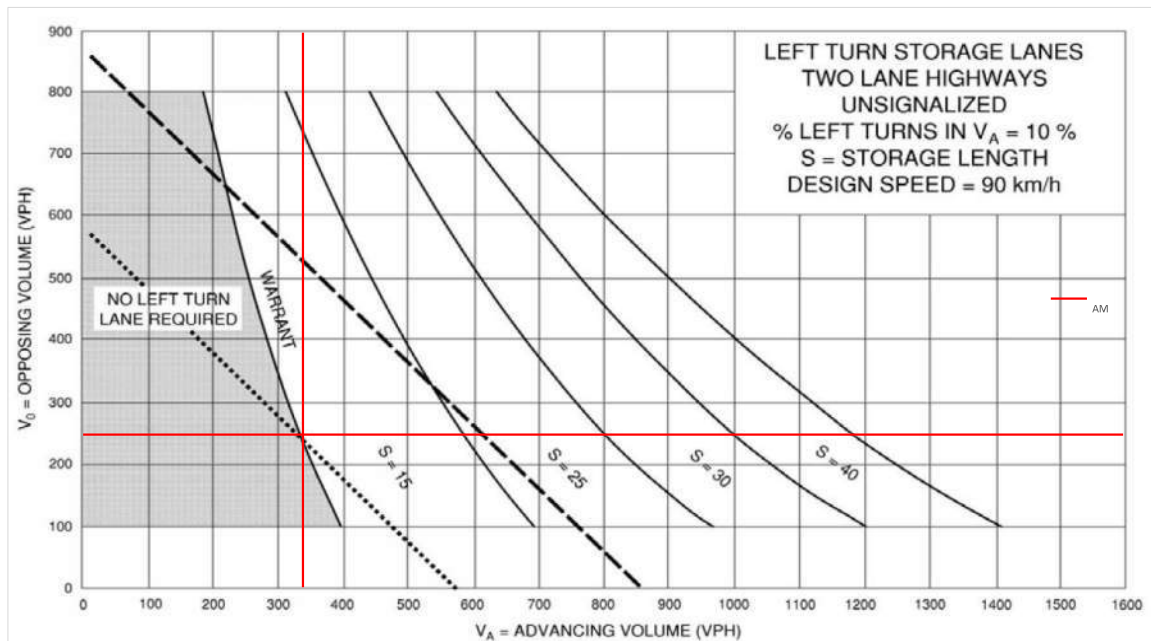


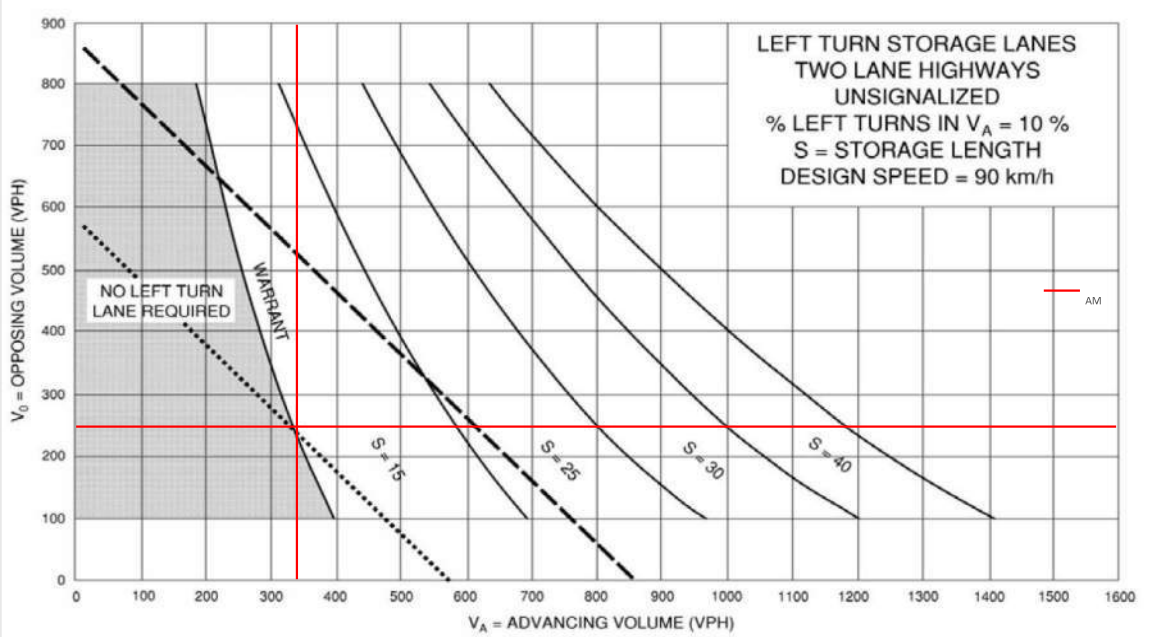


Flewellyn Road at Street 16

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	0	306	0	0	182	19	0	0	0	48	0	0	0.0%	306	201
		PM	0	231	0	0	353	45	0	0	0	34	0	0	0.0%	231	398
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	0	308	0	0	182	19	0	0	0	48	0	0	0.0%	308	201
		PM	0	231	0	0	355	45	0	0	0	34	0	0	0.0%	231	400
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	32	306	0	0	182	66	0	0	0	156	0	74	9.5%	338	248
		PM	74	231	0	0	353	153	0	0	0	110	0	52	24.3%	305	506
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	32	308	0	0	182	66	0	0	0	156	0	74	9.4%	340	248
		PM	74	231	0	0	355	153	0	0	0	110	0	52	24.3%	305	508







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
2018-03-08	2018	19:35	FERNBANK RD @ SHEA RD (0000399)	03 - Snow	07 - Dark	11 - Roundabout	0	03 - P.D. only	03 - Rear end	06 - Ice	2	0	0	0
2018-07-27	2018	16:03	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2018-08-10	2018	11:00	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2018-11-14	2018	7:46	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2019-01-21	2019	14:03	FERNBANK RD @ SHEA RD (0000399)	05 - Drifting Snow	01 - Daylight	11 - Roundabout	0	03 - P.D. only	07 - SMV other	05 - Packed snow	1	0	0	0
2019-02-26	2019	8:58	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2019-04-01	2019	7:10	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2019-11-06	2019	7:15	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	03 - Dawn	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2019-12-04	2019	10:28	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
2020-01-13	2020	18:30	FERNBANK RD @ SHEA RD (0000399)	03 - Snow	07 - Dark	11 - Roundabout	0	03 - P.D. only	03 - Rear end	06 - Ice	2	0	0	0
2020-10-23	2020	19:23	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	07 - Dark	11 - Roundabout	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2021-02-14	2021	17:44	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	07 - Dark	11 - Roundabout	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
2022-01-12	2022	9:00	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	07 - SMV other	06 - Ice	1	0	0	0
2022-02-12	2022	10:57	FERNBANK RD @ SHEA RD (0000399)	04 - Freezing Rain	01 - Daylight	11 - Roundabout	0	03 - P.D. only	07 - SMV other	06 - Ice	1	0	0	0
2022-03-03	2022	10:00	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	99 - Other	01 - Dry	2	0	0	0
2018-04-22	2018	11:30	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2018-05-15	2018	13:45	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
2018-07-30	2018	17:09	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
2018-08-31	2018	17:29	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2018-11-16	2018	9:35	FEWELLYN RD @ SHEA RD (0000398)	03 - Snow	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	03 - Loose snow	2	0	0	0
2018-11-28	2018	18:43	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	07 - Dark	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2019-01-31	2019	16:50	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	05 - Dusk	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
2019-03-29	2019	17:26	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2019-05-04	2019	15:59	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2019-06-03	2019	11:50	FEWELLYN RD @ SHEA RD (0000398)	02 - Rain	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
2019-11-07	2019	7:51	FEWELLYN RD @ SHEA RD (0000398)	03 - Snow	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	06 - Ice	2	0	0	0
2020-02-13	2020	7:08	FEWELLYN RD @ SHEA RD (0000398)	03 - Snow	03 - Dawn	02 - Stop sign	0	03 - P.D. only	02 - Angle	02 - Wet	2	0	0	0
2020-11-01	2020	12:17	FEWELLYN RD @ SHEA RD (0000398)	02 - Rain	01 - Daylight	02 - Stop sign	0	03 - P.D. only	07 - SMV other	02 - Wet	1	0	0	0
2021-06-16	2021	15:15	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2021-09-21	2021	16:17	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2021-10-23	2021	14:48	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
2022-01-01	2022	3:01	FEWELLYN RD @ SHEA RD (0000398)	07 - Fog, mist, smoke, dust	07 - Dark	02 - Stop sign	0	02 - Non-fatal injury	07 - SMV other	02 - Wet	1	0	0	0
2022-01-14	2022	16:26	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2022-02-22	2022	19:20	FEWELLYN RD @ SHEA RD (0000398)	04 - Freezing Rain	07 - Dark	02 - Stop sign	0	03 - P.D. only	02 - Angle	06 - Ice	2	0	0	0
2022-02-24	2022	7:11	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	03 - Dawn	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2022-03-12	2022	22:30	FEWELLYN RD @ SHEA RD (0000398)	03 - Snow	07 - Dark	02 - Stop sign	0	03 - P.D. only	02 - Angle	04 - Slush	3	0	0	0
2022-05-24	2022	9:43	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2022-06-24	2022	13:45	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2022-07-10	2022	11:13	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
2022-07-29	2022	8:37	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2022-08-23	2022	16:46	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
2022-09-02	2022	20:11	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	07 - Dark	02 - Stop sign	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	1	0	0
2022-11-04	2022	4:47	FEWELLYN RD @ SHEA RD (0000398)	07 - Fog, mist, smoke, dust	07 - Dark	02 - Stop sign	0	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
2022-11-06	2022	22:29	FEWELLYN RD @ SHEA RD (0000398)	01 - Clear	07 - Dark	02 - Stop sign	0	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
2022-11-16	2022	8:30	FEWELLYN RD @ SHEA RD (0000398)	03 - Snow	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	05 - Packed snow	2	0	0	0
2018-11-16	2018	18:23	FEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (_ 32A190)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	03 - Loose snow	1	0	0	0
2019-01-10	2019	9:15	FEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (_ 32A190)	03 - Snow	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	05 - Packed snow	2	0	0	0
2019-01-24	2019	8:33	FEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (_ 32A190)	04 - Freezing Rain	01 - Daylight	10 - No control	0	03 - P.D. only	07 - SMV other	04 - Slush	1	0	0	0
2019-09-27	2019	20:05	FEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (_ 32A190)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
2020-09-27	2020	23:15	FEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (_ 32A190)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
2020-11-09	2020	6:36	FEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (_ 32A190)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
2021-12-02	2021	19:47	FEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (_ 32A190)	02 - Rain	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	02 - Wet	1	0	0	0
2022-08-24	2022	23:50	FEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (_ 32A190)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
2018-08-27	2018	6:10	SHEA RD btwn FERNBANK RD & FEWELLYN RD (_ 32A19R)	01 - Clear	03 - Dawn	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
2018-11-09	2018	23:17	SHEA RD btwn FERNBANK RD & FEWELLYN RD (_ 32A19R)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	03 - Loose snow	1	0	0	0
2022-02-19	2022	17:29	SHEA RD btwn FERNBANK RD & FEWELLYN RD (_ 32A19R)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	06 - Ice	1	0	0	0
2022-08-13	2022	20:59	SHEA RD btwn FERNBANK RD & FEWELLYN RD (_ 32A19R)	01 - Clear	07 - Dark	10 - No control	0	02 - Non-fatal injury	06 - SMV unattended vehicle	01 - Dry	1	0	0	0

Collision Summary Report

Location: FLEWELLYN RD @ SHEA RD							Geo ID: 0000398				
Municipality: Ottawa							Jurisdiction: Municipal (excl. Twp. Rd.)				
Traffic Control: Stop sign							Total Collisions: 35				
Collision ID	Date/Time	Env	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuvre	Vehicle Type	First Event	Driver Action	No. Ped
240911814	2024-Sep-4, Wed, 8:45	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	0
Comments:					South	Dry	Stopped	Automobile, station wagon		Driving properly	
240185120	2024-Jul-12, Fri, 18:13	Clear	Angle	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	0
Comments:					West	Dry	Going ahead	Automobile, station wagon		Improper turn	
240909296	2024-Jul-8, Mon, 18:00	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	0
Comments:					North	Dry	Going ahead	Automobile, station wagon		Driving properly	
240168710	2024-Jun-27, Thu, 17:08	Clear	Angle	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Unknown	0
Comments:					East	Dry	Going ahead	Automobile, station wagon		Unknown	
240908006	2024-Jun-11, Tue, 6:45	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Unknown	0
Comments:					West	Dry	Going ahead	Automobile, station wagon		Driving properly	
240907524	2024-Jun-1, Sat, 20:40	Rain	Angle	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	0
Comments:					West	Wet	Going ahead	Truck - open		Lost control	
240906553	2024-May-13, Mon, 7:50	Clear	Angle	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	0
Comments:					South	Dry	Going ahead	Automobile, station wagon		Driving properly	
240117751	2024-May-9, Thu, 14:41	Clear	Angle	Non-fatal injury	South	Dry	Turning left	Passenger van	Other motor vehicle	Driving properly	0
Comments:					West	Dry	Going ahead	Tow truck	Steel guide rail	Failed to yield right-of-way	
240904794	2024-Apr-4, Thu, 9:30	Snow	Rear end	P.D. only	South	Slush	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other	0
Comments:					South	Slush	Slowing or stopping	Automobile, station wagon		Driving properly	
220323290	2022-Dec-7, Wed, 1:05	Clear	SMV other	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Steel guide rail	Lost control	0

Comments:										Ditch	
220900793	2022-Nov-16, Wed, 8:30	Snow	Angle	P.D. only	South	Packed snow	Going ahead	Pick-up truck	Other motor vehicle	Lost control	0
Comments:					East	Packed snow	Going ahead	Pick-up truck		Driving properly	
220296822	2022-Nov-6, Sun, 22:29	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Steel guide rail	Lost control	0
Comments:											
220294201	2022-Nov-4, Fri, 4:47	Fog, mist, smoke, dust	SMV other	P.D. only	South	Dry	Going ahead	Police vehicle	Skidding/sliding	Lost control	0
Comments:										Steel guide rail	
220233881	2022-Sep-2, Fri, 20:11	Clear	SMV other	Non-fatal injury	North	Dry	Going ahead	Motorcycle	Steel guide rail	Speed too fast for condition	0
Comments:											
220230456	2022-Aug-29, Mon, 22:30	Rain	Turning movement	P.D. only	South	Wet	Turning left		Other motor vehicle		0
Comments:					West	Wet	Going ahead				
220223454	2022-Aug-23, Tue, 16:46	Clear	Angle	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	0
Comments:					West	Dry	Going ahead	Automobile, station wagon		Improper turn	
220199149	2022-Jul-29, Fri, 8:37	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					East	Dry	Going ahead	Automobile, station wagon		Driving properly	
220180670	2022-Jul-10, Sun, 11:13	Clear	Angle	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					West	Dry	Going ahead	Pick-up truck		Driving properly	
220164228	2022-Jun-24, Fri, 13:45	Clear	Angle	P.D. only	East	Dry	Turning left	Pick-up truck	Other motor vehicle	Improper turn	0
Comments:					South	Dry	Stopped	Automobile, station wagon		Driving properly	
220132465	2022-May-24, Tue, 9:43	Clear	Angle	P.D. only	South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Failed to yield right-of-way	0
Comments:					West	Dry	Going ahead	Pick-up truck		Driving properly	
220063489	2022-Mar-12, Sat, 22:30	Snow	Angle	P.D. only	North	Slush	Slowing or stopping	Pick-up truck	Other motor vehicle	Speed too fast for condition	0
Comments:					East	Slush	Going ahead	Unknown		Unknown	

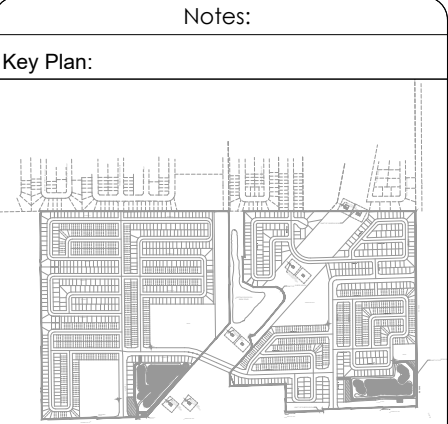
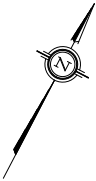
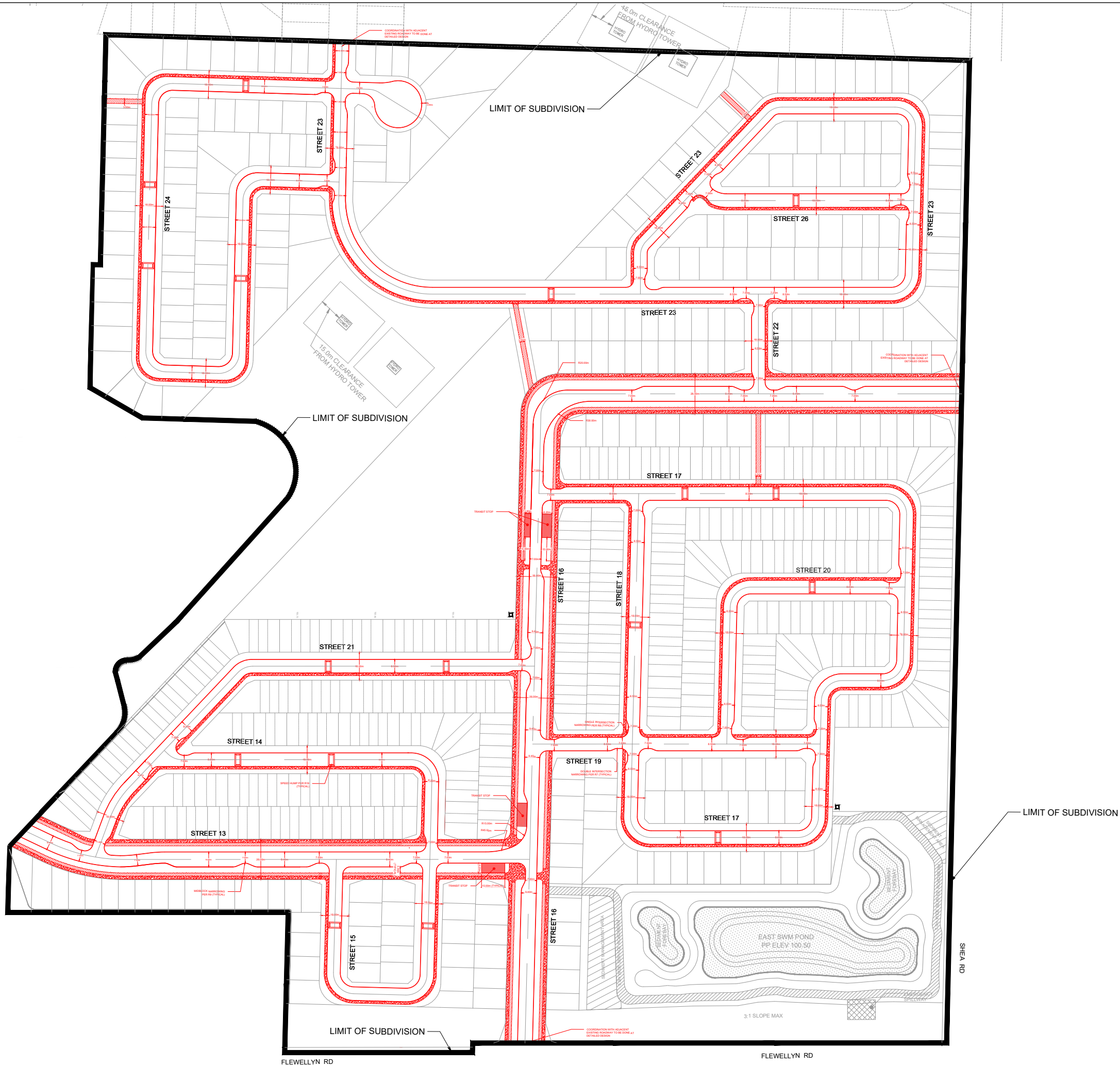
220047233	2022-Feb-24, Thu, 7:11	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					East	Dry	Going ahead	Pick-up truck		Driving properly	
220046611	2022-Feb-22, Tue, 19:20	Freezing Rain	Angle	P.D. only	South	Ice	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control	0
Comments:					East	Slush	Going ahead	Automobile, station wagon		Driving properly	
220011424	2022-Jan-14, Fri, 16:26	Clear	Angle	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					East	Dry	Going ahead	Automobile, station wagon		Driving properly	
220000130	2022-Jan-1, Sat, 3:01	Fog, mist, smoke, dust	SMV other	Non-fatal injury	North	Wet	Going ahead	Automobile, station wagon	Steel guide rail	Driving properly	0
Comments:											
210272463	2021-Oct-23, Sat, 14:48	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					West	Dry	Going ahead	Automobile, station wagon		Driving properly	
210240555	2021-Sep-21, Tue, 16:17	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					West	Dry	Going ahead	Automobile, station wagon		Driving properly	
210142214	2021-Jun-16, Wed, 15:15	Clear	Angle	P.D. only	South	Dry	Turning left	Truck - dump	Other motor vehicle	Failed to yield right-of-way	0
Comments:					East	Dry	Going ahead	Automobile, station wagon		Driving properly	
200266982	2020-Nov-1, Sun, 12:17	Rain	SMV other	P.D. only	South	Wet	Turning right	Pick-up truck	Skidding/sliding	Lost control	0
Comments:									Ran off road		
200041824	2020-Feb-13, Thu, 7:08	Snow	Angle	P.D. only	South	Wet	Slowing or stopping	Pick-up truck	Other motor vehicle	Disobeyed traffic control	0
Comments:					West	Wet	Going ahead	Pick-up truck		Driving properly	
190295435	2019-Nov-7, Thu, 7:51	Snow	Angle	P.D. only	South	Ice	Turning left	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	0
Comments:					East	Ice	Going ahead	Automobile, station wagon		Driving properly	
190138341	2019-Jun-3, Mon, 13:50	Rain	Rear end	P.D. only	South	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	0
Comments:					South	Wet	Stopped	Passenger van		Driving properly	

190110322	2019-May-4, Sat, 15:59	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					West	Dry	Going ahead	Automobile, station wagon		Driving properly	
190077717	2019-Mar-29, Fri, 17:26	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					West	Dry	Going ahead	Automobile, station wagon		Driving properly	
190026837	2019-Jan-31, Thu, 16:50	Clear	Angle	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					West	Dry	Going ahead	Passenger van		Driving properly	
Location: FLEWELLYN RD btwn SHEA RD & SHEA RD					Geo ID: __3ZAI9S						
Municipality: Ottawa (OT)					Jurisdiction: Municipal (excl. Twp. Rd.)						
Traffic Control: No control					Total Collisions: 1						
Collision ID	Date/Time	Env	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuvre	Vehicle Type	First Event	Driver Action	No. Ped
240908236	2024-Jun-15, Sat, 9:30	Clear	Sideswipe	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	0
Comments:					West	Dry	Going ahead	Automobile, station wagon		Driving properly	
Location: SHEA RD N @ FERNBANK RD					Geo ID: 0000399						
Municipality: Ottawa					Jurisdiction: Municipal (excl. Twp. Rd.)						
Traffic Control: Roundabout					Total Collisions: 14						
Collision ID	Date/Time	Env	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuvre	Vehicle Type	First Event	Driver Action	No. Ped
240914398	2024-Oct-24, Thu, 15:35	Clear	Rear end	P.D. only	East	Dry	Going ahead	School bus	Other motor vehicle	Driving properly	0
Comments:					East	Dry	Stopped	Automobile, station wagon		Driving properly	
240911970	2024-Sep-6, Fri, 20:45	Rain	Sideswipe	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	0
Comments:					South	Wet	Going ahead	Automobile, station wagon		Driving properly	
240906502	2024-May-10, Fri, 13:10	Clear	Turning movement	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	0
Comments:					West	Dry	Turning right	Automobile, station wagon		Unknown	
220053606	2022-Mar-3, Thu, 10:00	Clear	Other	P.D. only	North	Dry	Reversing	Truck - open	Other motor vehicle	Unknown	0
Comments:					South	Dry	Stopped	Pick-up truck		Driving properly	
220036740	2022-Feb-12, Sat, 10:57	Freezing Rain	SMV other	P.D. only	North	Ice	Slowing or stopping	Automobile, station wagon	Pole (sign, parking meter)	Lost control	0
Comments:											

220009354	2022-Jan-12, Wed, 9:00	Clear	SMV other	P.D. only	West	Ice	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Speed too fast for condition	0
Comments:									Ditch		
210035810	2021-Feb-14, Sun, 17:44	Clear	Rear end	Non-fatal injury	West	Dry	Going ahead	Pick-up truck	Other motor vehicle	Following too close	0
Comments:					West	Dry	Stopped	Pick-up truck		Driving properly	
200259605	2020-Oct-23, Fri, 19:23	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	0
Comments:					West	Dry	Going ahead	Automobile, station wagon		Driving properly	
200012096	2020-Jan-13, Mon, 18:30	Snow	Rear end	P.D. only	South	Ice	Going ahead	Pick-up truck	Other motor vehicle	Following too close	0
Comments:					South	Ice	Stopped	Pick-up truck		Driving properly	
190321391	2019-Dec-4, Wed, 10:28	Clear	Angle	P.D. only	North	Wet	Merging	Passenger van	Other motor vehicle	Failed to yield right-of-way	0
Comments:					East	Wet	Going ahead	Delivery van		Driving properly	
190294418	2019-Nov-6, Wed, 7:15	Clear	Angle	P.D. only	East	Dry	Merging	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					South	Dry	Going ahead	Automobile, station wagon		Driving properly	
190079855	2019-Apr-1, Mon, 7:10	Clear	Angle	P.D. only	West	Dry	Merging	Passenger van	Other motor vehicle	Failed to yield right-of-way	0
Comments:					North	Dry	Going ahead	Automobile, station wagon		Driving properly	
190048780	2019-Feb-26, Tue, 8:58	Clear	Angle	P.D. only	East	Dry	Merging	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	0
Comments:					South	Dry	Going ahead	Automobile, station wagon		Driving properly	
190017921	2019-Jan-21, Mon, 14:03	Drifting Snow	SMV other	P.D. only	West	Packed snow	Slowing or stopping	Passenger van	Skidding/sliding	Lost control	0
Comments:									Pole (sign, parking meter)		

Appendix H

Conceptual Traffic Calming Plan



- LEGEND:
- CONCRETE SIDEWALK
2.00m ON COLLECTOR ROADS
1.80m ON LOCAL ROADS
 - 2.00m ASPHALT CYCLE TRACK
 - Transit Stops
- NOTES:
- THIS TRAFFIC CALMING CONCEPT IS SUBJECT TO SERVICING AND ILLUSTRATES THE PHILOSOPHY OF THE 30KM/H TRAFFIC CALMING GUIDELINES.

01	Issued for Review:	CH	2026-04-29
REV:	DESCRIPTION:	BY:	DATE:
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:
**5971 Flewellyn Rd, 1820 Shea Rd
and 1770 Shea Rd**

TITLE: **GRDD Redline**

SCALE: AT A3: NTS	DATE: 2026-04-29	DRAWN: CH	CHECKED: AL
PROJECT NO: 2026-018	DRAWING NO: 001	REVISION: 01	

Appendix I

MMLOS Analysis

Multi-Modal Level of Service - Segments Form

Project: Caivan Magnolia East
Consultant: CGH Transportation Inc.
Date: 2026-05-06
Scenario: Existing and Future

Segment Name		Flewellyn(Existing/Future)		New Collector Road		Shea (Existing)		Shea (Future)		New Local Road	
OP Transect / Policy Area		Outer Urban or Suburban		Outer Urban or Suburban		Outer Urban or Suburban		Outer Urban or Suburban		Outer Urban or Suburban	
Segment Component		Majority (>50%)		Majority (>50%)		Majority (>50%)		Majority (>50%)		Majority (>50%)	
Side of Street		N		W or N	E or S	W		W		W or N	E or S
Pedestrian	PLOS Inputs										
	Posted Speed (km/h)	80 km/h		40 km/h		80 km/h		80 km/h		30 km/h	
	Two-Way ADT	11,050		5,200		3,800		7,000		1,000	
	Pedestrian Facility	None		Sidewalk	Sidewalk	None		Sidewalk		Sidewalk	Sidewalk
	Does the facility meet the TMP Sidewalk or MUP Policy? If not, for MUPs, does the location have a low volume of peak daily users AND are pedestrian volumes likely less than 20% of total users?	No		Yes	Yes	No		Yes		Yes	Yes
	Facility Width (m)	1.80m		2.00m	2.00m	1.80m		2.00m		1.80m	1.80m
	Offset from Motor Vehicle Travel Lanes (m)	< 0.5m		≥ 3.0m	≥ 3.0m	< 0.5m		1.5-2.99m		< 0.5m	
Bicycle	Presence of Adjacent Parking?	-		Yes	Yes	-		-		-	
	General Purpose Curb Lane ADT	> 3000		≤ 3000	≤ 3000	≤ 3000		> 3000		≤ 3000	
	Max. Distance between Controlled Crossings (m)	-		≤ 200m	≤ 200m	-		> 400m		-	
	Score	0.75	-	5.00	5.00	0.75	-	2.25	-	3.50	3.50
	PLOS	E	-	A	A	E	-	D	-	B	B
	Target PLOS	C		C		C		C		C	
	BLOS Inputs										
Transit	Cycling Route Classification	Elsewhere		Elsewhere		Elsewhere		Elsewhere		Elsewhere	
	Cycling Facility	Paved Shoulder without Buffer	Input PLOS First	Cycle Track	Cycle Track	Shared Operating Space	Input PLOS First	Cycle Track	Input PLOS First	Shared Operating Space	Shared Operating Space
	Is the minimum level of separation provided according to OTM Book 18 Pre-Selection Nomograph - Rural Context (Figure 5.6)? (for paved shoulders)	Yes		-	-	-		-		-	-
	Facility Operation	-		Unidirectional	Unidirectional	-		Unidirectional		-	-
	Pedestrian/Cyclist Volume	-		-	-	-		-		-	-
	Facility Width	1.5-1.99m		1.8m-2.09m	1.8m-2.09m	-		1.8m-2.09m		-	-
	Boulevard/Buffer Width (excluding curb)	-		≥ 0.6m	≥ 0.6m	-		Outside clear zone or continuous traffic barrier provided		-	-
	Unsignalized Roadway Crossing Type (where cyclists are required to yield)	None		Cross-Street	Cross-Street	None		None		Cross-Street	Cross-Street
	Number of Travel Lanes at Crossing	-		≤ 2	≤ 2	-		-		≤ 2	≤ 2
	Crossing Includes Median Refuge (≥ 2.7m)	-		No	No	-		-		No	No
	Cross-street Posted Speed (km/h)	-		≥ 60 km/h	≥ 60 km/h	-		-		40 km/h	40 km/h
	Cycling Path Blockages (e.g. bus stops and/or loading zones)	Rare		-	-	Rare		-		Frequent, Short Duration	Frequent, Short Duration
	Score	3.30	-	3.98	3.98	0.75	-	4.50	-	4.55	4.55
Public Realm	BLOS	C	-	B	B	E	-	A	-	A	A
	Target BLOS	C		C		C		C		C	
	TLOS Inputs										
	Transit Facility	Mixed Traffic		Mixed Traffic		Mixed Traffic		Mixed Traffic		Select Transit Designation	
	Facility Type	Mixed Traffic		Mixed Traffic		Mixed Traffic		Mixed Traffic			
Public Realm	Expected Transit Running Time	Slightly Impeded		Slightly Impeded		Slightly Impeded		Slightly Impeded			
	Transit Travel Speed (if available)	Enter Speed (if available)		Enter Speed (if available)		Enter Speed (if available)		Enter Speed (if available)			
	TLOS	C	-	C	C	C	-	C	-	-	-
	Target TLOS	E (D for frequent transit routes)		E (D for frequent transit routes)		E (D for frequent transit routes)		E (D for frequent transit routes)		-	
	PRLOS Inputs										
Public Realm	Context	Other Streets	Input PLOS and BLOS First	Other Streets	Other Streets	Other Streets	Input PLOS and BLOS First	Other Streets	Input PLOS and BLOS First	Other Streets	Other Streets
	Inner Boulevard Width	≤ 0.6m		≥ 4.0m	≥ 4.0m	≤ 0.6m		≥ 4.0m		≤ 0.6m	≤ 0.6m
	Middle Boulevard Width	≤ 0.5m		≤ 0.5m	≤ 0.5m	≤ 0.5m		≤ 0.5m		≤ 0.5m	≤ 0.5m
	Outer Boulevard (Frontage) Width	1.5-1.99m		≤ 0.5m	≤ 0.5m	1.5-1.99m		≤ 0.5m		2.0-2.99m	2.0-2.99m
	Transit Route on Segment?	No		Yes	Yes	No		Yes		No	No
	Bus Stop Elements	-		Curbside landing zone with no shelter	Curbside landing zone with no shelter	-		Curbside landing zone with no shelter		-	-
	Number of Midblock Traffic Lanes (both travel directions)	≤ 2		≤ 2	≤ 2	≤ 2		≤ 2		≤ 2	
	Score	16.20	-	26.70	26.70	13.20	-	17.70	-	23.10	23.10
	PRLOS	C	-	A	A	D	-	C	-	B	B
		C		A		D		C		B	

Appendix J

TDM Checklist

TDM Measures Checklist:

Residential Developments (multi-family, condominium or subdivision)

Legend	
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance
★	The measure is one of the most dependably effective tools to encourage the use of sustainable modes

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

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 (<i>multi-family, condominium</i>)	☐
BETTER	3.1.2 Provide real-time arrival information display at entrances (<i>multi-family, condominium</i>)	☐
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 (<i>subdivision</i>)	☒
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 (<i>multi-family</i>)	☐
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized (<i>multi-family</i>)	☐
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 (<i>condominium</i>)	☐
BASIC ★	5.1.2 Unbundle parking cost from monthly rent (<i>multi-family</i>)	☐

TDM measures: <i>Residential developments</i>		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 1.01 - Assigned December, 2024

AM Peak Hour Total Traffic Volume

Stittsville South

2022 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: Nov 2025
EMME Scenario: 22002



Legend

AM Peak Hour Total Traffic Volume



Distance (m)



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

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

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

Made with OpenPaths™

TRANS Regional Model

Version 1.01 - Assigned December, 2024

AM Peak Hour Total Traffic Volume

Stittsville South

2046 Model - Priority Network

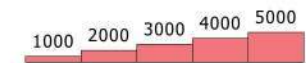
N/A

User Initials: TIMW
Plot Prepared: Nov, 2025
EMME Scenario: 46011



Legend

AM Peak Hour Total Traffic Volume



Distance (m)



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

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

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

Made with OpenPaths™

Appendix L

Background Development

Figure 1: Total Background Development Volumes

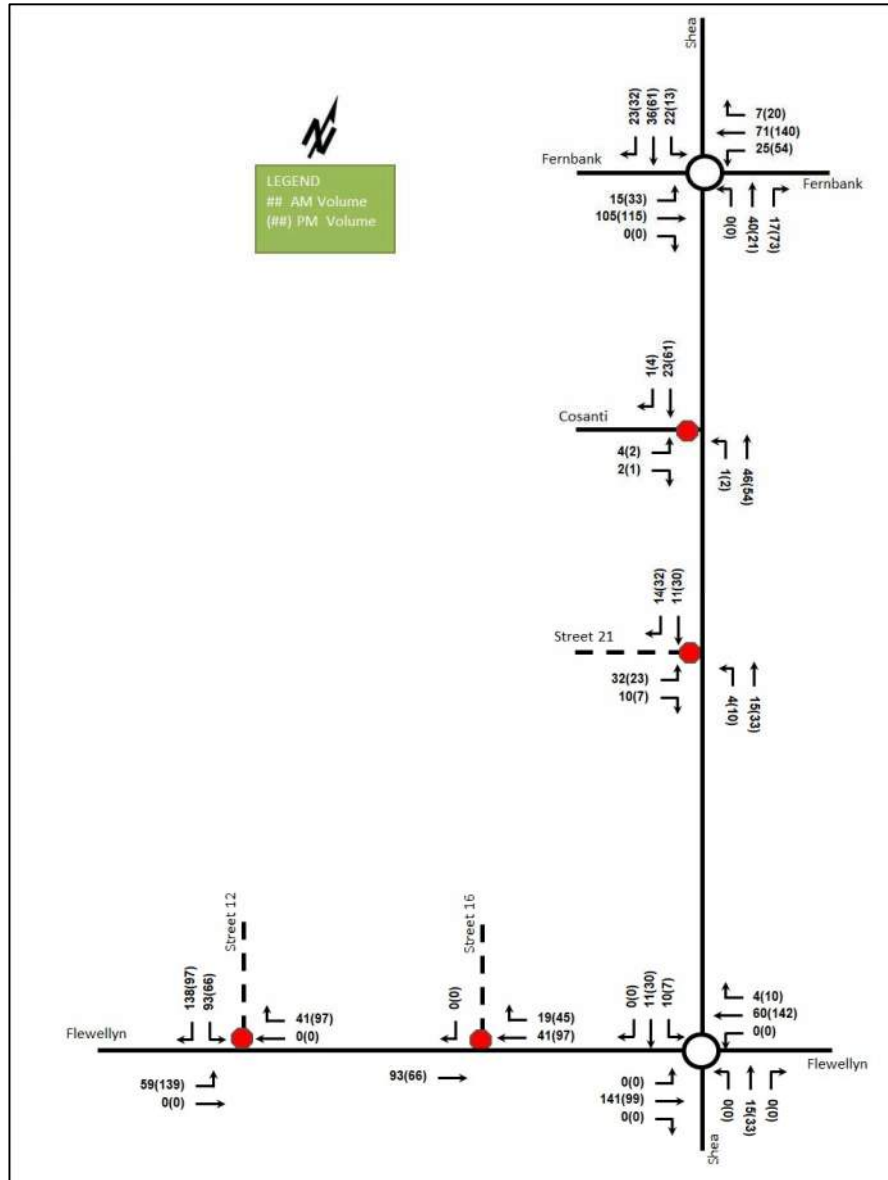
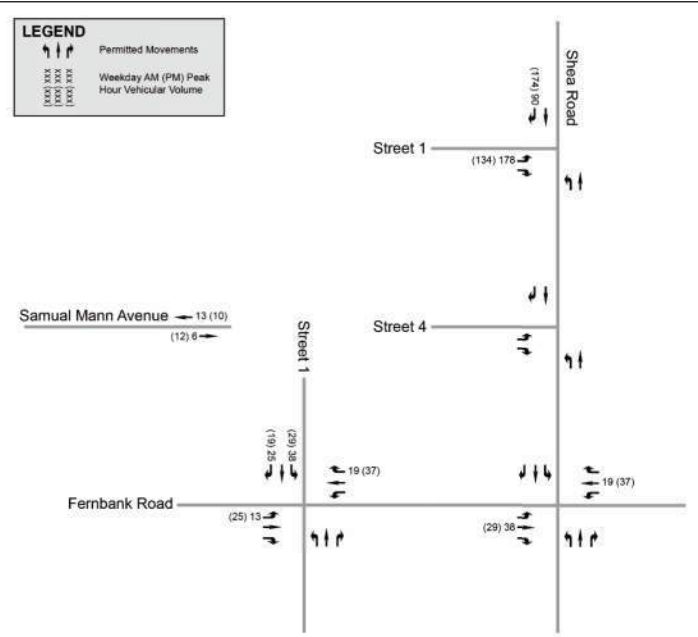
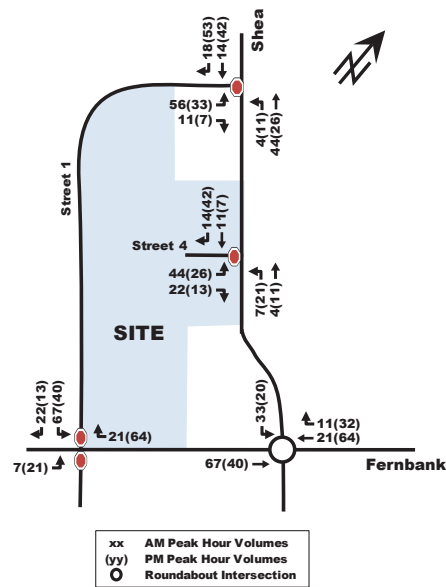
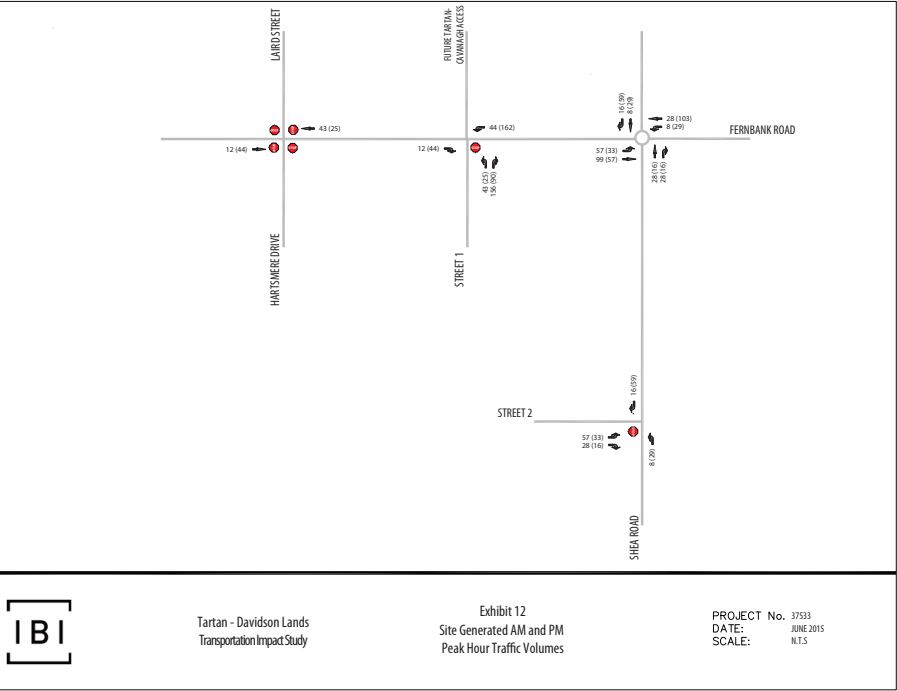


Figure 3: Total 'New' Auto Trips



5993 Flewellyn Road



5960 Fernbank Road

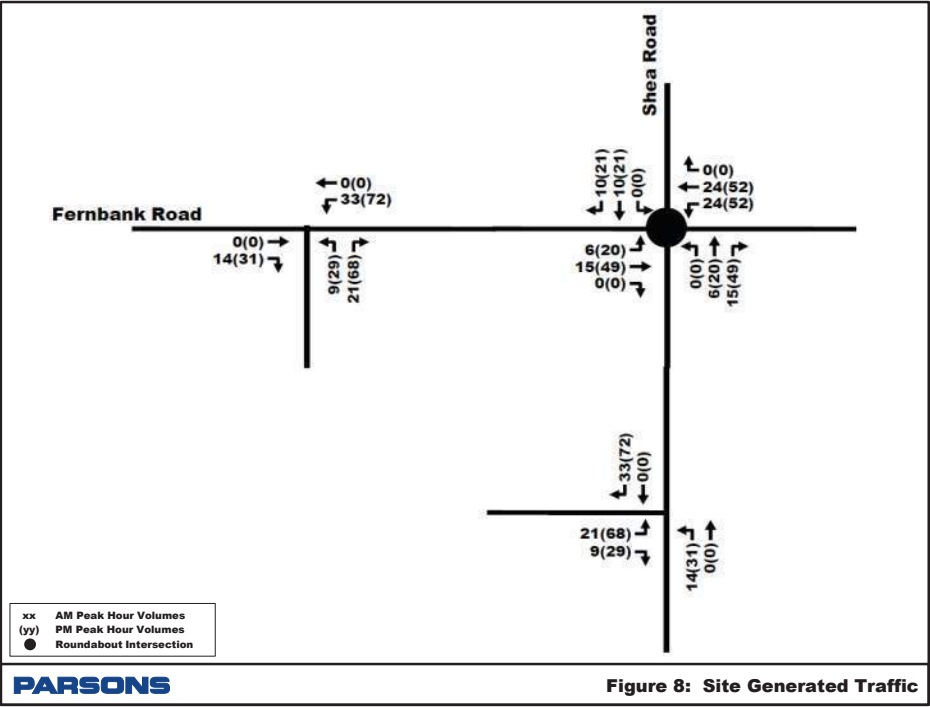
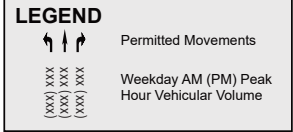
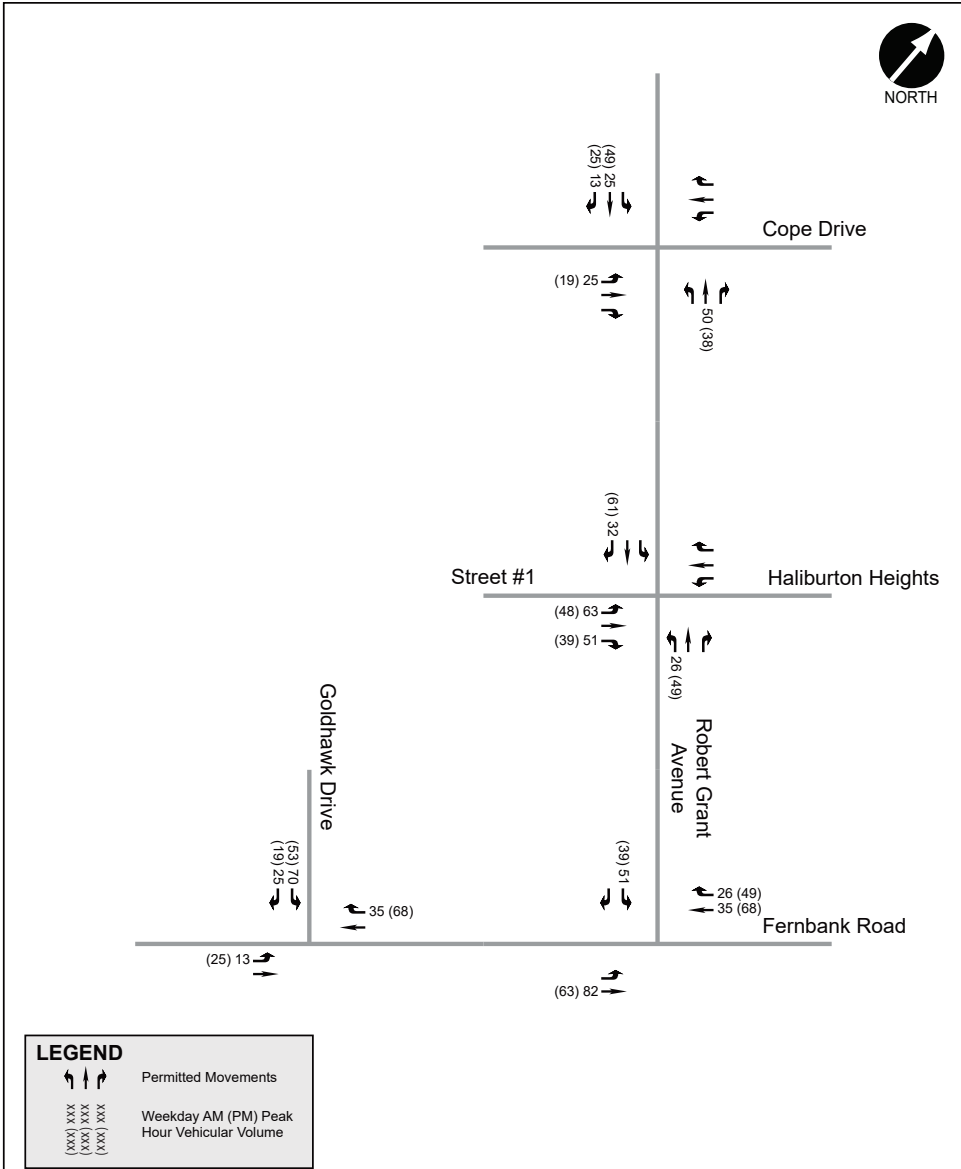
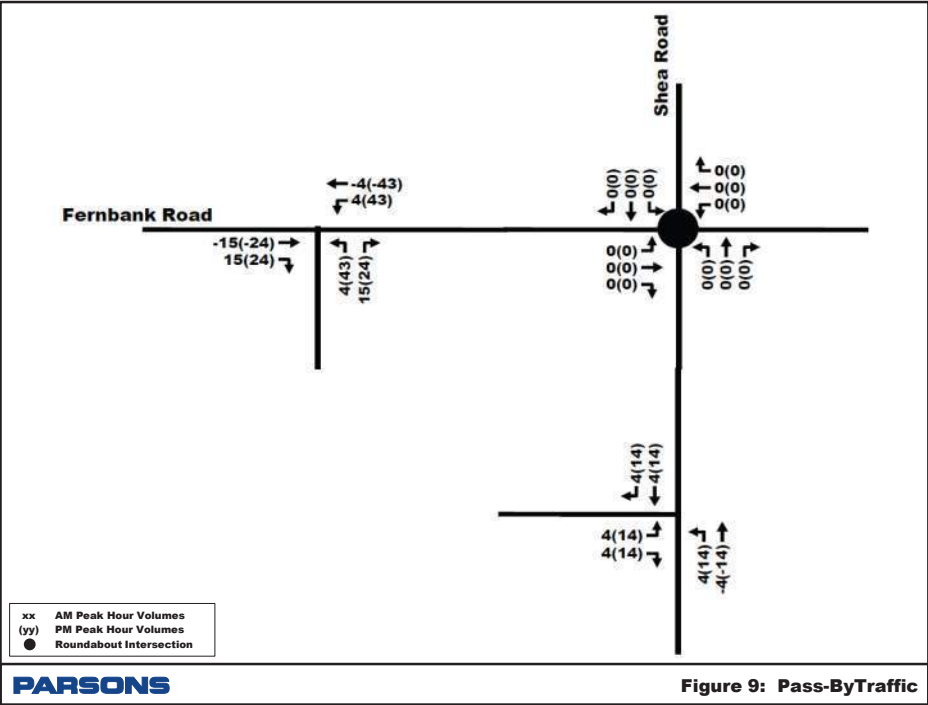


Figure 8: Site Generated Traffic



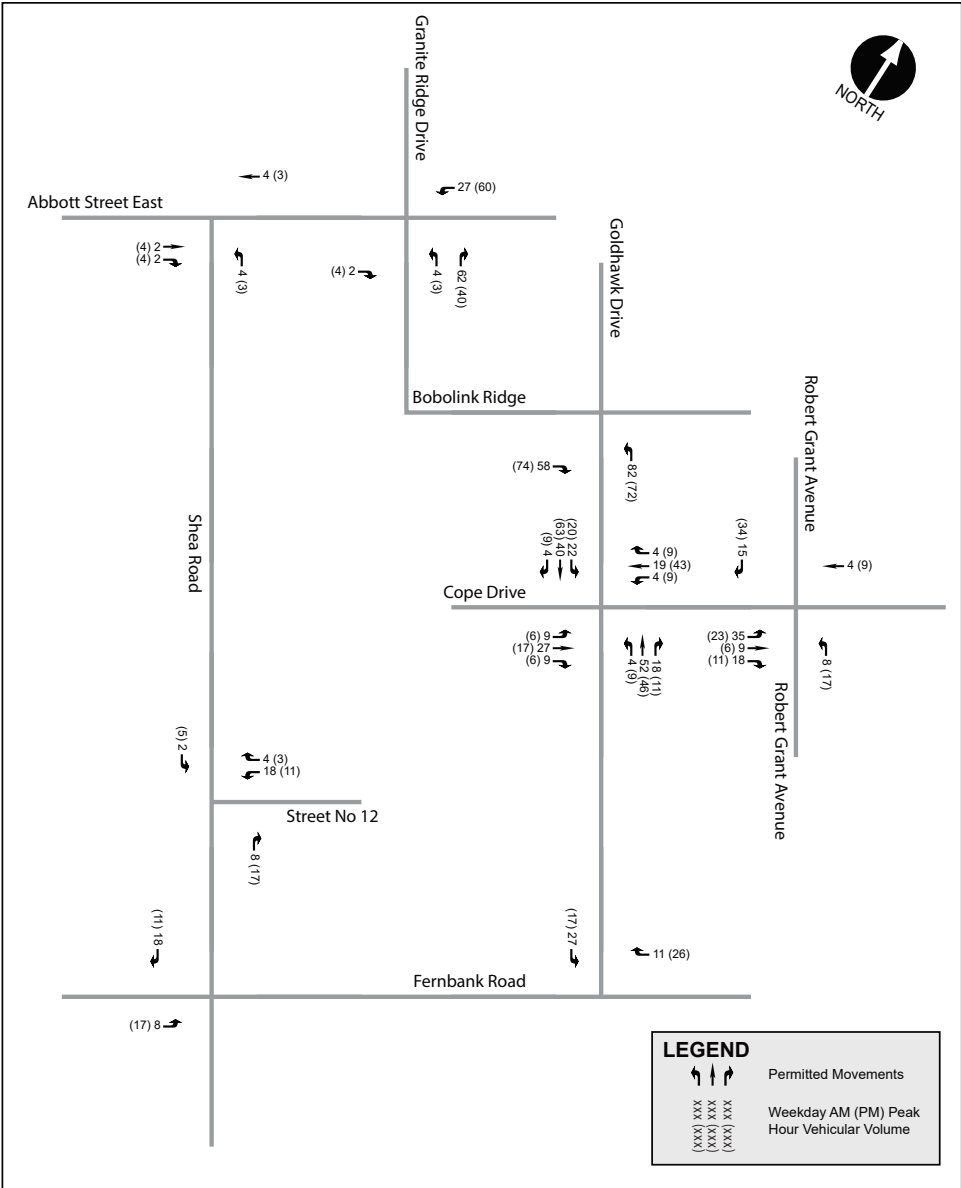
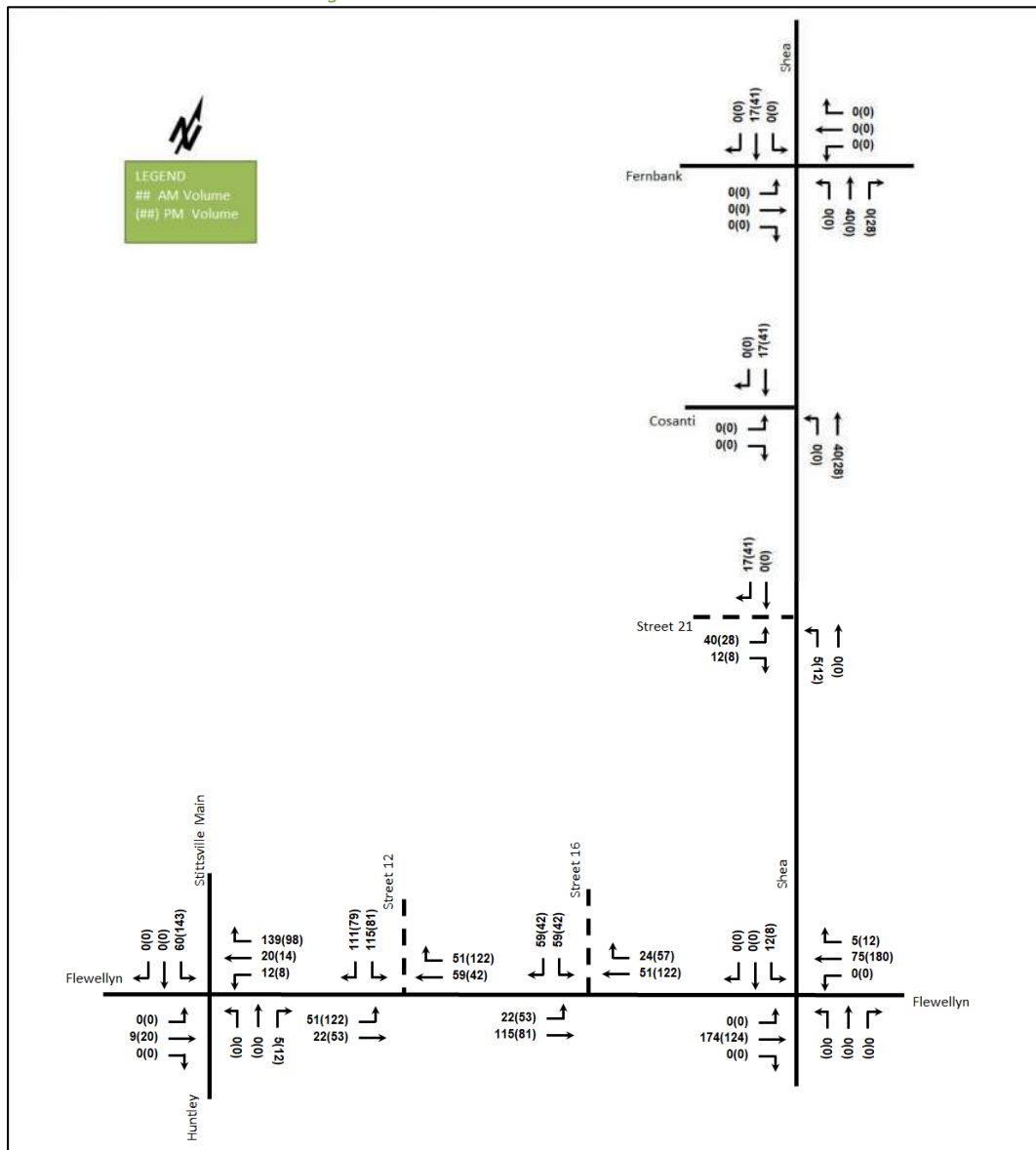


Figure 13: New Site Generation Auto Volumes



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: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
			veh/h		veh/h					veh	m				
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.599	19.5	LOS C	3.5	26.3	0.82	0.92	1.26	42.1
2	T1	All MCs	204	5.0	204	5.0	0.599	19.3	LOS C	3.5	26.3	0.82	0.92	1.26	42.7
3	R2	All MCs	92	13.0	92	13.0	0.599	20.9	LOS C	3.5	26.3	0.82	0.92	1.26	42.4
Approach			314	7.4	314	7.4	0.599	19.7	LOS C	3.5	26.3	0.82	0.92	1.26	42.6
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.529	12.6	LOS B	3.8	27.7	0.74	0.73	1.06	45.5
5	T1	All MCs	244	4.0	244	4.0	0.529	12.5	LOS B	3.8	27.7	0.74	0.73	1.06	46.2
6	R2	All MCs	75	2.0	75	2.0	0.529	12.3	LOS B	3.8	27.7	0.74	0.73	1.06	46.0
Approach			406	3.8	406	3.8	0.529	12.5	LOS B	3.8	27.7	0.74	0.73	1.06	46.0
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.532	10.8	LOS B	4.2	31.1	0.68	0.57	0.87	46.2
8	T1	All MCs	136	7.0	136	7.0	0.532	11.0	LOS B	4.2	31.1	0.68	0.57	0.87	46.9
9	R2	All MCs	222	5.0	222	5.0	0.532	10.9	LOS B	4.2	31.1	0.68	0.57	0.87	46.7
Approach			489	5.3	489	5.3	0.532	10.9	LOS B	4.2	31.1	0.68	0.57	0.87	46.6
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.803	22.2	LOS C	16.4	117.9	0.97	1.13	1.98	40.4
11	T1	All MCs	406	3.0	406	3.0	0.803	22.1	LOS C	16.4	117.9	0.97	1.13	1.98	41.0
12	R2	All MCs	33	3.0	33	3.0	0.803	22.1	LOS C	16.4	117.9	0.97	1.13	1.98	40.7
Approach			744	3.4	744	3.4	0.803	22.1	LOS C	16.4	117.9	0.97	1.13	1.98	40.7
All Vehicles			1953	4.6	1953	4.6	0.803	16.9	LOS C	16.4	117.9	0.83	0.87	1.40	43.4

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.

HCM 2010 TWSC
8: Shea & Flewellyn

2030 FB
AM Peak Hour

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	268	26	2	142	21	8	161	13	35	149	51
Future Vol, veh/h	60	268	26	2	142	21	8	161	13	35	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	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	268	26	2	142	21	8	161	13	35	149	51
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	163	0	0	294	0	0	658	568	281	645	571	153
Stage 1	-	-	-	-	-	-	401	401	-	157	157	-
Stage 2	-	-	-	-	-	-	257	167	-	488	414	-
Critical Hdwy	4.17	-	-	4.12	-	-	7.23	6.55	6.22	7.12	6.53	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.617	4.045	3.318	3.518	4.027	3.372
Pot Cap-1 Maneuver	1386	-	-	1268	-	-	363	428	758	385	429	878
Stage 1	-	-	-	-	-	-	604	596	-	845	766	-
Stage 2	-	-	-	-	-	-	724	755	-	561	591	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1386	-	-	1268	-	-	235	405	758	251	406	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	235	405	-	251	406	-
Stage 1	-	-	-	-	-	-	573	565	-	801	764	-
Stage 2	-	-	-	-	-	-	548	753	-	374	560	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.3			0.1			20.9			24.3		
HCM LOS							C			C		

HCM 2010 TWSC
12: Shea & Street 21

2030 FB
AM Peak Hour

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	10	4	238	225	14
Future Vol, veh/h	32	10	4	238	225	14
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	32	10	4	238	225	14

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	478	232	239
Stage 1	232	-	-
Stage 2	246	-	-
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	546	807	1328
Stage 1	807	-	-
Stage 2	795	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	544	807	1328
Mov Cap-2 Maneuver	544	-	-
Stage 1	805	-	-
Stage 2	795	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	590	-
HCM Lane V/C Ratio	0.003	-	0.071	-
HCM Control Delay (s)	7.7	0	11.6	-
HCM Lane LOS	A	A	B	-
HCM 95th %tile Q(veh)	0	-	0.2	-

HCM 2010 TWSC
13: Flewellyn & Street 16

2030 FB
AM Peak Hour

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	306	182	19	48	0
Future Vol, veh/h	0	306	182	19	48	0
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	306	182	19	48	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	201	0	498
Stage 1	-	-	192
Stage 2	-	-	306
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1371	-	532
Stage 1	-	-	841
Stage 2	-	-	747
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1371	-	532
Mov Cap-2 Maneuver	-	-	532
Stage 1	-	-	841
Stage 2	-	-	747

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1371	-	-	-	532
HCM Lane V/C Ratio	-	-	-	-	0.09
HCM Control Delay (s)	0	-	-	-	12.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

HCM 2010 TWSC
14: Flewellyn & Street 12

2030 FB
AM Peak Hour

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	213	141	41	93	138
Future Vol, veh/h	59	213	141	41	93	138
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	59	213	141	41	93	138
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	182	0	-	0	493	162
Stage 1	-	-	-	-	162	-
Stage 2	-	-	-	-	331	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1393	-	-	-	535	883
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1393	-	-	-	509	883
Mov Cap-2 Maneuver	-	-	-	-	509	-
Stage 1	-	-	-	-	825	-
Stage 2	-	-	-	-	728	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.7	0		13		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1393	-	-	-	681	
HCM Lane V/C Ratio	0.042	-	-	-	0.339	
HCM Control Delay (s)	7.7	0	-	-	13	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	1.5	

HCM 2010 TWSC
18: Shea & Cosanti

2030 FB
AM Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	264	218	12
Future Vol, veh/h	43	21	6	264	218	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	264	218	12
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	500	224	230	0	-	0
Stage 1	224	-	-	-	-	-
Stage 2	276	-	-	-	-	-
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	530	815	1338	-	-	-
Stage 1	813	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	527	815	1338	-	-	-
Mov Cap-2 Maneuver	527	-	-	-	-	-
Stage 1	809	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.8	0.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1338	-	596	-	-	
HCM Lane V/C Ratio	0.004	-	0.107	-	-	
HCM Control Delay (s)	7.7	0	11.8	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	213	141	41	93	138
Future Vol, veh/h	59	213	141	41	93	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	-	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	59	213	141	41	93	138
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	182	0	-	0	493	162
Stage 1	-	-	-	-	162	-
Stage 2	-	-	-	-	331	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1393	-	-	-	535	883
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1393	-	-	-	513	883
Mov Cap-2 Maneuver	-	-	-	-	513	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	728	-
Approach	EB		WB		SB	
HCM Control Delay, s	1.7		0		12.9	
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1393		-	-	-	684
HCM Lane V/C Ratio	0.042		-	-	-	0.338
HCM Control Delay (s)	7.7		-	-	-	12.9
HCM Lane LOS	A		-	-	-	B
HCM 95th %tile Q(veh)	0.1		-	-	-	1.5

MOVEMENT SUMMARY

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

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 HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
			veh/h	%	veh/h	%	v/c	sec			m				
South: Shea															
1	L2	All MCs	8	13.0	8	13.0	0.200	6.5	LOS A	0.9	6.5	0.50	0.36	0.50	56.4
2	T1	All MCs	161	5.0	161	5.0	0.200	5.9	LOS A	0.9	6.5	0.50	0.36	0.50	59.7
3	R2	All MCs	13	2.0	13	2.0	0.200	5.7	LOS A	0.9	6.5	0.50	0.36	0.50	59.9
Approach			182	5.1	182	5.1	0.200	5.9	LOS A	0.9	6.5	0.50	0.36	0.50	59.6
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.156	4.7	LOS A	0.7	5.0	0.40	0.24	0.40	60.4
5	T1	All MCs	142	2.0	142	2.0	0.156	4.7	LOS A	0.7	5.0	0.40	0.24	0.40	61.7
6	R2	All MCs	21	12.0	21	12.0	0.156	5.2	LOS A	0.7	5.0	0.40	0.24	0.40	58.7
Approach			165	3.3	165	3.3	0.156	4.8	LOS A	0.7	5.0	0.40	0.24	0.40	61.3
North: Shea															
7	L2	All MCs	35	2.0	35	2.0	0.204	4.8	LOS A	1.0	7.2	0.34	0.18	0.34	59.6
8	T1	All MCs	149	3.0	149	3.0	0.204	4.9	LOS A	1.0	7.2	0.34	0.18	0.34	60.7
9	R2	All MCs	51	8.0	51	8.0	0.204	5.1	LOS A	1.0	7.2	0.34	0.18	0.34	58.9
Approach			235	3.9	235	3.9	0.204	4.9	LOS A	1.0	7.2	0.34	0.18	0.34	60.1
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.317	6.5	LOS A	1.7	12.3	0.42	0.24	0.42	57.0
11	T1	All MCs	268	2.0	268	2.0	0.317	6.2	LOS A	1.7	12.3	0.42	0.24	0.42	59.6
12	R2	All MCs	26	4.0	26	4.0	0.317	6.3	LOS A	1.7	12.3	0.42	0.24	0.42	58.6
Approach			354	3.0	354	3.0	0.317	6.3	LOS A	1.7	12.3	0.42	0.24	0.42	59.0
All Vehicles			936	3.7	936	3.7	0.317	5.6	LOS A	1.7	12.3	0.41	0.25	0.41	59.8

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: Sieglösch 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 [Fernbank at Shea FB2030 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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.481	12.4	LOS B	2.9	20.7	0.74	0.74	1.00	45.8
2	T1	All MCs	173	3.0	173	3.0	0.481	12.4	LOS B	2.9	20.7	0.74	0.74	1.00	46.5
3	R2	All MCs	122	6.0	122	6.0	0.481	12.8	LOS B	2.9	20.7	0.74	0.74	1.00	46.2
Approach			325	4.1	325	4.1	0.481	12.6	LOS B	2.9	20.7	0.74	0.74	1.00	46.3
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.842	25.8	LOS D	21.1	152.4	1.00	1.27	2.24	39.4
5	T1	All MCs	551	3.0	551	3.0	0.842	25.4	LOS D	21.1	152.4	1.00	1.27	2.24	40.0
6	R2	All MCs	115	2.0	115	2.0	0.842	25.3	LOS D	21.1	152.4	1.00	1.27	2.24	39.8
Approach			796	3.7	796	3.7	0.842	25.4	LOS D	21.1	152.4	1.00	1.27	2.24	39.9
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.727	23.2	LOS C	6.4	46.4	0.89	1.05	1.61	40.3
8	T1	All MCs	252	2.0	252	2.0	0.727	23.2	LOS C	6.4	46.4	0.89	1.05	1.61	40.8
9	R2	All MCs	144	9.0	144	9.0	0.727	24.4	LOS C	6.4	46.4	0.89	1.05	1.61	40.5
Approach			456	4.2	456	4.2	0.727	23.6	LOS C	6.4	46.4	0.89	1.05	1.61	40.6
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.732	19.0	LOS C	9.9	71.7	0.89	0.99	1.65	42.3
11	T1	All MCs	452	3.0	452	3.0	0.732	18.8	LOS C	9.9	71.7	0.89	0.99	1.65	42.9
12	R2	All MCs	34	3.0	34	3.0	0.732	18.8	LOS C	9.9	71.7	0.89	0.99	1.65	42.7
Approach			619	3.4	619	3.4	0.732	18.8	LOS C	9.9	71.7	0.89	0.99	1.65	42.8
All Vehicles			2196	3.8	2196	3.8	0.842	21.3	LOS C	21.1	152.4	0.91	1.07	1.76	41.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: 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: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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HCM 2010 TWSC
8: Shea & Flewellyn

2030 FB
PM Peak Hour

Intersection													
Int Delay, s/veh		19.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Vol, veh/h	59	194	11	2	311	43	16	169	17	21	224	71	
Future Vol, veh/h	59	194	11	2	311	43	16	169	17	21	224	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	194	11	2	311	43	16	169	17	21	224	71	

Major/Minor	Major1	Major2		Minor1	Minor2								
Conflicting Flow All	354	0	0	205	0	0	802	676	200	748	660	333	
Stage 1	-	-	-	-	-	318	318	-	337	337	-	-	
Stage 2	-	-	-	-	-	484	358	-	411	323	-	-	
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	1188	-	-	1366	-	298	375	831	329	383	706		
Stage 1	-	-	-	-	-	685	654	-	677	641	-		
Stage 2	-	-	-	-	-	557	628	-	618	650	-		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	1188	-	-	1366	-	130	353	831	193	361	706		
Mov Cap-2 Maneuver	-	-	-	-	-	130	353	-	193	361	-		
Stage 1	-	-	-	-	-	647	617	-	639	640	-		
Stage 2	-	-	-	-	-	325	627	-	415	614	-		

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	32.7	46.8
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	325	1188	-	-	1366	-	-	381
HCM Lane V/C Ratio	0.622	0.05	-	-	0.001	-	-	0.829
HCM Control Delay (s)	32.7	8.2	0	-	7.6	0	-	46.8
HCM Lane LOS	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	3.9	0.2	-	-	0	-	-	7.6

Scenario 1 1770 & 1820 Shea Rd and 5971 & 5993 Flewellyn Rd 7:12 pm 05-06-2026 2030 FB

Synchro 11 Report
Page 1

HCM 2010 TWSC
12: Shea & Street 21

2030 FB
PM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	7	10	261	309	32
Future Vol, veh/h	23	7	10	261	309	32
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	23	7	10	261	309	32
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	606	325	341	0	-	0
Stage 1	325	-	-	-	-	-
Stage 2	281	-	-	-	-	-
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	460	716	1218	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	455	716	1218	-	-	-
Mov Cap-2 Maneuver	455	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	12.7		0.3		0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1218	-	497	-	-	
HCM Lane V/C Ratio	0.008	-	0.06	-	-	
HCM Control Delay (s)	8	0	12.7	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

HCM 2010 TWSC
13: Flewellyn & Street 16

2030 FB
PM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	231	353	45	34	0
Future Vol, veh/h	0	231	353	45	34	0
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	231	353	45	34	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	398	0	-	0	607	376
Stage 1	-	-	-	-	376	-
Stage 2	-	-	-	-	231	-
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	1161	-	-	-	460	670
Stage 1	-	-	-	-	694	-
Stage 2	-	-	-	-	807	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1161	-	-	-	460	670
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	694	-
Stage 2	-	-	-	-	807	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		13.5		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1161	-	-	-	460	
HCM Lane V/C Ratio	-	-	-	-	0.074	
HCM Control Delay (s)	0	-	-	-	13.5	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

HCM 2010 TWSC
14: Flewellyn & Street 12

2030 FB
PM Peak Hour

Intersection						
Int Delay, s/veh	4.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	139	165	256	97	66	97
Future Vol, veh/h	139	165	256	97	66	97
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	139	165	256	97	66	97
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	353	0	-	0	748	305
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	443	-
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	1206	-	-	-	380	735
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1206	-	-	-	332	735
Mov Cap-2 Maneuver	-	-	-	-	332	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	647	-
Approach	EB		WB		SB	
HCM Control Delay, s	3.8		0		15.9	
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1206	-	-	-	493	
HCM Lane V/C Ratio	0.115	-	-	-	0.331	
HCM Control Delay (s)	8.4	0	-	-	15.9	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.4	-	-	-	1.4	

HCM 2010 TWSC
18: Shea & Cosanti

2030 FB
PM Peak Hour

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	263	329	43
Future Vol, veh/h	24	12	21	263	329	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	263	329	43
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	656	351	372	0	-	0
Stage 1	351	-	-	-	-	-
Stage 2	305	-	-	-	-	-
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	430	692	1186	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	421	692	1186	-	-	-
Mov Cap-2 Maneuver	421	-	-	-	-	-
Stage 1	698	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13	0.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1186	-	484	-	-	
HCM Lane V/C Ratio	0.018	-	0.074	-	-	
HCM Control Delay (s)	8.1	0	13	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-	

Intersection						
Int Delay, s/veh	4.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	139	165	256	97	66	97
Future Vol, veh/h	139	165	256	97	66	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	-	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	139	165	256	97	66	97
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	353	0	-	0	748	305
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	443	-
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	1206	-	-	-	380	735
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1206	-	-	-	336	735
Mov Cap-2 Maneuver	-	-	-	-	336	-
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	647	-
Approach	EB		WB		SB	
HCM Control Delay, s	3.8		0		15.8	
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1206	-	-	-	496	
HCM Lane V/C Ratio	0.115	-	-	-	0.329	
HCM Control Delay (s)	8.4	-	-	-	15.8	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.4	-	-	-	1.4	

MOVEMENT SUMMARY

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

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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	Dist]				km/h
			veh/h		veh/h					veh	m				
South: Shea															
1	L2	All MCs	16	6.0	16	6.0	0.198	5.6	LOS A	0.9	6.6	0.45	0.29	0.45	58.4
2	T1	All MCs	169	2.0	169	2.0	0.198	5.3	LOS A	0.9	6.6	0.45	0.29	0.45	60.8
3	R2	All MCs	17	6.0	17	6.0	0.198	5.6	LOS A	0.9	6.6	0.45	0.29	0.45	59.3
Approach			202	2.7	202	2.7	0.198	5.4	LOS A	0.9	6.6	0.45	0.29	0.45	60.5
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.337	6.8	LOS A	1.8	12.9	0.49	0.30	0.49	58.5
5	T1	All MCs	311	2.0	311	2.0	0.337	6.8	LOS A	1.8	12.9	0.49	0.30	0.49	59.8
6	R2	All MCs	43	2.0	43	2.0	0.337	6.8	LOS A	1.8	12.9	0.49	0.30	0.49	59.3
Approach			356	2.0	356	2.0	0.337	6.8	LOS A	1.8	12.9	0.49	0.30	0.49	59.7
North: Shea															
7	L2	All MCs	21	2.0	21	2.0	0.327	7.1	LOS A	1.7	11.9	0.54	0.38	0.54	57.9
8	T1	All MCs	224	2.0	224	2.0	0.327	7.1	LOS A	1.7	11.9	0.54	0.38	0.54	59.2
9	R2	All MCs	71	3.0	71	3.0	0.327	7.2	LOS A	1.7	11.9	0.54	0.38	0.54	58.4
Approach			316	2.2	316	2.2	0.327	7.1	LOS A	1.7	11.9	0.54	0.38	0.54	58.9
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.253	5.9	LOS A	1.2	8.9	0.45	0.28	0.45	57.6
11	T1	All MCs	194	2.0	194	2.0	0.253	5.8	LOS A	1.2	8.9	0.45	0.28	0.45	59.7
12	R2	All MCs	11	18.0	11	18.0	0.253	6.7	LOS A	1.2	8.9	0.45	0.28	0.45	55.6
Approach			264	3.3	264	3.3	0.253	5.9	LOS A	1.2	8.9	0.45	0.28	0.45	59.0
All Vehicles			1138	2.5	1138	2.5	0.337	6.4	LOS A	1.8	12.9	0.49	0.32	0.49	59.5

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: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix N

Synchro and Sidra Intersection Worksheets – 2035 Future Background Conditions

MOVEMENT SUMMARY

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

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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.602	19.6	LOS C	3.6	26.4	0.82	0.92	1.27	42.0
2	T1	All MCs	204	5.0	204	5.0	0.602	19.5	LOS C	3.6	26.4	0.82	0.92	1.27	42.7
3	R2	All MCs	92	13.0	92	13.0	0.602	21.1	LOS C	3.6	26.4	0.82	0.92	1.27	42.3
Approach			314	7.4	314	7.4	0.602	19.9	LOS C	3.6	26.4	0.82	0.92	1.27	42.5
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.529	12.6	LOS B	3.8	27.7	0.74	0.73	1.06	45.5
5	T1	All MCs	244	4.0	244	4.0	0.529	12.5	LOS B	3.8	27.7	0.74	0.73	1.06	46.2
6	R2	All MCs	75	2.0	75	2.0	0.529	12.3	LOS B	3.8	27.7	0.74	0.73	1.06	46.0
Approach			406	3.8	406	3.8	0.529	12.5	LOS B	3.8	27.7	0.74	0.73	1.06	46.0
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.532	10.8	LOS B	4.2	31.1	0.68	0.57	0.87	46.2
8	T1	All MCs	136	7.0	136	7.0	0.532	11.0	LOS B	4.2	31.1	0.68	0.57	0.87	46.9
9	R2	All MCs	222	5.0	222	5.0	0.532	10.9	LOS B	4.2	31.1	0.68	0.57	0.87	46.7
Approach			489	5.3	489	5.3	0.532	10.9	LOS B	4.2	31.1	0.68	0.57	0.87	46.6
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.807	22.5	LOS C	16.7	120.7	0.98	1.15	2.01	40.2
11	T1	All MCs	410	3.0	410	3.0	0.807	22.5	LOS C	16.7	120.7	0.98	1.15	2.01	40.8
12	R2	All MCs	33	3.0	33	3.0	0.807	22.5	LOS C	16.7	120.7	0.98	1.15	2.01	40.6
Approach			748	3.4	748	3.4	0.807	22.5	LOS C	16.7	120.7	0.98	1.15	2.01	40.6
All Vehicles			1957	4.6	1957	4.6	0.807	17.1	LOS C	16.7	120.7	0.83	0.88	1.41	43.3

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: Sieglösch 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.

HCM 2010 TWSC
8: Shea & Flewellyn

2035 FB
AM Peak Hour

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	270	26	2	142	21	8	161	13	35	149	51
Future Vol, veh/h	60	270	26	2	142	21	8	161	13	35	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	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	270	26	2	142	21	8	161	13	35	149	51
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	163	0	0	296	0	0	660	570	283	647	573	153
Stage 1	-	-	-	-	-	-	403	403	-	157	157	-
Stage 2	-	-	-	-	-	-	257	167	-	490	416	-
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	1386	-	-	1265	-	-	362	427	756	384	428	878
Stage 1	-	-	-	-	-	-	603	595	-	845	766	-
Stage 2	-	-	-	-	-	-	724	755	-	560	590	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1386	-	-	1265	-	-	234	404	756	250	405	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	234	404	-	250	405	-
Stage 1	-	-	-	-	-	-	572	564	-	801	764	-
Stage 2	-	-	-	-	-	-	548	753	-	373	559	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.3			0.1			20.9			24.4		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	405	1386	-	-	1265	-	-	415				
HCM Lane V/C Ratio	0.449	0.043	-	-	0.002	-	-	0.566				
HCM Control Delay (s)	20.9	7.7	0	-	7.8	0	-	24.4				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	2.3	0.1	-	-	0	-	-	3.4				

HCM 2010 TWSC
12: Shea & Street 21

2035 FB
AM Peak Hour

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	10	4	238	225	14
Future Vol, veh/h	32	10	4	238	225	14
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	32	10	4	238	225	14
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	478	232	239	0	-	0
Stage 1	232	-	-	-	-	-
Stage 2	246	-	-	-	-	-
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	546	807	1328	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	795	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	544	807	1328	-	-	-
Mov Cap-2 Maneuver	544	-	-	-	-	-
Stage 1	805	-	-	-	-	-
Stage 2	795	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.6	0.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1328	-	590	-	-	
HCM Lane V/C Ratio	0.003	-	0.071	-	-	
HCM Control Delay (s)	7.7	0	11.6	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

HCM 2010 TWSC
13: Flewellyn & Street 16

2035 FB
AM Peak Hour

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	308	182	19	48	0
Future Vol, veh/h	0	308	182	19	48	0
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	308	182	19	48	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	201	0	-	0	500	192
Stage 1	-	-	-	-	192	-
Stage 2	-	-	-	-	308	-
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	1371	-	-	-	530	850
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	745	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1371	-	-	-	530	850
Mov Cap-2 Maneuver	-	-	-	-	530	-
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	745	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		12.5		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1371	-	-	-	530	
HCM Lane V/C Ratio	-	-	-	-	0.091	
HCM Control Delay (s)	0	-	-	-	12.5	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.3	

HCM 2010 TWSC
14: Flewellyn & Street 12

2035 FB
AM Peak Hour

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	215	141	41	93	138
Future Vol, veh/h	59	215	141	41	93	138
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	59	215	141	41	93	138
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	182	0	-	0	495	162
Stage 1	-	-	-	-	162	-
Stage 2	-	-	-	-	333	-
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	1393	-	-	-	534	883
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	726	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1393	-	-	-	508	883
Mov Cap-2 Maneuver	-	-	-	-	508	-
Stage 1	-	-	-	-	825	-
Stage 2	-	-	-	-	726	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.7	0		13		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1393	-	-	-	681	
HCM Lane V/C Ratio	0.042	-	-	-	0.339	
HCM Control Delay (s)	7.7	0	-	-	13	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	1.5	

HCM 2010 TWSC
18: Shea & Cosanti

2035 FB
AM Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	264	218	12
Future Vol, veh/h	43	21	6	264	218	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	264	218	12
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	500	224	230	0	-	0
Stage 1	224	-	-	-	-	-
Stage 2	276	-	-	-	-	-
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	530	815	1338	-	-	-
Stage 1	813	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	527	815	1338	-	-	-
Mov Cap-2 Maneuver	527	-	-	-	-	-
Stage 1	809	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.8	0.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1338	-	596	-	-	
HCM Lane V/C Ratio	0.004	-	0.107	-	-	
HCM Control Delay (s)	7.7	0	11.8	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	215	141	41	93	138
Future Vol, veh/h	59	215	141	41	93	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	-	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	59	215	141	41	93	138
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	182	0	-	0	495	162
Stage 1	-	-	-	-	162	-
Stage 2	-	-	-	-	333	-
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	1393	-	-	-	534	883
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	726	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1393	-	-	-	512	883
Mov Cap-2 Maneuver	-	-	-	-	512	-
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	726	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.7	0		12.9		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1393	-	-	-	684	
HCM Lane V/C Ratio	0.042	-	-	-	0.338	
HCM Control Delay (s)	7.7	-	-	-	12.9	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	1.5	

MOVEMENT SUMMARY

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

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 HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
			veh/h	%	veh/h	%	v/c	sec			m				
South: Shea															
1	L2	All MCs	8	13.0	8	13.0	0.201	6.5	LOS A	0.9	6.5	0.51	0.36	0.51	56.3
2	T1	All MCs	161	5.0	161	5.0	0.201	5.9	LOS A	0.9	6.5	0.51	0.36	0.51	59.7
3	R2	All MCs	13	2.0	13	2.0	0.201	5.7	LOS A	0.9	6.5	0.51	0.36	0.51	59.9
Approach			182	5.1	182	5.1	0.201	5.9	LOS A	0.9	6.5	0.51	0.36	0.51	59.6
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.156	4.7	LOS A	0.7	5.0	0.40	0.24	0.40	60.4
5	T1	All MCs	142	2.0	142	2.0	0.156	4.7	LOS A	0.7	5.0	0.40	0.24	0.40	61.7
6	R2	All MCs	21	12.0	21	12.0	0.156	5.2	LOS A	0.7	5.0	0.40	0.24	0.40	58.7
Approach			165	3.3	165	3.3	0.156	4.8	LOS A	0.7	5.0	0.40	0.24	0.40	61.3
North: Shea															
7	L2	All MCs	35	2.0	35	2.0	0.204	4.8	LOS A	1.0	7.2	0.34	0.18	0.34	59.6
8	T1	All MCs	149	3.0	149	3.0	0.204	4.9	LOS A	1.0	7.2	0.34	0.18	0.34	60.7
9	R2	All MCs	51	8.0	51	8.0	0.204	5.1	LOS A	1.0	7.2	0.34	0.18	0.34	58.9
Approach			235	3.9	235	3.9	0.204	4.9	LOS A	1.0	7.2	0.34	0.18	0.34	60.1
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.319	6.5	LOS A	1.7	12.4	0.42	0.24	0.42	57.0
11	T1	All MCs	270	2.0	270	2.0	0.319	6.2	LOS A	1.7	12.4	0.42	0.24	0.42	59.5
12	R2	All MCs	26	4.0	26	4.0	0.319	6.3	LOS A	1.7	12.4	0.42	0.24	0.42	58.5
Approach			356	3.0	356	3.0	0.319	6.3	LOS A	1.7	12.4	0.42	0.24	0.42	59.0
All Vehicles			938	3.7	938	3.7	0.319	5.6	LOS A	1.7	12.4	0.41	0.25	0.41	59.8

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

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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.481	12.4	LOS B	2.9	20.7	0.74	0.74	1.00	45.8
2	T1	All MCs	173	3.0	173	3.0	0.481	12.4	LOS B	2.9	20.7	0.74	0.74	1.00	46.5
3	R2	All MCs	122	6.0	122	6.0	0.481	12.8	LOS B	2.9	20.7	0.74	0.74	1.00	46.2
Approach			325	4.1	325	4.1	0.481	12.6	LOS B	2.9	20.7	0.74	0.74	1.00	46.3
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.842	25.8	LOS D	21.1	152.4	1.00	1.27	2.24	39.4
5	T1	All MCs	551	3.0	551	3.0	0.842	25.4	LOS D	21.1	152.4	1.00	1.27	2.24	40.0
6	R2	All MCs	115	2.0	115	2.0	0.842	25.3	LOS D	21.1	152.4	1.00	1.27	2.24	39.8
Approach			796	3.7	796	3.7	0.842	25.4	LOS D	21.1	152.4	1.00	1.27	2.24	39.9
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.727	23.2	LOS C	6.4	46.4	0.89	1.05	1.61	40.3
8	T1	All MCs	252	2.0	252	2.0	0.727	23.2	LOS C	6.4	46.4	0.89	1.05	1.61	40.8
9	R2	All MCs	144	9.0	144	9.0	0.727	24.4	LOS C	6.4	46.4	0.89	1.05	1.61	40.5
Approach			456	4.2	456	4.2	0.727	23.6	LOS C	6.4	46.4	0.89	1.05	1.61	40.6
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.732	19.0	LOS C	9.9	71.7	0.89	0.99	1.65	42.3
11	T1	All MCs	452	3.0	452	3.0	0.732	18.8	LOS C	9.9	71.7	0.89	0.99	1.65	42.9
12	R2	All MCs	34	3.0	34	3.0	0.732	18.8	LOS C	9.9	71.7	0.89	0.99	1.65	42.7
Approach			619	3.4	619	3.4	0.732	18.8	LOS C	9.9	71.7	0.89	0.99	1.65	42.8
All Vehicles			2196	3.8	2196	3.8	0.842	21.3	LOS C	21.1	152.4	0.91	1.07	1.76	41.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: 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: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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HCM 2010 TWSC
8: Shea & Flewellyn

2035 FB
PM Peak Hour

Intersection												
Int Delay, s/veh	19.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	194	11	2	313	43	16	169	17	21	224	71
Future Vol, veh/h	59	194	11	2	313	43	16	169	17	21	224	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	194	11	2	313	43	16	169	17	21	224	71

Major/Minor	Major1		Major2		Minor1		Minor2							
Conflicting Flow All	356	0	0	205	0	0	804	678	200	750	662	335		
Stage 1	-	-	-	-	-	-	318	318	-	339	339	-		
Stage 2	-	-	-	-	-	-	486	360	-	411	323	-		
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	1186	-	-	1366	-	-	297	374	831	328	382	705		
Stage 1	-	-	-	-	-	-	685	654	-	676	640	-		
Stage 2	-	-	-	-	-	-	555	626	-	618	650	-		
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-		
Mov Cap-1 Maneuver	1186	-	-	1366	-	-	129	352	831	192	360	705		
Mov Cap-2 Maneuver	-	-	-	-	-	-	129	352	-	192	360	-		
Stage 1	-	-	-	-	-	-	647	617	-	638	639	-		
Stage 2	-	-	-	-	-	-	323	625	-	415	614	-		

Approach	EB		WB		NB		SB
HCM Control Delay, s	1.8		0		33.1		47.2
HCM LOS					D		E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	323	1186	-	-	1366	-	-	380
HCM Lane V/C Ratio	0.625	0.05	-	-	0.001	-	-	0.832
HCM Control Delay (s)	33.1	8.2	0	-	7.6	0	-	47.2
HCM Lane LOS	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	4	0.2	-	-	0	-	-	7.6

Scenario 1 1770 & 1820 Shea Rd and 5971 & 5993 Flewellyn Rd 7:12 pm 05-06-2026 2035 FB

Synchro 11 Report
Page 1

HCM 2010 TWSC
12: Shea & Street 21

2035 FB
PM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	7	10	261	309	32
Future Vol, veh/h	23	7	10	261	309	32
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	23	7	10	261	309	32
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	606	325	341	0	-	0
Stage 1	325	-	-	-	-	-
Stage 2	281	-	-	-	-	-
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	460	716	1218	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	455	716	1218	-	-	-
Mov Cap-2 Maneuver	455	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	12.7		0.3		0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1218	-	497	-	-	
HCM Lane V/C Ratio	0.008	-	0.06	-	-	
HCM Control Delay (s)	8	0	12.7	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

HCM 2010 TWSC
13: Flewellyn & Street 16

2035 FB
PM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	231	355	45	34	0
Future Vol, veh/h	0	231	355	45	34	0
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	231	355	45	34	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	400	0	-	0	609	378
Stage 1	-	-	-	-	378	-
Stage 2	-	-	-	-	231	-
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	1159	-	-	-	458	669
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	807	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1159	-	-	-	458	669
Mov Cap-2 Maneuver	-	-	-	-	458	-
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	807	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		13.5		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1159	-	-	-	458	
HCM Lane V/C Ratio	-	-	-	-	0.074	
HCM Control Delay (s)	0	-	-	-	13.5	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

HCM 2010 TWSC
14: Flewellyn & Street 12

2035 FB
PM Peak Hour

Intersection						
Int Delay, s/veh	4.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	139	165	258	97	66	97
Future Vol, veh/h	139	165	258	97	66	97
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	139	165	258	97	66	97
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	355	0	-	0	750	307
Stage 1	-	-	-	-	307	-
Stage 2	-	-	-	-	443	-
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	1204	-	-	-	379	733
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1204	-	-	-	331	733
Mov Cap-2 Maneuver	-	-	-	-	331	-
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	647	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.8	0		15.9		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1204	-	-	-	491	
HCM Lane V/C Ratio	0.115	-	-	-	0.332	
HCM Control Delay (s)	8.4	0	-	-	15.9	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.4	-	-	-	1.4	

HCM 2010 TWSC
18: Shea & Cosanti

2035 FB
PM Peak Hour

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	263	329	43
Future Vol, veh/h	24	12	21	263	329	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	263	329	43
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	656	351	372	0	-	0
Stage 1	351	-	-	-	-	-
Stage 2	305	-	-	-	-	-
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	430	692	1186	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	421	692	1186	-	-	-
Mov Cap-2 Maneuver	421	-	-	-	-	-
Stage 1	698	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13	0.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1186	-	484	-	-	
HCM Lane V/C Ratio	0.018	-	0.074	-	-	
HCM Control Delay (s)	8.1	0	13	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-	

Intersection						
Int Delay, s/veh	4.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	139	165	258	97	66	97
Future Vol, veh/h	139	165	258	97	66	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	-	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	139	165	258	97	66	97
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	355	0	-	0	750	307
Stage 1	-	-	-	-	307	-
Stage 2	-	-	-	-	443	-
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	1204	-	-	-	379	733
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1204	-	-	-	335	733
Mov Cap-2 Maneuver	-	-	-	-	335	-
Stage 1	-	-	-	-	660	-
Stage 2	-	-	-	-	647	-
Approach	EB		WB		SB	
HCM Control Delay, s	3.8		0		15.8	
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1204	-	-	-	495	
HCM Lane V/C Ratio	0.115	-	-	-	0.329	
HCM Control Delay (s)	8.4	-	-	-	15.8	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.4	-	-	-	1.4	

MOVEMENT SUMMARY

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

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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Shea															
1	L2	All MCs	16	6.0	16	6.0	0.198	5.6	LOS A	0.9	6.6	0.45	0.29	0.45	58.4
2	T1	All MCs	169	2.0	169	2.0	0.198	5.3	LOS A	0.9	6.6	0.45	0.29	0.45	60.8
3	R2	All MCs	17	6.0	17	6.0	0.198	5.6	LOS A	0.9	6.6	0.45	0.29	0.45	59.3
Approach			202	2.7	202	2.7	0.198	5.4	LOS A	0.9	6.6	0.45	0.29	0.45	60.5
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.339	6.8	LOS A	1.8	13.0	0.49	0.30	0.49	58.5
5	T1	All MCs	313	2.0	313	2.0	0.339	6.8	LOS A	1.8	13.0	0.49	0.30	0.49	59.8
6	R2	All MCs	43	2.0	43	2.0	0.339	6.8	LOS A	1.8	13.0	0.49	0.30	0.49	59.2
Approach			358	2.0	358	2.0	0.339	6.8	LOS A	1.8	13.0	0.49	0.30	0.49	59.7
North: Shea															
7	L2	All MCs	21	2.0	21	2.0	0.328	7.2	LOS A	1.7	11.9	0.54	0.38	0.54	57.9
8	T1	All MCs	224	2.0	224	2.0	0.328	7.2	LOS A	1.7	11.9	0.54	0.38	0.54	59.2
9	R2	All MCs	71	3.0	71	3.0	0.328	7.2	LOS A	1.7	11.9	0.54	0.38	0.54	58.4
Approach			316	2.2	316	2.2	0.328	7.2	LOS A	1.7	11.9	0.54	0.38	0.54	58.9
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.253	5.9	LOS A	1.2	8.9	0.45	0.28	0.45	57.6
11	T1	All MCs	194	2.0	194	2.0	0.253	5.8	LOS A	1.2	8.9	0.45	0.28	0.45	59.7
12	R2	All MCs	11	18.0	11	18.0	0.253	6.7	LOS A	1.2	8.9	0.45	0.28	0.45	55.6
Approach			264	3.3	264	3.3	0.253	5.9	LOS A	1.2	8.9	0.45	0.28	0.45	59.0
All Vehicles			1140	2.5	1140	2.5	0.339	6.4	LOS A	1.8	13.0	0.49	0.32	0.49	59.5

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: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix O

Synchro and Sidra Intersection Worksheets – 2030 Future Total Conditions

MOVEMENT SUMMARY

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

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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
			veh/h		veh/h					veh	m				
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.645	21.7	LOS C	4.1	30.5	0.84	0.97	1.37	41.1
2	T1	All MCs	229	5.0	229	5.0	0.645	21.5	LOS C	4.1	30.5	0.84	0.97	1.37	41.7
3	R2	All MCs	92	13.0	92	13.0	0.645	23.2	LOS C	4.1	30.5	0.84	0.97	1.37	41.3
Approach			339	7.2	339	7.2	0.645	22.0	LOS C	4.1	30.5	0.84	0.97	1.37	41.6
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.544	13.3	LOS B	4.0	28.8	0.76	0.76	1.11	45.1
5	T1	All MCs	244	4.0	244	4.0	0.544	13.2	LOS B	4.0	28.8	0.76	0.76	1.11	45.9
6	R2	All MCs	75	2.0	75	2.0	0.544	12.9	LOS B	4.0	28.8	0.76	0.76	1.11	45.6
Approach			406	3.8	406	3.8	0.544	13.1	LOS B	4.0	28.8	0.76	0.76	1.11	45.7
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.544	11.1	LOS B	4.5	33.1	0.69	0.59	0.91	46.1
8	T1	All MCs	147	7.0	147	7.0	0.544	11.3	LOS B	4.5	33.1	0.69	0.59	0.91	46.8
9	R2	All MCs	222	5.0	222	5.0	0.544	11.1	LOS B	4.5	33.1	0.69	0.59	0.91	46.5
Approach			500	5.3	500	5.3	0.544	11.2	LOS B	4.5	33.1	0.69	0.59	0.91	46.5
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.813	23.2	LOS C	16.9	121.4	0.99	1.17	2.07	39.9
11	T1	All MCs	406	3.0	406	3.0	0.813	23.1	LOS C	16.9	121.4	0.99	1.17	2.07	40.5
12	R2	All MCs	33	3.0	33	3.0	0.813	23.1	LOS C	16.9	121.4	0.99	1.17	2.07	40.3
Approach			744	3.4	744	3.4	0.813	23.2	LOS C	16.9	121.4	0.99	1.17	2.07	40.3
All Vehicles			1989	4.6	1989	4.6	0.813	17.9	LOS C	16.9	121.4	0.84	0.91	1.46	43.0

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.

HCM 2010 TWSC
8: Shea & Flewellyn

2030 FT
AM Peak Hour

Intersection													
Int Delay, s/veh		15.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Vol, veh/h	60	376	26	2	189	24	8	161	13	42	149	51	
Future Vol, veh/h	60	376	26	2	189	24	8	161	13	42	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	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	376	26	2	189	24	8	161	13	42	149	51	
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	213	0	0	402	0	0	814	726	389	801	727	201	
Stage 1	-	-	-	-	-	-	509	509	-	205	205	-	
Stage 2	-	-	-	-	-	-	305	217	-	596	522	-	
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	1328	-	-	1157	-	-	284	347	659	303	349	825	
Stage 1	-	-	-	-	-	-	527	533	-	797	730	-	
Stage 2	-	-	-	-	-	-	682	718	-	490	529	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	1328	-	-	1157	-	-	164	326	659	174	328	825	
Mov Cap-2 Maneuver	-	-	-	-	-	-	164	326	-	174	328	-	
Stage 1	-	-	-	-	-	-	496	502	-	751	729	-	
Stage 2	-	-	-	-	-	-	508	717	-	307	498	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	1			0.1			29.5			44.5			
HCM LOS							D			E			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	324	1328	-	-	1157	-	-	319					
HCM Lane V/C Ratio	0.562	0.045	-	-	0.002	-	-	0.759					
HCM Control Delay (s)	29.5	7.8	0	-	8.1	0	-	44.5					
HCM Lane LOS	D	A	A	-	A	A	-	E					
HCM 95th %tile Q(veh)	3.2	0.1	-	-	0	-	-	5.9					

HCM 2010 TWSC
12: Shea & Street 21

2030 FT
AM Peak Hour

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	57	17	7	238	225	25
Future Vol, veh/h	57	17	7	238	225	25
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	57	17	7	238	225	25
Major/Minor						
Conflicting Flow All	490	238	250	0	-	0
Stage 1	238	-	-	-	-	-
Stage 2	252	-	-	-	-	-
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	537	801	1316	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	790	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	534	801	1316	-	-	-
Mov Cap-2 Maneuver	534	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	790	-	-	-	-	-
Approach						
EB	NB		SB			
HCM Control Delay, s	12.1	0.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt						
NBL	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	1316	-	578	-	-	
HCM Lane V/C Ratio	0.005	-	0.128	-	-	
HCM Control Delay (s)	7.8	0	12.1	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

HCM 2010 TWSC
13: Flewellyn & Street 16

2030 FT
AM Peak Hour

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	32	306	182	66	156	74
Future Vol, veh/h	32	306	182	66	156	74
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	32	306	182	66	156	74
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	248	0	-	0	585	215
Stage 1	-	-	-	-	215	-
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	1318	-	-	-	473	825
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1318	-	-	-	459	825
Mov Cap-2 Maneuver	-	-	-	-	459	-
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	699	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.7	0		16.7		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1318	-	-	-	535	
HCM Lane V/C Ratio	0.024	-	-	-	0.43	
HCM Control Delay (s)	7.8	0	-	-	16.7	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1	

HCM 2010 TWSC
14: Flewellyn & Street 12

2030 FT
AM Peak Hour

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	73	245	215	41	93	170
Future Vol, veh/h	73	245	215	41	93	170
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	73	245	215	41	93	170
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	256	0	-	0	627	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	391	-
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	1309	-	-	-	447	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	683	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1309	-	-	-	418	803
Mov Cap-2 Maneuver	-	-	-	-	418	-
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	683	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.8	0		15.4		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1309	-	-	-	606	
HCM Lane V/C Ratio	0.056	-	-	-	0.434	
HCM Control Delay (s)	7.9	0	-	-	15.4	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	2.2	

HCM 2010 TWSC
18: Shea & Cosanti

2030 FT
AM Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	289	229	12
Future Vol, veh/h	43	21	6	289	229	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	289	229	12
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	536	235	241	0	-	0
Stage 1	235	-	-	-	-	-
Stage 2	301	-	-	-	-	-
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	505	804	1326	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	751	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	502	804	1326	-	-	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	751	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	12.1		0.2		0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBL		NBT EBLn1	SBT	SBR	
Capacity (veh/h)	1326		-	573	-	
HCM Lane V/C Ratio	0.005		-	0.112	-	
HCM Control Delay (s)	7.7		0	12.1	-	
HCM Lane LOS	A		A	B	-	
HCM 95th %tile Q(veh)	0		-	0.4	-	

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	73	245	215	41	93	170
Future Vol, veh/h	73	245	215	41	93	170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	40	-	-	-	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	245	215	41	93	170
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	256	0	-	0	627	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	391	-
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	1309	-	-	-	447	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	683	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1309	-	-	-	422	803
Mov Cap-2 Maneuver	-	-	-	-	422	-
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	683	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.8	0		15.3		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1309	-	-	-	609	
HCM Lane V/C Ratio	0.056	-	-	-	0.432	
HCM Control Delay (s)	7.9	-	-	-	15.3	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	2.2	

MOVEMENT SUMMARY

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

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 HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
			veh/h	%	veh/h	%	v/c	sec			m				
South: Shea															
1	L2	All MCs	8	13.0	8	13.0	0.227	7.6	LOS A	1.0	7.1	0.57	0.45	0.57	55.5
2	T1	All MCs	161	5.0	161	5.0	0.227	6.9	LOS A	1.0	7.1	0.57	0.45	0.57	58.8
3	R2	All MCs	13	2.0	13	2.0	0.227	6.6	LOS A	1.0	7.1	0.57	0.45	0.57	59.0
Approach			182	5.1	182	5.1	0.227	6.9	LOS A	1.0	7.1	0.57	0.45	0.57	58.7
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.203	5.2	LOS A	1.0	6.9	0.42	0.25	0.42	59.9
5	T1	All MCs	189	2.0	189	2.0	0.203	5.2	LOS A	1.0	6.9	0.42	0.25	0.42	61.3
6	R2	All MCs	24	12.0	24	12.0	0.203	5.7	LOS A	1.0	6.9	0.42	0.25	0.42	58.3
Approach			215	3.1	215	3.1	0.203	5.2	LOS A	1.0	6.9	0.42	0.25	0.42	60.9
North: Shea															
7	L2	All MCs	42	2.0	42	2.0	0.221	5.2	LOS A	1.1	7.7	0.39	0.23	0.39	59.1
8	T1	All MCs	149	3.0	149	3.0	0.221	5.3	LOS A	1.1	7.7	0.39	0.23	0.39	60.2
9	R2	All MCs	51	8.0	51	8.0	0.221	5.5	LOS A	1.1	7.7	0.39	0.23	0.39	58.5
Approach			242	3.9	242	3.9	0.221	5.3	LOS A	1.1	7.7	0.39	0.23	0.39	59.7
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.416	7.8	LOS A	2.5	18.1	0.48	0.27	0.48	56.1
11	T1	All MCs	376	2.0	376	2.0	0.416	7.5	LOS A	2.5	18.1	0.48	0.27	0.48	58.5
12	R2	All MCs	26	4.0	26	4.0	0.416	7.6	LOS A	2.5	18.1	0.48	0.27	0.48	57.5
Approach			462	2.8	462	2.8	0.416	7.6	LOS A	2.5	18.1	0.48	0.27	0.48	58.1
All Vehicles			1101	3.5	1101	3.5	0.416	6.5	LOS A	2.5	18.1	0.46	0.29	0.46	59.1

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: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: Z:\Active Projects\2026\2026-018 Caivan - Magnolia East\DATA\Sidra\2026-018 Magnolia East.sip9

MOVEMENT SUMMARY

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

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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
			veh/h		veh/h						m				
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.506	13.0	LOS B	3.2	22.9	0.75	0.76	1.05	45.4
2	T1	All MCs	173	3.0	173	3.0	0.506	13.0	LOS B	3.2	22.9	0.75	0.76	1.05	46.1
3	R2	All MCs	139	6.0	139	6.0	0.506	13.5	LOS B	3.2	22.9	0.75	0.76	1.05	45.8
Approach			342	4.2	342	4.2	0.506	13.2	LOS B	3.2	22.9	0.75	0.76	1.05	45.9
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.842	25.8	LOS D	21.1	152.4	1.00	1.27	2.24	39.4
5	T1	All MCs	551	3.0	551	3.0	0.842	25.4	LOS D	21.1	152.4	1.00	1.27	2.24	40.0
6	R2	All MCs	115	2.0	115	2.0	0.842	25.3	LOS D	21.1	152.4	1.00	1.27	2.24	39.8
Approach			796	3.7	796	3.7	0.842	25.4	LOS D	21.1	152.4	1.00	1.27	2.24	39.9
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.766	26.2	LOS D	7.4	53.8	0.91	1.11	1.77	39.0
8	T1	All MCs	277	2.0	277	2.0	0.766	26.2	LOS D	7.4	53.8	0.91	1.11	1.77	39.5
9	R2	All MCs	144	9.0	144	9.0	0.766	27.4	LOS D	7.4	53.8	0.91	1.11	1.77	39.2
Approach			481	4.1	481	4.1	0.766	26.6	LOS D	7.4	53.8	0.91	1.11	1.77	39.4
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.752	20.6	LOS C	10.4	75.2	0.91	1.05	1.75	41.5
11	T1	All MCs	452	3.0	452	3.0	0.752	20.4	LOS C	10.4	75.2	0.91	1.05	1.75	42.1
12	R2	All MCs	34	3.0	34	3.0	0.752	20.4	LOS C	10.4	75.2	0.91	1.05	1.75	41.9
Approach			619	3.4	619	3.4	0.752	20.4	LOS C	10.4	75.2	0.91	1.05	1.75	42.0
All Vehicles			2238	3.8	2238	3.8	0.842	22.4	LOS C	21.1	152.4	0.92	1.10	1.82	41.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: 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.

HCM 2010 TWSC
8: Shea & Flewellyn

2030 FT
PM Peak Hour

Intersection												
Int Delay, s/veh		45.7										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	270	11	2	419	50	16	169	17	26	224	71
Future Vol, veh/h	59	270	11	2	419	50	16	169	17	26	224	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	270	11	2	419	50	16	169	17	26	224	71
Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	469	0	0	281	0	0	990	867	276	935	847	444
Stage 1	-	-	-	-	-	-	394	394	-	448	448	-
Stage 2	-	-	-	-	-	-	596	473	-	487	399	-
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	1077	-	-	1282	-	-	222	291	753	246	299	612
Stage 1	-	-	-	-	-	-	623	605	-	590	573	-
Stage 2	-	-	-	-	-	-	483	558	-	562	602	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1077	-	-	1282	-	-	63	272	753	116	279	612
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	272	-	116	279	-
Stage 1	-	-	-	-	-	-	583	566	-	552	572	-
Stage 2	-	-	-	-	-	-	259	557	-	360	563	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.5			0			81.6			137.1		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	225	1077	-	-	1282	-	-	281				
HCM Lane V/C Ratio	0.898	0.055	-	-	0.002	-	-	1.142				
HCM Control Delay (s)	81.6	8.5	0	-	7.8	0	-	137.1				
HCM Lane LOS	F	A	A	-	A	A	-	F				
HCM 95th %tile Q(veh)	7.4	0.2	-	-	0	-	-	13.8				

HCM 2010 TWSC
12: Shea & Street 21

2030 FT
PM Peak Hour

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	12	17	261	309	57
Future Vol, veh/h	40	12	17	261	309	57
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	17	261	309	57
Major/Minor						
Conflicting Flow All	633	338	366	0	-	0
Stage 1	338	-	-	-	-	-
Stage 2	295	-	-	-	-	-
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	444	704	1193	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	436	704	1193	-	-	-
Mov Cap-2 Maneuver	436	-	-	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Approach						
EB	NB		SB			
HCM Control Delay, s	13.4	0.5		0		
HCM LOS	B					
Minor Lane/Major Mvmt						
NBL	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	1193	-	478	-	-	
HCM Lane V/C Ratio	0.014	-	0.109	-	-	
HCM Control Delay (s)	8.1	0	13.4	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

HCM 2010 TWSC
13: Flewellyn & Street 16

2030 FT
PM Peak Hour

Intersection						
Int Delay, s/veh	4.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	74	231	353	153	110	52
Future Vol, veh/h	74	231	353	153	110	52
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	74	231	353	153	110	52
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	506	0	-	0	809	430
Stage 1	-	-	-	-	430	-
Stage 2	-	-	-	-	379	-
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	1059	-	-	-	350	625
Stage 1	-	-	-	-	656	-
Stage 2	-	-	-	-	692	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1059	-	-	-	322	625
Mov Cap-2 Maneuver	-	-	-	-	322	-
Stage 1	-	-	-	-	604	-
Stage 2	-	-	-	-	692	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.1	0		21.3		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1059	-	-	-	381	
HCM Lane V/C Ratio	0.07	-	-	-	0.425	
HCM Control Delay (s)	8.7	0	-	-	21.3	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	2.1	

HCM 2010 TWSC
14: Flewellyn & Street 12

2030 FT
PM Peak Hour

Intersection						
Int Delay, s/veh	5.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	171	239	308	97	66	119
Future Vol, veh/h	171	239	308	97	66	119
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	171	239	308	97	66	119
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	405	0	-	0	938	357
Stage 1	-	-	-	-	357	-
Stage 2	-	-	-	-	581	-
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	1154	-	-	-	293	687
Stage 1	-	-	-	-	708	-
Stage 2	-	-	-	-	559	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1154	-	-	-	243	687
Mov Cap-2 Maneuver	-	-	-	-	243	-
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	559	-
Approach	EB		WB		SB	
HCM Control Delay, s	3.6		0		20.4	
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1154	-	-	-	416	
HCM Lane V/C Ratio	0.148	-	-	-	0.445	
HCM Control Delay (s)	8.7	0	-	-	20.4	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.5	-	-	-	2.2	

HCM 2010 TWSC
18: Shea & Cosanti

2030 FT
PM Peak Hour

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	280	354	43
Future Vol, veh/h	24	12	21	280	354	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	280	354	43
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	698	376	397	0	-	0
Stage 1	376	-	-	-	-	-
Stage 2	322	-	-	-	-	-
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	407	670	1162	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	398	670	1162	-	-	-
Mov Cap-2 Maneuver	398	-	-	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.5	0.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1162	-	460	-	-	
HCM Lane V/C Ratio	0.018	-	0.078	-	-	
HCM Control Delay (s)	8.2	0	13.5	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-	

Intersection						
Int Delay, s/veh	5.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	171	239	308	97	66	119
Future Vol, veh/h	171	239	308	97	66	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	40	-	-	-	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	171	239	308	97	66	119
Major/Minor						
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	405	0	-	0	938	357
Stage 1	-	-	-	-	357	-
Stage 2	-	-	-	-	581	-
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	1154	-	-	-	293	687
Stage 1	-	-	-	-	708	-
Stage 2	-	-	-	-	559	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1154	-	-	-	250	687
Mov Cap-2 Maneuver	-	-	-	-	250	-
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	559	-
Approach						
Approach	EB		WB		SB	
HCM Control Delay, s	3.6		0		20	
HCM LOS					C	
Minor Lane/Major Mvmt						
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1154	-	-	-	423	
HCM Lane V/C Ratio	0.148	-	-	-	0.437	
HCM Control Delay (s)	8.7	-	-	-	20	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.5	-	-	-	2.2	

MOVEMENT SUMMARY

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

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 HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Shea															
1	L2	All MCs	16	6.0	16	6.0	0.216	6.2	LOS A	1.0	7.1	0.51	0.36	0.51	57.9
2	T1	All MCs	169	2.0	169	2.0	0.216	5.9	LOS A	1.0	7.1	0.51	0.36	0.51	60.2
3	R2	All MCs	17	6.0	17	6.0	0.216	6.2	LOS A	1.0	7.1	0.51	0.36	0.51	58.7
Approach			202	2.7	202	2.7	0.216	6.0	LOS A	1.0	7.1	0.51	0.36	0.51	59.9
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.446	8.3	LOS A	2.7	19.3	0.55	0.34	0.55	57.1
5	T1	All MCs	419	2.0	419	2.0	0.446	8.3	LOS A	2.7	19.3	0.55	0.34	0.55	58.4
6	R2	All MCs	50	2.0	50	2.0	0.446	8.3	LOS A	2.7	19.3	0.55	0.34	0.55	57.9
Approach			471	2.0	471	2.0	0.446	8.3	LOS A	2.7	19.3	0.55	0.34	0.55	58.3
North: Shea															
7	L2	All MCs	26	2.0	26	2.0	0.372	8.5	LOS A	1.9	13.4	0.62	0.48	0.62	56.7
8	T1	All MCs	224	2.0	224	2.0	0.372	8.5	LOS A	1.9	13.4	0.62	0.48	0.62	57.9
9	R2	All MCs	71	3.0	71	3.0	0.372	8.5	LOS A	1.9	13.4	0.62	0.48	0.62	57.2
Approach			321	2.2	321	2.2	0.372	8.5	LOS A	1.9	13.4	0.62	0.48	0.62	57.6
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.327	6.8	LOS A	1.7	12.4	0.49	0.31	0.49	57.1
11	T1	All MCs	270	2.0	270	2.0	0.327	6.7	LOS A	1.7	12.4	0.49	0.31	0.49	59.1
12	R2	All MCs	11	18.0	11	18.0	0.327	7.7	LOS A	1.7	12.4	0.49	0.31	0.49	55.0
Approach			340	3.0	340	3.0	0.327	6.7	LOS A	1.7	12.4	0.49	0.31	0.49	58.6
All Vehicles			1334	2.4	1334	2.4	0.446	7.6	LOS A	2.7	19.3	0.54	0.37	0.54	58.5

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: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Appendix P

Synchro and Sidra Intersection Worksheets – 2035 Future Total Conditions

MOVEMENT SUMMARY

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

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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.648	21.9	LOS C	4.1	30.6	0.84	0.97	1.37	41.0
2	T1	All MCs	229	5.0	229	5.0	0.648	21.7	LOS C	4.1	30.6	0.84	0.97	1.37	41.6
3	R2	All MCs	92	13.0	92	13.0	0.648	23.4	LOS C	4.1	30.6	0.84	0.97	1.37	41.2
Approach			339	7.2	339	7.2	0.648	22.2	LOS C	4.1	30.6	0.84	0.97	1.37	41.5
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.544	13.3	LOS B	4.0	28.8	0.76	0.76	1.11	45.1
5	T1	All MCs	244	4.0	244	4.0	0.544	13.2	LOS B	4.0	28.8	0.76	0.76	1.11	45.9
6	R2	All MCs	75	2.0	75	2.0	0.544	12.9	LOS B	4.0	28.8	0.76	0.76	1.11	45.6
Approach			406	3.8	406	3.8	0.544	13.1	LOS B	4.0	28.8	0.76	0.76	1.11	45.7
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.544	11.1	LOS B	4.5	33.1	0.69	0.59	0.91	46.1
8	T1	All MCs	147	7.0	147	7.0	0.544	11.3	LOS B	4.5	33.1	0.69	0.59	0.91	46.8
9	R2	All MCs	222	5.0	222	5.0	0.544	11.1	LOS B	4.5	33.1	0.69	0.59	0.91	46.5
Approach			500	5.3	500	5.3	0.544	11.2	LOS B	4.5	33.1	0.69	0.59	0.91	46.5
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.817	23.6	LOS C	17.2	124.3	0.99	1.19	2.10	39.8
11	T1	All MCs	410	3.0	410	3.0	0.817	23.5	LOS C	17.2	124.3	0.99	1.19	2.10	40.3
12	R2	All MCs	33	3.0	33	3.0	0.817	23.5	LOS C	17.2	124.3	0.99	1.19	2.10	40.1
Approach			748	3.4	748	3.4	0.817	23.6	LOS C	17.2	124.3	0.99	1.19	2.10	40.1
All Vehicles			1993	4.6	1993	4.6	0.817	18.1	LOS C	17.2	124.3	0.84	0.91	1.47	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.

HCM 2010 TWSC
8: Shea & Flewellyn

2035 FT
AM Peak Hour

Intersection													
Int Delay, s/veh		15.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Vol, veh/h	60	378	26	2	189	24	8	161	13	42	149	51	
Future Vol, veh/h	60	378	26	2	189	24	8	161	13	42	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	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	378	26	2	189	24	8	161	13	42	149	51	

Major/Minor	Major1	Major2		Minor1	Minor2							
Conflicting Flow All	213	0	0	404	0	0	816	728	391	803	729	201
Stage 1	-	-	-	-	-	511	511	-	205	205	-	-
Stage 2	-	-	-	-	-	305	217	-	598	524	-	-
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	1328	-	-	1155	-	283	347	658	302	348	825	
Stage 1	-	-	-	-	-	526	532	-	797	730	-	
Stage 2	-	-	-	-	-	682	718	-	489	528	-	
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	
Mov Cap-1 Maneuver	1328	-	-	1155	-	164	326	658	174	327	825	
Mov Cap-2 Maneuver	-	-	-	-	-	164	326	-	174	327	-	
Stage 1	-	-	-	-	-	495	501	-	751	729	-	
Stage 2	-	-	-	-	-	508	717	-	306	497	-	

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.1	29.5	44.5
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	324	1328	-	-	1155	-	-	319
HCM Lane V/C Ratio	0.562	0.045	-	-	0.002	-	-	0.759
HCM Control Delay (s)	29.5	7.8	0	-	8.1	0	-	44.5
HCM Lane LOS	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	3.2	0.1	-	-	0	-	-	5.9

HCM 2010 TWSC
12: Shea & Street 21

2035 FT
AM Peak Hour

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	57	17	7	238	225	25
Future Vol, veh/h	57	17	7	238	225	25
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	57	17	7	238	225	25
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	490	238	250	0	-	0
Stage 1	238	-	-	-	-	-
Stage 2	252	-	-	-	-	-
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	537	801	1316	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	790	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	534	801	1316	-	-	-
Mov Cap-2 Maneuver	534	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	790	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	12.1		0.2		0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1316	-	578	-	-	
HCM Lane V/C Ratio	0.005	-	0.128	-	-	
HCM Control Delay (s)	7.8	0	12.1	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

HCM 2010 TWSC
13: Flewellyn & Street 16

2035 FT
AM Peak Hour

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	32	308	182	66	156	74
Future Vol, veh/h	32	308	182	66	156	74
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	32	308	182	66	156	74
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	248	0	-	0	587	215
Stage 1	-	-	-	-	215	-
Stage 2	-	-	-	-	372	-
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	1318	-	-	-	472	825
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	697	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1318	-	-	-	458	825
Mov Cap-2 Maneuver	-	-	-	-	458	-
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	697	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.7	0		16.7		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1318	-	-	-	535	
HCM Lane V/C Ratio	0.024	-	-	-	0.43	
HCM Control Delay (s)	7.8	0	-	-	16.7	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1	

HCM 2010 TWSC
14: Flewellyn & Street 12

2035 FT
AM Peak Hour

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	73	247	215	41	93	170
Future Vol, veh/h	73	247	215	41	93	170
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	73	247	215	41	93	170
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	256	0	-	0	629	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	393	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1309	-	-	-	446	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	682	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1309	-	-	-	417	803
Mov Cap-2 Maneuver	-	-	-	-	417	-
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	682	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.8	0		15.4		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1309	-	-	-	605	
HCM Lane V/C Ratio	0.056	-	-	-	0.435	
HCM Control Delay (s)	7.9	0	-	-	15.4	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	2.2	

HCM 2010 TWSC
18: Shea & Cosanti

2035 FT
AM Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	289	229	12
Future Vol, veh/h	43	21	6	289	229	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	289	229	12
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	536	235	241	0	-	0
Stage 1	235	-	-	-	-	-
Stage 2	301	-	-	-	-	-
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	505	804	1326	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	751	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	502	804	1326	-	-	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	751	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.1	0.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1326	-	573	-	-	
HCM Lane V/C Ratio	0.005	-	0.112	-	-	
HCM Control Delay (s)	7.7	0	12.1	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	73	247	215	41	93	170
Future Vol, veh/h	73	247	215	41	93	170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	40	-	-	-	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	247	215	41	93	170
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	256	0	-	0	629	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	393	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1309	-	-	-	446	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	682	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1309	-	-	-	421	803
Mov Cap-2 Maneuver	-	-	-	-	421	-
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	682	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.8	0		15.4		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1309	-	-	-	608	
HCM Lane V/C Ratio	0.056	-	-	-	0.433	
HCM Control Delay (s)	7.9	-	-	-	15.4	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	2.2	

MOVEMENT SUMMARY

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

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 HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Shea															
1	L2	All MCs	8	13.0	8	13.0	0.227	7.6	LOS A	1.0	7.1	0.57	0.45	0.57	55.5
2	T1	All MCs	161	5.0	161	5.0	0.227	6.9	LOS A	1.0	7.1	0.57	0.45	0.57	58.8
3	R2	All MCs	13	2.0	13	2.0	0.227	6.6	LOS A	1.0	7.1	0.57	0.45	0.57	59.0
Approach			182	5.1	182	5.1	0.227	6.9	LOS A	1.0	7.1	0.57	0.45	0.57	58.7
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.203	5.2	LOS A	1.0	6.9	0.42	0.25	0.42	59.9
5	T1	All MCs	189	2.0	189	2.0	0.203	5.2	LOS A	1.0	6.9	0.42	0.25	0.42	61.3
6	R2	All MCs	24	12.0	24	12.0	0.203	5.7	LOS A	1.0	6.9	0.42	0.25	0.42	58.3
Approach			215	3.1	215	3.1	0.203	5.2	LOS A	1.0	6.9	0.42	0.25	0.42	60.9
North: Shea															
7	L2	All MCs	42	2.0	42	2.0	0.221	5.2	LOS A	1.1	7.7	0.39	0.23	0.39	59.1
8	T1	All MCs	149	3.0	149	3.0	0.221	5.3	LOS A	1.1	7.7	0.39	0.23	0.39	60.2
9	R2	All MCs	51	8.0	51	8.0	0.221	5.5	LOS A	1.1	7.7	0.39	0.23	0.39	58.5
Approach			242	3.9	242	3.9	0.221	5.3	LOS A	1.1	7.7	0.39	0.23	0.39	59.7
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.418	7.8	LOS A	2.5	18.2	0.48	0.28	0.48	56.0
11	T1	All MCs	378	2.0	378	2.0	0.418	7.6	LOS A	2.5	18.2	0.48	0.28	0.48	58.5
12	R2	All MCs	26	4.0	26	4.0	0.418	7.7	LOS A	2.5	18.2	0.48	0.28	0.48	57.5
Approach			464	2.8	464	2.8	0.418	7.6	LOS A	2.5	18.2	0.48	0.28	0.48	58.1
All Vehicles			1103	3.5	1103	3.5	0.418	6.5	LOS A	2.5	18.2	0.46	0.29	0.46	59.1

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: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: Z:\Active Projects\2026\2026-018 Caivan - Magnolia East\DATA\Sidra\2026-018 Magnolia East.slp9

MOVEMENT SUMMARY

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

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		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.506	13.0	LOS B	3.2	22.9	0.75	0.76	1.05	45.4
2	T1	All MCs	173	3.0	173	3.0	0.506	13.0	LOS B	3.2	22.9	0.75	0.76	1.05	46.1
3	R2	All MCs	139	6.0	139	6.0	0.506	13.5	LOS B	3.2	22.9	0.75	0.76	1.05	45.8
Approach			342	4.2	342	4.2	0.506	13.2	LOS B	3.2	22.9	0.75	0.76	1.05	45.9
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.842	25.8	LOS D	21.1	152.4	1.00	1.27	2.24	39.4
5	T1	All MCs	551	3.0	551	3.0	0.842	25.4	LOS D	21.1	152.4	1.00	1.27	2.24	40.0
6	R2	All MCs	115	2.0	115	2.0	0.842	25.3	LOS D	21.1	152.4	1.00	1.27	2.24	39.8
Approach			796	3.7	796	3.7	0.842	25.4	LOS D	21.1	152.4	1.00	1.27	2.24	39.9
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.766	26.2	LOS D	7.4	53.8	0.91	1.11	1.77	39.0
8	T1	All MCs	277	2.0	277	2.0	0.766	26.2	LOS D	7.4	53.8	0.91	1.11	1.77	39.5
9	R2	All MCs	144	9.0	144	9.0	0.766	27.4	LOS D	7.4	53.8	0.91	1.11	1.77	39.2
Approach			481	4.1	481	4.1	0.766	26.6	LOS D	7.4	53.8	0.91	1.11	1.77	39.4
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.752	20.6	LOS C	10.4	75.2	0.91	1.05	1.75	41.5
11	T1	All MCs	452	3.0	452	3.0	0.752	20.4	LOS C	10.4	75.2	0.91	1.05	1.75	42.1
12	R2	All MCs	34	3.0	34	3.0	0.752	20.4	LOS C	10.4	75.2	0.91	1.05	1.75	41.9
Approach			619	3.4	619	3.4	0.752	20.4	LOS C	10.4	75.2	0.91	1.05	1.75	42.0
All Vehicles			2238	3.8	2238	3.8	0.842	22.4	LOS C	21.1	152.4	0.92	1.10	1.82	41.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: 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: Sieglösch 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.

HCM 2010 TWSC
8: Shea & Flewellyn

2035 FT
PM Peak Hour

Intersection												
Int Delay, s/veh		46.4										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	270	11	2	421	50	16	169	17	26	224	71
Future Vol, veh/h	59	270	11	2	421	50	16	169	17	26	224	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	270	11	2	421	50	16	169	17	26	224	71
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	471	0	0	281	0	0	992	869	276	937	849	446
Stage 1	-	-	-	-	-	-	394	394	-	450	450	-
Stage 2	-	-	-	-	-	-	598	475	-	487	399	-
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	1075	-	-	1282	-	-	221	290	753	245	298	610
Stage 1	-	-	-	-	-	-	623	605	-	589	572	-
Stage 2	-	-	-	-	-	-	482	557	-	562	602	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1075	-	-	1282	-	-	62	271	753	115	278	610
Mov Cap-2 Maneuver	-	-	-	-	-	-	62	271	-	115	278	-
Stage 1	-	-	-	-	-	-	583	566	-	551	571	-
Stage 2	-	-	-	-	-	-	258	556	-	360	563	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.5			0			83.8			138.7		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	223	1075	-	-	1282	-	-	280
HCM Lane V/C Ratio	0.906	0.055	-	-	0.002	-	-	1.146
HCM Control Delay (s)	83.8	8.5	0	-	7.8	0	-	138.7
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	7.5	0.2	-	-	0	-	-	13.8

HCM 2010 TWSC
12: Shea & Street 21

2035 FT
PM Peak Hour

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	12	17	261	309	57
Future Vol, veh/h	40	12	17	261	309	57
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	17	261	309	57
Major/Minor						
Conflicting Flow All	633	338	366	0	-	0
Stage 1	338	-	-	-	-	-
Stage 2	295	-	-	-	-	-
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	444	704	1193	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	436	704	1193	-	-	-
Mov Cap-2 Maneuver	436	-	-	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Approach						
EB	NB		SB			
HCM Control Delay, s	13.4	0.5		0		
HCM LOS	B					
Minor Lane/Major Mvmt						
NBL	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	1193	-	478	-	-	
HCM Lane V/C Ratio	0.014	-	0.109	-	-	
HCM Control Delay (s)	8.1	0	13.4	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.4	-	-	

HCM 2010 TWSC
13: Flewellyn & Street 16

2035 FT
PM Peak Hour

Intersection						
Int Delay, s/veh	4.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	74	231	355	153	110	52
Future Vol, veh/h	74	231	355	153	110	52
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	74	231	355	153	110	52
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	508	0	-	0	811	432
Stage 1	-	-	-	-	432	-
Stage 2	-	-	-	-	379	-
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	1057	-	-	-	349	624
Stage 1	-	-	-	-	655	-
Stage 2	-	-	-	-	692	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1057	-	-	-	321	624
Mov Cap-2 Maneuver	-	-	-	-	321	-
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	692	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.1	0		21.3		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1057	-	-	-	380	
HCM Lane V/C Ratio	0.07	-	-	-	0.426	
HCM Control Delay (s)	8.7	0	-	-	21.3	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.2	-	-	-	2.1	

HCM 2010 TWSC
14: Flewellyn & Street 12

2035 FT
PM Peak Hour

Intersection						
Int Delay, s/veh	5.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	171	239	310	97	66	119
Future Vol, veh/h	171	239	310	97	66	119
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	171	239	310	97	66	119
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	407	0	-	0	940	359
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	581	-
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	1152	-	-	-	293	685
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	559	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1152	-	-	-	243	685
Mov Cap-2 Maneuver	-	-	-	-	243	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	559	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.6	0		20.5		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1152	-	-	-	415	
HCM Lane V/C Ratio	0.148	-	-	-	0.446	
HCM Control Delay (s)	8.7	0	-	-	20.5	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0.5	-	-	-	2.2	

HCM 2010 TWSC
18: Shea & Cosanti

2035 FT
PM Peak Hour

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	280	354	43
Future Vol, veh/h	24	12	21	280	354	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	280	354	43
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	698	376	397	0	-	0
Stage 1	376	-	-	-	-	-
Stage 2	322	-	-	-	-	-
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	407	670	1162	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	398	670	1162	-	-	-
Mov Cap-2 Maneuver	398	-	-	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.5	0.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1162	-	460	-	-	
HCM Lane V/C Ratio	0.018	-	0.078	-	-	
HCM Control Delay (s)	8.2	0	13.5	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-	

Intersection						
Int Delay, s/veh	5.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	171	239	310	97	66	119
Future Vol, veh/h	171	239	310	97	66	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	40	-	-	-	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	171	239	310	97	66	119
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	407	0	-	0	940	359
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	581	-
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	1152	-	-	-	293	685
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	559	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1152	-	-	-	250	685
Mov Cap-2 Maneuver	-	-	-	-	250	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	559	-
Approach	EB		WB		SB	
HCM Control Delay, s	3.6		0		20	
HCM LOS					C	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1152	-	-	-	423	
HCM Lane V/C Ratio	0.148	-	-	-	0.437	
HCM Control Delay (s)	8.7	-	-	-	20	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.5	-	-	-	2.2	

MOVEMENT SUMMARY

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

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 HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Shea															
1	L2	All MCs	16	6.0	16	6.0	0.216	6.2	LOS A	1.0	7.1	0.51	0.36	0.51	57.9
2	T1	All MCs	169	2.0	169	2.0	0.216	5.9	LOS A	1.0	7.1	0.51	0.36	0.51	60.2
3	R2	All MCs	17	6.0	17	6.0	0.216	6.2	LOS A	1.0	7.1	0.51	0.36	0.51	58.7
Approach			202	2.7	202	2.7	0.216	6.0	LOS A	1.0	7.1	0.51	0.36	0.51	59.9
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.448	8.3	LOS A	2.7	19.5	0.55	0.34	0.55	57.1
5	T1	All MCs	421	2.0	421	2.0	0.448	8.3	LOS A	2.7	19.5	0.55	0.34	0.55	58.3
6	R2	All MCs	50	2.0	50	2.0	0.448	8.3	LOS A	2.7	19.5	0.55	0.34	0.55	57.8
Approach			473	2.0	473	2.0	0.448	8.3	LOS A	2.7	19.5	0.55	0.34	0.55	58.3
North: Shea															
7	L2	All MCs	26	2.0	26	2.0	0.373	8.5	LOS A	1.9	13.4	0.62	0.48	0.62	56.7
8	T1	All MCs	224	2.0	224	2.0	0.373	8.5	LOS A	1.9	13.4	0.62	0.48	0.62	57.9
9	R2	All MCs	71	3.0	71	3.0	0.373	8.6	LOS A	1.9	13.4	0.62	0.48	0.62	57.2
Approach			321	2.2	321	2.2	0.373	8.5	LOS A	1.9	13.4	0.62	0.48	0.62	57.6
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.327	6.8	LOS A	1.7	12.4	0.49	0.31	0.49	57.1
11	T1	All MCs	270	2.0	270	2.0	0.327	6.7	LOS A	1.7	12.4	0.49	0.31	0.49	59.1
12	R2	All MCs	11	18.0	11	18.0	0.327	7.7	LOS A	1.7	12.4	0.49	0.31	0.49	55.0
Approach			340	3.0	340	3.0	0.327	6.7	LOS A	1.7	12.4	0.49	0.31	0.49	58.6
All Vehicles			1336	2.4	1336	2.4	0.448	7.6	LOS A	2.7	19.5	0.54	0.37	0.54	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: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: Z:\Active Projects\2026\2026-018 Caivan - Magnolia East\DATA\Sidra\2026-018 Magnolia East.slp9

Appendix Q

Synchro and Sidra Intersection Worksheets – 2035 Future Total Conditions – Street #16 Right-In/Right-Out Sensitivity

HCM 2010 TWSC
8: Shea & Flewellyn

2035 FT-RIRO
AM Peak Hour

Intersection												
Int Delay, s/veh	39.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	286	26	2	189	24	8	161	13	135	149	51
Future Vol, veh/h	60	286	26	2	189	24	8	161	13	135	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	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	286	26	2	189	24	8	161	13	135	149	51

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	213	0	0	312
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.17	-	-	4.12
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.263	-	-	2.218
Pot Cap-1 Maneuver	1328	-	-	1248
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1328	-	-	1248
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.1	23.8	114.6
HCM LOS	C		F	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	370	1328	-	-	1248	-	-	308
HCM Lane V/C Ratio	0.492	0.045	-	-	0.002	-	-	1.088
HCM Control Delay (s)	23.8	7.8	0	-	7.9	0	-	114.6
HCM Lane LOS	C	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	2.6	0.1	-	-	0	-	-	13

HCM 2010 TWSC
12: Shea & Street 21

2035 FT-RIRO
AM Peak Hour

Intersection						
Int Delay, s/veh	3.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	57	110	7	238	225	25
Future Vol, veh/h	57	110	7	238	225	25
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	57	110	7	238	225	25

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	490	238	250
Stage 1	238	-	-
Stage 2	252	-	-
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	537	801	1316
Stage 1	802	-	-
Stage 2	790	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	534	801	1316
Mov Cap-2 Maneuver	534	-	-
Stage 1	797	-	-
Stage 2	790	-	-

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)	1316	-	684	-	-
HCM Lane V/C Ratio	0.005	-	0.244	-	-
HCM Control Delay (s)	7.8	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	1	-	-

HCM 2010 TWSC
13: Flewellyn & Street 16

2035 FT-RIRO
AM Peak Hour

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	372	182	66	0	74
Future Vol, veh/h	0	372	182	66	0	74
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	372	182	66	0	74

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	- 0 - 215
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	-	- - 0 825
Stage 1	0	-	- - 0 -
Stage 2	0	-	- - 0 -
Platoon blocked, %	-	-	- - -
Mov Cap-1 Maneuver	-	-	- - 825
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)	-	-	-	825
HCM Lane V/C Ratio	-	-	-	0.09
HCM Control Delay (s)	-	-	-	9.8
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	0.3

HCM 2010 TWSC
14: Flewellyn & Street 12

2035 FT-RIRO
AM Peak Hour

Intersection						
Int Delay, s/veh	8.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	↑
Traffic Vol, veh/h	105	215	215	41	157	170
Future Vol, veh/h	105	215	215	41	157	170
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	105	215	215	41	157	170

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	256	0	- 0 661 236
Stage 1	-	-	- - 236 -
Stage 2	-	-	- - 425 -
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	1309	-	- - 427 803
Stage 1	-	-	- - 803 -
Stage 2	-	-	- - 659 -
Platoon blocked, %	-	-	- - -
Mov Cap-1 Maneuver	1309	-	- - 388 803
Mov Cap-2 Maneuver	-	-	- - 388 -
Stage 1	-	-	- - 730 -
Stage 2	-	-	- - 659 -

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	22
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1309	-	-	-	531
HCM Lane V/C Ratio	0.08	-	-	-	0.616
HCM Control Delay (s)	8	0	-	-	22
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	4.1

Intersection						
Int Delay, s/veh	8.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	105	215	215	41	157	170
Future Vol, veh/h	105	215	215	41	157	170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	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	105	215	215	41	157	170
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	256	0	-	0	661	236
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	425	-
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	1309	-	-	-	427	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	659	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1309	-	-	-	393	803
Mov Cap-2 Maneuver	-	-	-	-	393	-
Stage 1	-	-	-	-	739	-
Stage 2	-	-	-	-	659	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.6	0		21.7		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1309	-	-	-	535	
HCM Lane V/C Ratio	0.08	-	-	-	0.611	
HCM Control Delay (s)	8	-	-	-	21.7	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0.3	-	-	-	4.1	

MOVEMENT SUMMARY

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

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 HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
			veh/h	%	veh/h	%	v/c	sec		veh	m				
South: Shea															
1	L2	All MCs	8	13.0	8	13.0	0.227	7.7	LOS A	1.0	7.2	0.57	0.45	0.57	55.5
2	T1	All MCs	161	5.0	161	5.0	0.227	6.9	LOS A	1.0	7.2	0.57	0.45	0.57	58.8
3	R2	All MCs	13	2.0	13	2.0	0.227	6.7	LOS A	1.0	7.2	0.57	0.45	0.57	59.0
Approach			182	5.1	182	5.1	0.227	6.9	LOS A	1.0	7.2	0.57	0.45	0.57	58.7
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.203	5.2	LOS A	1.0	6.9	0.42	0.25	0.42	59.9
5	T1	All MCs	189	2.0	189	2.0	0.203	5.2	LOS A	1.0	6.9	0.42	0.25	0.42	61.3
6	R2	All MCs	24	12.0	24	12.0	0.203	5.7	LOS A	1.0	6.9	0.42	0.25	0.42	58.3
Approach			215	3.1	215	3.1	0.203	5.2	LOS A	1.0	6.9	0.42	0.25	0.42	60.9
North: Shea															
7	L2	All MCs	135	2.0	135	2.0	0.305	6.1	LOS A	1.6	11.6	0.43	0.25	0.43	57.3
8	T1	All MCs	149	3.0	149	3.0	0.305	6.2	LOS A	1.6	11.6	0.43	0.25	0.43	58.3
9	R2	All MCs	51	8.0	51	8.0	0.305	6.5	LOS A	1.6	11.6	0.43	0.25	0.43	56.7
Approach			335	3.4	335	3.4	0.305	6.2	LOS A	1.6	11.6	0.43	0.25	0.43	57.7
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.370	7.8	LOS A	2.0	14.4	0.54	0.35	0.54	56.0
11	T1	All MCs	286	2.0	286	2.0	0.370	7.4	LOS A	2.0	14.4	0.54	0.35	0.54	58.5
12	R2	All MCs	26	4.0	26	4.0	0.370	7.6	LOS A	2.0	14.4	0.54	0.35	0.54	57.5
Approach			372	2.9	372	2.9	0.370	7.5	LOS A	2.0	14.4	0.54	0.35	0.54	58.0
All Vehicles			1104	3.5	1104	3.5	0.370	6.6	LOS A	2.0	14.4	0.49	0.32	0.49	58.5

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: Sieglösch 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.

HCM 2010 TWSC
8: Shea & Flewellyn

2035 FT-RIRO
PM Peak Hour

Intersection												
Int Delay, s/veh	90.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	205	11	2	421	50	16	169	17	91	224	71
Future Vol, veh/h	59	205	11	2	421	50	16	169	17	91	224	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	6	6	2	6	2	2	3
Mvmt Flow	59	205	11	2	421	50	16	169	17	91	224	71

Major/Minor	Major1	Major2	Minor1	Minor2								
Conflicting Flow All	471	0	0	216	0	0	927	804	211	872	784	446
Stage 1	-	-	-	-	-	-	329	329	-	450	450	-
Stage 2	-	-	-	-	-	-	598	475	-	422	334	-
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	1075	-	-	1354	-	-	245	316	819	271	325	610
Stage 1	-	-	-	-	-	-	676	646	-	589	572	-
Stage 2	-	-	-	-	-	-	482	557	-	609	643	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1075	-	-	1354	-	-	83	296	819	139	304	610
Mov Cap-2 Maneuver	-	-	-	-	-	-	83	296	-	139	304	-
Stage 1	-	-	-	-	-	-	634	606	-	552	571	-
Stage 2	-	-	-	-	-	-	258	556	-	403	603	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	56.1	283.6
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	257	1075	-	-	1354	-	-	256
HCM Lane V/C Ratio	0.786	0.055	-	-	0.001	-	-	1.508
HCM Control Delay (s)	56.1	8.5	0	-	7.7	0	-	283.6
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	5.9	0.2	-	-	0	-	-	22.6

HCM 2010 TWSC
12: Shea & Street 21

2035 FT-RIRO
PM Peak Hour

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	77	17	261	309	57
Future Vol, veh/h	40	77	17	261	309	57
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	77	17	261	309	57

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	633	338	366	0	-	0
Stage 1	338	-	-	-	-	-
Stage 2	295	-	-	-	-	-
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	444	704	1193	-	-	-
Stage 1	722	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	436	704	1193	-	-	-
Mov Cap-2 Maneuver	436	-	-	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	755	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1193	-	582	-	-
HCM Lane V/C Ratio	0.014	-	0.201	-	-
HCM Control Delay (s)	8.1	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

HCM 2010 TWSC
13: Flewellyn & Street 16

2035 FT-RIRO
PM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	275	355	153	0	52
Future Vol, veh/h	0	275	355	153	0	52
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	275	355	153	0	52
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	432
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	624
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	624
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		11.3		
HCM LOS				B		
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	624		
HCM Lane V/C Ratio	-	-	-	0.083		
HCM Control Delay (s)	-	-	-	11.3		
HCM Lane LOS	-	-	-	B		
HCM 95th %tile Q(veh)	-	-	-	0.3		

HCM 2010 TWSC
14: Flewellyn & Street 12

2035 FT-RIRO
PM Peak Hour

Intersection						
Int Delay, s/veh	11					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	245	165	310	97	110	119
Future Vol, veh/h	245	165	310	97	110	119
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	245	165	310	97	110	119
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	407	0	-	0	1014	359
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	655	-
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	1152	-	-	-	264	685
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1152	-	-	-	202	685
Mov Cap-2 Maneuver	-	-	-	-	202	-
Stage 1	-	-	-	-	542	-
Stage 2	-	-	-	-	517	-
Approach	EB	WB		SB		
HCM Control Delay, s	5.4	0		40.4		
HCM LOS	E					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1152	-	-	-	319	
HCM Lane V/C Ratio	0.213	-	-	-	0.718	
HCM Control Delay (s)	9	0	-	-	40.4	
HCM Lane LOS	A	A	-	-	E	
HCM 95th %tile Q(veh)	0.8	-	-	-	5.2	

Intersection						
Int Delay, s/veh	10.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	245	165	310	97	110	119
Future Vol, veh/h	245	165	310	97	110	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	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	245	165	310	97	110	119
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	407	0	-	0	1014	359
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	655	-
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	1152	-	-	-	264	685
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	517	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1152	-	-	-	208	685
Mov Cap-2 Maneuver	-	-	-	-	208	-
Stage 1	-	-	-	-	556	-
Stage 2	-	-	-	-	517	-
Approach	EB	WB		SB		
HCM Control Delay, s	5.4	0		38.4		
HCM LOS	E					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1152	-	-	-	326	
HCM Lane V/C Ratio	0.213	-	-	-	0.702	
HCM Control Delay (s)	9	-	-	-	38.4	
HCM Lane LOS	A	-	-	-	E	
HCM 95th %tile Q(veh)	0.8	-	-	-	5	

MOVEMENT SUMMARY

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

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 HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Shea															
1	L2	All MCs	16	6.0	16	6.0	0.216	6.2	LOS A	1.0	7.1	0.51	0.36	0.51	57.9
2	T1	All MCs	169	2.0	169	2.0	0.216	5.9	LOS A	1.0	7.1	0.51	0.36	0.51	60.2
3	R2	All MCs	17	6.0	17	6.0	0.216	6.2	LOS A	1.0	7.1	0.51	0.36	0.51	58.7
Approach			202	2.7	202	2.7	0.216	6.0	LOS A	1.0	7.1	0.51	0.36	0.51	59.9
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.448	8.3	LOS A	2.7	19.5	0.55	0.34	0.55	57.1
5	T1	All MCs	421	2.0	421	2.0	0.448	8.3	LOS A	2.7	19.5	0.55	0.34	0.55	58.3
6	R2	All MCs	50	2.0	50	2.0	0.448	8.3	LOS A	2.7	19.5	0.55	0.34	0.55	57.8
Approach			473	2.0	473	2.0	0.448	8.3	LOS A	2.7	19.5	0.55	0.34	0.55	58.3
North: Shea															
7	L2	All MCs	91	2.0	91	2.0	0.449	9.7	LOS A	2.8	19.9	0.66	0.55	0.78	55.0
8	T1	All MCs	224	2.0	224	2.0	0.449	9.7	LOS A	2.8	19.9	0.66	0.55	0.78	56.1
9	R2	All MCs	71	3.0	71	3.0	0.449	9.8	LOS A	2.8	19.9	0.66	0.55	0.78	55.5
Approach			386	2.2	386	2.2	0.449	9.8	LOS A	2.8	19.9	0.66	0.55	0.78	55.7
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.283	6.7	LOS A	1.4	10.0	0.51	0.35	0.51	57.1
11	T1	All MCs	205	2.0	205	2.0	0.283	6.5	LOS A	1.4	10.0	0.51	0.35	0.51	59.1
12	R2	All MCs	11	18.0	11	18.0	0.283	7.6	LOS A	1.4	10.0	0.51	0.35	0.51	55.0
Approach			275	3.3	275	3.3	0.283	6.6	LOS A	1.4	10.0	0.51	0.35	0.51	58.4
All Vehicles			1336	2.4	1336	2.4	0.449	8.0	LOS A	2.8	19.9	0.57	0.41	0.60	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: Sieglösch 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.