

6310 Hazeldean Road

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Strategy Report

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PN: 2025-090

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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 site plan application. A previous TIA has been prepared and approved for the zoning bylaw amendment application.

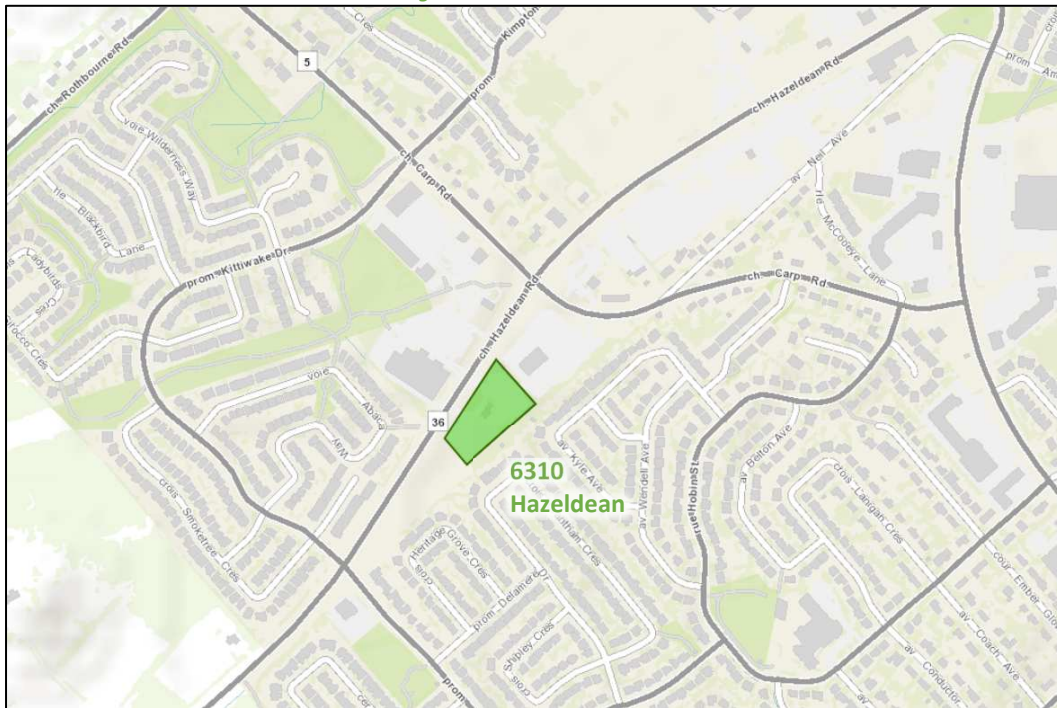
2 Existing and Planned Conditions

2.1 Proposed Development

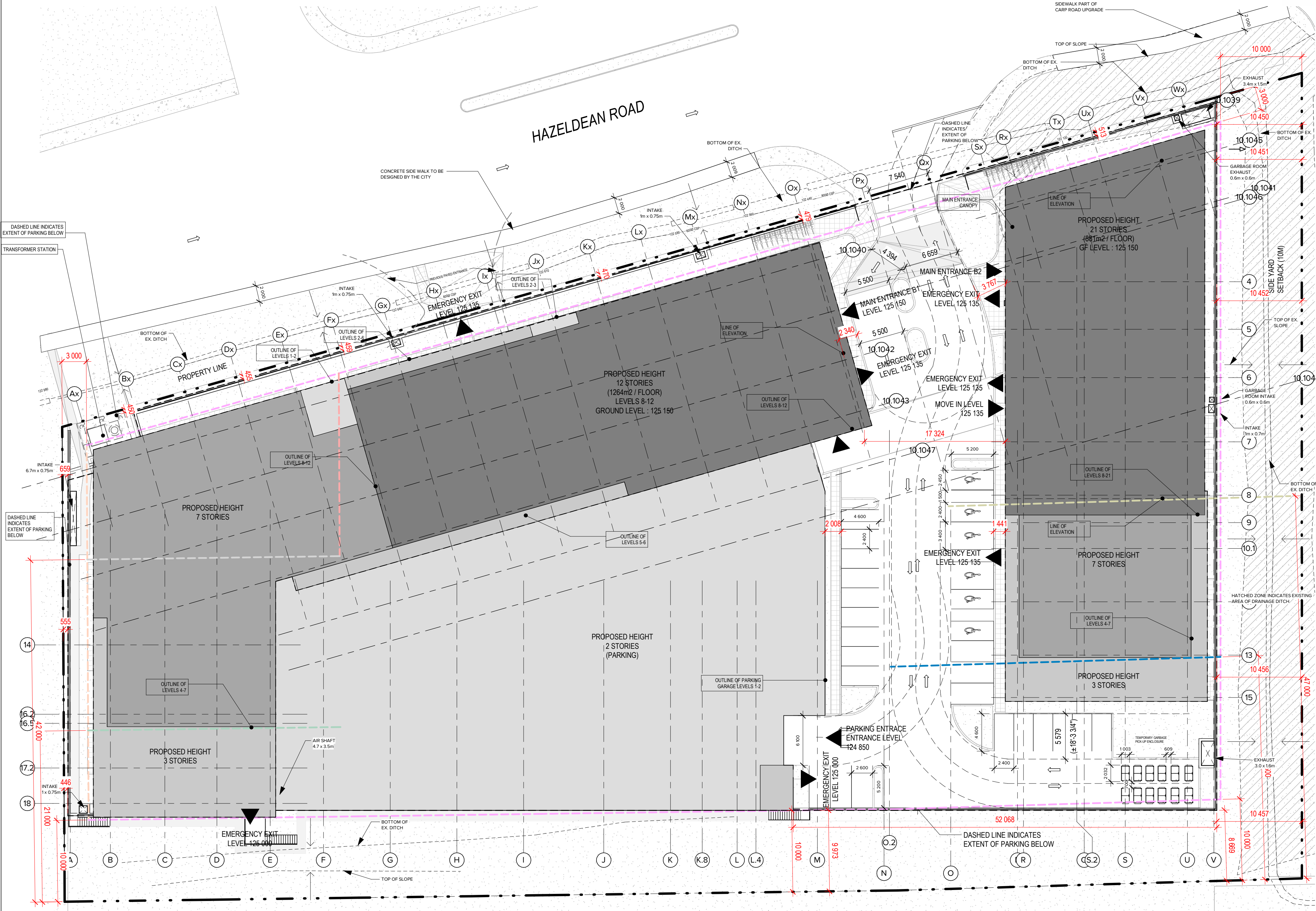
The existing site, located at 6310 Hazeldean Road, is zoned as Arterial Mainstreet Zone (AM9[2102]). The proposed redevelopment consists of 456 apartment units in two buildings. A full-movements access will remain at the existing signalized intersection on Hazeldean Road. The redevelopment proposed 464 vehicle parking spaces and 456 bike parking spaces. The anticipated full build-out and occupancy horizon is 2027 with construction occurring in a single phase.

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

Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: September 19, 2023



1 SITE PLAN
A-025 ÉCHELLE: 1 : 300

PROJECT DESCRIPTION :	
PROPOSED DESIGN	2 RESIDENTIAL BUILDING
BUILDING 01	12 STOREY
BUILDING 02	21 STOREY
LOCAL AUTHORITY	CITY OF OTTAWA
PIN NUMBER	04753 0270, 0271, 0272
MUNICIPAL ADDRESS	6310 HAZELDEAN ROAD
SITE INFORMATION :	
LOT AREA	12,014m ²
LOT FRONTAGE	152m
LOT DEPTH	78.5m
BUILDINGS INFORMATION :	
BUILDING AREA 01	5,030m ²
BUILDING AREA 02	1,335m ²
BUILDING FLOOR AREA (ABOVE GRADE)	
BUILDING 01 PROPOSED USE	HIGH-RISE DWELLING UNITS
BUILDING 02 PROPOSED USE	HIGH-RISE DWELLING UNITS
BUILDING 01 NUMBER OF UNITS	248
BUILDING 02 NUMBER OF UNITS	208
TOTAL NUMBER OF UNITS	456
PROJECT ZONING BY-LAW AND APPLICABLE BUILDING CODE:	

ZONING TABLE	AM92(102) S801 Provisions	PROPOSED
MINIMUM LOT AREA	No minimum	12,014m ²
MINIMUM LOT WIDTH	No minimum	152m
MINIMUM FRONT YARD SETBACK	3m	Building 01: 0.48 m Building 02: 0.5 m
MINIMUM INTERIOR SIDE YARD	EAST: 10 m WEST: 3 m	Building 01(West): 0.45 m Building 02 (East): 10 m
MINIMUM REAR YARD	10m	8.2 m
MINIMUM BUILDING HEIGHT	Area A: 41 m Area B: 67.7 m Area C: 24 m Area D: 11 m Area E: 0 m Area F: 0 m	Area A: 38.25 m Area B: 65.15 m Area C: 23 m Area D: 11 m Area E: 0 m Area F: 1.8 m
MINIMUM SETBACK ABOVE 4 th FLOOR FOR ANY PORTION OF A BUILDING 10 FLOOR OR MORE	1.5 m	Building 1: 1.5 m Above the 5 th floor for a portion of building, no set back for remainder Building 2: 3 m (no setback is proposed)
MAXIMUM FLOOR SPACE INDEX	N/A	N/A
APARTMENT AREA	Total 6 m ² / Dwelling unit (2,736 m ²)	Building 01: 39,600m ² Building 02: 65,700m ²
MINIMUM LOT AREA FOR HIGH-RISE BUILDINGS	Communal: 50% of the required total amenity area 1,358 m ²	1800 m ²
MINIMUM INTERIOR SIDE AND REAR YARD SETBACK	11.5 m	11.5 m
MINIMUM SEPARATION DISTANCE BETWEEN TOWERS ON THE SAME LOT	19 m	17.4 m
GARAGE ROOM EXHAUST	0.75 spaces/ unit (342 spaces)	354 spaces
VEHICLE PARKING SPACE	2.0 m wide x 5.2 long 50% of spaces may be reduced to 2.4 m x 4.6 m for compact cars	361 (2.8 m x 5.2 m), 79 (2.4 m x 4.6 m), 6 (Accessible type A) and 6 (Accessible type B) Total: 452
MINIMUM VISITOR PARKING SPACE	0.2 spaces/ unit (91 spaces)	92 spaces
MINIMUM AISLE AND DRIVEWAY SIZE	Aisle 6 m Driveway (double traffic) min: 6 m Max: 6.7 m	6m
MINIMUM LANDSCAPING PROVISIONS FOR PARKING LOTS	15% of the area of any parking lot provided as perimeter of interior landscape area	Provided
OUTDOOR REFUSE	1.5 m landscape buffer Located 3 m (minimum) from a lot line Screened from view by an opaque screen with a height of 2 m	Provided 13.5 m setbacks
MINIMUM BICYCLE PARKING SPACE	1 Space dwelling unit (456 spaces)	469 spaces

LOCATION OF BICYCLE PARKING SPACES	A maximum of 50% of the required bicycles spaces or 15 spaces which ever is greater may be in a landscape area	24 bicycles spaces for visitors in landscape area
MINIMUM BICYCLE PARKING SPACE PROVISIONS	Horizontal: 0.8 m x 1.8 m Vertical: 0.8 m x 1.5 m Stacked: 0.37 m x 1.8 m Aisle: 1.5 m	Horizontal: 0.8 m x 1.8 m provided Vertical: 0.8 m x 1.5 m provided Aisle: 1.5 m provided

PROJECT STATISTICS:				
GFA Calculation: (Zoning by Law Part 1- Definitions)				
Building 01:				
GROUND FLOOR	1058 m ²			
2 nd FLOOR	1245 m ²			
3 rd FLOOR	1681 m ²			
4 th FLOOR	1916 m ²			
5 th FLOOR	1900 m ²			
6 th FLOOR	1886 m ²			
7 th FLOOR	1881 m ²			
8 th FLOOR	1047.40 m ²			
9 th FLOOR	1047.40 m ²			
10 th FLOOR	1047.40 m ²			
11 th FLOOR	1047.40 m ²			
12 th FLOOR	1047.40 m ²			
TOTAL	16,809 m ²			
Building 02:				
GROUND FLOOR	721.3 m ²			
2 nd FLOOR	1129 m ²			
3 rd FLOOR	1200 m ²			
4 th FLOOR	1043 m ²			
5 th FLOOR	1047 m ²			
6 th FLOOR	1047 m ²			
7 th FLOOR	780 m ²			
8 th FLOOR	780 m ²			
9 th FLOOR	780 m ²			
10 th FLOOR	780 m ²			
11 th FLOOR	780 m ²			
12 th FLOOR	780 m ²			
13 th FLOOR	780 m ²			
14 th FLOOR	780 m ²			
15 th FLOOR	780 m ²			
16 th FLOOR	780 m ²			
17 th FLOOR	780 m ²			
18 th FLOOR	780 m ²			
19 th FLOOR	780 m ²			
20 th FLOOR	780 m ²			
21 st FLOOR	780 m ²			
TOTAL	18154.3 m ²			
UNIT MIX:				
	STUDIO	1 BEDROOM	2 BEDROOM	3 BEDROOM
BUILDING 01	33	155	55	5
BUILDING 02	15	61	104	29
TOTAL	48	216	159	33
TOTAL BUILDING 01 248 + BUILDING 02 208 = 456				

CAR PARKING BREAKDOWN:	
REGULAR PARKING 2.6m x 5.2m	361
SMALL PARKING (COMPACT) 2.4m x 4.2m	79
ACCESSIBLE TYPE A 3.3m x 5.2m	6
ACCESSIBLE TYPE B 2.5 m x 5.2m	6
TOTAL	452

BICYCLE BREAKDOWN:	
INTERIOR BICYCLE SPACE	445
EXTERIOR BICYCLE SPACE	24
TOTAL	469

L'ENTREPRENEUR EST RESPONSABLE DE LA VÉRIFICATION ET DE LA COORDINATION DE TOUTES LES DIMENSIONS DE CONSTRUCTION ET D'IMPLANTATION SUR LE SITE. CELUI-CI DEVRA AVISER L'ARCHITECTE DE TOUTE IRÉGULARITÉ, OMISSION OU DIVERGENCE ENTRE CES DOCUMENTS, CEUX DES AUTRES PROFESSIONNELS ET LES CONDITIONS RELEVÉES AU CHANTIER. AUCUNE DIMENSION NE DOIT ÊTRE MESURÉE À L'ÉCHELLE SUR LES DESSINS.

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NOTES GÉNÉRALES

ENTREPRENEUR / GESTIONNAIRE DE PROJET



DESIGN INTÉRIEUR

ARCHITECTE DU PAYSAGE

MÉCANIQUE / ÉLECTRICITÉ



STRUCTURE / CIVIL



1	ISSUED FOR SPA	2025-08-15	MST H
NO	ÉMISSION	DATE	PAR

ARCHITECTURE

ACDF
ARCHITECTURE

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PROJET

SCALIA
STITTSVILLE-HAZELDEAN
6310 Hazeldean Rd, Ottawa, ON K2S 0T2

DESSIN
SITE PLAN

SCEAU	DOSSIER	
	25-1839	
	DESSIN NO	RÉV. NO.
	A-025	1
	DATE	MAY 2025
DESSINÉ PAR	ÉCHELLE	1 : 300
	FM	VÉRIFIÉ PAR
	FM	FM

FORMAT: A1

2.2 Existing Conditions

2.2.1 Area Road Network

Hazeldean Road: Hazeldean Road is a City of Ottawa arterial road with a two-lane cross-section west of the signalized Farmboy access, and a divided four-lane cross-section to the east. The cross-section is rural with gravel shoulders west of Kittiwake Drive, rural with paved shoulders between Kittiwake Drive and the unsignalized western inbound Farmboy driveway, semi-urban with a paved shoulder on the south side between the inbound Farmboy access and Carp Road, and urban east of Carp Road. Within the study area, gravel shoulders are provided on both sides of the road west of Kittiwake Drive/West Ridge Drive, and transition to paved shoulders east of Kittiwake Drive/West Ridge Drive. Sidewalks are present on the north side of the road along the Farmboy frontage and east to Carp Road, and on both sides east of Carp Road. Bike lanes are present on both sides of the road east of Carp Road, and a westbound bike lane continues west of Carp Road and transitions to a paved shoulder on the west side of the inbound unsignalized Farmboy access. West of the edge of urban development, approximately 195 metres west of Kittiwake Drive, the posted speed limit is 80 km/h to the west and the posted speed limit is 60 km/h to the east. The City-protected right-of-way is 37.5 metres. Hazeldean Road is designated as a truck route.

Carp Road: Carp Road is a City of Ottawa arterial road with a two-lane cross-section that is rural north of Kittiwake Drive, semi-urban with a curb on the west side between Kittiwake Drive and Carp Road, semi-urban with a curb on the east side between Carp Road and Hobin Street, and urban south of Hobin Street. Bike lanes are present on both sides of the road north of Hazeldean Road within the study area. South of Hazeldean Road, a bike lane is present on the east side of the road approaching Hazeldean Road, and a paved shoulder is present on the west side of the road. Sidewalks are provided on the west side of the road between Kittiwake Drive/Echowoods Avenue and Hazeldean Road, on the east side between Hazeldean Road and McCooeye Lane/Hobin Street, and on both sides between McCooeye Lane/Hobin Street and Stittsville Main Street. The posted speed limit is 50km/h. The City-protected right-of-way is 33.2 metres north of Echowoods Avenue, 33.4 metres between Hazeldean Road and Echowoods Avenue, and 23.0 metres between Hazeldean Road and Stittsville Main Street. Carp Road is designated as a truck route.

West Ridge Drive: West Ridge Drive is a City of Ottawa collector road with a two-lane urban cross-section. The sidewalk is provided on the west side of the road. The speed limit is 40 km/h, and the City-protected right-of-way is 24.0 metres.

Kittiwake Drive: Kittiwake Drive is a City of Ottawa collector road with a two-lane urban cross-section with a sidewalk provided on the south/east side of the road. The posted speed limit is 40 km/h, and the existing right-of-way is 26.0 metres.

Echowoods Avenue: Echowoods Avenue is a City of Ottawa collector road with a two-lane urban cross-section with a sidewalk on the south side of the road. The posed speed limit is 40 km/h, and the existing right-of-way is 18.0 metres.

Hobin Street: Hobin Street is a City of Ottawa collector road with a two-lane rural cross-section including gravel shoulders and the speed limit is 40 km/h. The City-protected right-of-way is 24.0 metres within the study area.

McCooeye Lane: McCooeye Lane is a City of Ottawa local road with a two-lane rural cross-section including gravel shoulders. The unposed speed limit is assumed to be 50 km/h. The existing right of way is 26.0 metres.

2.2.2 Existing Intersections

The existing signalized area intersections within one kilometre of the site have been summarized below:

<i>Hazeldean Road at West Ridge Drive/Kittiwake Drive</i>	The intersection of West Ridge Drive/Kittiwake Drive at Hazeldean Road is a signalized intersection. The northbound approach consists of a shared left-turn/through lane and a right-turn movement lane. The southbound, eastbound, and westbound approaches each consist of an auxiliary left-turn lane and a shared through/right-turn lane. Trucks are restricted on the north and south legs.
<i>Hazeldean Road at Stittsville Corners Mall</i>	The intersection of Hazeldean Road at the Stittsville Corners Mall is a signalized intersection. The private northbound approach consists of a shared all-movement lane, and the private southbound approach consists of a shared left-turn/through lane and a right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, a through lane, a through/right-turn lane, and a bike lane, and the westbound approach consists of an auxiliary left-turn lane, a through lane, a bike lane, and an auxiliary right-turn lane. No turn restrictions were noted.
<i>Hazeldean Road at Carp Road</i>	The intersection of Carp Road at Hazeldean Road is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane, a through lane, an auxiliary shared through/right lane, and a bike lane. The southbound and westbound approaches each approach consist of an auxiliary left-turn lane, a through lane, a bike lane, and a channelized right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, a through lane, and a shared through/right-turn lane. No turn restrictions were noted.
<i>Hazeldean Road at Jackson Trails Centre Mall</i>	The intersection of Hazeldean Road at the Jackson Trails Centre Mall is a signalized T-intersection. The private southbound approach consists of a shared all-movement lane that functions as a left-turn lane and an auxiliary right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, two through lanes, and a bike lane, and the westbound approach consists of a through lane, a shared through/right-turn lane, and a bike lane. No turn restrictions were noted.
<i>Carp Road at Kittiwake Drive/Echowoods Avenue</i>	The intersection of Carp Road at Kittiwake Drive/Echowoods Avenue is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane, and the southbound approach consists of an auxiliary left-turn, a through lane, a bike lane, and an auxiliary right-turn. The eastbound approach consists of a left-turn lane and a shared through/right-turn lane, and the westbound approach consists of a shared all-movement lane. No turn restrictions were noted.
<i>Carp Road at McCooeye Lane/Hobin Street</i>	The intersection of Carp Road at McCooeye Lane/Hobin Street is a signalized intersection. Carp Road is considered as N-S movements, and McCooeye Lane/Hobin Street is E-W movements. The northbound and southbound approaches each consist of an auxiliary left-turn lane and a shared through/right-turn lane, and the eastbound and westbound approaches each consists of a shared all-movement lane. No turn restrictions were noted.

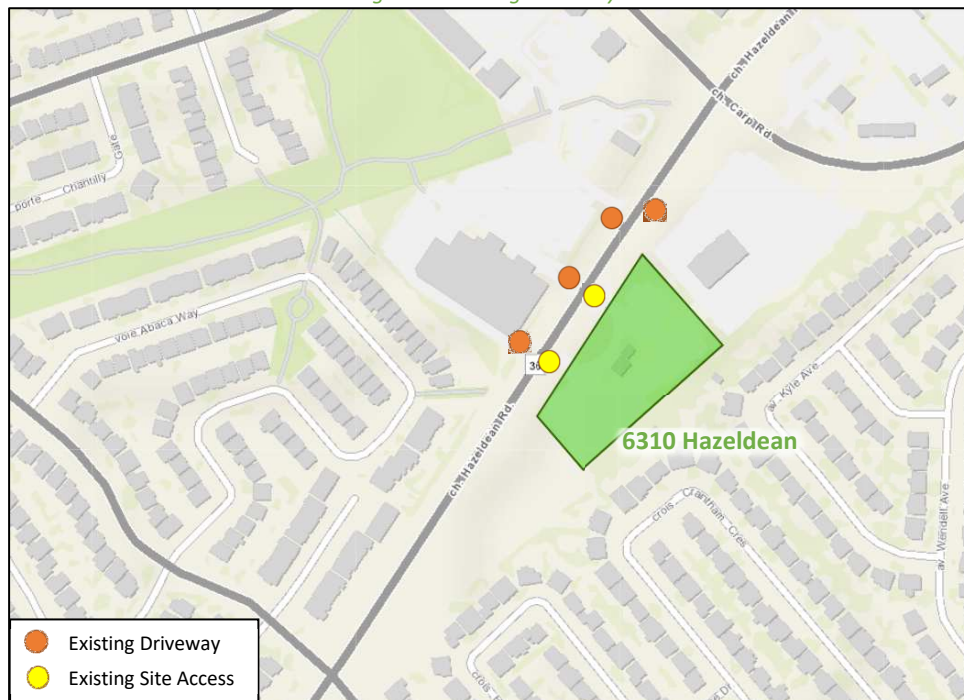
Carp Road at Stittsville Main Street

The intersection of Carp Road at Stittsville Main Street is a signalized intersection. The northbound approach consists of a left-turn lane and a shared through/right-turn lane, and the southbound approach consists of an auxiliary left-turn, a through lane, and an auxiliary channelized right-turn. The eastbound approach consists of an auxiliary left-turn, a through lane, and an auxiliary channelized right-turn lane, and the westbound approach consists of a left-turn lane and a shared through/right-turn movement lane. No turn restrictions were noted.

2.2.3 Existing Driveways

Within 200 metres of the site accesses, two existing driveways to the site on the south side of Hazeldean Road, and three existing driveways to a retail plaza are present on the north side of Hazeldean Road. Figure 3 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: September 20, 2023

2.2.4 Cycling and Pedestrian Facilities

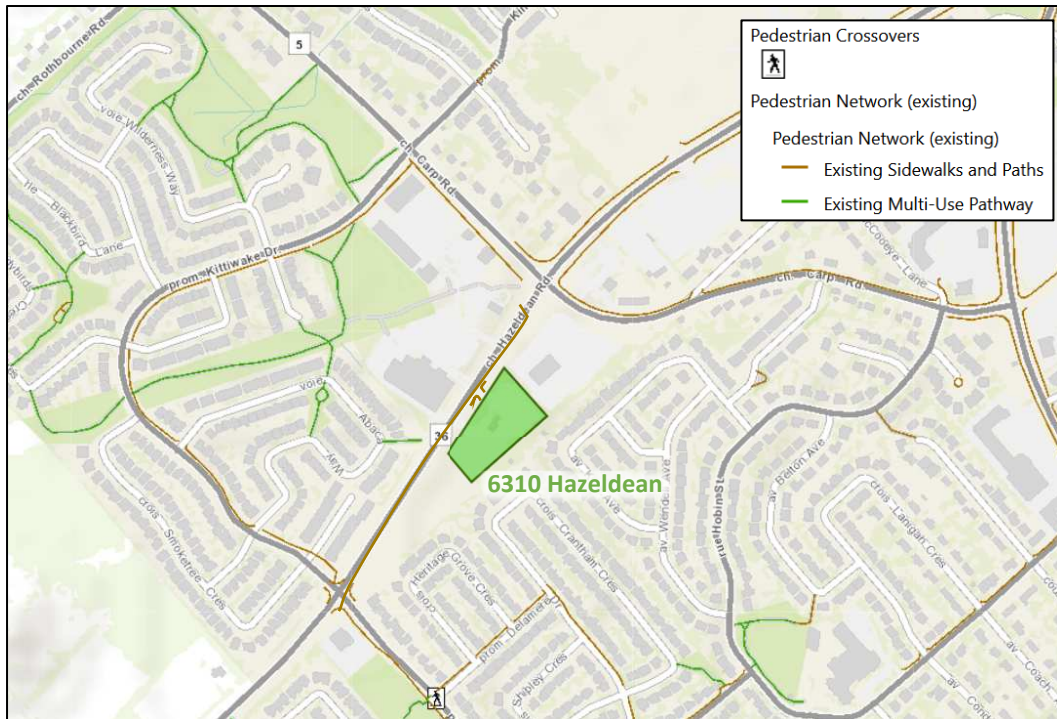
Figure 4 illustrates the pedestrian facilities in the study area and Figure 5 illustrates the cycling facilities.

Sidewalks and asphalt pathways are provided on the north side of Hazeldean Road between Kittiwake Drive/West Ridge Drive and Carp Road and of Carp Road east of Stittsville Main Street, on the south side of Echowoods Avenue and Kittiwake Drive, on the east side of Carp Road between Hazeldean Road and McCooeye Lane/Hobin Street, on the west side of Carp Road between Kittiwake Drive/Echowoods Avenue and Hazeldean Road and of West Ridge Drive, and on both sides of Hazeldean Road east of Carp Road, of Carp Road between McCooeye Lane/Hobin Street and Stittsville Main Street, of Stittsville Main Street.

Bike lanes are provided on the south side of Hazeldean Road east of Carp Road, on the north side of Hazeldean Road east of Stittsville Corners Mall access, on the east side of Carp Road approaching Hazeldean Road to Kittiwake Drive/Echowoods Avenue, and on the west side of Carp Road north of Hazeldean Road.

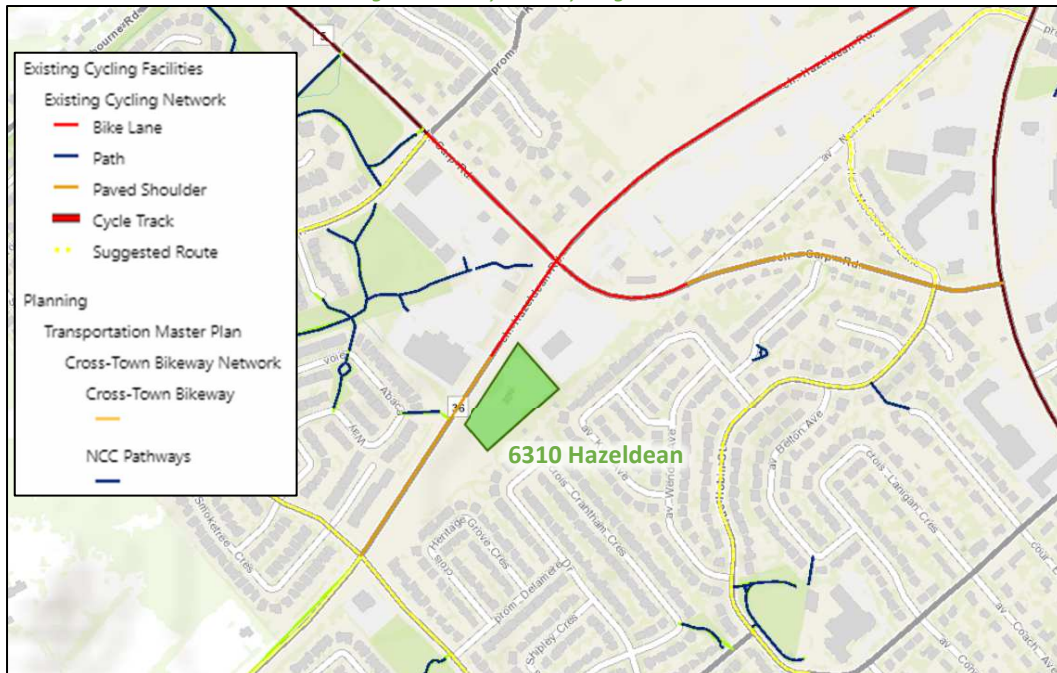
Paved shoulders are present on the west side of Carp Road between Hazeldean Road and McCooeye Lane/Hobin Street, on both sides of Hazeldean Road between Kittiwake Drive/West Ridge Drive and Stittsville Corners Mall access, and on the south side of Hazeldean Road between Stittsville Corners Mall access and Carp Road.

Figure 4: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: June 20, 2025

Figure 5: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: June 20, 2025

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 6 and Figure 7, respectively.

Figure 6: Existing Pedestrian Volumes

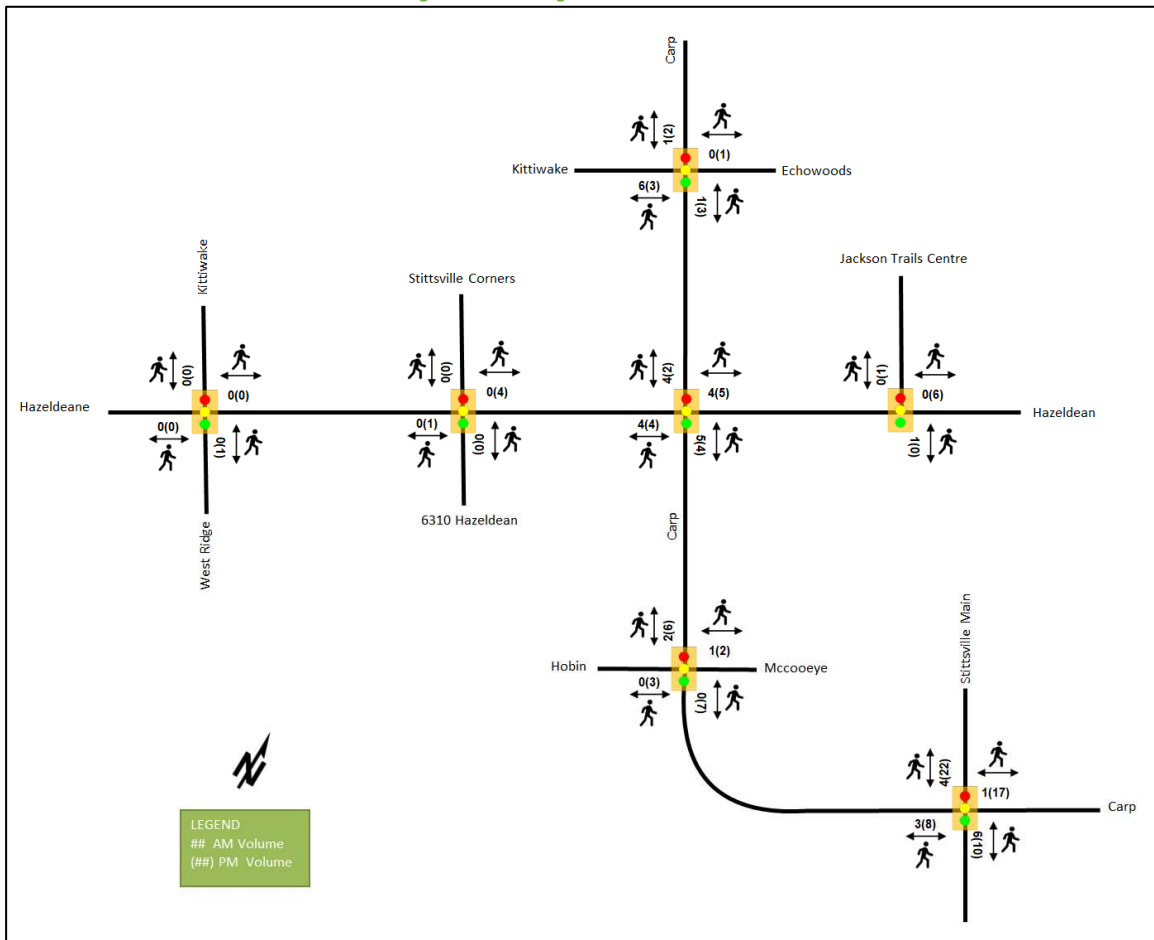
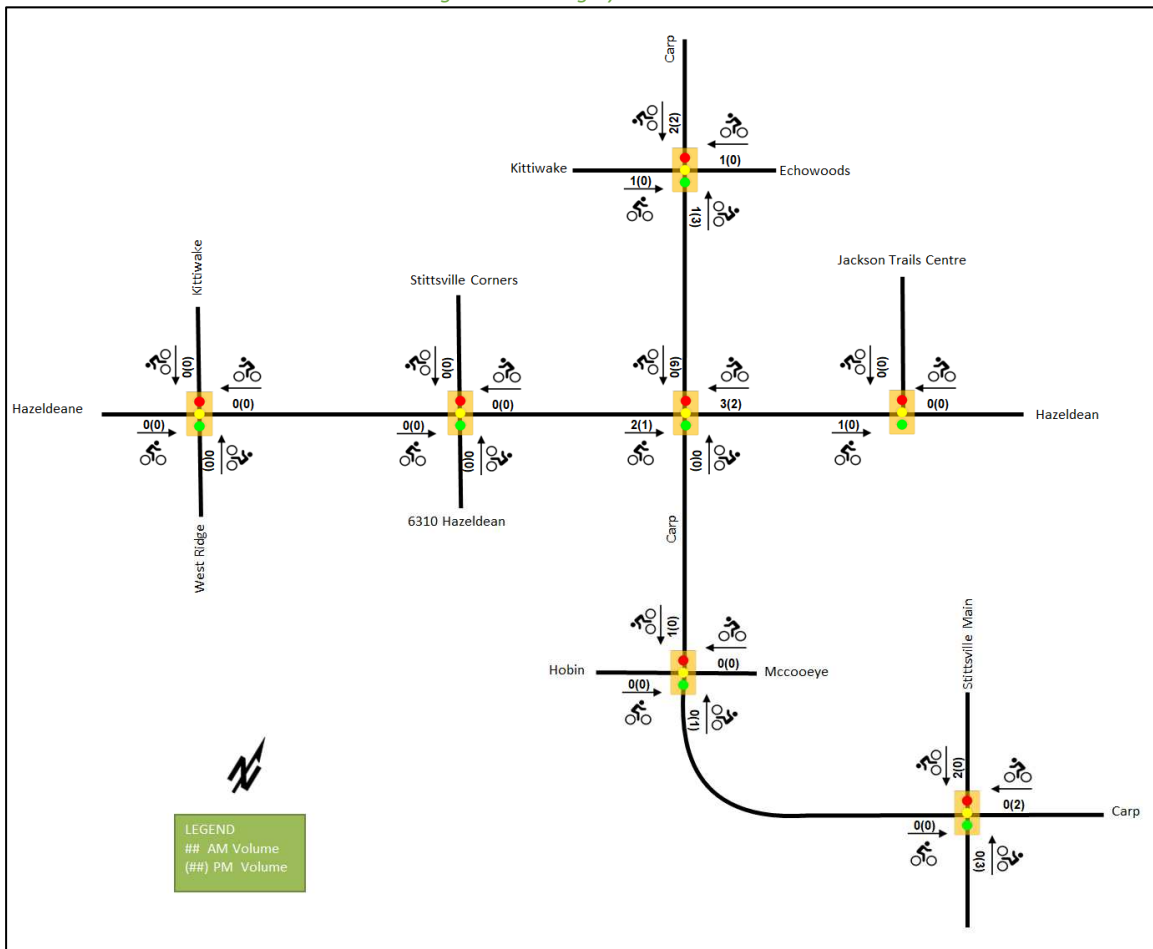


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stops. All transit information is from June 20, 2025 and is included for general information purposes and context to the surrounding area.

Within the study area, route # 61 travels along Hazeldean Road and Carp Road, route # 163 travels along Hazeldean Road, Carp Road, and Kittiwake Drive, and route # 262 travels along Carp Road, Kittiwake Drive, and West Ridge Drive. Primary stops are located at Carp Road at Hazeldean Road intersection. The frequency of these routes within proximity of the proposed site based on June 20, 2025 service levels are:

- Route # 61 – 15-minute service in the peak period/direction, 30-minute service all-day
- Route # 163 – 30-minute service all day and one-hour service after 8:30 PM
- Route # 262 – Four morning buses and five afternoon buses per day

Figure 8: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: June 20, 2025

Figure 9: Existing Study Area Transit Stops



Source: <http://www.octranspo.com/> Accessed: September 20, 2023

2.2.6 Existing Area Traffic Management Measures

On-road messaging of the 50 km/h speed limit is present on Carp Road south of Hazeldean Road.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa and The Traffic Specialist for the existing study area intersections. Table 1 summarizes the intersection count dates. As City's request, the existing traffic counts are unbalanced in the existing condition, and discrepancies have been noted along Hazeldean Road.

Table 1: Intersection Count Date

Intersection	Count Date	Source
Hazeldean Rd @ West Ridge Dr/Kittiwake Dr	Tuesday, January 11, 2022	City of Ottawa
Hazeldean Rd @ Stittsville Corners Mall	Wednesday, January 19, 2022	City of Ottawa
Hazeldean Rd @ Jackson Trails Centre Mall	Tuesday, January 11, 2022	City of Ottawa
Hazeldean Rd @ Carp Rd	Wednesday, August 23, 2023	The Traffic Specialist
Carp Rd @ Echowoods Ave/Kittiwake Dr	Wednesday, August 23, 2023	The Traffic Specialist
Carp Road at McCooeye Lane/Hobin Street	Thursday, May 04, 2017	City of Ottawa
Carp Road at Stittsville Main Street	Thursday, May 04, 2017	City of Ottawa

Figure 10 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services and average delay for unsignalized 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

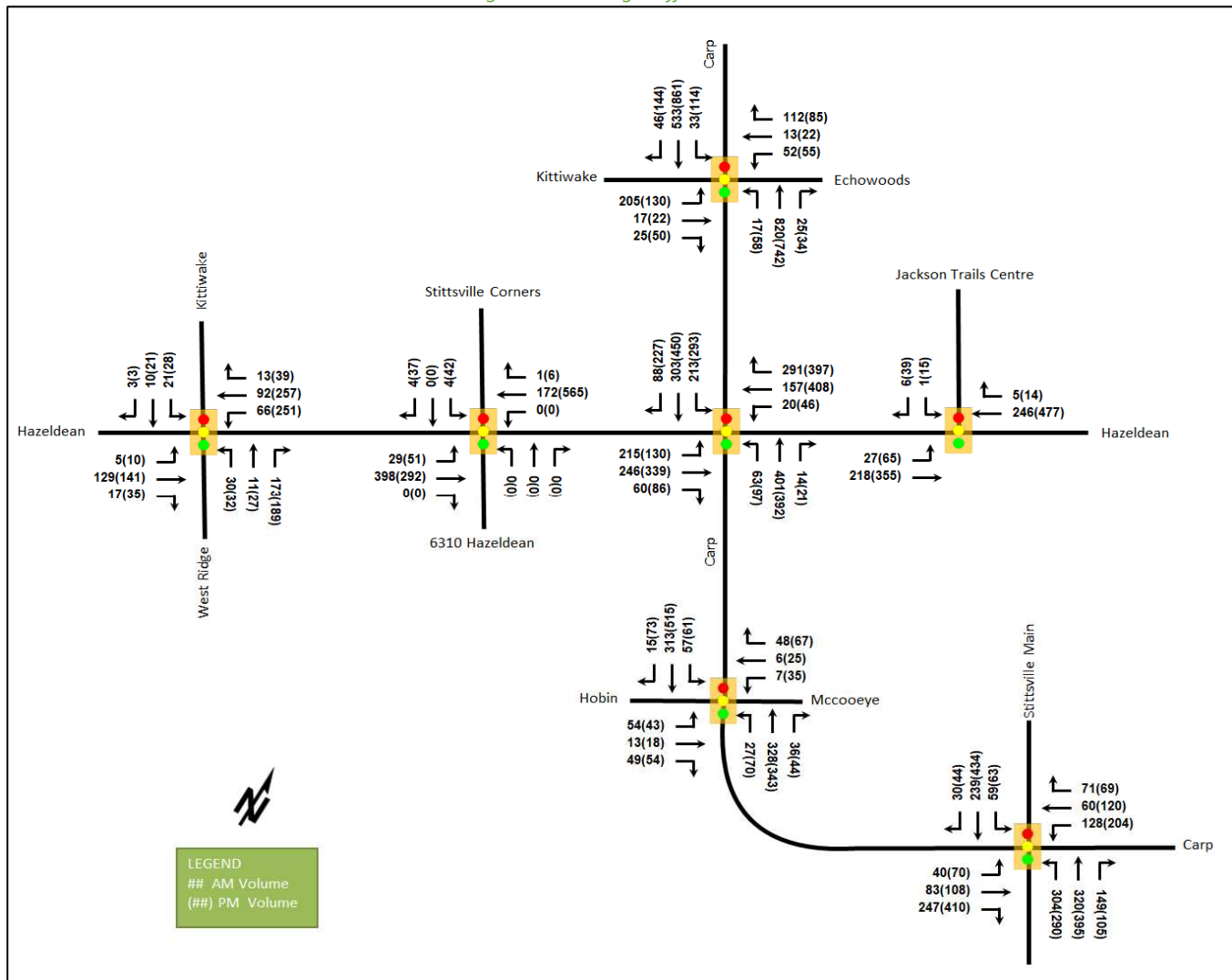


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Hazeldean Rd at West Ridge Dr / Kittiwake Dr Signalized	EBL	A	0.01	4.2	1.2	A	0.01	3.4	2.2
	EBT/R	A	0.14	4.5	12.1	A	0.14	3.2	18.4
	WBL	A	0.10	4.7	6.8	A	0.31	4.8	65.1
	WBT/R	A	0.10	4.2	8.9	A	0.24	3.2	46.8
	NBL/T	A	0.23	26.7	12.7	A	0.46	64.6	29.0
	NBR	A	0.49	9.2	15.0	B	0.63	15.4	22.0
	SBL	A	0.12	24.9	8.0	A	0.25	57.0	16.4
	SBT/R	A	0.05	21.2	5.4	A	0.16	48.9	13.6
	Overall	A	0.33	8.6	-	A	0.45	11.8	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Hazeldean Rd at Stittsville Corners Mall/6310 Hazeldean Rd <i>Signalized</i>	EBL	A	0.03	1.0	2.8	A	0.09	3.4	6.8
	EBT/R	A	0.14	0.7	12.4	A	0.12	2.7	13.7
	WBL	-	-	-	-	-	-	-	-
	WBT	A	0.12	1.4	20.2	A	0.42	2.9	m40.8
	WBR	A	0.00	0.0	m0.0	A	0.01	0.2	m0.0
	NB	-	-	-	-	-	-	-	-
	SBL	A	0.04	54.0	4.7	A	0.41	66.8	23.7
	SBR	A	0.03	0.2	0.0	A	0.25	19.3	10.7
	Overall	A	0.14	1.3	-	A	0.42	6.2	-
Hazeldean at Jackson Trails Centre Mall <i>Signalized</i>	EBL	A	0.03	1.1	2.8	A	0.11	2.7	5.7
	EBT	A	0.08	0.8	7.2	A	0.14	2.3	11.3
	WBT/R	A	0.09	0.8	8.2	A	0.20	2.4	15.7
	SBL	A	0.01	48.0	1.9	A	0.13	53.5	11.1
	SBR	A	0.06	28.3	4.5	A	0.27	19.5	11.1
	Overall	A	0.09	1.2	-	A	0.21	3.9	-
Hazeldean Rd at Carp Rd <i>Signalized</i>	EBL	E	0.94	82.7	#69.0	D	0.86	71.6	#57.6
	EBT/R	A	0.40	33.0	39.2	A	0.39	27.6	58.5
	WBL	A	0.16	43.8	11.1	A	0.25	38.8	21.4
	WBT	B	0.66	60.0	56.3	E	0.93	71.3	#167.8
	WBR	B	0.64	10.6	23.0	B	0.63	8.6	32.9
	NBL	A	0.57	73.1	#34.1	C	0.72	82.6	#50.6
	NBT/R	A	0.37	28.6	56.2	A	0.57	46.8	75.1
	SBL	C	0.80	62.5	#141.0	D	0.88	60.2	m106.4
	SBT	A	0.39	37.4	114.1	C	0.75	57.2	m159.5
	SBR	A	0.13	13.4	19.7	A	0.36	18.0	m33.4
	Overall	B	0.63	40.3	-	D	0.83	45.1	-
Carp Rd at Echowoods Ave/Kittiwake Dr <i>Signalized</i>	EBL	E	0.93	86.0	#93.9	E	0.92	106.1	#74.4
	EBT/R	A	0.11	17.6	12.6	A	0.26	19.9	19.1
	WB	A	0.48	27.8	46.6	B	0.67	52.6	59.6
	NBL	A	0.05	9.1	m3.1	A	0.27	5.2	m3.5
	NBT/R	E	0.92	36.2	m#321.2	C	0.80	14.7	m56.0
	SBL	A	0.23	12.8	7.8	A	0.43	10.1	14.5
	SBT	A	0.58	19.9	146.0	D	0.82	25.2	259.8
	SBR	A	0.06	1.4	2.9	A	0.16	5.3	16.3
	Overall	D	0.90	34.3	-	C	0.80	25.5	-
Carp Rd at McCooye Ln/Hobin St <i>Signalized</i>	EB	A	0.50	25.6	23.3	A	0.57	32.4	27.0
	WB	A	0.24	12.7	10.5	A	0.56	29.1	27.7
	NBL	A	0.04	3.7	m2.2	A	0.17	5.8	m5.5
	NBT/R	A	0.33	3.9	20.5	A	0.36	7.3	m25.7
	SBL	A	0.10	5.7	9.3	A	0.11	5.2	9.6
	SBT/R	A	0.29	6.0	43.1	A	0.53	8.1	91.6
	Overall	A	0.37	7.9	-	A	0.54	11.7	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95 th)	LOS	V/C	Delay (s)	Q (95 th)
Carp Rd at Stittsville Main St Signalized	EBL	A	0.19	30.1	15.0	A	0.41	41.7	m25.0
	EBT	A	0.27	30.9	25.4	A	0.38	38.9	35.3
	EBR	A	0.57	16.6	35.7	D	0.84	31.3	72.4
	WBL	B	0.61	39.8	33.3	A	0.58	27.6	41.7
	WBT/R	A	0.40	16.6	21.3	A	0.36	18.0	33.2
	NBL	A	0.54	11.2	42.8	D	0.89	53.4	#116.8
	NBT/R	A	0.57	17.3	#111.5	C	0.78	35.8	#170.3
	SBL	A	0.14	7.6	9.2	A	0.24	15.2	14.2
	SBT	A	0.34	17.6	49.1	E	0.95	62.0	#139.7
	SBR	A	0.05	0.1	0.0	A	0.09	0.4	0.0
	Overall	A	0.54	18.1	-	D	0.85	39.0	-

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

At the Hazeldean Road and Carp Road intersection, the eastbound, northbound, and southbound left-turn movements may be subject to extended queues during the AM peak hour with the eastbound left-turn movement also experiencing high delays. During the PM peak hour, the eastbound and northbound left-turn, and westbound through movements may be subject to extended queues with the northbound left-turn movement also experiencing high delays.

At the intersection of Carp Road at Echowoods Avenue/Kittiwake Drive Boulevard, the eastbound left-turn movement may be subject to extended queues and high delays during both peak hours, and the northbound through/right-turn movement may be subject to extended queues during the AM peak hour.

At the intersection of Carp Road at Stittsville Main Street, the northbound shared through/right-turn movements during AM peak hour and the northbound and southbound through movements during PM peak hour may be subject to extended queues.

It is noted that the difference between the 2022 and the 2023 volumes on the network, specifically eastbound and westbound along Hazeldean Road for approximately 130-230 vehicles increase during the AM peak and approximately 130-335 vehicles increase during the PM peak. The network volumes will be balanced as part of the background analysis.

2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study area road network. Table 3 summarizes the collision types and conditions in the study area, Figure 11 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2018-2022

Total Collisions		Number	%
		60	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	7	12%
	Property Damage Only	53	88%
Initial Impact Type	Angle	4	7%
	Rear end	34	57%
	Sideswipe	8	13%

		Number	%
Total Collisions		60	100%
	Turning Movement	6	10%
	SMV Other	5	8%
	Other	3	5%
Road Surface Condition	Dry	39	65%
	Wet	11	18%
	Loose Snow	2	3%
	Slush	2	3%
	Packed Snow	2	3%
	Ice	4	7%
Pedestrian Involved		0	0%
Cyclists Involved		2	3%

Figure 11: Study Area Collision Records

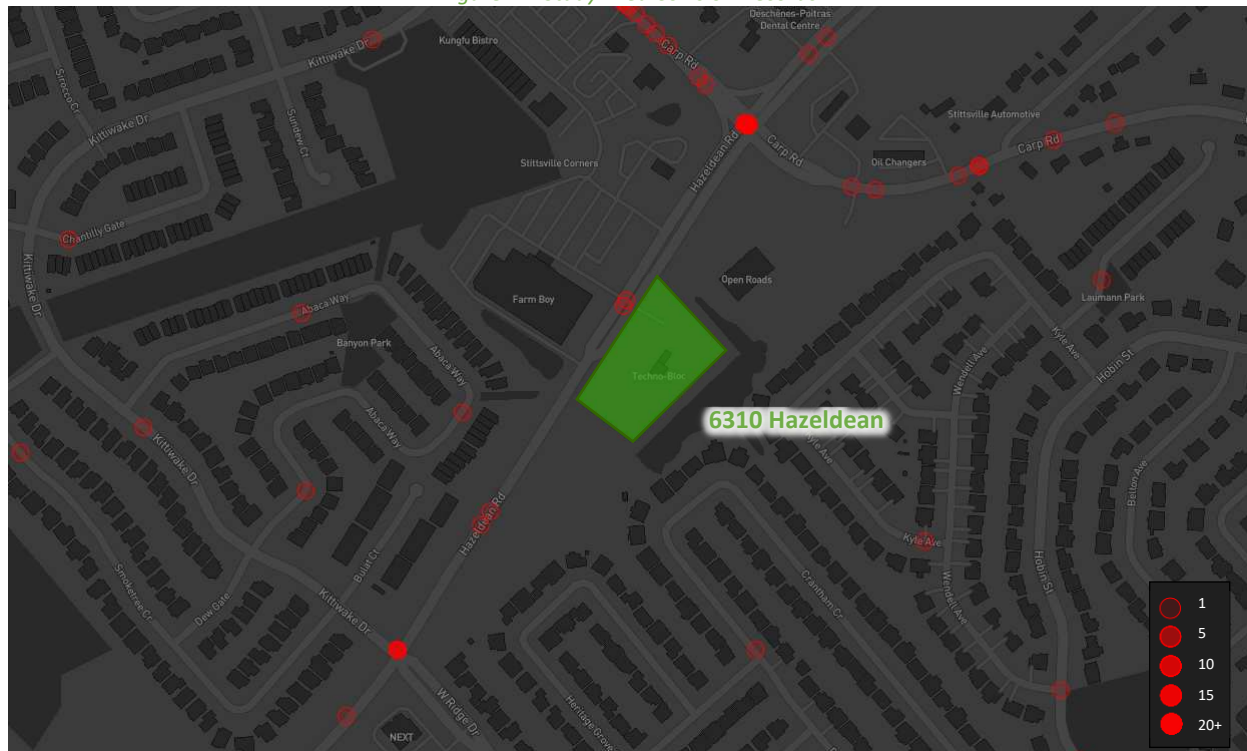


Table 4: Summary of Collision Locations, 2018-2022

	Number	%
Intersections / Segments	60	100%
Hazeldean Rd @ Carp Rd	46	77%
Hazeldean Rd @ West Ridge Dr	11	18%
Hazeldean Rd btwn Kittiwake Dr & Carp Rd	3	5%

Within the study area, the intersections of Hazeldean Road at Carp Road and at West Ridge Drive 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: Hazeldean Road at Carp Road Collision Summary

Total Collisions		Number	%
		46	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	6	13%
	Property Damage Only	40	87%
Initial Impact Type	Angle	3	7%
	Rear end	29	63%
	Turning Movement	5	11%
	SMV Other	3	7%
	Other	2	4%
Road Surface Condition	Dry	30	65%
	Wet	9	20%
	Loose Snow	1	2%
	Slush	2	4%
	Packed Snow	1	2%
	Ice	3	7%
Pedestrian Involved		0	0%
Cyclists Involved		1	2%

The Hazeldean Road at Carp Road intersection had a total of 46 collisions during the 2018-2022 time period, with 40 involving property damage only and the remaining six having non-fatal injuries. The collision types are most represented by the rear end with 29 collisions, followed by turning movement with five collisions, angle and “SMV other” each with three collisions, and with the remaining collision type represented by “Other”. Weather conditions do not affect collisions at this location.

One cyclist collision was noted during the 2018-2022 time period during daylight hours in clear and dry conditions, occurring as an angle collision. While no patterns can be discerned from this single cyclist collision, ultimately this intersection is proposed to be reconstructed as part of the Carp Road Widening works, and cycling safety will be a key consideration of the City design. No further examination of collisions at this intersection is required as part of this study.

Table 6: Hazeldean Road at West Ridge Drive Collision Summary

Total Collisions		Number	%
		11	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	1	9%
	Property Damage Only	10	91%
Initial Impact Type	Angle	1	9%
	Rear end	4	36%
	Sideswipe	3	27%
	Turning Movement	1	9%
	SMV Other	1	9%
	Other	1	9%
Road Surface Condition	Dry	8	73%
	Wet	2	18%
	Packed Snow	1	9%
Pedestrian Involved		0	0%
Cyclists Involved		1	9%

The Hazeldean Road at West Ridge Drive intersection had a total of eleven collisions during the 2018-2022 time period, with ten involving property damage only and the remaining one having non-fatal injuries. The collision types are most represented by rear end with four collisions, followed by sideswipe with three collisions, and with the remaining collision types split between angle, turning movement, “SMV other”, and “Other”.

One cyclist collision occurred in June of 2020 during daylight hours in clear and dry conditions, occurring as an angle collision. No patterns can be discerned from this single collision.

Weather conditions do not affect collisions at this location. No patterns are identified with the collision types; therefore 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 Part 1 (2023)*

The Transportation Master Plan Part 1 provides the active transportation project list, which includes sidewalks along Hobin Street from Carp Road to Crossing Bridge Park.

2.3.1.2 *Transportation Master Plan Part 2 (2025)*

The Transportation Master Plan Part 2 project list has been released for road and transit projects, along with the draft capital infrastructure plan. Projects included within the draft Priority Active Transportation Project list includes sidewalks along Hobin Street from Carp Road to Crossing Bridge Park. the toad projects include implementation of new pedestrian and cycling facilities on the south side of Hazeldean Road from Carp Road to West Ridge Drive and reconstruction section of existing sidewalk and multi-use pathway on the north side to a standard configuration and Carp Road widening from two to four lanes between Highway 417 and Hazeldean Road as a committed project.

2.3.1.3 *Carp Road Widening Environmental Assessment*

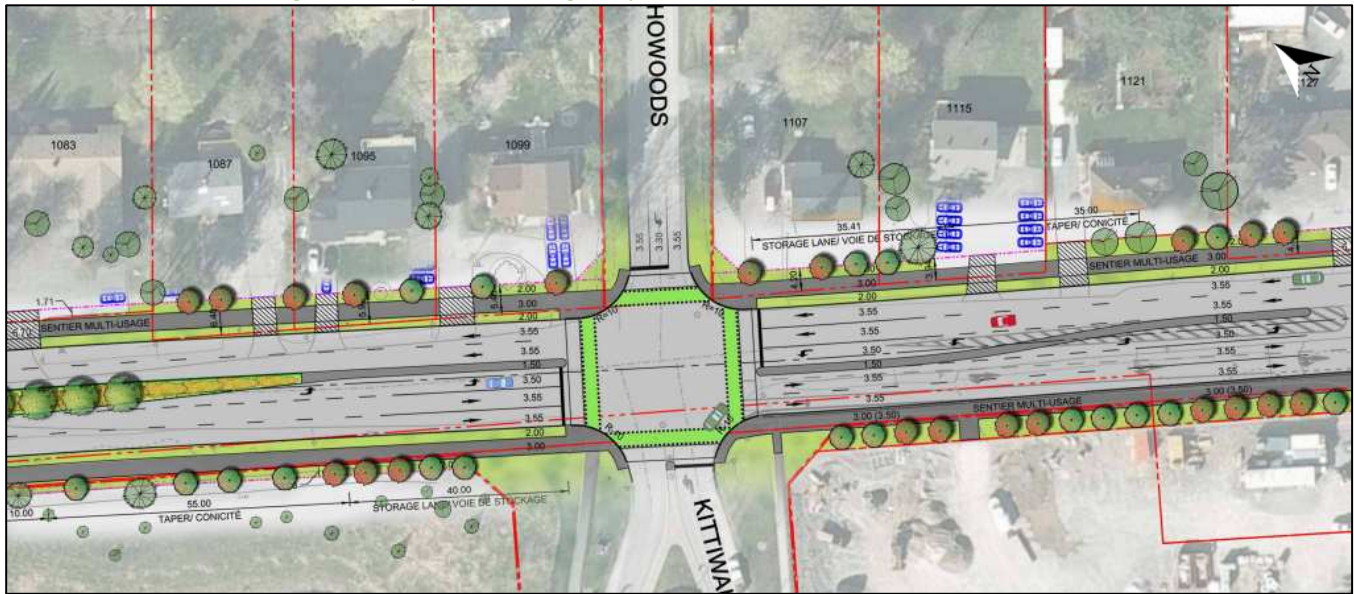
The widening will include changes to the cross-section of Carp Road from a two-lane to a five-lane cross-section including a two-way left-turn lane south of Westbrook Road, dividing median along the Carp Road approaches to the intersections, and multi-use pathways on both sides of the road. Figure 12 and Figure 13 illustrate examples of the changes anticipated to the area intersections. The changes at the intersections of Hazeldean Road at Carp Road and Carp Road at Kittiwake Drive/Echowoods Avenue will be included in future conditions.

Figure 12: Carp Road Widening - Hazeldean Road at Carp Road



Source: https://documents.ottawa.ca/sites/documents/files/documents/carp_landscapes_en.pdf Accessed: September 11, 2023

Figure 13: Carp Road Widening - Carp Road at Kittiwake Drive/Echowoods Avenue



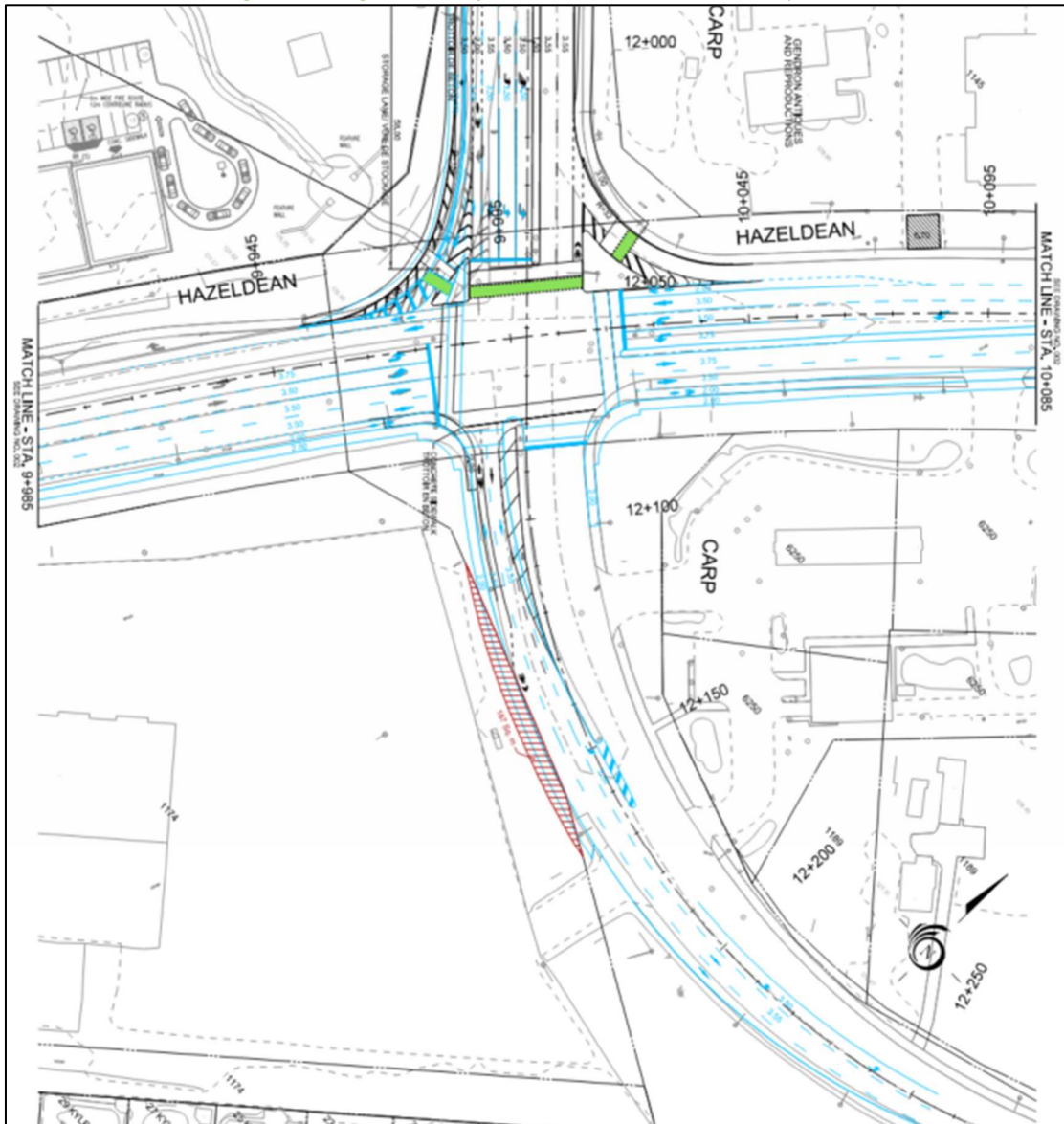
Source: https://documents.ottawa.ca/sites/documents/files/documents/carp_landscape_en.pdf Accessed: September 11, 2023

Included within the Carp Road Widening EA was a conceptual plan for long-term modifications to the Hazeldean Road at Carp Road intersection. Beyond the features provided within the EA recommended plan north of the Stittsville Corners access, the following elements were proposed as part of the long-term modifications:

- multi-use pathways on both sides of Carp Road north of Hazeldean Road
- a sidewalk on the west side of Carp Road south of Hazeldean Road
- a sidewalk and bike lane on the south side of Hazeldean Road on the west leg of the intersection
- dual auxiliary left-turn lanes on each the eastbound, westbound, and southbound approaches
- a new auxiliary receiving lane on the south leg of the intersection

The scope and budget of the EA were recently expanded to include these modifications, and the area of work on Hazeldean Road is understood to extend to the intersection of Hazeldean Road at West Ridge Drive/Kittiwake Drive, and will include urbanization of the south side of Hazeldean Road from this intersection to the intersection of Hazeldean Road at Carp Road with a sidewalk. The intersection and widening works are subject to future preliminary, functional, and detailed design, and are anticipated to be completed by the 2027. Figure 14 illustrates the conceptual long-term modifications for the intersection of Hazeldean Road at Carp Road from the EA, including the property requirements for the works in red hatch, which have been reserved as part of the subject development plan.

Figure 14: Long-Term Modifications - Hazeldean Road at Carp Road



Source: Carp Road Widening EA Accessed: November 11, 2024

2.3.2 Other Study Area Developments

6171 Hazeldean Road

The proposed development application includes a plan of subdivision for the construction of a total of 529 units with 20 single detached, 150 townhomes, 240 condominium units, 160 apartment units, and a 19,400 ft² commercial space. The originally anticipated full build-out and occupancy horizon was 2024, however construction has not yet commenced. The development is predicted to generate 273 new AM and 345 new PM two-way peak-hour auto trips. (EXP Services Inc., 2021)

37 Wildpine Court

The proposed development application includes a zoning amendment to allow the construction of 29 new townhomes on both public and private streets. No TIA is required for this development.

1174 Carp Road

The proposed development application includes a site plan to allow the construction of approximately 413 senior's housing units within a 14-storey tower on nine- and five-storey podiums. The anticipated full build-out and occupancy horizon is 2026, and the development is anticipated to generate 52 two-way AM and 73 two-way PM peak hour auto trips. (CGH, 2024)

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Hazeldean Road at:
 - West Ridge Drive/Kittiwake Drive
 - Stittsville Corners Mall/6310 Hazeldean Road
 - Jackson Trails Centre Mall
- Carp Road at:
 - Hazeldean Road
 - Kittiwake Drive/Echowoods Avenue
 - McCooeye Lane/Hobin Street (Existing Condition)
 - Stittsville Main Street (Existing Condition)

The intersections of Carp Road and McCooeye Lane/Hobin Street and Carp Road and Stittsville Main Street are within one kilometre of the site. It is noted that the development would generate low volumes on any turning movements at these intersections, and these intersections will not be analyzed beyond the existing conditions.

The boundary road will be Hazeldean Road and no screenlines are present within proximity to the site.

3.2 Time Periods

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

3.3 Horizon Years

The anticipated build-out year is 2027. As a result, the full build-out plus five years horizon year is 2032.

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 for Kanata/Stittsville have been summarized in Table 7.

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

Travel Mode	Multi-Unit (High-Rise)	
	AM	PM
Auto Driver	43%	55%
Auto Passenger	26%	19%
Transit	28%	21%
Cycling	0%	0%
Walking	4%	5%
Total	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 8 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 8: Trip Generation Person Trip Rates by Peak Period

Land Use	Land Use Code	Peak Period	Person Trip Rates
Multi-Unit (High-Rise)	221 & 222 (TRANS)	AM	0.80
		PM	0.90

Using the above person trip rates, the total person trip generation has been estimated. Table 9 summarizes the total person trip generation for the residential land uses.

Table 9: Total Residential Person Trip Generation by Peak Period

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Multi-Unit (High-Rise)	456	113	252	365	238	172	410

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 10 summarizes the residential trip generation.

Table 10: Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Multi-Unit (High-Rise)	Auto Driver	43%	23	53	75	55%	55	44	99
	Auto Passenger	26%	14	32	46	19%	19	15	34
	Transit	28%	17	39	56	21%	22	18	40
	Cycling	0%	0	0	0	0%	0	0	0
	Walking	4%	3	6	9	5%	6	5	11
	Total	100%	57	130	186	100%	102	82	184

As shown above, a total of 75 AM and 99 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

4.3 Trip Distribution

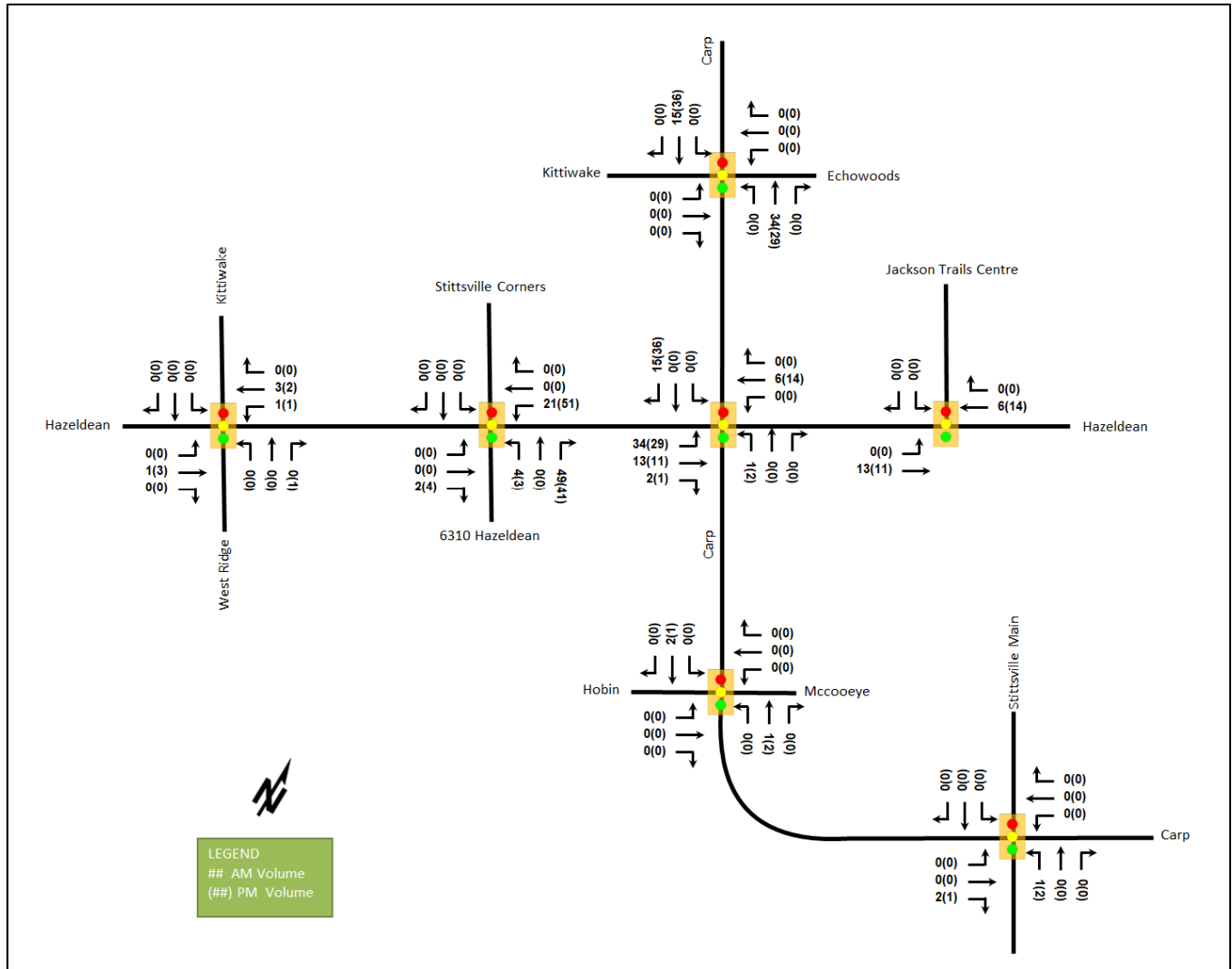
To understand the travel patterns of the subject development, the OD Survey has been reviewed to determine the travel for the residential component, and these patterns were applied based on the build-out of Kanata/Stittsville. Using the distribution, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. Table 11 summarizes the distributions and the proportional assignment to the study area roadways, and Figure 15 illustrates the new site generated volumes.

Table 11: OD Survey Distribution – Kanata/Stittsville

To/From	Residential % of Trips	Via
North	30%	30% Carp Road (N)
South	5%	3% Carp/Stittsville Main (S) 2% West Ridge Drive (S)

To/From	Residential % of Trips	Via
East	60%	35% Carp Road (N) 25% Hazeldean Road (E)
West	5%	5% Hazeldean Road (W)
Total	100%	100%

Figure 15: New Site Generation Auto Volumes



5 Exemption Review

Table 12 summarizes the exemptions for this TIA.

Table 12: Exemption Review

Module	Element	Explanation	Exempt/Required
Site Design and TDM			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plan and zoning by-law applications	Required
	4.1.3 New Street Networks	Only required for plans of subdivision	Exempt

Module	Element	Explanation	Exempt/Required
4.2 Parking	4.2.1 Parking Supply	Only required for site plan and zoning by-law applications	Required
4.3 Boundary Street Design		All applications	Required
4.5 Transportation Demand Management	All Elements	Only required when the development generates more than 60 person-trips	Required
Network Impact			
3.2 Background Network Travel Demand	All Elements	Only required when one or more other Network Impact Modules are triggered when the development generates more than 75 auto or transit trips	Required
3.3 Demand Rationalization		Only required when one or more other Network Impact Modules when the development generates more than 75 auto trips	Required
4.6 Neighbourhood Traffic Calming	4.6.1 Adjacent Neighbourhoods	If the development meets all of the following criteria along the route(s) site generated traffic is expected to utilize between an arterial road and the site's access: 1. Access to Collector or Local; 2. "Significant sensitive land use presence" exists, where there is at least two of the following adjacent to the subject street segment: • School (within 250m walking distance); • Park; • Retirement / Older Adult Facility (i.e. long-term care and retirement homes); • Licenced Child Care Centre; • Community Centre; or • 50%, or greater, of adjacent property along the route(s) is occupied by residential lands and a minimum of 10 occupied residential units are present on the route. 3. Application is for Zoning By-Law Amendment or Draft Plan of Subdivision; 4. At least 75 site-generated auto trips; 5. Site Trip Infiltration is expected. Site traffic will increase peak hour vehicle volumes along the route by 50% or more.	Exempt
4.7 Transit	4.7.1 Transit Route Capacity	Only required when the development generates more than 75 transit trips	Exempt

Module	Element	Explanation	Exempt/Required
	4.7.2 Transit Priority Requirements	Only required when the development generates more than 75 auto trips	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt
4.9 Intersection Design	4.9.1 Intersection Control	Only required when the development generates more than 75 auto trips	Required
	4.9.2 Intersection Design	Only required when the development generates more than 75 auto trips	Required

6 Development Design

6.1 Design for Sustainable Modes

The proposed development are residential buildings with parking provided on three levels of parking, one underground, one ground floor and one second level. The bicycle parking spaces are proposed both external and internal including a total of 456 spaces. Bicycle storage rooms are located on all levels of parking, and bike racks are located externally. Main local bus stops are located within 200 metres of the site entrances at Hazeldean Road at Carp Road intersection. Hard surface connections from the building entrances are tie in the existing pedestrian facilities at the intersection.

The infrastructure TDM checklist is provided in Appendix E.

As part of the site plan application, it has been requested that funding for a future sidewalk be provided along the frontage of Hazeldean Road. It is understood that the City will undertake the larger infrastructure and urbanization elements associated with any sidewalk implementation.

6.2 Circulation and Access

Access is provided via the existing intersection on Hazeldean Road. The main drive aisle is two-way between the two towers. A drop off loop is provided on the west side of the drive aisle and has a one-way operation into the site. The outbound throat length is approximately 35 metres from the stop bar and the inbound provides approximately 14 metres to the one-way drop-off loop and the exit of the drop-off loop is the same as the outbound throat length. This configuration was proposed as part of the zoning bylaw amendment application and has been carried forward to the site plan application.

The TAC (2017) desired throat length is 40 metres for an access on an arterial road and the proposed outbound configuration is accommodated sufficiently as proposed. The inbound throat length would be similar for all visitors and tenants heading to the surface or internal parking levels. The first space in the drop off loop is approximately 21 metres from the access and sufficient width is provided for a vehicle to pass within the drop off loop. Overall, with less than one car per minute expected over the peak hours, no conflict is anticipated with the proposed throat length and the access configurations can supported.

Garbage pick-up is proposed at the southwest corner of the parcel. A surface parking space is reserved for moving south of the drop off loop. Turning templates were reviewed and completed by others.

7 Parking

7.1 Parking Supply

The site provides 464 vehicle parking spaces including 269 regular parking, 91 small parking, and twelve barrier-free parking spaces. The proposed parking will provide a parking ratio of approximately 0.82 spaces per unit. The minimum parking requirement is 0.75 spaces per unit, which is 354 spaces, and the site meets this requirement. The minimum visitor parking requirement is 0.2 spaces per unit, which is 91 spaces, and the site meets this requirement.

Based on City of Ottawa Traffic and Parking (By-law No. 2017-301), the minimum number of accessible spaces required is five spaces, and the proposed parking provision meets the requirements.

A total of 456 bicycle parking spaces are proposed including 16 exterior spaces split between either side of the site access and at the rear of the site, and the rest of the bike parking spaces will be provided on the single underground level, the ground floor and second floor parking levels. The minimum bicycle parking provision is 456 at a ratio of 1 space per unit, and the proposed bicycle parking exceeds the minimum requirement.

8 Boundary Street Design

Table 13 summarizes the MMLOS analysis for the boundary street of Hazeldean Road. The future conditions assume the City's urbanization and boulevard elements consistent with a 4-lane arterial cross-section. The boundary street analysis is based on Arterial Mainstreet. The MMLOS worksheets have been provided in Appendix F.

Table 13: Boundary Street MMLOS Analysis

Segment	Horizon	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Hazeldean Road	Existing	F	C	C	C	N/A	N/A	B	D
	Ultimate	D	C	A	C	N/A	N/A	A	D

The pedestrian LOS will not be met along the segment of Hazeldean Road during either horizon. To meet the theoretical pedestrian LOS targets, the operating speed would need to be lower than 60 km/h or reduced traffic along Hazeldean Road.

The bicycle LOS meets along the segment of Hazeldean Road during all horizons. Once a separated facility is introduced, the BLOS target will improve from LOS C to LOS A.

9 Transportation Demand Management

9.1 Context for TDM

The mode shares used within the TIA represent the recommended shares for the Kanata/Stittsville. Overall, the modal shares are likely to be achieved and supporting TDM measures should be provided.

The subject site is not within a design priority area. Total bedrooms within the development are subject to the final unit count and layout selections by purchasers, and no age restrictions are noted.

9.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel, and those assumptions have been carried through the analysis. The unmodified district mode shares have been applied and based on this factor and the

residual capacity available throughout the study area, risks to other network users from failing to meet mode share targets are low.

9.3 TDM Program

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

- Display area walking, cycling, and transit maps with route schedules
- Provide a multimodal travel option information package to new residents
- Inclusion of a 1-year Presto card for first time new apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
- Unbundle parking cost from the purchase or rental cost

10 Background Network Travel Demands

10.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3. The widening of Carp Road is the only confirmed project within the study horizons and is considered at future horizons. As no plan is yet available for the recent expansion of scope of this Carp Road Widening EA, no additional geometric changes will be assumed for the study area intersections associated with these works.

10.2 Background Growth

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

In general, the growth rates in the study area derived from the two TRANS model horizons are projected to be positive in all directions. When comparing the existing volumes to 2031 horizons, the existing volumes for all directions in the study area have exceeded the forecasted volumes. Given the TRANS model rates are low, the growth rates derived were rounded to the nearest 0.25% and will be applied to the appropriate roadway mainline volume and to the appropriate major turning movements at the intersections to account for external area growth. Table 14 summarizes the growth rates from the TRANS model, and Table 15 summarizes the growth rates applied within the study area.

Table 14: TRANS Regional Model Projections – Study Area Growth Rates

Street	TRANS Rate	
	Eastbound	Westbound
Hazeldean Rd	0.55%	0.09%
	Northbound	Southbound
Carp Rd	2.62%	0.24%

Table 15: Study Area Growth Rates Applied

Street	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Hazeldean Rd	0.50%	0%	0%	0.50%
	Northbound	Southbound	Northbound	Southbound
Carp Rd	2.50%	0.25%	0.25%	2.50%

10.3 Other Developments

The background developments explicitly considered in the background conditions (Section 10.2) include:

- 6171 Hazeldean Road
- 1174 Carp Road

The background development volumes within the study area have been provided in Appendix H.

11 Demand Rationalization

11.1 2027 Future Background Operations

As noted in Section 2.2.7, due to the difference between the 2022 and the 2023 volumes on the network, approximately 130-230 vehicles during the AM peak and approximately 130-335 vehicles during the PM peak were added to the 2022 counts along Hazeldean Road on the eastbound and westbound movements for balancing the volumes for the future analysis. Figure 16 illustrates the 2027 background volumes and Table 16 summarizes the 2027 background intersection operations. The level of service for signalized intersections is based on HCM 2010 calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services and HCM average delay for unsignalized intersections. The synchro worksheets for the 2027 future background horizon are provided in Appendix I.

Figure 16: 2027 Future Background Volumes

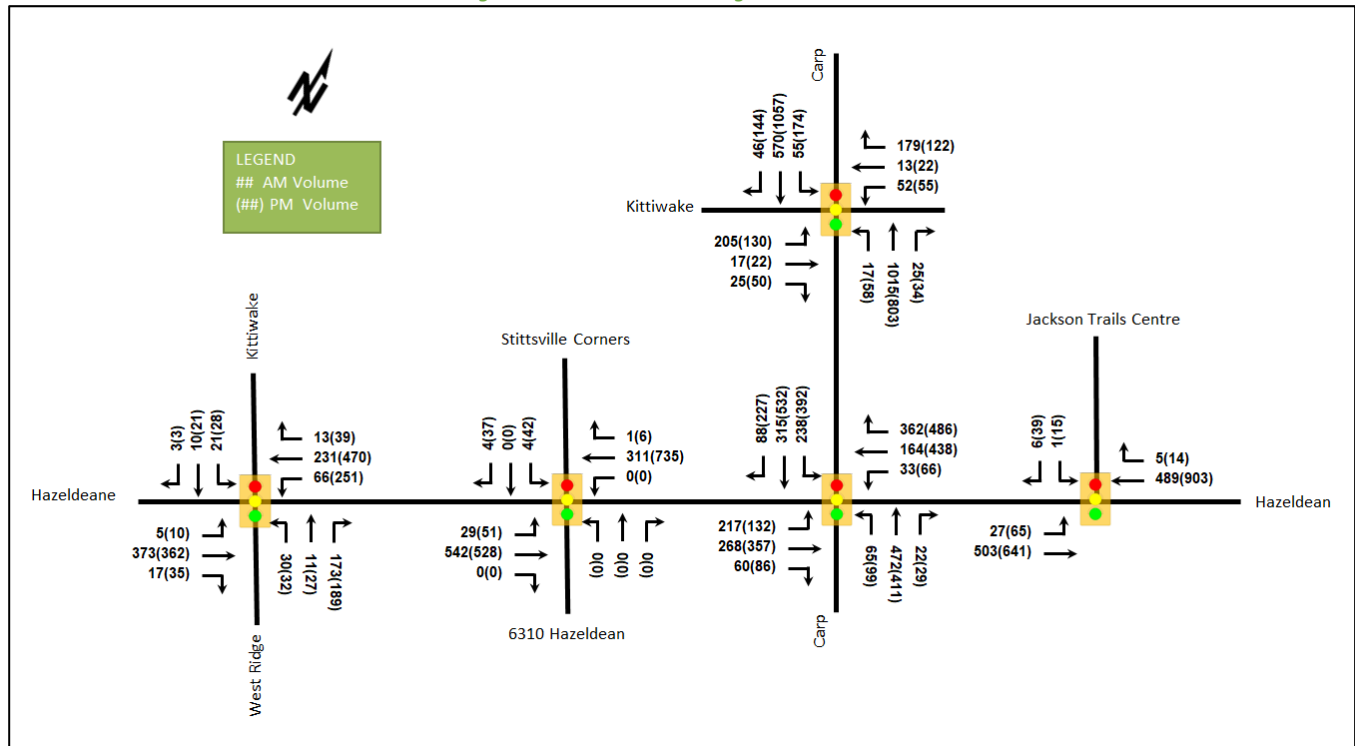


Table 16: 2027 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Hazeldean Rd at West Ridge Dr /Kittiwake Dr <i>Signalized</i>	EBL	A	0.01	4.2	1.1	A	0.02	3.4	2.0
	EBT/R	A	0.34	6.0	30.4	A	0.29	4.1	41.5
	WBL	A	0.11	4.8	6.4	A	0.34	9.0	70.0
	WBT/R	A	0.22	5.0	18.0	A	0.37	8.8	121.9
	NBL/T	A	0.21	26.5	12.0	A	0.42	63.1	26.7
	NBR	A	0.47	9.2	14.2	A	0.60	15.2	20.6
	SBL	A	0.11	24.8	7.4	A	0.23	56.7	15.4
	SBT/R	A	0.05	21.2	5.0	A	0.15	48.6	12.6
	Overall	A	0.38	7.8	-	A	0.43	12.1	-
Hazeldean Rd at Stittsville Corners Mall/6310 Hazeldean Rd <i>Signalized</i>	EBL	A	0.03	1.0	2.6	A	0.10	3.7	7.8
	EBT/R	A	0.17	0.8	15.4	A	0.19	3.0	27.2
	WBL	-	-	-	-	-	-	-	-
	WBT	A	0.19	0.8	7.3	A	0.49	2.9	m19.8
	WBR	A	0.00	0.0	m0.0	A	0.00	0.0	m0.0
	NB	-	-	-	-	-	-	-	-
	SBL/T	A	0.04	54.0	4.7	A	0.38	65.8	21.9
	SBR	A	0.03	0.2	0.0	A	0.23	19.9	10.6
	Overall	A	0.19	1.0	-	A	0.48	5.3	-
Hazeldean at Jackson Trails Centre Mall <i>Signalized</i>	EBL	A	0.04	1.2	2.6	A	0.14	3.2	5.7
	EBT	A	0.16	0.9	14.7	A	0.23	2.5	19.0
	WBT/R	A	0.17	0.9	14.6	A	0.33	2.9	29.4
	SBL	A	0.01	48.0	1.9	A	0.11	53.2	10.2
	SBR	A	0.05	29.0	4.2	A	0.25	19.7	10.7
	Overall	A	0.17	1.1	-	A	0.33	3.6	-
Hazeldean Rd at Carp Rd <i>Signalized</i>	EBL	D	0.85	65.2	57.4	C	0.77	55.8	#36.3
	EBT/R	A	0.39	33.3	37.9	A	0.37	24.8	37.2
	WBL	A	0.24	46.8	15.1	A	0.31	40.9	26.3
	WBT	B	0.64	59.4	53.2	E	0.91	69.5	#159.3
	WBR	B	0.70	12.5	27.6	B	0.66	8.0	30.2
	NBL	A	0.55	72.6	30.4	B	0.67	79.3	#43.9
	NBT/R	A	0.33	23.7	60.2	A	0.43	37.9	67.7
	SBL	B	0.65	57.2	#55.9	C	0.75	51.0	64.5
	SBT	A	0.36	35.4	104.7	C	0.78	50.9	#188.1
	SBR	A	0.12	13.8	15.4	A	0.33	17.8	46.3
	Overall	A	0.58	36.1	-	D	0.82	40.3	-
Carp Rd at Echowoods Ave/Kittiwake Dr <i>Signalized</i>	EBL	E	0.92	86.9	#83.2	D	0.82	88.4	#61.9
	EBT/R	A	0.11	18.1	11.6	A	0.25	20.4	18.1
	WBL	A	0.17	36.0	19.7	A	0.28	50.3	24.8
	WBT/R	A	0.40	10.9	24.4	A	0.42	15.2	23.3
	NBL	A	0.04	8.9	m2.7	A	0.20	4.7	m2.2
	NBT/R	A	0.55	17.0	129.6	A	0.40	13.1	79.6
	SBL	A	0.19	10.6	10.4	A	0.41	8.4	19.2
	SBT/R	A	0.31	13.2	58.3	A	0.55	12.7	103.5
	Overall	A	0.59	22.1	-	A	0.56	17.2	-

Notes:

Saturation flow rate of 1800 veh/h/lane
 PHF = 1.00
 Delay = average driver delay in seconds
 v/c = volume to capacity ratio

Q = 95th percentile queue measured in metres
 m = metered queue
 # = volume for the 95th %ile cycle exceeds capacity

Intersections of Hazeldean Road at West Ridge Drive /Kittiwake Drive, Hazeldean Road at Stittsville Corners Mall/6310 Hazeldean Road, and Hazeldean at Jackson Trails Centre Mall will operate similarly to existing condition with the incremental improvement to the intersection operations and balancing along Hazeldean Road. It is predominantly a result of the peak hour factor adjustment to 1.00 for forecasted conditions.

The anticipated widening of Carp Road will improve operations at the intersections of Hazeldean Road at Carp Road and Carp Road at Echowoods Avenue/Kittiwake Drive. The overall LOS at Hazeldean Road at Carp Road intersection will be decreased from 0.70 to 0.59 during AM peak hour, and from 0.88 to 0.85 during PM peak hour. During PM peak hour, the westbound and southbound through movements will be over theoretical capacity. The overall LOS at Carp Road at Echowoods Avenue/Kittiwake Drive will be decreased from 0.92 to 0.64 during AM peak hour, and from 0.84 to 0.60 during PM peak hour.

11.2 2032 Future Background Operations

As noted in Section 2.2.7, due to the difference between the 2022 and the 2032 volumes on the network, approximately 130-230 vehicles during the AM peak and approximately 130-335 vehicles during the PM peak were added to the 2022 counts along Hazeldean Road on the eastbound and westbound movements for balancing the volumes for the future analysis. Figure 17 illustrates the 2032 background volumes and Table 17 summarizes the 2032 background intersection operations. The level of service for signalized intersections is based on HCM 2010 calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services and HCM average delay for unsignalized intersections. The synchro worksheets for the 2032 future background horizon are provided in Appendix J.

Figure 17: 2032 Future Background Volumes

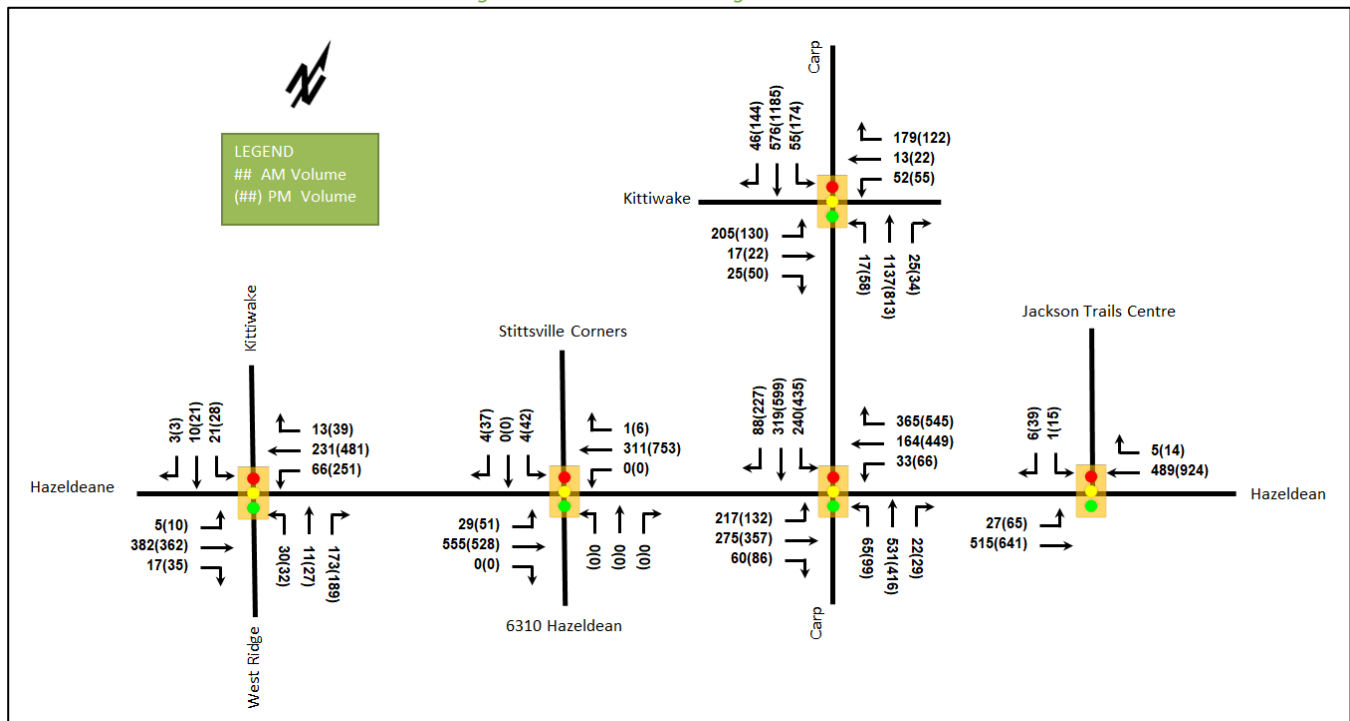


Table 17: 2032 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Hazeldean Rd at West Ridge Dr /Kittiwake Dr <i>Signalized</i>	EBL	A	0.01	4.2	1.1	A	0.02	3.4	2.0
	EBT/R	A	0.35	6.1	31.3	A	0.29	4.1	41.5
	WBL	A	0.11	4.8	6.4	A	0.34	8.7	69.1
	WBT/R	A	0.22	5.0	18.0	A	0.38	8.7	125.4
	NBL/T	A	0.21	26.5	12.0	A	0.42	63.1	26.7
	NBR	A	0.47	9.2	14.2	A	0.60	15.2	20.6
	SBL	A	0.11	24.8	7.4	A	0.23	56.7	15.4
	SBT/R	A	0.05	21.2	5.0	A	0.15	48.6	12.6
	Overall	A	0.39	7.8	-	A	0.44	12.0	-
Hazeldean Rd at Stittsville Corners Mall/6310 Hazeldean Rd <i>Signalized</i>	EBL	A	0.03	1.0	2.6	A	0.10	3.8	7.8
	EBT/R	A	0.18	0.8	15.8	A	0.19	3.0	27.2
	WBL	-	-	-	-	-	-	-	-
	WBT	A	0.19	0.7	6.5	A	0.51	3.1	m22.3
	WBR	A	0.00	0.0	m0.0	A	0.00	0.0	m0.0
	NB	-	-	-	-	-	-	-	-
	SBL/T	A	0.04	54.0	4.7	A	0.38	65.8	21.9
	SBR	A	0.03	0.2	0.0	A	0.23	19.9	10.6
	Overall	A	0.19	1.0	-	A	0.50	5.4	-
Hazeldean at Jackson Trails Centre Mall <i>Signalized</i>	EBL	A	0.04	1.2	2.6	A	0.15	3.2	5.7
	EBT	A	0.17	0.9	15.2	A	0.23	2.5	19.0
	WBT/R	A	0.17	0.9	14.6	A	0.33	2.9	30.2
	SBL	A	0.01	48.0	1.9	A	0.11	53.2	10.2
	SBR	A	0.05	29.0	4.2	A	0.25	19.7	10.7
	Overall	A	0.17	1.1	-	A	0.33	3.6	-
Hazeldean Rd at Carp Rd <i>Signalized</i>	EBL	D	0.85	65.2	57.5	C	0.78	57.2	#37.3
	EBT/R	A	0.40	33.6	39.0	A	0.36	24.5	37.2
	WBL	A	0.24	46.9	15.1	A	0.31	40.6	26.3
	WBT	B	0.64	59.4	53.2	E	0.92	70.0	#165.7
	WBR	C	0.74	16.8	37.2	B	0.70	9.2	37.7
	NBL	A	0.55	72.6	30.4	B	0.67	79.3	#43.9
	NBT/R	A	0.37	24.4	68.1	A	0.47	40.0	70.0
	SBL	B	0.65	56.8	#56.3	C	0.77	49.2	70.3
	SBT	A	0.36	35.5	105.7	D	0.89	59.4	#227.6
	SBR	A	0.12	13.8	15.4	A	0.34	19.0	50.8
	Overall	A	0.59	36.7	-	D	0.87	42.0	-
Carp Rd at Echowoods Ave/Kittiwake Dr <i>Signalized</i>	EBL	E	0.92	86.9	#83.2	D	0.86	96.6	#62.5
	EBT/R	A	0.11	18.1	11.6	A	0.26	20.6	18.1
	WBL	A	0.17	36.0	19.7	A	0.29	51.0	24.8
	WBT/R	A	0.41	14.2	29.2	A	0.43	15.5	23.3
	NBL	A	0.04	9.1	m2.7	A	0.23	4.9	m2.3
	NBT/R	B	0.61	18.8	150.0	A	0.41	11.9	78.7
	SBL	A	0.22	11.2	10.4	A	0.41	8.3	19.2
	SBT/R	A	0.32	13.2	58.9	A	0.60	13.6	121.9
	Overall	B	0.64	23.0	-	B	0.61	17.5	-

Notes:

Saturation flow rate of 1800 veh/h/lane
 PHF = 1.00
 Delay = average driver delay in seconds
 v/c = volume to capacity ratio

Q = 95th percentile queue measured in metres
 m = metered queue
 # = volume for the 95th %ile cycle exceeds capacity

During both AM and PM peak hours, the study area intersection will operate similar to 2027 future background conditions. No additional capacity issues are noted.

11.3 Modal Share Sensitivity and Demand Rationalization Conclusions

11.3.1 Network Rationalization

No capacity constraints are noted in the background conditions. No further rationalization for background travel demand is required for this study.

11.3.2 Development Rationalization

The proposed trip generation rates and modal shares are consistent with the surrounding area context and do not unduly impact the surrounding road network. No site-specific demand rationalization is considered necessary as part of this TIA.

12 Transit

12.1 Transit Priority

Site traffic is anticipated to have negligible impact on transit movements throughout the study area. All intersections' transit LOS scores are similar between the background and total conditions.

13 Intersection Design

13.1 Intersection Control

No change to the existing signalized control is recommended for the network intersections.

13.2 Intersection Design

13.2.1 2027 Future Total Intersection Operations

As noted in Section 2.2.7, due to the difference between the 2022 and the 2023 volumes on the network, approximately 130-230 vehicles during the AM peak and approximately 130-335 vehicles during the PM peak were added to the 2022 counts along Hazeldean Road on the eastbound and westbound movements for balancing the volumes for the future analysis. The 2027 future total intersection volumes are illustrated in Figure 18 and the intersection operations are summarized below in Table 18. The level of service for signalized intersections is based on v/c calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services and average delay for unsignalized intersections. The synchro worksheets for 2027 future total conditions have been provided in Appendix K.

Figure 18: 2027 Future Total Volumes

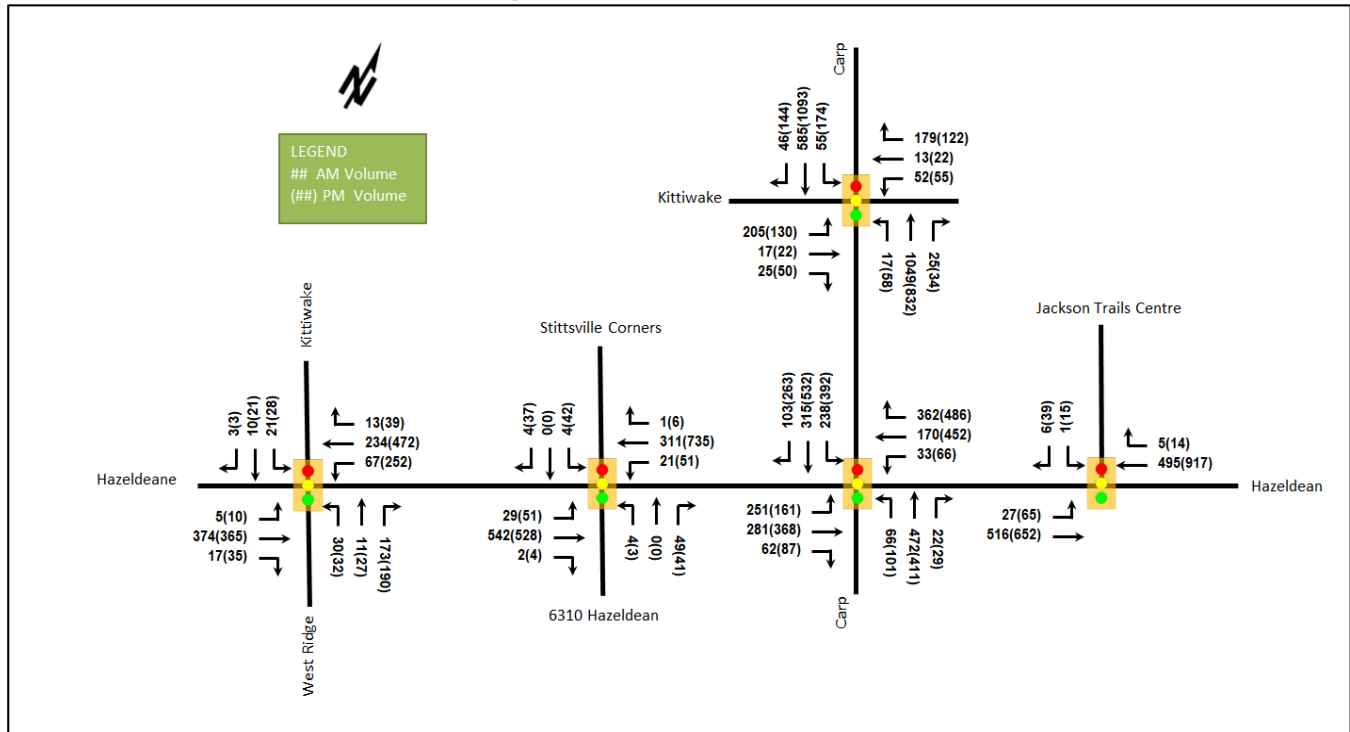


Table 18: 2027 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Hazeldean Rd at West Ridge Dr / Kittiwake Dr Signalized	EBL	A	0.01	4.2	1.1	A	0.02	3.4	2.0
	EBT/R	A	0.35	6.0	30.6	A	0.29	4.1	42.0
	WBL	A	0.11	4.8	6.5	A	0.34	8.9	67.1
	WBT/R	A	0.22	5.1	18.3	A	0.37	8.6	116.7
	NBL/T	A	0.21	26.5	12.0	A	0.42	63.1	26.7
	NBR	A	0.47	9.2	14.2	A	0.60	15.2	20.6
	SBL	A	0.11	24.8	7.4	A	0.23	56.7	15.4
	SBT/R	A	0.05	21.2	5.0	A	0.15	48.6	12.6
	Overall	A	0.39	7.8	-	A	0.43	12.0	-
Hazeldean Rd at Stittsville Corners Mall/6310 Hazeldean Rd Signalized	EBL	A	0.04	2.2	2.6	A	0.10	3.8	7.9
	EBT/R	A	0.19	2.3	15.4	A	0.19	3.0	27.8
	WBL	A	0.03	1.0	m1.2	A	0.08	1.4	m2.0
	WBT	A	0.21	1.0	10.0	A	0.49	2.7	m24.6
	WBR	A	0.00	0.0	m0.0	A	0.00	0.0	m0.0
	NB	A	0.33	22.3	13.4	A	0.27	21.5	12.0
	SBL	A	0.04	54.2	4.7	A	0.30	61.3	21.6
	SBR	A	0.03	0.2	0.0	A	0.23	19.8	10.5
	Overall	A	0.23	3.1	-	A	0.48	5.4	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Hazeldean at Jackson Trails Centre Mall Signalized	EBL	A	0.04	1.2	2.6	A	0.15	3.2	5.7
	EBT	A	0.17	0.9	15.2	A	0.23	2.5	19.3
	WBT/R	A	0.17	0.9	14.7	A	0.33	2.9	29.8
	SBL	A	0.01	48.0	1.9	A	0.11	53.2	10.2
	SBR	A	0.05	29.0	4.2	A	0.25	19.7	10.7
	Overall	A	0.17	1.1	-	A	0.33	3.6	-
Hazeldean Rd at Carp Rd Signalized	EBL	E	0.99	91.8	#77.3	E	0.96	91.3	#57.0
	EBT/R	A	0.40	32.3	40.8	A	0.37	24.9	40.1
	WBL	A	0.24	46.6	15.1	A	0.31	40.7	26.3
	WBT	B	0.65	59.8	55.3	E	0.92	71.0	#167.3
	WBR	B	0.70	13.3	29.9	B	0.66	8.9	35.2
	NBL	A	0.55	72.8	31.0	B	0.68	80.1	#45.8
	NBT/R	A	0.34	23.9	60.2	A	0.44	38.3	67.7
	SBL	B	0.65	57.0	#55.9	C	0.75	50.8	64.5
	SBT	A	0.36	35.7	105.1	C	0.79	51.9	#188.2
	SBR	A	0.14	15.3	20.1	A	0.38	18.1	53.6
	Overall	B	0.61	39.4	-	D	0.85	42.5	-
Carp Rd at Echowoods Ave/Kittiwake Dr Signalized	EBL	E	0.92	86.9	#83.2	D	0.86	96.6	#62.5
	EBT/R	A	0.11	18.1	11.6	A	0.26	20.6	18.1
	WBL	A	0.17	36.0	19.7	A	0.29	51.0	24.8
	WBT/R	A	0.40	11.7	25.8	A	0.43	15.5	23.3
	NBL	A	0.04	9.5	m2.8	A	0.20	4.3	m2.0
	NBT/R	A	0.56	18.1	m129.2	A	0.42	12.2	m77.2
	SBL	A	0.20	10.8	10.4	A	0.42	8.4	19.2
	SBT/R	A	0.32	13.2	60.0	A	0.56	12.8	108.3
	Overall	A	0.60	22.6	-	A	0.57	17.3	-

Notes:
 Saturation flow rate of 1800 veh/h/lane
 PHF = 1.00
 Delay = average driver delay in seconds
 v/c = volume to capacity ratio

Q = 95th percentile queue measured in metres
 m = metered queue
 # = volume for the 95th %ile cycle exceeds capacity

During both AM and PM peak hours, the study area intersection will operate similar to 2027 future background conditions. No additional capacity issues are noted.

13.2.2 2032 Future Total Intersection Operations

As noted in Section 2.2.7, due to the difference between the 2022 and the 2023 volumes on the network, approximately 130-230 vehicles during the AM peak and approximately 130-335 vehicles during the PM peak were added to the 2022 counts along Hazeldean Road on the eastbound and westbound movements for balancing the volumes for the future analysis. The 2032 future total intersection volumes are illustrated in Figure 19 and the intersection operations are summarized below in Table 19. The level of service for signalized intersections is based on v/c calculations for individual lane movements and MMLOS Guidelines weighted v/c methodology for the overall intersection, per direction from Transportation Engineering Services and average delay for unsignalized intersections. The synchro worksheets for 2032 future total conditions have been provided in Appendix L.

Figure 19: 2032 Future Total Volumes

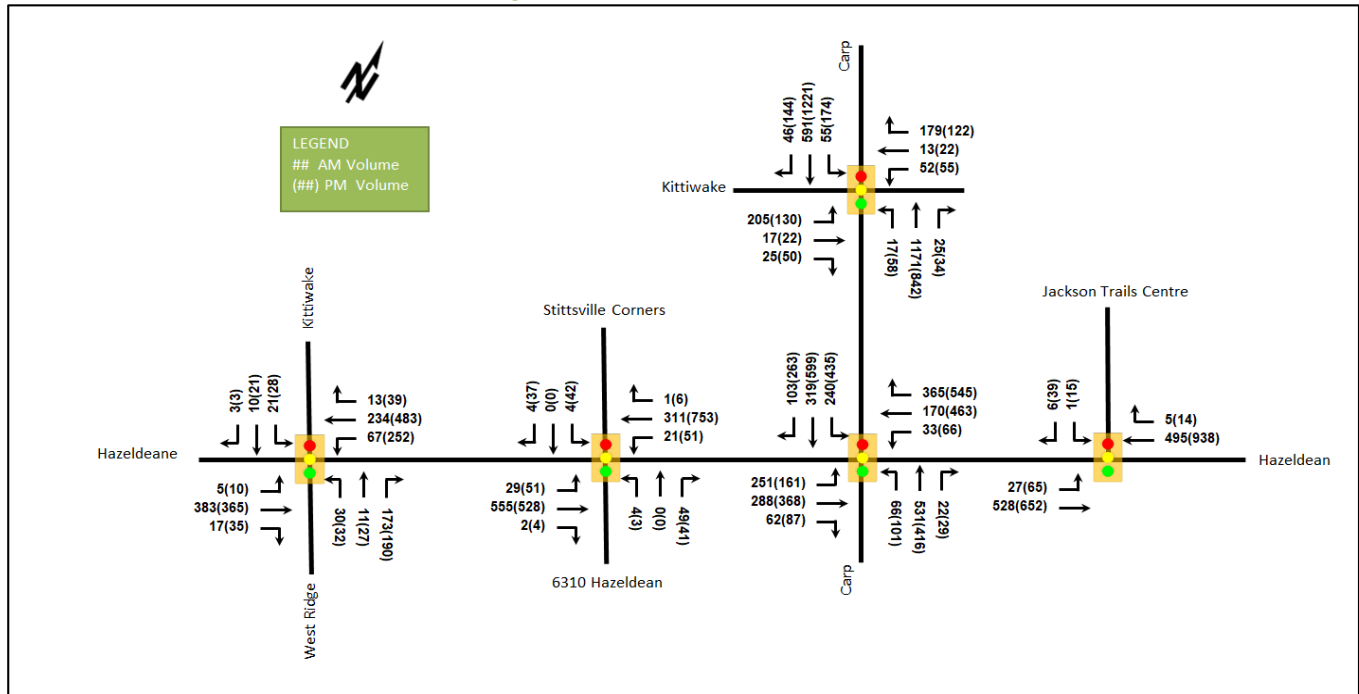


Table 19: 2032 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Hazeldean Rd at West Ridge Dr /Kittiwake Dr <i>Signalized</i>	EBL	A	0.01	4.2	1.1	A	0.02	3.4	2.0
	EBT/R	A	0.35	6.1	31.5	A	0.29	4.1	42.0
	WBL	A	0.11	4.9	6.4	A	0.34	8.6	66.0
	WBT/R	A	0.22	5.1	18.3	A	0.38	8.6	120.1
	NBL/T	A	0.21	26.5	12.0	A	0.42	63.1	26.7
	NBR	A	0.47	9.2	14.2	A	0.60	15.2	20.6
	SBL	A	0.11	24.8	7.4	A	0.23	56.7	15.4
	SBT/R	A	0.05	21.2	5.0	A	0.15	48.6	12.6
	Overall	A	0.39	7.8	-	A	0.44	11.9	-
Hazeldean Rd at Stittsville Corners Mall/6310 Hazeldean Rd <i>Signalized</i>	EBL	A	0.04	2.2	2.6	A	0.10	3.8	7.9
	EBT/R	A	0.20	2.3	15.8	A	0.19	3.0	27.8
	WBL	A	0.03	1.0	m1.2	A	0.08	1.5	m2.2
	WBT	A	0.21	1.0	10.1	A	0.51	2.9	m27.1
	WBR	A	0.00	0.0	m0.0	A	0.00	0.0	m0.0
	NB	A	0.33	22.3	13.4	A	0.27	21.5	12.0
	SBL/T	A	0.04	54.2	4.7	A	0.30	61.3	21.6
	SBR	A	0.03	0.2	0.0	A	0.23	19.8	10.5
	Overall	A	0.23	3.1	-	A	0.50	5.5	-
Hazeldean at Jackson Trails Centre Mall <i>Signalized</i>	EBL	A	0.04	1.2	2.6	A	0.15	3.3	5.8
	EBT	A	0.17	0.9	15.5	A	0.23	2.5	19.3
	WBT/R	A	0.17	0.9	14.7	A	0.34	2.9	30.8
	SBL	A	0.01	48.0	1.9	A	0.11	53.2	10.2
	SBR	A	0.05	29.0	4.2	A	0.25	19.7	10.7
	Overall	A	0.17	1.1	-	A	0.34	3.6	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Hazeldean Rd at Carp Rd Signalized	EBL	E	0.99	91.9	#76.8	E	0.97	94.0	#59.3
	EBT/R	A	0.41	32.5	41.9	A	0.37	24.5	40.1
	WBL	A	0.24	46.7	15.1	A	0.31	40.4	26.3
	WBT	B	0.65	59.8	55.3	E	0.93	71.5	#173.7
	WBR	C	0.74	17.8	39.6	C	0.71	10.1	43.7
	NBL	A	0.55	72.8	31.0	B	0.68	80.1	#45.8
	NBT/R	A	0.38	24.6	68.1	A	0.47	40.4	70.0
	SBL	B	0.65	56.7	#56.5	C	0.77	48.7	70.3
	SBT	A	0.36	35.9	106.2	D	0.90	60.1	#227.9
	SBR	A	0.14	15.4	20.2	A	0.39	19.5	590.0
	Overall	B	0.63	39.9	-	D	0.90	44.3	-
Carp Rd at Echowoods Ave/Kittiwake Dr Signalized	EBL	E	0.92	86.9	#83.2	D	0.86	96.6	#62.5
	EBT/R	A	0.11	18.1	11.6	A	0.26	20.6	18.1
	WBL	A	0.17	36.0	19.7	A	0.29	51.0	24.8
	WBT/R	A	0.42	14.9	30.1	A	0.43	15.5	23.3
	NBL	A	0.04	9.6	m2.9	A	0.23	4.8	m2.1
	NBT/R	B	0.63	19.9	m149.7	A	0.42	11.4	m76.6
	SBL	A	0.23	11.4	10.4	A	0.42	8.5	19.2
	SBT/R	A	0.32	13.3	60.6	B	0.62	14.0	127.6
	Overall	B	0.66	23.5	-	B	0.63	17.4	-

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
Delay = average driver delay in seconds
v/c = volume to capacity ratio

Q = 95th percentile queue measured in metres
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

The network intersection operations for the 2032 future total horizon are anticipated to operate similarly to the 2032 future background conditions.

13.2.3 Intersection MMLOS

Table 20 summarizes the MMLOS analysis for the network intersections within the study area. The analysis of intersection along Hazeldean Road is based on Arterial Main Street, Carp Road at Kittiwake Drive/ Echowoods Avenue and Carp Road at McCooey Lane /Hobin Street intersections are based on General Urban Area, and Carp Road at Stittsville Main Street intersection is based on Traditional Mainstreet. The MMLOS worksheets have been provided in Appendix F.

Table 20: Study Area Intersection MMLOS Analysis

Intersection	Horizon	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Hazeldean Rd at West Ridge Dr/Kittiwake Dr	Existing /Future	F	C	F	C	N/A	N/A	N/A	N/A	A	D
Hazeldean Rd at Stittsville Corners Mall /6310 Hazeldean Rd	Existing /Future	F	C	F	C	N/A	N/A	N/A	N/A	A	D

Intersection	Horizon	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Hazeldean Rd at Jackson Trails Centre Mall	Existing /Future	F	C	F	C	N/A	N/A	N/A	N/A	A	D
Hazeldean Rd at Carp Rd	Existing	F	C	F	C	N/A	N/A	C	D	D	D
	Future	F	C	F	C	N/A	N/A	C	D	E	D
Carp Rd at Echowoods Ave/ Kittiwake Dr	Existing	F	C	F	B	N/A	N/A	N/A	N/A	D	D
	Future	F	C	A	B	N/A	N/A	N/A	N/A	B	D
Carp Rd at McCooey Ln /Hobin St	Existing /Future	F	C	E	B	N/A	N/A	N/A	N/A	A	D
Carp Rd at Stittsville Main St	Existing /Future	F	B	F	C	F	D	C	D	D	D

The pedestrian LOS targets will not be met at the existing or future intersections within the study area. As typical for arterial roads, the crossing distance does not permit the targets to be met. To meet pedestrian LOS targets, the maximum crossing distance on all pedestrian crossings would need to be reduced to a three lane-width.

In addition to the geometric changes required to meet the PLOS targets for pedestrian exposure to traffic at signalized intersections (PETS), the pedestrian delay LOS would require all crossings to have reductions in the cycle length and a balancing of phase times to reach an average delay of less than 30 seconds. Generally, changes required to optimize pedestrian delay result in failure of auto and transit LOS and unnecessarily burden the pedestrian LOS. No signal timing changes are recommended on this basis.

The bicycle LOS targets will not be met at the existing or future intersections within the study area except for the future intersection of Carp Road at Echowoods Avenue/Kittiwake Drive. To meet bicycle LOS targets, the left-turn configurations would need to be two-stage or include turn boxes or protected facilities would be required at the intersections.

The transit LOS targets will not be met at the existing or future intersection of Carp Road at Stittsville Main Street.

The auto LOS targets will not be met at the future intersection of Hazeldean Road at Carp Road due to background growth with the existing threshold of LOS D. Given the City is moving to a lower auto threshold, no improvements are required for this mode.

The existing road network requires wide ranging pedestrian and cycling facilities to decrease the gap of the MMLOS results and the target thresholds for the study area intersections. The nature of these improvements would require a study similar to the Carp Road Widening improvements and connections to other facilities. It is anticipated that as part of the expansion of the Carp Road Widening EA that the City's desired balance of MMLOS trade-offs will be met at the intersections of Hazeldean Road at Carp Road, Hazeldean Road at Stittsville Corners Mall /6310 Hazeldean Road, and Hazeldean Road at West Ridge Drive/Kittiwake Drive through these works.

13.2.4 Recommended Design Elements

No study area intersection design elements are proposed as part of this study.

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 redevelopment consists of 456 apartment units in two buildings
- The redevelopment proposed 464 vehicle parking spaces and 456 bike parking spaces
- A full-movements access will be remained at the existing signalized intersection on Hazeldean Road
- The development is proposed to be completed as a single phase by 2027
- The trip generation trigger, location trigger, and safety triggers were met for the TIA Screening

Existing Conditions

- Hazeldean Road, Carp Road, Stittsville Main Street are arterial roads, and West Ridge Drive, Kittiwake Drive, Echowoods Avenue, and Hobin Street are collector roads in the study area
- Sidewalk and asphalt pathway are provided on Hazeldean road east of Kittiwake Drive /West Ridge Drive, Carp Road south of Kittiwake Drive/ Echowoods Avenue, Echowoods Avenue, Kittiwake Drive, and West Ridge Drive
- Bike lanes are provided on the south side of Hazeldean Road east of Carp Road, on the north side of Hazeldean Road east of Stittsville Corners Mall access, on the east side of Carp Road approaching Hazeldean Road to Kittiwake Drive/Echowoods Avenue, and on the west side of Carp Road north of Hazeldean
- The high volumes roadways have produced a high number of collisions at the study area intersections, primarily at the Carp Road at Hazeldean Road intersection, which has 88% of the collisions within the study area
- The collisions types at Hazeldean Road at Carp Road intersection are overwhelmingly associated with congestion at the intersection, which it is not considered a pattern and only a localized issue due to construction or other transient circumstances, and no further examination is required as part of this study
- Extended queues or high delays may be exhibited on several movements at the intersections of Carp Road at Hazeldean Road, at Echowoods Avenue/Kittiwake Drive, and at Stittsville Main Street in the existing condition

Development Generated Travel Demand

- The proposed development is forecasted to produce 186 two-way people trips during the AM peak hour and 184 two-way people trips during the PM peak hour
- Of the forecasted people trips, 75 two-way trips will be vehicle trips during the AM peak hour and 99 two-way trips will be vehicle trips during the PM peak hour
- Of the forecasted trips, 30% are anticipated to travel north, 5% to both the south and the west, and 60% to the east

Development Design

- The bicycle parking spaces are proposed both external and internal including a total of 456 spaces
- Bicycle storage rooms are located on the single underground level and the ground floor and second floor parking levels, and bike racks are located externally
- Main local bus stops are located within 200 metres of the site entrances at Hazeldean Road at Carp Road intersection
- Hard surface connections are provided from the building entrances to existing intersection pedestrian facilities.

- It is understood that the City will be undertaking an urbanization project along Hazeldean Road to facilitate a sidewalk along the site frontage, with the sidewalk component funded through the site plan application

Circulation and Access

- The site integrates with the existing signal on Hazeldean Road, includes a primary drive aisle through the site with a drop-off loop on the west side, and on the southern part of the site has access to surface parking, the garage and garbage pick up
- The throat length is less than the TAC desired 40 metres, with 35 metres provided along the main drive aisle prior to the surface parking/loading area
- The one-way parking loop entrance situated 14 metres from the signal and the first stopping location at 21 metres on the inbound lane
- The resident trip generation is less than one car per minute and passing space is provided within the one-way loop, therefore it is considered sufficient for the site design

Parking

- The site provides 464 vehicle parking spaces including 269 regular spaces, 91 small spaces, twelve barrier-free spaces and 92 visitor spaces, and meets both the tenant and visitor parking requirements
- The accessible spaces meets City of Ottawa Traffic and Parking requirements
- A total of 456 bicycle parking spaces are proposed and meets the bicycle parking requirements

Boundary Street Design

- The pedestrian LOS will not be met along the existing segment of Hazeldean Road, and require operating speeds to be reduced to 60 km/h or vehicular volumes reduced along Hazeldean Road
- The bicycle LOS meets along the segment of Hazeldean Road during all horizons
- The City will be exploring urbanization options along Hazeldean Road and it is understood the site plan will be providing funding for the sidewalk facility, concrete and base only, along the frontage of the site

TDM

- Supportive TDM measures to be included within the proposed development should include:
 - Display area walking, cycling, and transit maps with route schedules
 - Provide a multimodal travel option information package to new residents
 - Inclusion of a 1-year Presto card for first time new apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
 - Unbundle parking cost from the purchase or rental cost

Background Conditions

- Due to the difference between the 2022 and the 2023 volumes on the network, approximately 130-230 vehicles during the AM peak and approximately 130-335 vehicles during the PM peak were added to the 2022 counts along Hazeldean Road on the eastbound and westbound movements for balancing the volumes for the future analysis
- The background growth rates included 0.50% in the peak directions along Hazeldean Road, and 2.50% in the peak direction and 0.25% in the off-peak direction along Carp Road
- The plan of subdivision at 6171 Hazeldean Road and site plan at 1174 Carp Road are the explicit developments considered in the background conditions

- The anticipated widening of Carp Road will improve operations at the intersections of Hazeldean Road at Carp Road and Carp Road at Echowoods Avenue/Kittiwake Drive

Transit

- Site traffic is anticipated to have negligible impact on transit movements throughout the study area. All intersections' transit LOS scores are similar between the background and total conditions

Network Intersection Design

- Generally, the network intersections are anticipated to operate similarly to the future background conditions
- The pedestrian LOS targets will not be met at the existing or future intersections within the study area, and generally cannot be met along the arterial roadways
- The bicycle LOS targets will not be met at the existing or future intersections within the study area except for the future intersection of Carp Road at Echowoods Avenue/Kittiwake Drive, and it is limited by the lack of dedicated facilities and improved left-turn configurations
- The transit LOS targets will not be met at the existing or future intersection of Carp Road at Stittsville Main Street
- The auto LOS targets will not be met at the future intersection of Hazeldean Road at Carp Road due to background growth with the existing threshold of LOS D
- Given the City is moving to a lower auto threshold, no improvements are required for auto
- The existing road network requires wide ranging pedestrian and cycling facilities to decrease the gap of the MMLOS results and the target thresholds for the study area intersections. The nature of these improvements are similar to the Carp Road Widening improvements and connections to other facilities. This scope of work is well beyond the proposed development responsibility and should be identified in the City's long range planning and ongoing missing links projects

15 Conclusion

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

Prepared By:



John Kingsley, EIT
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
Step 1 - Screening Form

Date: 22-Sep-23
Project Number: 2023-114
Project Reference: 6310 Hazeldean Road

1.1 Description of Proposed Development	
Municipal Address	6310 Hazeldean Road
Description of Location	Ward 6. On the south side of Hazeldean Road between Carp Road and Kittiwake Drive/West Ridge Drive
Land Use Classification	Arterial Mainstreet Zone (AM9[2102])
Development Size	390 apartment units
Accesses	One existing access on Hazeldean Road
Phase of Development	Single
Buildout Year	2027
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger	
Land Use Type	Multi-Family (High-Rise)
Development Size	390 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)?	Yes Hazeldean Arterial Mainstreet design priority areas
Location Trigger	Yes

1.4. Safety Triggers	
Are posted speed limits on a boundary street 80 km/hr or greater?	No
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)?	Yes
Is the proposed driveway within auxiliary lanes of an intersection?	No
Does the proposed driveway make use of an existing median break that serves an existing site?	No
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No
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

HAZELDEAN RD @ WEST RIDGE DR

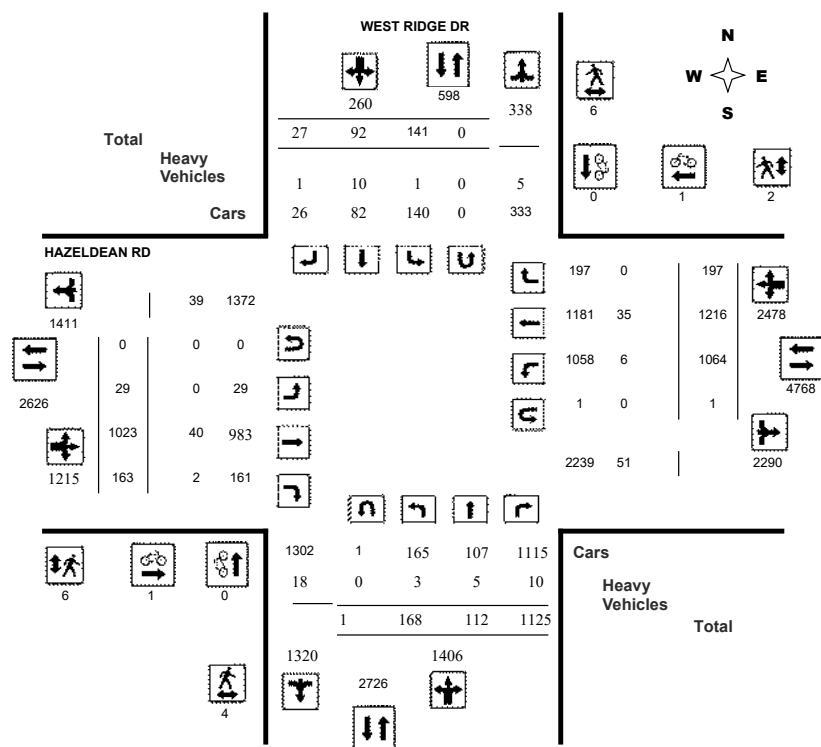
Survey Date: Tuesday, January 11, 2022

WO No: 40027

Start Time: 07:00

Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

HAZELDEAN RD @ WEST RIDGE DR

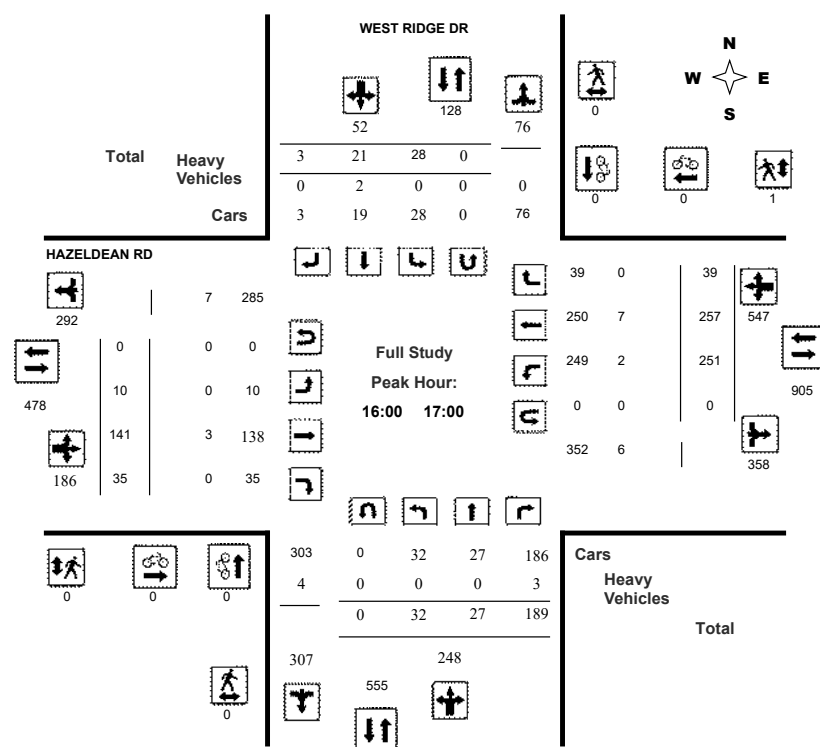
Survey Date: Tuesday, January 11, 2022

WO No: 40027

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram

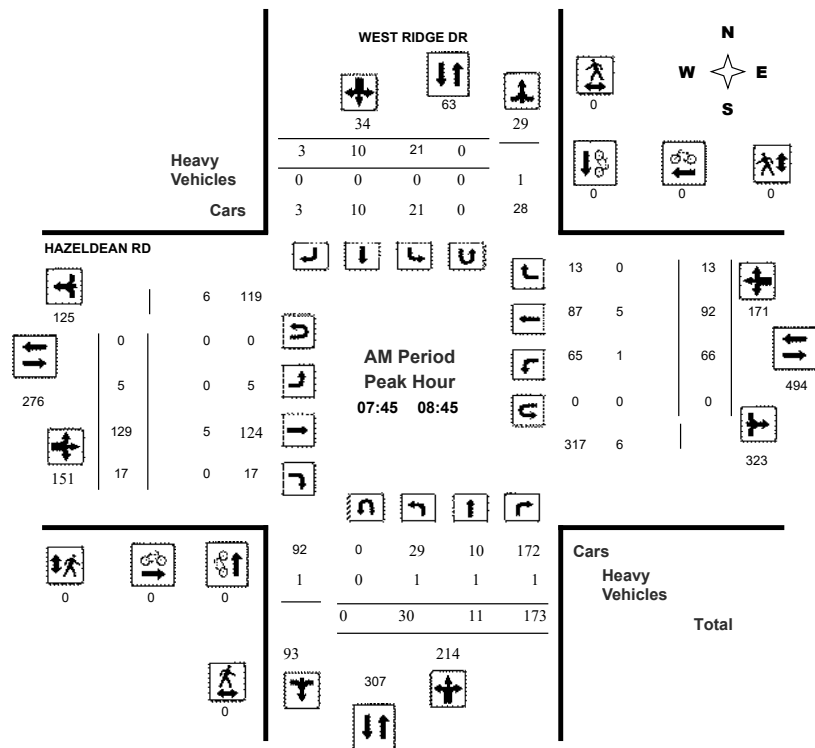




Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
HAZELDEAN RD @ WEST RIDGE DR

Survey Date: Tuesday, January 11, 2022
Start Time: 07:00

WO No: 40027
Device: Miovision



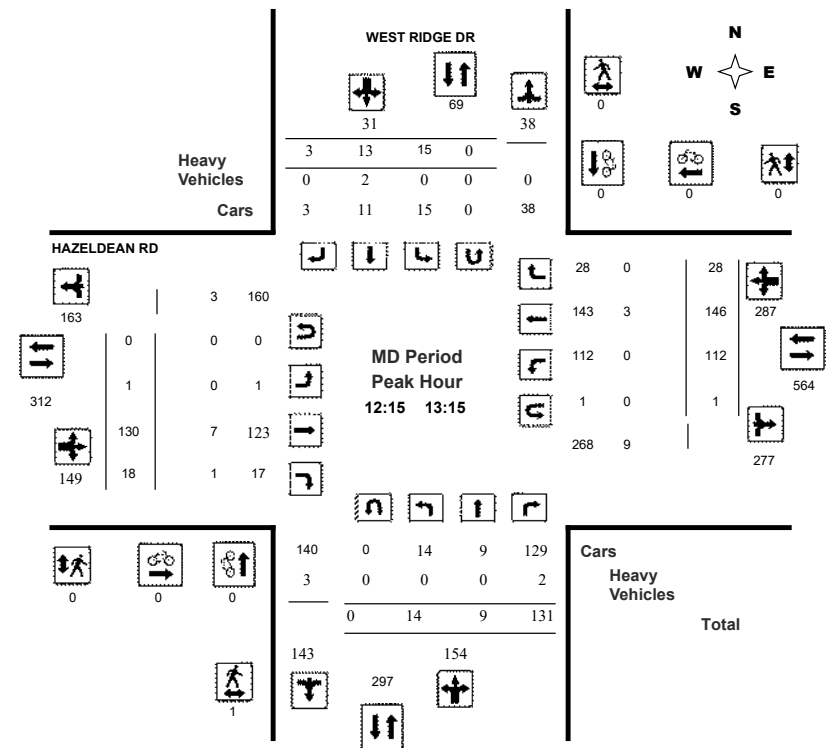
Comments



Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
HAZELDEAN RD @ WEST RIDGE DR

Survey Date: Tuesday, January 11, 2022
Start Time: 07:00

WO No: 40027
Device: Miovision



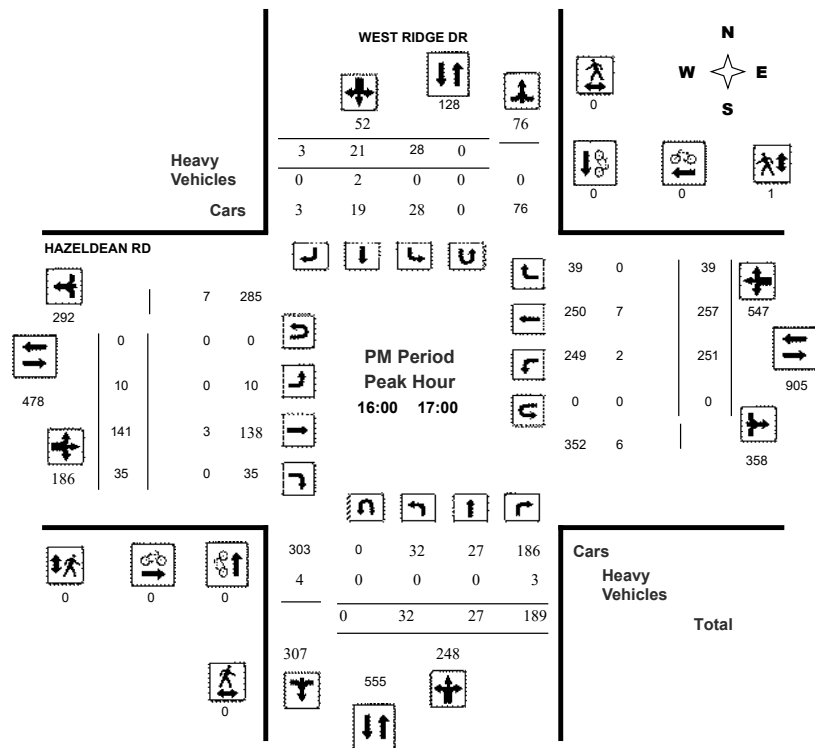
Comments



Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
HAZELDEAN RD @ WEST RIDGE DR

Survey Date: Tuesday, January 11, 2022
Start Time: 07:00

WO No: 40027
Device: Miovision



Transportation Services - Traffic Services
Turning Movement Count - Study Results
HAZELDEAN RD @ WEST RIDGE DR

Survey Date: Tuesday, January 11, 2022
Start Time: 07:00

WO No: 40027
Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, January 11, 2022

Total Observed U-Turns
Northbound: 1 Southbound: 0
Eastbound: 0 Westbound: 1
AADT Factor
1.10

WEST RIDGE DR										HAZELDEAN 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	33	12	142	187	10	5	5	20	207	2	139	10	151	32	73	3	108	259	466
08:00-09:00	22	9	170	201	21	11	3	35	236	4	123	21	148	76	91	18	185	333	569
09:00-10:00	23	5	132	160	7	4	3	14	174	0	115	13	128	85	93	21	199	327	501
11:30-12:30	12	10	117	139	18	9	4	31	170	2	136	7	145	110	139	14	263	408	578
12:30-13:30	15	10	118	143	16	9	4	29	172	1	117	18	136	110	147	31	288	424	596
15:00-16:00	18	19	136	173	20	14	3	37	210	3	140	23	166	185	235	25	445	611	821
16:00-17:00	32	27	189	248	28	21	3	52	300	10	141	35	186	251	257	39	547	733	1033
17:00-18:00	13	20	121	154	21	19	2	42	196	7	112	36	155	215	181	46	442	597	793
Sub Total	168	112	1125	1405	141	92	27	260	1665	29	1023	163	1215	1064	1216	197	2477	3692	5357
U Turns	1				0				1	0				1				1	2
Total	168	112	1125	1406	141	92	27	260	1666	29	1023	163	1215	1064	1216	197	2478	3693	5359
EQ 12Hr	234	156	1564	1954	196	128	38	361	2316	40	1422	227	1689	1479	1690	274	3444	5133	7449
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39					
AVG 12Hr	257	172	1720	2149	216	184	54	397	2548	44	1564	250	1858	1627	1859	301	3788	5646	8194
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														1.10					
AVG 24Hr	337	225	2253	2815	283	241	71	520	3338	58	2049	328	2434	2131	2435	394	4962	7396	10734
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

HAZELDEAN RD @ WEST RIDGE DR

Survey Date: Tuesday, January 11, 2022

WO No: 40027

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

WEST RIDGE DR										HAZELDEAN 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	8	1	28	37	2	0	1	3	40	1	29	3	33	4	15	0	19	52	92
07:15 07:30	9	1	30	40	2	1	2	5	45	0	33	2	35	9	21	0	30	65	110
07:30 07:45	6	5	39	50	3	0	2	5	55	0	43	4	47	8	17	2	27	74	129
07:45 08:00	10	5	45	60	3	4	0	7	67	1	34	1	36	11	20	1	32	68	135
08:00 08:15	5	3	54	62	3	2	2	7	69	1	25	1	27	19	24	3	46	73	142
08:15 08:30	8	2	40	50	5	3	0	8	58	1	33	6	40	18	20	3	41	81	139
08:30 08:45	7	1	34	42	10	1	1	12	54	2	37	9	48	18	28	6	52	100	154
08:45 09:00	2	3	42	47	3	5	0	8	55	0	28	5	33	21	19	6	46	79	134
09:00 09:15	8	1	37	47	1	1	1	3	50	0	31	4	35	23	25	4	52	87	137
09:15 09:30	6	0	29	35	5	1	1	7	42	0	32	2	34	22	29	4	55	89	131
09:30 09:45	3	2	34	39	0	1	1	2	41	0	21	3	24	24	15	4	43	67	108
09:45 10:00	6	2	32	40	1	1	0	2	42	0	31	4	35	16	24	9	49	84	126
11:30 11:45	5	3	24	32	4	2	2	8	40	2	33	2	37	18	37	2	57	94	134
11:45 12:00	0	3	28	31	7	0	1	8	39	0	33	1	34	27	32	6	65	99	138
12:00 12:15	4	2	31	37	3	2	1	6	43	0	36	2	38	33	31	2	66	104	147
12:15 12:30	3	2	34	39	4	5	0	9	48	0	34	2	36	32	39	4	75	111	159
12:30 12:45	1	2	30	33	2	2	0	4	37	1	30	4	35	29	32	9	71	106	143
12:45 13:00	6	1	34	41	3	2	2	7	48	0	26	6	32	31	37	6	74	106	154
13:00 13:15	4	4	33	41	6	4	1	11	52	0	40	6	46	20	38	9	67	113	165
13:15 13:30	4	3	21	28	5	1	1	7	35	0	21	2	23	30	40	7	77	100	135
15:00 15:15	8	7	29	44	5	2	1	8	52	1	22	8	31	45	48	3	96	127	179
15:15 15:30	1	3	32	36	5	2	0	7	43	1	40	2	43	44	61	6	111	154	197
15:30 15:45	3	2	42	47	9	4	1	14	61	0	41	10	51	39	71	7	117	168	229
15:45 16:00	6	7	33	46	1	6	1	8	54	1	37	3	41	57	55	9	121	162	216
16:00 16:15	9	9	57	75	7	7	0	14	89	3	33	9	45	59	66	10	135	180	269
16:15 16:30	7	7	43	57	4	3	2	9	66	2	47	8	57	64	57	6	127	184	250
16:30 16:45	10	5	51	66	10	6	1	17	83	2	33	7	42	72	79	11	162	204	287
16:45 17:00	6	6	38	50	7	5	0	12	62	3	28	11	42	56	55	12	123	165	227
17:00 17:15	2	6	31	39	5	9	0	14	53	5	33	12	50	62	69	10	141	191	244
17:15 17:30	6	5	42	53	5	3	1	9	62	0	34	10	44	68	48	14	130	174	236
17:30 17:45	4	5	19	28	6	5	1	12	40	1	26	8	35	47	37	12	96	131	171
17:45 18:00	1	4	29	34	5	2	0	7	41	1	19	6	26	38	27	10	75	101	142
Total:	168	112	1125	1406	141	92	27	260	1666	29	1023	163	1215	1064	1216	197	2478	3693	5,359

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

HAZELDEAN RD @ WEST RIDGE DR

Survey Date: Tuesday, January 11, 2022

WO No: 40027

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

HAZELDEAN RD @ WEST RIDGE DR

Survey Date: Tuesday, January 11, 2022

WO No: 40027

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

WEST RIDGE DR

HAZELDEAN RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	2	0	2	0	0	0	2
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	2	2	2	0	2	4
12:00 12:15	0	2	2	2	0	2	4
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	1	0	1	0	0	0	1
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	2	2	2	0	2	4
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	1	1	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	1	0	1	0	1	1	2
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	0	0	0
Total	4	6	10	6	2	8	18



Transportation Services - Traffic Services

Turning Movement Count - Study Results

HAZELDEAN RD @ WEST RIDGE DR

Survey Date: Tuesday, January 11, 2022

WO No: 40027

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

WEST RIDGE DR

HAZELDEAN 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	0	2	0	0	0	1	3	0	0	1	2	0	1	0	1	3	3
07:15 07:30	1	0	0	1	0	0	0	0	1	0	1	0	4	0	2	0	3	7	4
07:30 07:45	0	1	0	1	0	0	0	1	2	0	2	0	3	0	1	0	3	6	4
07:45 08:00	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	4	2
08:00 08:15	0	1	0	2	0	0	0	1	3	0	1	0	1	1	0	0	2	3	3
08:15 08:30	1	0	1	2	0	0	0	0	2	0	1	0	2	0	0	0	2	4	3
08:30 08:45	0	0	0	0	0	0	0	0	0	0	3	0	6	0	3	0	6	12	6
08:45 09:00	0	0	0	0	0	0	0	0	0	0	2	0	4	0	2	0	4	8	4
09:00 09:15	0	0	0	0	0	0	0	0	0	0	2	0	6	0	4	0	6	12	6
09:15 09:30	0	0	1	1	0	0	0	0	1	0	1	0	2	0	1	0	3	5	3
09:30 09:45	0	0	0	2	0	0	0	0	2	0	1	0	1	2	0	0	3	4	3
09:45 10:00	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	2	4	2
11:30 11:45	0	0	0	1	0	0	1	1	2	0	1	0	5	1	3	0	5	10	6
11:45 12:00	0	0	0	0	1	0	0	1	1	0	3	0	3	0	0	0	4	7	4
12:00 12:15	0	0	0	1	0	1	0	1	2	0	0	0	0	0	0	0	0	0	1
12:15 12:30	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	2	1
12:30 12:45	0	0	0	1	0	1	0	1	2	0	3	0	4	0	1	0	4	8	5
12:45 13:00	0	0	1	2	0	0	0	0	2	0	2	1	4	0	1	0	4	8	5
13:00 13:15	0	0	1	2	0	1	0	1	3	0	1	0	2	0	1	0	3	5	4
13:15 13:30	0	1	0	1	0	0	0	1	2	0	0	0	2	0	2	0	2	4	3
15:00 15:15	1	0	1	3	0	1	0	1	4	0	0	0	2	0	1	0	2	4	4
15:15 15:30	0	1	1	2	0	0	0	1	3	0	2	0	2	0	0	0	3	5	4
15:30 15:45	0	0	0	1	0	1	0	1	2	0	2	0	3	0	1	0	3	6	4
15:45 16:00	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	2	4	2
16:00 16:15	0	0	1	2	0	1	0	1	3	0	0	0	1	0	1	0	2	3	3
16:15 16:30	0	0	1	1	0	0	0	0	1	0	1	0	6	0	5	0	7	13	7
16:30 16:45	0	0	1	3	0	1	0	1	4	0	0	0	0	1	0	0	2	2	3
16:45 17:00	0	0	0	1	0	0	0	0	1	0	2	0	3	1	1	0	4	7	4
17:00 17:15	0	0	0	1	0	1	0	1	2	0	1	0	1	0	0	0	1	2	2
17:15 17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30 17:45	0	0	1	2	0	1	0	1	3	0	1	0	2	0	1	0	3	5	4
17:45 18:00	0	0	0	1	0	1	0	1	2	0	3	0	3	0	0	0	3	6	4
Total: None	3	5	10	36	1	10	1	17	53	0	40	2	81	6	35	0	92	173	113

Turning Movement Count - Study Results

HAZELDEAN RD @ WEST RIDGE DR

Survey Date: Tuesday, January 11, 2022

WO No: 40027

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

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

Turning Movement Count - Study Results

HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

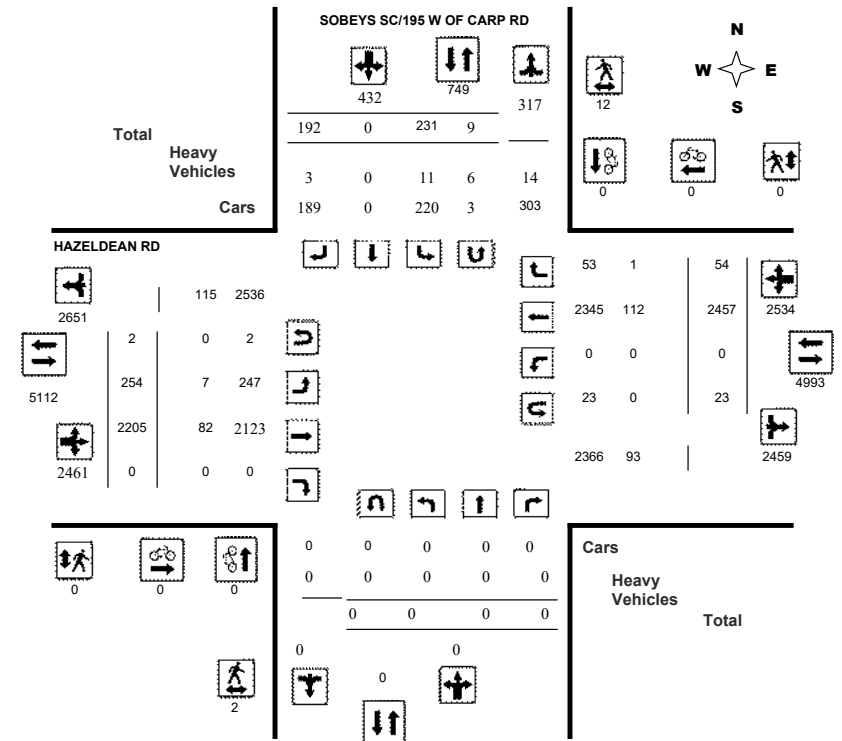
Survey Date: Wednesday, January 19, 2022

WO No: 40051

Start Time: 07:00

Device: Miovision

Full Study Diagram





Transportation Services - Traffic Services

Turning Movement Count - Study Results

HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

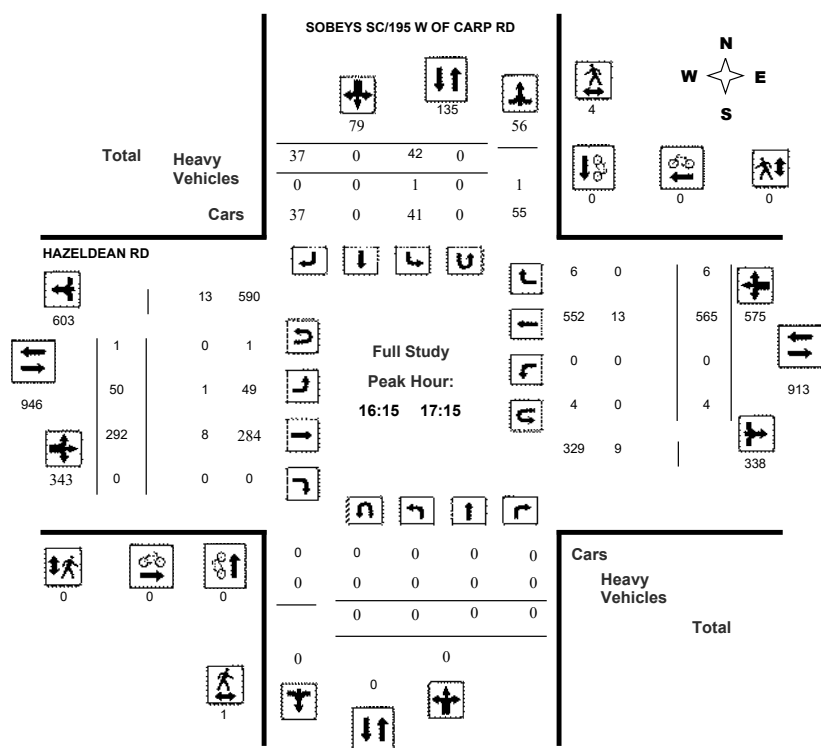
Survey Date: Wednesday, January 19, 2022

WO No: 40051

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

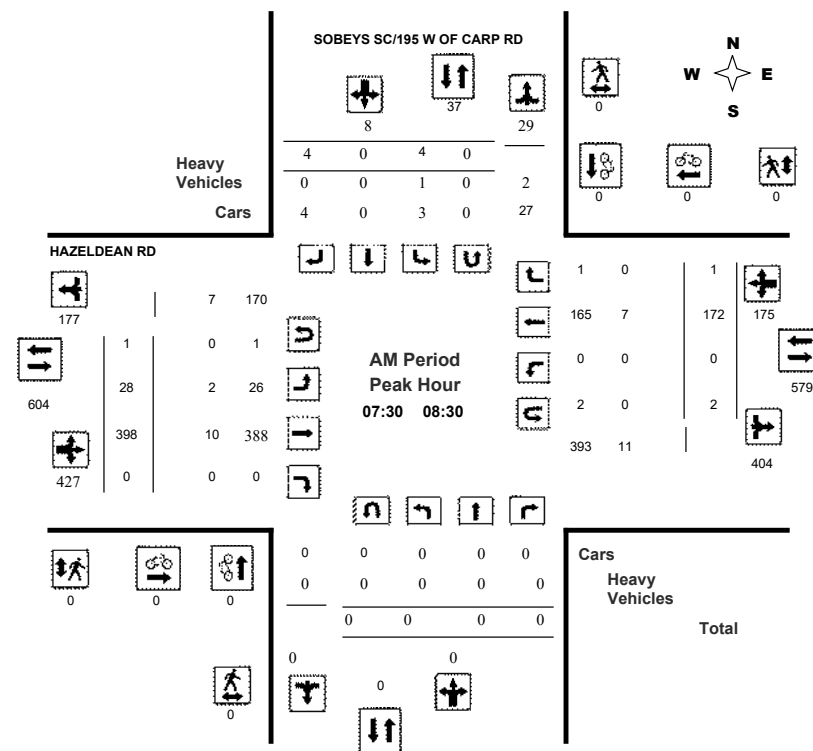
HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

Survey Date: Wednesday, January 19, 2022

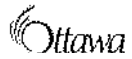
WO No: 40051

Start Time: 07:00

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

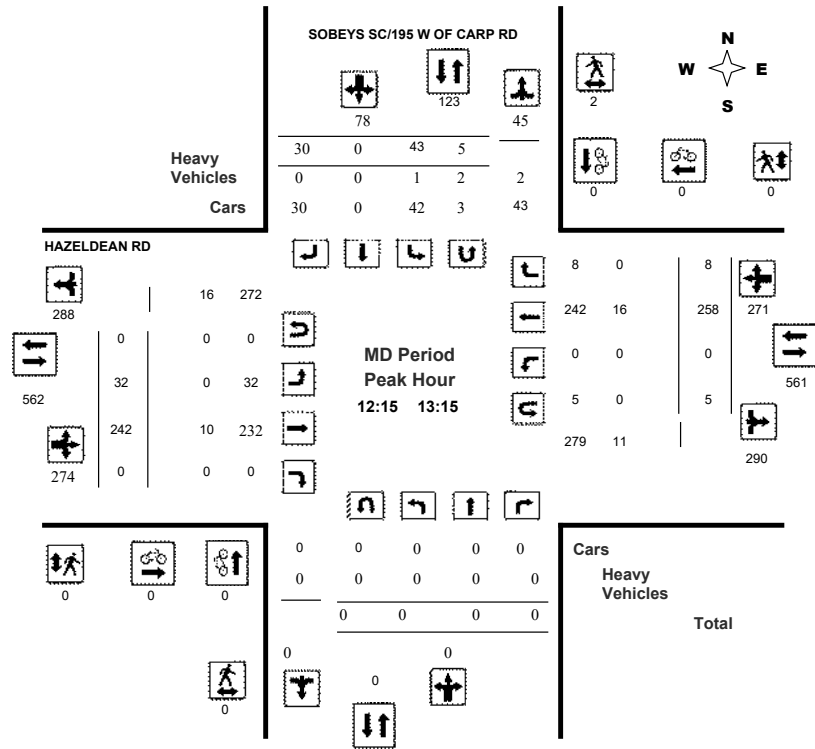
HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

Survey Date: Wednesday, January 19, 2022

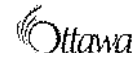
Start Time: 07:00

WO No: 40051

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

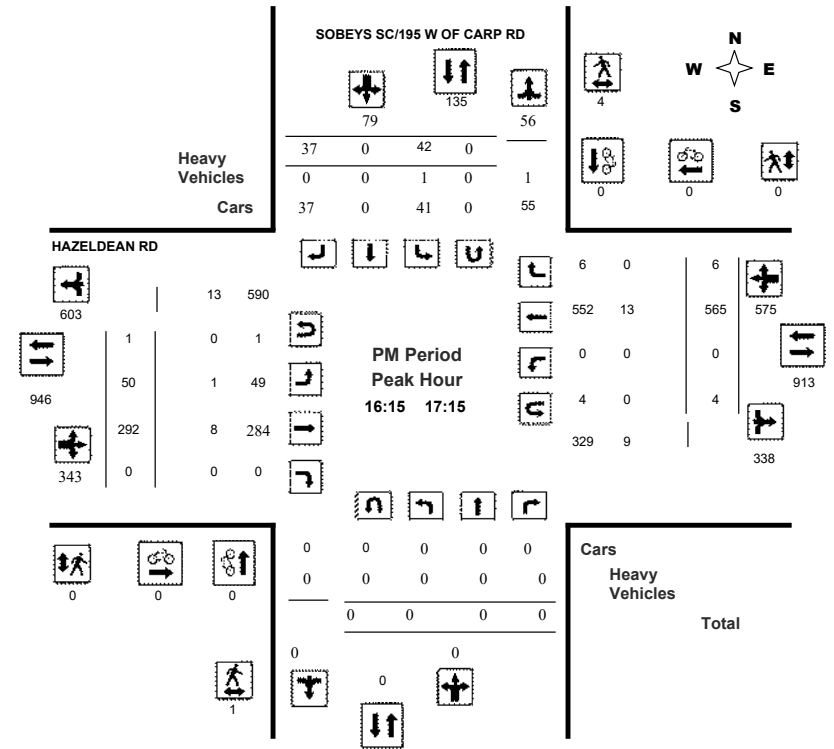
HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

Survey Date: Wednesday, January 19, 2022

Start Time: 07:00

WO No: 40051

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Study Results

HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

Survey Date: Wednesday, January 19, 2022

WO No: 40051

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, January 19, 2022

Total Observed U-Turns

AADT Factor

Northbound: 0 Southbound: 9
Eastbound: 2 Westbound: 23

SOBEYS SC/195 W OF CARP RD										HAZELDEAN 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	0	0	0	0	2	0	5	7	7	29	401	0	430	0	144	3	147	577	584		
08:00 09:00	0	0	0	0	8	0	6	14	14	23	314	0	337	0	201	0	201	538	552		
09:00 10:00	0	0	0	0	20	0	7	27	27	17	236	0	253	0	192	2	194	447	474		
11:30 12:30	0	0	0	0	38	0	26	64	64	44	200	0	244	0	222	8	230	474	538		
12:30 13:30	0	0	0	0	41	0	27	68	68	30	236	0	266	0	250	9	259	525	593		
15:00 16:00	0	0	0	0	43	0	37	80	80	31	283	0	314	0	435	15	450	764	844		
16:00 17:00	0	0	0	0	43	0	42	85	85	44	292	0	336	0	565	3	568	904	989		
17:00 18:00	0	0	0	0	36	0	42	78	78	36	243	0	279	0	448	14	462	741	819		
Sub Total	0	0	0	0	231	0	192	423	423	254	2205	0	2459	0	2457	54	2511	4970	5393		
U Turns	0			0	9			9	9	2			2	23			23	25	34		
Total	0	0	0	0	240	0	192	432	432	256	2205	0	2461	23	2457	54	2534	4995	5427		
EQ 12Hr	0	0	0	0	334	0	267	601	601	356	3065	0	3421	32	3415	75	3522	6943	7544		
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39							
AVG 12Hr	0	0	0	0	334	0	267	601	601	356	3065	0	3421	32	3415	75	3522	6943	7544		
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														1.00							
AVG 24Hr	0	0	0	0	438	0	350	788	788	466	4015	0	4481	42	4474	98	4614	9095	9883		
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

HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

Survey Date: Wednesday, January 19, 2022

WO No: 40051

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

SOBEYS SC/195 W OF CARP RD										HAZELDEAN 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	0	0	0	0	0	0	2	2	6	81	0	87	1	34	1	36	123	125
07:15 07:30	0	0	0	0	1	0	2	3	3	9	89	0	98	2	35	1	38	136	139
07:30 07:45	0	0	0	0	1	0	0	1	1	8	100	0	108	1	35	1	37	145	146
07:45 08:00	0	0	0	0	0	0	1	1	1	6	131	0	137	0	40	0	40	177	178
08:00 08:15	0	0	0	0	1	0	1	2	2	9	74	0	83	1	53	0	54	137	139
08:15 08:30	0	0	0	0	2	0	2	4	4	6	93	0	99	0	44	0	44	143	147
08:30 08:45	0	0	0	0	3	0	2	5	5	5	74	0	79	0	50	0	50	129	134
08:45 09:00	0	0	0	0	2	0	1	3	3	4	73	0	77	0	54	0	54	131	134
09:00 09:15	0	0	0	0	5	0	1	6	6	2	62	0	64	0	45	0	45	109	115
09:15 09:30	0	0	0	0	6	0	0	6	6	8	57	0	65	0	54	2	56	121	127
09:30 09:45	0	0	0	0	5	0	4	9	9	5	56	0	61	0	52	0	52	113	122
09:45 10:00	0	0	0	0	8	0	2	10	10	2	61	0	63	0	41	0	41	104	114
11:30 11:45	0	0	0	0	8	0	5	13	13	8	58	0	66	0	52	3	55	121	134
11:45 12:00	0	0	0	0	14	0	9	23	23	12	44	0	56	1	56	1	58	114	137
12:00 12:15	0	0	0	0	9	0	4	13	13	13	46	0	59	2	52	1	55	114	127
12:15 12:30	0	0	0	0	7	0	8	15	15	11	52	0	63	1	62	3	66	129	144
12:30 12:45	0	0	0	0	17	0	9	26	26	5	58	0	63	2	61	1	64	127	153
12:45 13:00	0	0	0	0	19	0	6	25	25	8	53	0	61	0	74	2	76	137	162
13:00 13:15	0	0	0	0	5	0	7	12	12	8	79	0	87	2	61	2	65	152	164
13:15 13:30	0	0	0	0	5	0	5	10	10	9	46	0	55	1	54	4	59	114	124
15:00 15:15	0	0	0	0	11	0	7	18	18	6	65	0	71	1	91	5	97	168	186
15:15 15:30	0	0	0	0	13	0	16	29	29	7	70	0	77	0	109	1	110	187	216
15:30 15:45	0	0	0	0	7	0	4	11	11	7	75	0	82	0	125	4	129	211	222
15:45 16:00	0	0	0	0	12	0	10	22	22	11	73	0	84	1	110	5	116	200	222
16:00 16:15	0	0	0	0	8	0	13	21	21	1	67	0	68	0	135	2	137	205	226
16:15 16:30	0	0	0	0	13	0	9	22	22	16	72	0	88	1	141	1	143	231	253
16:30 16:45	0	0	0	0	9	0	12	21	21	16	75	0	91	0	152	0	152	243	264
16:45 17:00	0	0	0	0	13	0	8	21	21	12	78	0	90	1	137	0	138	228	249
17:00 17:15	0	0	0	0	7	0	8	15	15	7	67	0	74	2	135	5	142	216	231
17:15 17:30	0	0	0	0	13	0	9	22	22	9	70	0	79	1	107	5	113	192	214
17:30 17:45	0	0	0	0	11	0	16	27	27	13	62	0	75	2	115	2	119	194	221
17:45 18:00	0	0	0	0	5	0	9	14	14	7	44	0	51	0	91	2	93	144	158
Total:	0	0	0	0	240	0	192	432	432	256	2205	0	2461	23	2457	54	2534	432	5,427

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

Survey Date: Wednesday, January 19, 2022

WO No: 40051

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

		SOBEYS SC/195 W OF CARP RD			HAZELDEAN RD			Grand Total
Time Period		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		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

HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

Survey Date: Wednesday, January 19, 2022

WO No: 40051

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

		SOBEYS SC/195 W OF CARP RD			HAZELDEAN RD			Grand Total
Time Period		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	
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	1	1	0	0	0	1
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	2	2	0	0	0	2
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		1	2	3	0	0	0	3
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	1	1	0	0	0	1
16:15 16:30		0	1	1	0	0	0	1
16:30 16:45		0	1	1	0	0	0	1
16:45 17:00		1	1	2	0	0	0	2
17:00 17:15		0	1	1	0	0	0	1
17:15 17:30		0	0	0	0	0	0	0
17:30 17:45		0	2	2	0	0	0	2
17:45 18:00		0	0	0	0	0	0	0
Total		2	12	14	0	0	0	14

Transportation Services - Traffic Services

Turning Movement Count - Study Results

HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

Survey Date: Wednesday, January 19, 2022

WO No: 40051

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

SOBEYS SC/195 W OF CARP RD										HAZELDEAN 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	0	0	0	0	0	0	0	0	0	7	0	7	0	7	0	7	14	14
07:15-07:30	0	0	0	0	0	0	0	0	0	6	0	6	0	1	0	1	7	7	7
07:30-07:45	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6	6	6
07:45-08:00	0	0	0	0	0	0	0	0	0	4	0	4	0	1	0	1	5	5	5
08:00-08:15	0	0	0	0	1	0	0	1	1	2	0	0	2	0	1	0	1	3	4
08:15-08:30	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5	5
08:30-08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	3	3
08:45-09:00	0	0	0	0	2	0	0	2	2	0	4	0	4	0	7	0	7	11	13
09:00-09:15	0	0	0	0	0	0	0	0	0	3	0	3	0	4	0	4	7	7	7
09:15-09:30	0	0	0	0	1	0	0	1	1	0	3	0	3	0	5	1	6	9	12
09:30-09:45	0	0	0	0	1	0	0	1	1	0	2	0	2	0	4	0	4	6	9
09:45-10:00	0	0	0	0	2	0	0	2	2	0	4	0	4	0	3	0	3	7	9
11:30-11:45	0	0	0	0	1	0	0	1	1	0	1	0	1	0	4	0	4	5	6
11:45-12:00	0	0	0	0	1	0	1	2	2	0	4	0	4	0	3	0	3	7	9
12:00-12:15	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	4	5	5
12:15-12:30	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4	4
12:30-12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	7	9
12:45-13:00	0	0	0	0	1	0	0	1	1	0	3	0	3	0	6	0	6	9	10
13:00-13:15	0	0	0	0	0	0	0	0	0	4	0	4	0	2	0	2	6	6	6
13:15-13:30	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6	6
15:00-15:15	0	0	0	0	0	0	0	0	0	5	0	5	0	5	0	5	10	10	10
15:15-15:30	0	0	0	0	0	0	2	2	2	2	4	0	6	0	4	0	4	10	12
15:30-15:45	0	0	0	0	0	0	0	0	0	1	2	0	3	0	5	0	5	8	8
15:45-16:00	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	4	5	5
16:00-16:15	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	4	5	5
16:15-16:30	0	0	0	0	1	0	0	1	1	0	4	0	4	0	3	0	3	7	8
16:30-16:45	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	5	5	5
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6	6	6
17:00-17:15	0	0	0	0	0	0	0	0	0	1	2	0	3	0	1	0	1	4	4
17:15-17:30	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	0	3	4	4
17:30-17:45	0	0	0	0	0	0	0	0	0	1	2	0	3	0	2	0	2	5	5
17:45-18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
Total: None	0	0	0	0	11	0	3	14	14	7	82	0	89	0	112	1	113	202	222



Transportation Services - Traffic Services

Turning Movement Count - Study Results

HAZELDEAN RD @ SOBEYS SC/195 W OF CARP RD

Survey Date: Wednesday, January 19, 2022

WO No: 40051

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

SOBEYS SC/195 W OF CARP RD			HAZELDEAN 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	1	1
07:15	07:30	0	0	0	2	2
07:30	07:45	0	0	0	1	1
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	1	1	2
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	2	0	0	2
09:30	09:45	0	2	0	0	2
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	1	1
12:00	12:15	0	0	0	2	2
12:15	12:30	0	0	0	1	1
12:30	12:45	0	5	0	2	7
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	2	2
13:15	13:30	0	0	0	1	1
15:00	15:15	0	0	0	1	1
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	1	1
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	1	1
16:30	16:45	0	0	1	0	1
16:45	17:00	0	0	0	1	1
17:00	17:15	0	0	0	2	2
17:15	17:30	0	0	0	1	1
17:30	17:45	0	0	0	2	2
17:45	18:00	0	0	0	0	0
Total		0	9	2	23	34



Transportation Services - Traffic Services

Turning Movement Count - Study Results

250 W OF STITTSVILLE MAIN ST @ HAZELDEAN RD

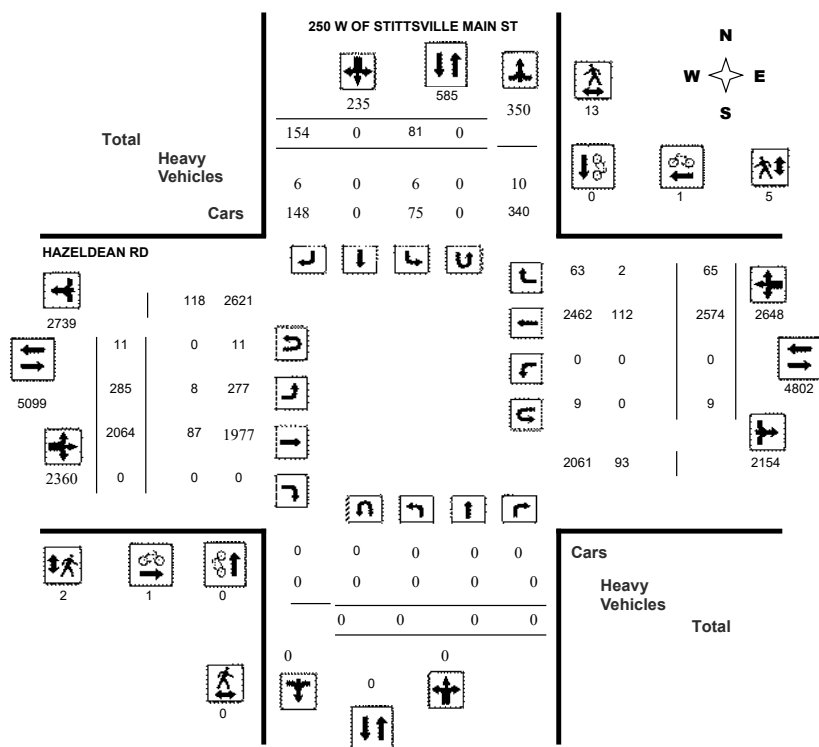
Survey Date: Tuesday, January 11, 2022

WO No: 40033

Start Time: 07:00

Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

250 W OF STITTSVILLE MAIN ST @ HAZELDEAN RD

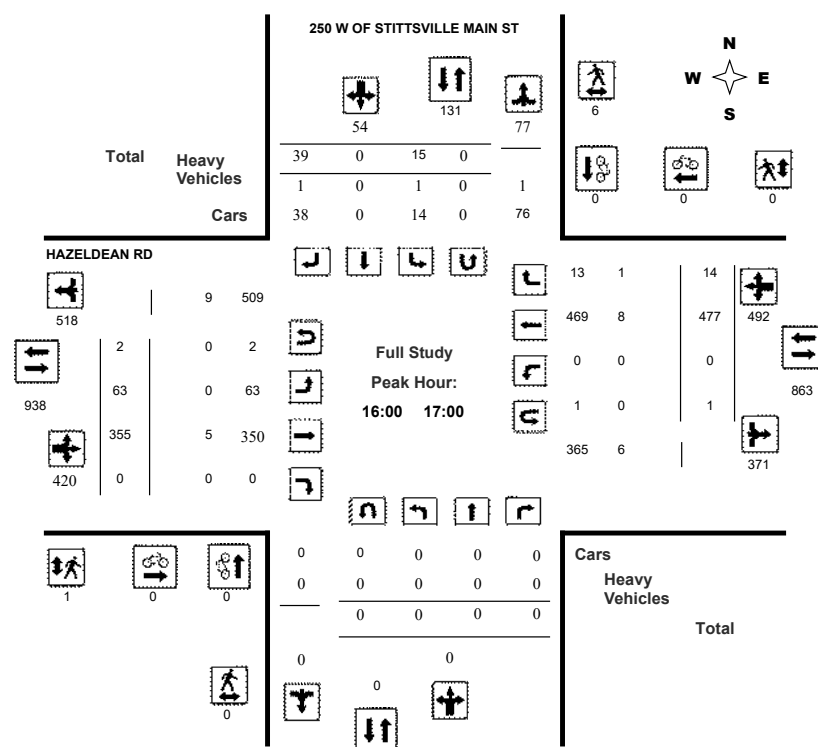
Survey Date: Tuesday, January 11, 2022

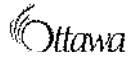
WO No: 40033

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

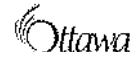
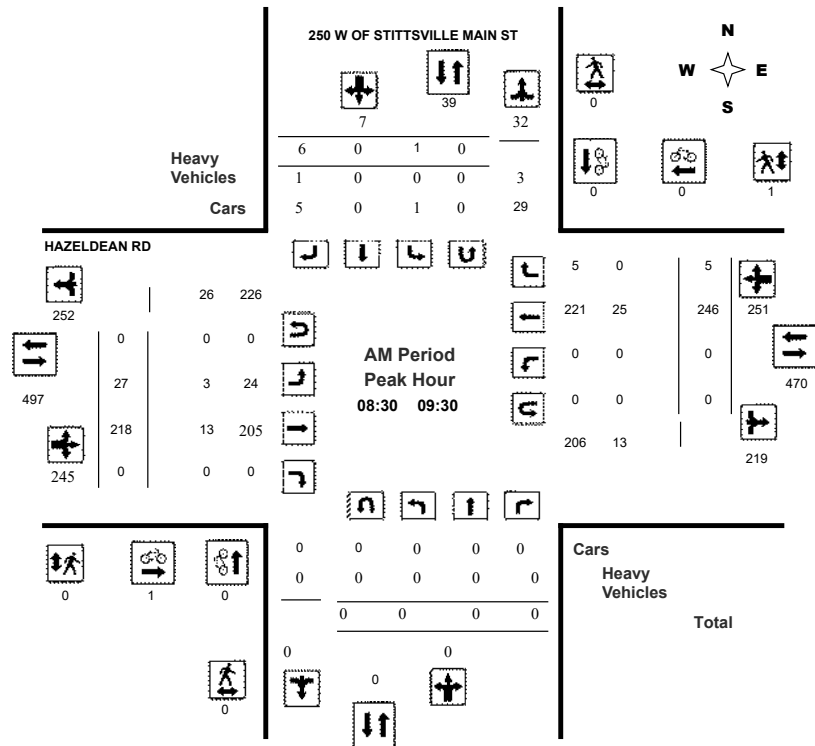
250 W OF STITTVILLE MAIN ST @ HAZELDEAN RD

Survey Date: Tuesday, January 11, 2022

Start Time: 07:00

WO No: 40033

Device: Miovision



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

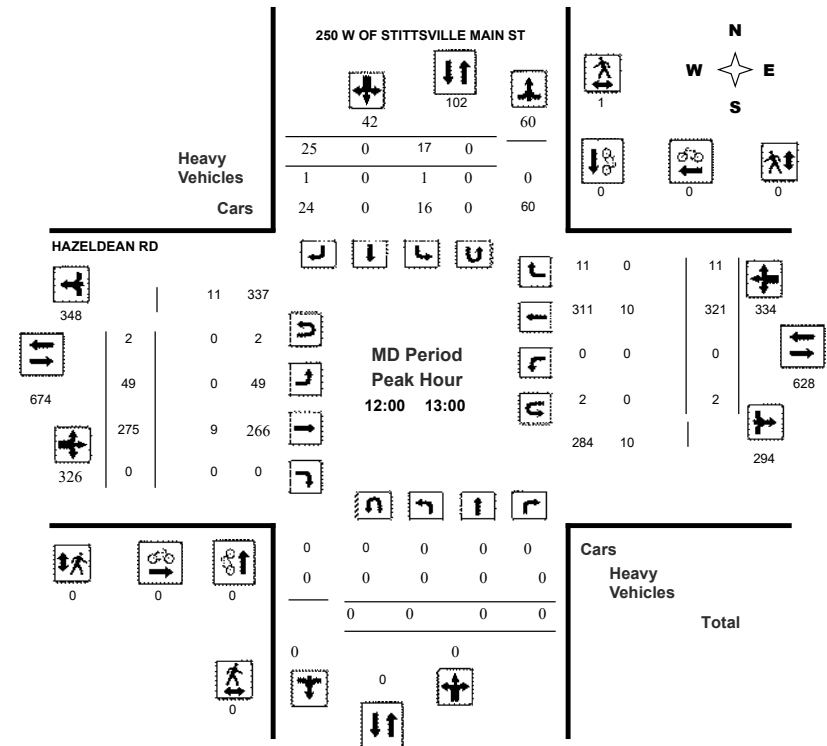
250 W OF STITTVILLE MAIN ST @ HAZELDEAN RD

Survey Date: Tuesday, January 11, 2022

Start Time: 07:00

WO No: 40033

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

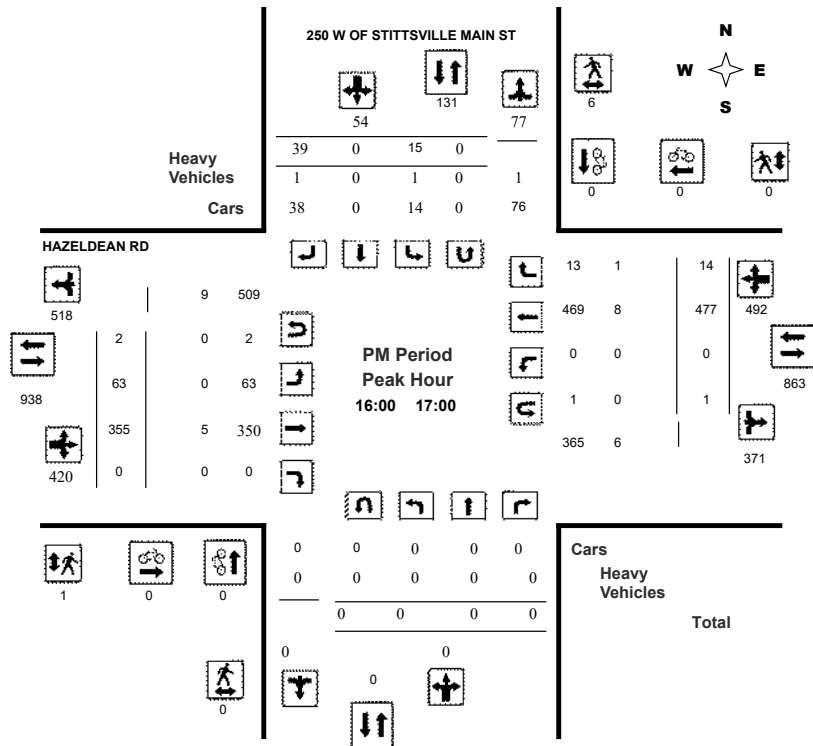
250 W OF STITTSVILLE MAIN ST @ HAZELDEAN RD

Survey Date: Tuesday, January 11, 2022

Start Time: 07:00

WO No: 40033

Device: Miovision



Transportation Services - Traffic Services

Turning Movement Count - Study Results

250 W OF STITTSVILLE MAIN ST @ HAZELDEAN RD

Survey Date: Tuesday, January 11, 2022

Start Time: 07:00

WO No: 40033

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, January 11, 2022

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 11 Westbound: 9

AADT Factor
1.10

250 W OF STITTSVILLE MAIN ST										HAZELDEAN 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	0	0	0	0	1	0	3	4	4	9	191	0	200	0	176	1	177	377	381			
08:00 09:00	0	0	0	0	3	0	4	7	7	19	218	0	237	0	239	5	244	481	488			
09:00 10:00	0	0	0	0	2	0	10	12	12	25	216	0	241	0	249	0	249	490	502			
11:30 12:30	0	0	0	0	13	0	20	33	33	41	279	0	320	0	314	10	324	644	677			
12:30 13:30	0	0	0	0	15	0	20	35	35	47	250	0	297	0	314	13	327	624	659			
15:00 16:00	0	0	0	0	20	0	29	49	49	39	280	0	319	0	427	12	439	758	807			
16:00 17:00	0	0	0	0	15	0	39	54	54	63	355	0	418	0	477	14	491	909	963			
17:00 18:00	0	0	0	0	12	0	29	41	41	42	275	0	317	0	378	10	388	705	746			
Sub Total	0	0	0	0	81	0	154	235	235	285	2064	0	2349	0	2574	65	2639	4988	5223			
U Turns	0				0				0				11				9				20	20
Total	0	0	0	0	81	0	154	235	235	285	2064	0	2360	0	2574	65	2648	5008	5243			
EQ 12Hr	0	0	0	0	113	0	214	327	327	396	2869	0	3280	0	3578	90	3681	6961	7288			
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39								
AVG 12Hr	0	0	0	0	124	0	308	360	360	436	3156	0	3608	0	3936	99	4049	7657	8017			
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														1.10								
AVG 24Hr	0	0	0	0	162	0	403	472	472	571	4134	0	4726	0	5156	130	5304	10031	10502			

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

1.39

AVG 12Hr 0 0 0 0 124 0 308 360 360 436 3156 0 3608 0 3936 99 4049 7657 8017

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

1.10

AVG 24Hr 0 0 0 0 162 0 403 472 472 571 4134 0 4726 0 5156 130 5304 10031 10502

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

250 W OF STITTSVILLE MAIN ST @ HAZELDEAN RD

Survey Date: Tuesday, January 11, 2022

WO No: 40033

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

250 W OF STITTSVILLE MAIN ST										HAZELDEAN 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	0	0	0	0	0	0	0	0	1	39	0	41	0	35	0	35	76	76
07:15 07:30	0	0	0	0	1	0	1	2	2	4	39	0	43	0	42	0	42	85	87
07:30 07:45	0	0	0	0	0	0	2	2	2	53	0	55	0	38	0	38	93	95	
07:45 08:00	0	0	0	0	0	0	0	0	0	2	60	0	63	0	61	1	62	125	125
08:00 08:15	0	0	0	0	2	0	0	2	2	2	54	0	56	0	56	0	56	112	114
08:15 08:30	0	0	0	0	0	0	1	1	1	4	58	0	62	0	56	0	57	119	120
08:30 08:45	0	0	0	0	0	0	2	2	2	10	58	0	68	0	64	2	66	134	136
08:45 09:00	0	0	0	0	1	0	1	2	2	3	48	0	51	0	63	3	66	117	119
09:00 09:15	0	0	0	0	0	0	0	0	0	3	65	0	68	0	58	0	58	126	126
09:15 09:30	0	0	0	0	0	0	3	3	3	11	47	0	58	0	61	0	61	119	122
09:30 09:45	0	0	0	0	0	0	4	4	4	4	48	0	52	0	63	0	63	115	119
09:45 10:00	0	0	0	0	2	0	3	5	5	7	56	0	63	0	67	0	67	130	135
11:30 11:45	0	0	0	0	2	0	4	6	6	9	75	0	84	0	70	3	73	157	163
11:45 12:00	0	0	0	0	2	0	3	5	5	9	57	0	67	0	82	2	84	151	156
12:00 12:15	0	0	0	0	5	0	9	14	14	15	72	0	87	0	85	3	88	175	189
12:15 12:30	0	0	0	0	4	0	4	8	8	8	75	0	83	0	77	2	80	163	171
12:30 12:45	0	0	0	0	6	0	6	12	12	11	62	0	75	0	81	5	87	162	174
12:45 13:00	0	0	0	0	2	0	6	8	8	15	66	0	81	0	78	1	79	160	168
13:00 13:15	0	0	0	0	2	0	4	6	6	14	70	0	84	0	78	6	84	168	174
13:15 13:30	0	0	0	0	5	0	4	9	9	7	52	0	61	0	77	1	79	140	149
15:00 15:15	0	0	0	0	4	0	6	10	10	12	58	0	70	0	101	3	104	174	184
15:15 15:30	0	0	0	0	5	0	7	12	12	8	56	0	64	0	113	5	119	183	195
15:30 15:45	0	0	0	0	7	0	9	16	16	12	95	0	108	0	109	1	110	218	234
15:45 16:00	0	0	0	0	4	0	7	11	11	7	71	0	79	0	104	3	109	188	199
16:00 16:15	0	0	0	0	4	0	7	11	11	18	95	0	113	0	143	3	146	259	270
16:15 16:30	0	0	0	0	5	0	9	14	14	18	76	0	95	0	105	1	106	201	215
16:30 16:45	0	0	0	0	2	0	15	17	17	14	98	0	113	0	128	7	135	248	265
16:45 17:00	0	0	0	0	4	0	8	12	12	13	86	0	99	0	101	3	105	204	216
17:00 17:15	0	0	0	0	4	0	11	15	15	10	72	0	82	0	112	2	114	196	211
17:15 17:30	0	0	0	0	3	0	9	12	12	16	80	0	96	0	106	2	108	204	216
17:30 17:45	0	0	0	0	1	0	4	5	5	12	75	0	87	0	94	3	98	185	190
17:45 18:00	0	0	0	0	4	0	5	9	9	4	48	0	52	0	66	3	69	121	130
Total:	0	0	0	0	81	0	154	235	235	285	2064	0	2360	0	2574	65	2648	5008	5,243

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

250 W OF STITTSVILLE MAIN ST @ HAZELDEAN RD

Survey Date: Tuesday, January 11, 2022

WO No: 40033

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

250 W OF STITTSVILLE MAIN ST							HAZELDEAN RD							
Time Period	Northbound		Southbound		Street Total		Eastbound		Westbound		Street Total		Grand Total	
07:00 07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:15 07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30 07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:45 08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:00 08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:15 08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:30 08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:45 09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:00 09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:15 09:30	0	0	0	0	0	1	0	0	1	1	1	1	1	
09:30 09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:45 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:00 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:15 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:45 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
13:00 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
13:15 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:00 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:15 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:30 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:45 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:00 16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:15 16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:30 16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:45 17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:00 17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:15 17:30	0	0	0	0	0	0	1	1	1	1	1	1	1	
17:30 17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:45 18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	1	1	1	2	2	2	2	2	



Transportation Services - Traffic Services

Turning Movement Count - Study Results

250 W OF STITTSVILLE MAIN ST @ HAZELDEAN RD

Survey Date: Tuesday, January 11, 2022

WO No: 40033

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

250 W OF STITTSVILLE MAIN ST				HAZELDEAN RD			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	1	0	1	1
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	1	1	1
08:00 08:15	0	0	0	0	0	0	0
08:15 08:30	0	1	1	0	0	0	1
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	1	1	1
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	1	1	0	0	0	1
11:30 11:45	0	1	1	0	0	0	1
11:45 12:00	0	1	1	0	0	0	1
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	1	1	0	0	0	1
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	2	2	0	0	0	2
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	2	2	2
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	0	2	2	1	0	1	3
16:15 16:30	0	3	3	0	0	0	3
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	1	1	1
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	13	13	2	5	7	20



Transportation Services - Traffic Services

Turning Movement Count - Study Results

250 W OF STITTSVILLE MAIN ST @ HAZELDEAN RD

Survey Date: Tuesday, January 11, 2022

WO No: 40033

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

250 W OF STITTSVILLE MAIN ST										HAZELDEAN 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	0	0	0	0	0	0	1	1	1	2	0	5	0	2	0	4	9	5
07:15 07:30	0	0	0	0	1	0	1	3	3	1	5	0	9	0	2	0	8	17	10
07:30 07:45	0	0	0	0	0	0	0	0	0	0	3	0	8	0	5	0	8	16	8
07:45 08:00	0	0	0	0	0	0	0	0	0	0	2	0	9	0	7	0	9	18	9
08:00 08:15	0	0	0	0	0	0	0	0	0	0	3	0	6	0	3	0	6	12	6
08:15 08:30	0	0	0	0	0	0	0	0	0	0	4	0	6	0	2	0	6	12	6
08:30 08:45	0	0	0	0	0	0	0	1	1	1	2	0	10	0	7	0	9	19	10
08:45 09:00	0	0	0	0	0	0	0	1	1	1	3	0	9	0	5	0	8	17	9
09:00 09:15	0	0	0	0	0	0	0	0	0	0	6	0	11	0	5	0	11	22	11
09:15 09:30	0	0	0	0	0	0	1	2	2	1	2	0	12	0	8	0	10	22	12
09:30 09:45	0	0	0	0	0	0	0	1	1	1	2	0	7	0	4	0	6	13	7
09:45 10:00	0	0	0	0	0	0	0	0	0	0	3	0	12	0	9	0	12	24	12
11:30 11:45	0	0	0	0	0	0	0	0	0	0	5	0	6	0	1	0	6	12	6
11:45 12:00	0	0	0	0	1	0	0	3	3	2	2	0	11	0	7	0	10	21	12
12:00 12:15	0	0	0	0	1	0	1	2	2	0	3	0	6	0	2	0	6	12	7
12:15 12:30	0	0	0	0	0	0	0	0	0	0	2	0	5	0	3	0	5	10	5
12:30 12:45	0	0	0	0	0	0	0	0	0	0	1	0	4	0	3	0	4	8	4
12:45 13:00	0	0	0	0	0	0	0	0	0	0	3	0	5	0	2	0	5	10	5
13:00 13:15	0	0	0	0	0	0	1	1	1	0	7	0	13	0	5	0	12	25	13
13:15 13:30	0	0	0	0	1	0	1	2	2	0	1	0	7	0	5	0	7	14	8
15:00 15:15	0	0	0	0	1	0	0	1	1	0	5	0	7	0	2	0	8	15	8
15:15 15:30	0	0	0	0	0	0	0	0	0	0	2	0	3	0	1	0	3	6	3
15:30 15:45	0	0	0	0	0	0	0	0	0	0	7	0	12	0	5	0	12	24	12
15:45 16:00	0	0	0	0	0	0	0	1	1	0	2	0	5	0	3	1	6	11	6
16:00 16:15	0	0	0	0	0	0	1	1	1	0	1	0	5	0	3	0	4	9	5
16:15 16:30	0	0	0	0	0	0	0	0	0	0	1	0	3	0	2	0	3	6	3
16:30 16:45	0	0	0	0	0	0	0	1	1	0	0	0	2	0	2	1	3	5	3
16:45 17:00	0	0	0	0	1	0	0	1	1	0	3	0	4	0	1	0	5	9	5
17:00 17:15	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	2	4	2
17:15 17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30 17:45	0	0	0	0	0	0	0	0	0	0	2	0	6	0	4	0	6	12	6
17:45 18:00	0	0	0	0	0	0	0	0	0	0	2	0	3	0	1	0	3	6	3
Total: None	0	0	0	0	6	0	6	22	22	8	87	0	213	0	112	2	207	420	221



Transportation Services - Traffic Services

Turning Movement Count - Study Results

250 W OF STITTSTVILLE MAIN ST @ HAZELDEAN RD

Survey Date: Tuesday, January 11, 2022

WO No: 40033

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

250 W OF STITTSTVILLE MAIN ST HAZELDEAN 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	1	0	1
07:15 07:30	0	0	0	0	0
07:30 07:45	0	0	0	0	0
07:45 08:00	0	0	1	0	1
08:00 08:15	0	0	0	0	0
08:15 08:30	0	0	0	1	1
08:30 08:45	0	0	0	0	0
08:45 09:00	0	0	0	0	0
09:00 09:15	0	0	0	0	0
09:15 09:30	0	0	0	0	0
09:30 09:45	0	0	0	0	0
09:45 10:00	0	0	0	0	0
11:30 11:45	0	0	0	0	0
11:45 12:00	0	0	1	0	1
12:00 12:15	0	0	0	0	0
12:15 12:30	0	0	0	1	1
12:30 12:45	0	0	2	1	3
12:45 13:00	0	0	0	0	0
13:00 13:15	0	0	0	0	0
13:15 13:30	0	0	2	1	3
15:00 15:15	0	0	0	0	0
15:15 15:30	0	0	0	1	1
15:30 15:45	0	0	1	0	1
15:45 16:00	0	0	1	2	3
16:00 16:15	0	0	0	0	0
16:15 16:30	0	0	1	0	1
16:30 16:45	0	0	1	0	1
16:45 17:00	0	0	0	1	1
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	1	1
17:45 18:00	0	0	0	0	0
Total	0	0	11	9	20



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEY LANE

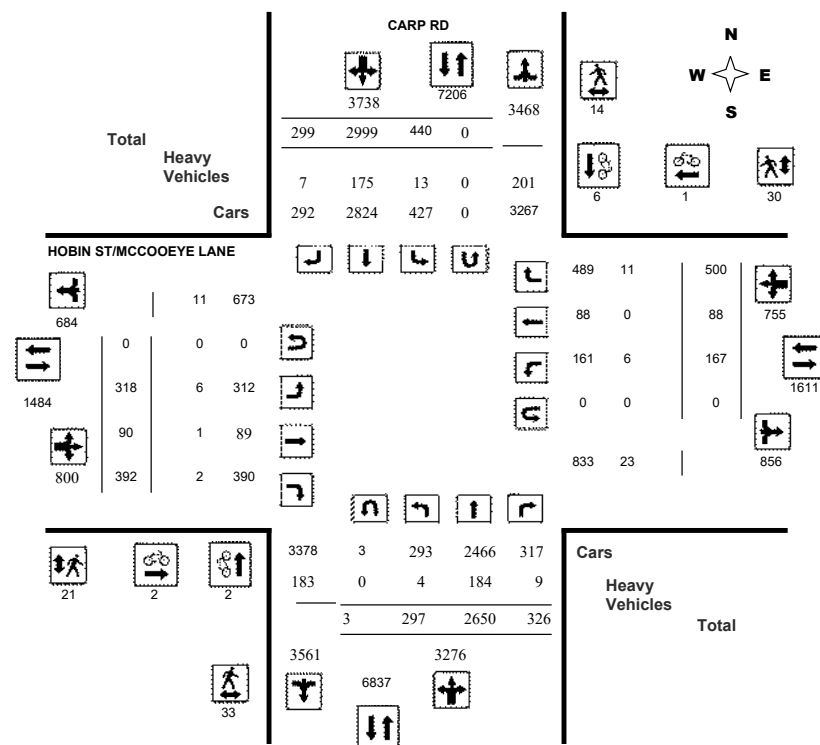
Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study Diagram





Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEY LANE

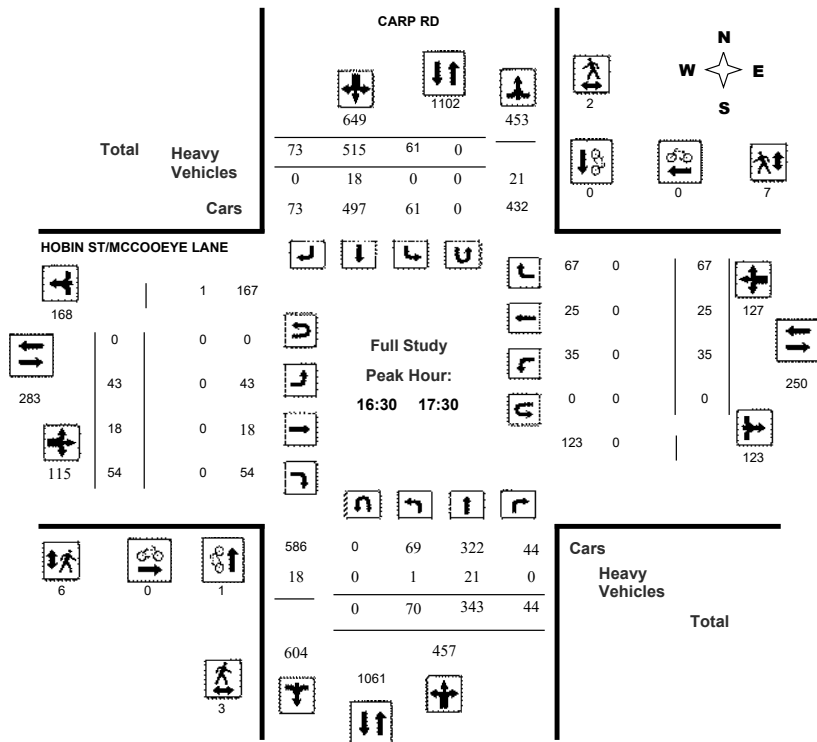
Survey Date: Thursday, May 04, 2017

Start Time: 07:00

WO No: 36998

Device: Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

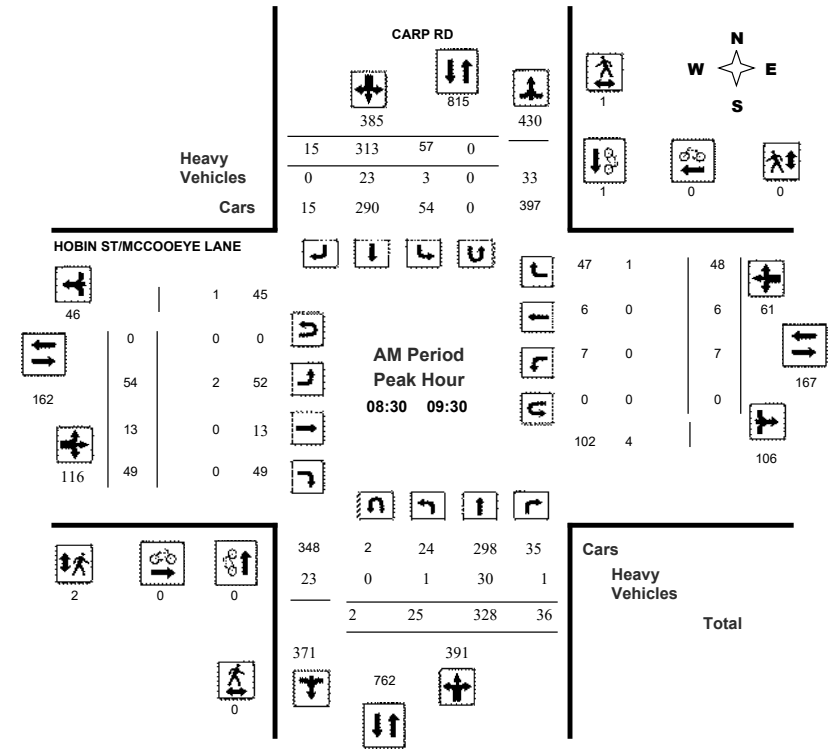
CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017

Start Time: 07:00

WO No: 36998

Device: Miovision

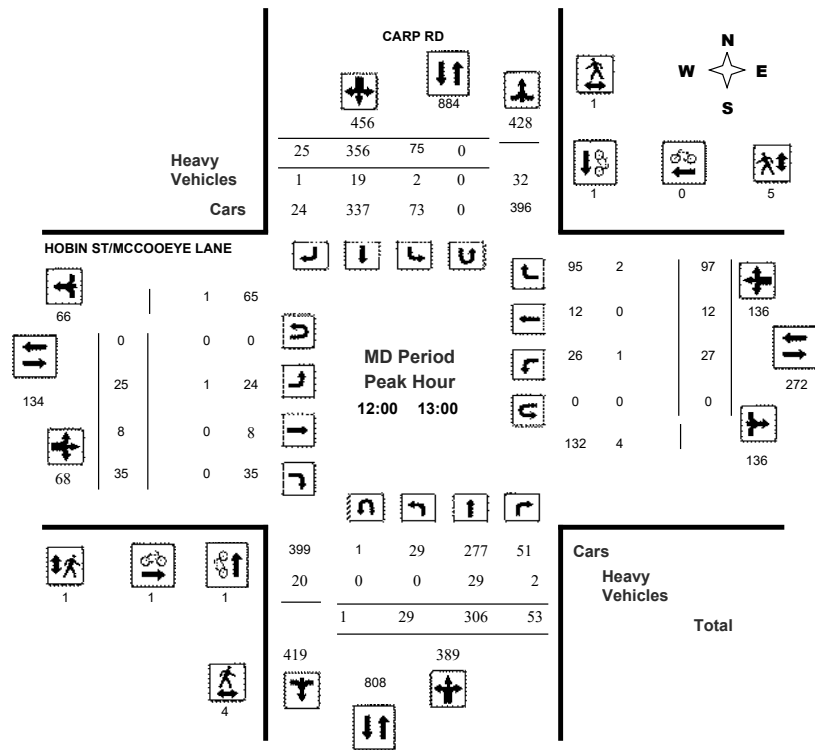




Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

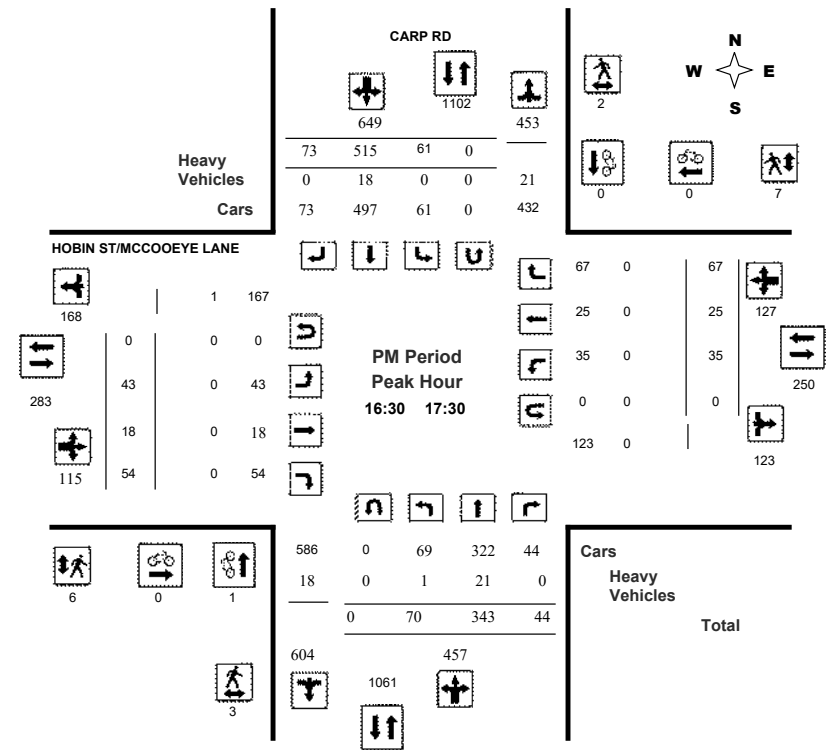
WO No: 36998
Device: Miovision



Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

WO No: 36998
Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, May 04, 2017

Total Observed U-Turns

AADT Factor

Northbound: 3 Southbound: 0

Eastbound: 0 Westbound: 0

CARP RD										HOBIN ST/MCCOOEYE LANE											
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	11	352	27	390	40	255	17	312	702	72	8	63	143	10	3	43	56	199	901		
08:00 09:00	22	343	23	388	48	293	17	358	746	43	16	52	111	8	2	49	59	170	916		
09:00 10:00	27	317	43	387	50	293	11	354	741	51	7	49	107	10	6	54	70	177	918		
11:30 12:30	24	311	60	395	65	368	19	452	847	26	11	33	70	20	8	86	114	184	1031		
12:30 13:30	30	294	39	363	73	345	28	446	809	23	7	43	73	32	14	80	126	199	1008		
15:00 16:00	39	353	48	440	51	440	59	550	990	24	13	47	84	24	13	72	109	193	1183		
16:00 17:00	60	362	38	460	65	507	69	641	1101	47	14	45	106	33	23	58	114	220	1321		
17:00 18:00	84	318	48	450	48	498	79	625	1075	32	14	60	106	30	19	58	107	213	1288		
Sub Total	297	2650	326	3273	440	2999	299	3738	7011	318	90	392	800	167	88	500	755	1555	8566		
U Turns	3			3	0			0	3	0			0	0			0	0	3		
Total	300	2650	326	3276	440	2999	299	3738	7014	318	90	392	800	167	88	500	755	1555	8569		
EQ 12Hr	417	3683	453	4553	612	4169	416	5197	9750	442	125	545	1112	232	122	695	1049	2161	11911		
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39							
AVG 12Hr	375	3315	408	4098	551	3752	374	4677	8775	398	112	490	1000	209	110	626	945	1945	10720		
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														.90							
AVG 24Hr	491	4343	534	5368	722	4915	490	6127	11495	521	147	642	1310	274	144	820	1238	2548	14043		
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

CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

CARP RD										HOBIN ST/MCCOOEY LANE											
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	77	9	88	12	61	4	77	165	17	0	8	25	0	1	11	12	37	202		
07:15-07:30	0	99	3	102	10	55	5	70	172	17	4	13	34	2	0	16	18	52	224		
07:30-07:45	5	94	5	104	4	68	4	76	180	21	2	18	41	3	1	8	12	53	233		
07:45-08:00	4	82	10	96	14	71	4	89	185	17	2	24	43	5	1	8	14	57	242		
08:00-08:15	8	88	8	104	14	68	7	89	193	13	4	17	34	3	0	15	18	52	245		
08:15-08:30	2	96	3	101	6	74	3	83	184	10	5	13	28	1	0	13	14	42	226		
08:30-08:45	6	86	2	94	16	69	5	90	184	11	4	10	25	0	1	11	12	37	221		
08:45-09:00	8	73	10	91	12	82	2	96	187	9	3	12	24	4	1	10	15	39	226		
09:00-09:15	9	82	9	100	15	70	6	91	191	17	3	17	37	1	2	14	17	54	245		
09:15-09:30	4	87	15	106	14	92	2	108	214	17	3	10	30	2	2	13	17	47	261		
09:30-09:45	7	79	9	95	8	70	2	80	175	9	1	12	22	7	1	15	23	45	220		
09:45-10:00	7	69	10	86	13	61	1	75	161	8	0	10	18	0	1	12	13	31	192		
11:30-11:45	5	82	17	104	12	80	4	96	200	10	5	12	27	4	2	16	22	49	249		
11:45-12:00	4	69	12	85	18	117	6	141	226	4	0	6	10	4	3	20	27	37	263		
12:00-12:15	7	95	18	120	18	90	3	111	231	6	2	8	16	6	1	25	32	48	279		
12:15-12:30	9	65	13	87	17	81	6	104	191	6	4	7	17	6	2	25	33	50	241		
12:30-12:45	7	53	8	68	19	82	6	107	175	5	1	8	14	10	0	28	38	52	227		
12:45-13:00	7	93	14	114	21	103	10	134	248	8	1	12	21	5	9	19	33	54	302		
13:00-13:15	9	84	11	104	20	72	6	98	202	4	1	12	17	5	1	11	17	34	236		
13:15-13:30	7	64	6	77	13	88	6	107	184	6	4	11	21	12	4	22	38	59	243		
15:00-15:15	7	87	10	104	12	111	9	132	236	9	4	10	23	9	2	7	18	41	277		
15:15-15:30	10	71	12	93	12	111	14	137	230	1	2	10	13	4	2	18	24	37	267		
15:30-15:45	10	103	11	124	13	107	20	140	264	3	5	10	18	7	4	22	33	51	315		
15:45-16:00	12	92	15	119	14	111	16	141	260	11	2	17	30	4	5	25	34	64	324		
16:00-16:15	14	101	9	124	16	117	17	150	274	10	4	7	21	8	5	11	24	45	319		
16:15-16:30	17	78	14	109	14	134	16	164	273	12	3	12	27	7	4	15	26	53	326		
16:30-16:45	18	89	8	115	19	124	16	159	274	15	4	14	33	12	7	16	35	68	342		
16:45-17:00	11	94	7	112	16	132	20	168	280	10	3	12	25	6	7	16	29	54	334		
17:00-17:15	20	82	10	112	12	134	16	162	274	8	3	15	26	10	5	13	28	54	328		
17:15-17:30	21	78	19	118	14	125	21	160	278	10	8	13	31	7	6	22	35	66	344		
17:30-17:45	21	82	10	113	8	129	26	163	276	6	2	18	26	6	4	15	25	51	327		
17:45-18:00	22	76	9	107	14	110	16	140	247	8	1	14	23	7	4	8	19	42	289		
Total:	300	2650	326	3276	440	2999	299	3738	7014	318	90	392	800	167	88	500	755	1555	8569		

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEYE LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

		CARP RD			HOBIN ST/MCCOOEYE LANE			Grand Total
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15		0	0	0	0	0	0	0
07:15 07:30		0	1	1	0	0	0	1
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	1	1	0	0	0	1
09:30 09:45		0	1	1	0	0	0	1
09:45 10:00		0	2	2	0	1	1	3
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	1	1	0	0	0	1
12:15 12:30		1	0	1	0	0	0	1
12:30 12:45		0	0	0	0	0	0	0
12:45 13:00		0	0	0	1	0	1	1
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	1	0	1	1
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		1	0	1	0	0	0	1
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		2	6	8	2	1	3	11



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEYE LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

		CARP RD			HOBIN ST/MCCOOEYE LANE			Grand Total
Time Period		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	
07:00 07:15		0	0	0	0	1	1	1
07:15 07:30		0	1	1	1	0	1	2
07:30 07:45		2	1	3	1	0	1	4
07:45 08:00		0	0	0	1	0	1	1
08:00 08:15		5	0	5	1	0	1	6
08:15 08:30		0	0	0	0	2	2	2
08:30 08:45		0	1	1	0	0	0	1
08:45 09:00		0	0	0	0	0	0	0
09:00 09:15		0	0	0	2	0	2	2
09:15 09:30		0	0	0	0	0	0	0
09:30 09:45		0	1	1	0	3	3	4
09:45 10:00		0	2	2	1	0	1	3
11:30 11:45		0	0	0	1	0	1	1
11:45 12:00		0	1	1	0	0	0	1
12:00 12:15		1	0	1	0	2	2	3
12:15 12:30		1	0	1	0	0	0	1
12:30 12:45		0	1	1	1	1	2	3
12:45 13:00		2	0	2	0	2	2	4
13:00 13:15		1	1	2	1	1	2	4
13:15 13:30		4	1	5	3	1	4	9
15:00 15:15		1	0	1	0	3	3	4
15:15 15:30		1	0	1	0	1	1	2
15:30 15:45		3	1	4	0	3	3	7
15:45 16:00		2	0	2	0	0	0	2
16:00 16:15		1	0	1	1	2	3	4
16:15 16:30		2	0	2	0	1	1	3
16:30 16:45		2	2	4	1	4	5	9
16:45 17:00		0	0	0	0	3	3	3
17:00 17:15		0	0	0	2	0	2	2
17:15 17:30		1	0	1	3	0	3	4
17:30 17:45		1	1	2	0	0	0	2
17:45 18:00		3	0	3	1	0	1	4
Total		33	14	47	21	30	51	98



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

CARP RD										HOBIN ST/MCCOOEYE LANE										
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	4	0	4	1	11	1	13	17	0	0	0	0	0	0	0	0	17	
07:15	07:30	0	6	0	6	1	6	1	8	14	0	0	0	0	0	0	2	2	16	
07:30	07:45	0	3	0	3	0	8	0	8	11	0	0	1	1	0	0	0	1	12	
07:45	08:00	0	10	1	11	2	3	0	5	16	0	0	0	0	1	0	0	1	17	
08:00	08:15	1	8	1	10	1	7	1	9	19	0	0	0	0	0	0	2	2	21	
08:15	08:30	0	3	0	3	0	3	0	3	6	0	0	0	0	1	0	1	2	8	
08:30	08:45	0	7	0	7	2	3	0	5	12	0	0	0	0	0	0	1	1	13	
08:45	09:00	1	4	0	5	0	8	0	8	13	0	0	0	0	0	0	0	0	13	
09:00	09:15	0	11	0	11	0	7	0	7	18	2	0	0	2	0	0	0	2	20	
09:15	09:30	0	8	1	9	1	5	0	6	15	0	0	0	0	0	0	0	0	15	
09:30	09:45	0	5	0	5	0	10	0	10	15	0	0	0	0	1	0	2	3	18	
09:45	10:00	0	9	0	9	0	3	0	3	12	0	0	0	0	0	0	0	0	12	
11:30	11:45	0	7	0	7	2	6	1	9	16	2	0	0	2	0	0	1	1	19	
11:45	12:00	0	4	2	6	0	9	0	9	15	0	0	0	0	0	0	0	0	15	
12:00	12:15	0	12	1	13	0	5	0	5	18	0	0	0	0	0	0	0	0	18	
12:15	12:30	0	5	0	5	0	2	0	2	7	1	0	0	1	0	0	0	1	8	
12:30	12:45	0	3	0	3	2	5	0	7	10	0	0	0	0	1	0	1	2	12	
12:45	13:00	0	9	1	10	0	7	1	8	18	0	0	0	0	0	0	1	1	19	
13:00	13:15	0	4	1	5	0	2	2	4	9	0	0	0	0	0	0	0	0	9	
13:15	13:30	0	7	0	7	0	11	0	11	18	0	1	0	1	1	0	0	1	2	20
15:00	15:15	0	4	0	4	0	5	0	5	9	0	0	0	0	0	0	0	0	9	
15:15	15:30	0	7	0	7	0	6	0	6	13	0	0	0	0	0	0	0	0	13	
15:30	15:45	0	4	0	4	0	3	0	3	7	0	0	0	0	1	0	0	1	8	
15:45	16:00	0	5	0	5	0	3	0	3	8	1	0	1	2	0	0	0	2	10	
16:00	16:15	0	4	0	4	1	5	0	6	10	0	0	0	0	0	0	0	0	10	
16:15	16:30	0	6	1	7	0	6	0	6	13	0	0	0	0	0	0	0	0	13	
16:30	16:45	1	8	0	9	0	6	0	6	15	0	0	0	0	0	0	0	0	15	
16:45	17:00	0	5	0	5	0	6	0	6	11	0	0	0	0	0	0	0	0	11	
17:00	17:15	0	4	0	4	0	2	0	2	6	0	0	0	0	0	0	0	0	6	
17:15	17:30	0	4	0	4	0	4	0	4	8	0	0	0	0	0	0	0	0	8	
17:30	17:45	0	2	0	2	0	3	0	3	5	0	0	0	0	0	0	0	0	5	
17:45	18:00	1	2	0	3	0	5	0	5	8	0	0	0	0	0	0	0	0	8	
Total:	None	4	184	9	197	13	175	7	195	392	6	1	2	9	6	0	11	17	26	418



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

		CARP RD				HOBIN ST/MCCOOEY LANE					
		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	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0	0	0	0
08:30	08:45	1	0	0	0	0	0	0	0	1	1
08:45	09:00	1	0	0	0	0	0	0	0	1	1
09:00	09:15	0	0	0	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0	0	0	0
12:15	12:30	1	0	0	0	0	0	0	0	1	1
12:30	12:45	0	0	0	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0	0	0	0
13:30	13:45	0	0	0	0	0	0	0	0	0	0
13:45	14:00	0	0	0	0	0	0	0	0	0	0
14:00	14:15	0	0	0	0	0	0	0	0	0	0
14:15	14:30	0	0	0	0	0	0	0	0	0	0
14:30	14:45	0	0	0	0	0	0	0	0	0	0
14:45	15:00	0	0	0	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0	0
Total		3	0	0	0	0	0	0	0	3	3



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



Carp Road & Echowoods Avenue/Kittiwake Drive Stittsville, ON

Survey Date: Wednesday, August 23, 2023 Start Time: 0700 AADT Factor: 0.9
Weather AM: Clear/Sunny 14° C Survey Duration: 8 Hrs. Survey Hours: 0700-1000, 1130-1330 & 1500-1800
Weather PM: Overcast 27° C Surveyor(s): T. Carmody

Kittiwake Dr.												Echowoods Ave.										Carp Rd.												Carp Rd.											
Eastbound												Westbound										Northbound												Southbound											
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total																						
0700-0800	185	4	18	0	207	19	7	92	0	118	325	6	723	15	0	744	24	445	31	0	500	1244	1569																						
0800-0900	183	16	25	0	224	47	14	123	0	184	408	20	819	30	0	869	36	535	47	0	618	1487	1895																						
0900-1000	129	9	16	0	154	29	12	70	0	111	265	13	637	18	0	668	24	524	61	0	609	1277	1542																						
1130-1230	156	23	35	0	214	29	10	60	0	99	313	32	645	21	0	698	46	670	101	0	817	1515	1828																						
1230-1330	141	20	34	0	195	28	10	47	0	85	280	31	654	21	0	706	42	700	78	0	820	1526	1806																						
1500-1600	99	27	16	0	142	38	8	53	0	99	241	32	672	35	1	740	92	760	83	0	935	1675	1916																						
1600-1700	103	20	40	0	163	49	19	90	0	158	321	39	752	48	0	839	94	827	124	0	1045	1884	2205																						
1700-1800	136	28	54	0	218	44	16	80	0	140	358	62	678	29	0	769	120	854	138	0	1112	1881	2239																						
Totals	1132	147	238	0	1517	283	96	615	0	994	2511	235	5580	217	1	6033	478	5315	663	0	6456	12489	15000																						

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor

Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 → 12 expansion factor of 1.39																							
Eq. 12 Hr	1573	204	331	0	2109	393	133	855	0	1382	3490	327	7756	302	1	8386	664	7388	922	0	8974	17360	20850

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9																							
AADT 12-hr	1416	184	298	0	1898	354	120	769	0	1243	3141	294	6981	271	1	7547	598	6649	829	0	8076	15624	18765

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 → 24 expansion factor of 1.31																							
AADT 24 Hr	1855	241	390	0	2486	464	157	1008	0	1629	4115	385	9145	356	2	9887	783	8710	1087	0	10580	20467	24582

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor ➡ 0.97											Highest Hourly Vehicle Volume Between 0700h & 1000h													
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0745-0845	205	17	25	0	247	52	13	112	0	177	424	17	820	25	0	862	33	533	46	0	612	1474	1898	
OFF Peak Hour Factor ➡ 0.98											Highest Hourly Vehicle Volume Between 1130h & 1330h													
OFF Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1145-1245	173	25	37	0	235	26	8	50	0	84	319	32	653	20	0	705	51	737	102	0	890	1595	1914	
PM Peak Hour Factor ➡ 0.94											Highest Hourly Vehicle Volume Between 1500h & 1800h													
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1630-1730	130	22	50	0	202	55	22	85	0	162	364	58	742	34	0	834	114	861	144	0	1119	1953	2317	

Comments:

OC Transpo and Para Transpo buses and school buses comprise 4.76% of the heavy vehicle traffic. The bicycle totals include 11 varieties of E-bicycles and E-scooters (stand-up types). A total of 6 bicycles and E-bicycles/E-scooters used the bicycle lane along the west side of Carp Road south of Kittiwake Drive.

Notes:

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

Printed on: 8/30/2023

Prepared by: thetrafficspecialist@gmail.com

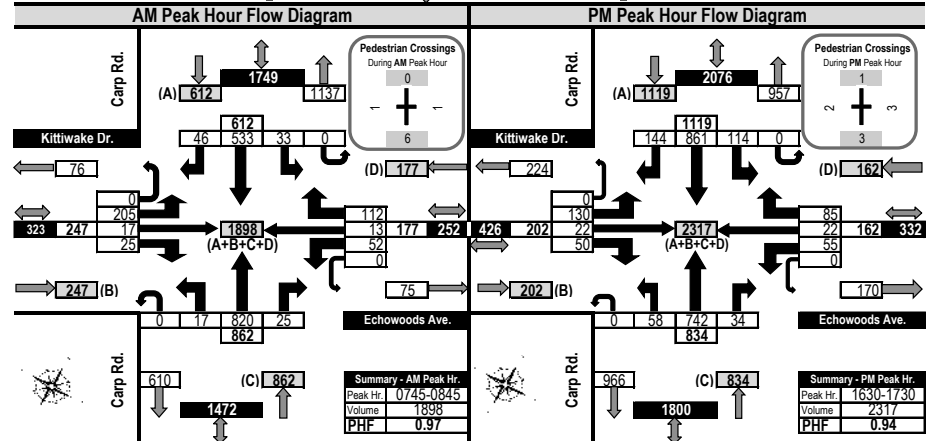
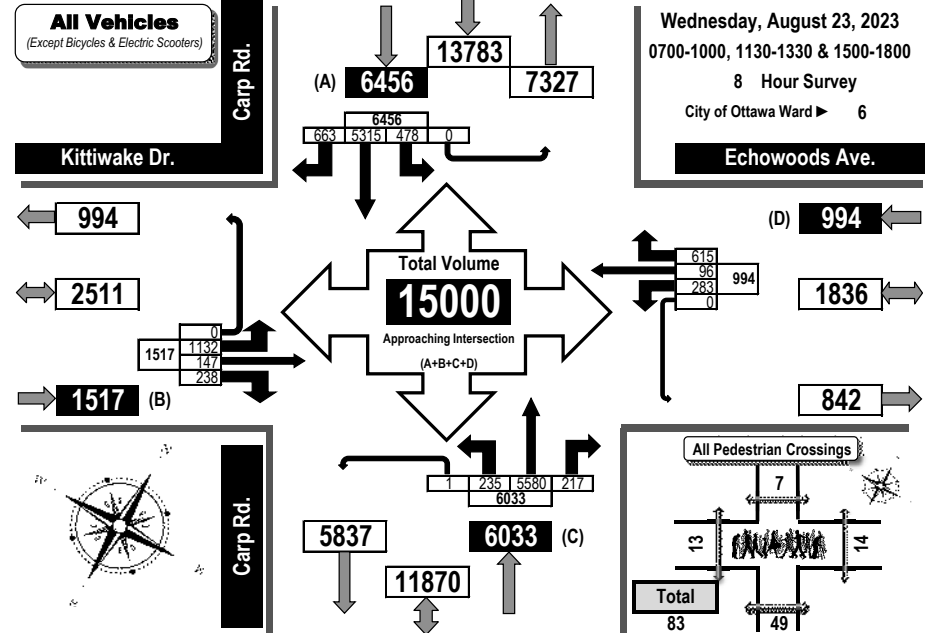
Summary: All Vehicles



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



Carp Road & Echowoods Avenue/Kittiwake Drive Stittsville, ON



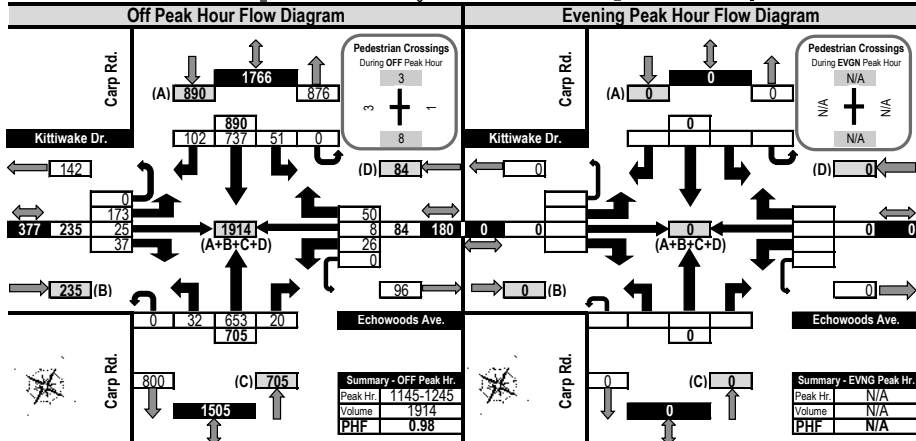
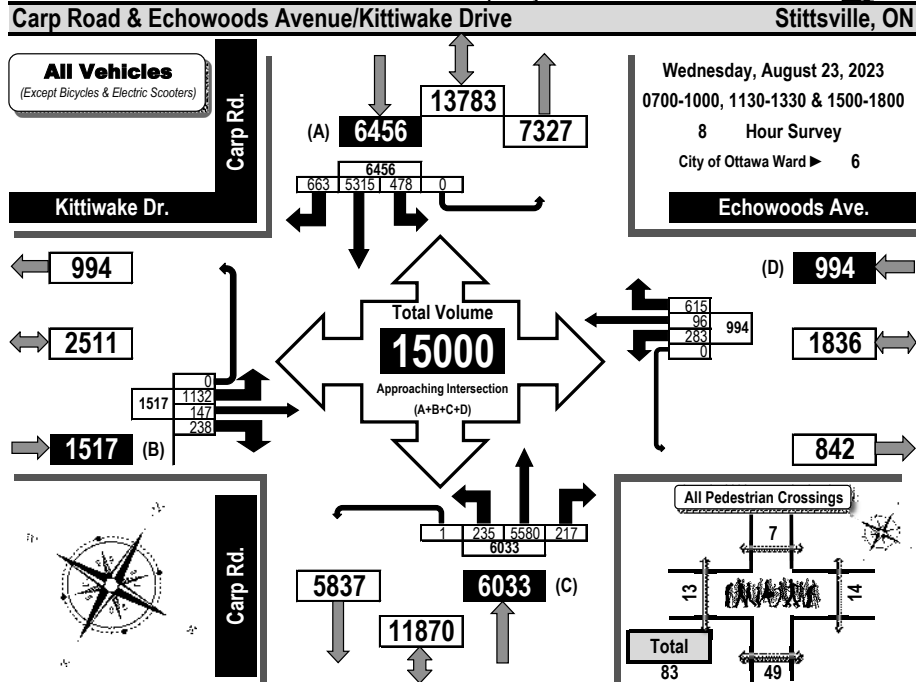
Printed on: 8/30/2023

Prepared by: thetrafficspecialist@gmail.com

Flow Diagrams: AM PM Peak



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



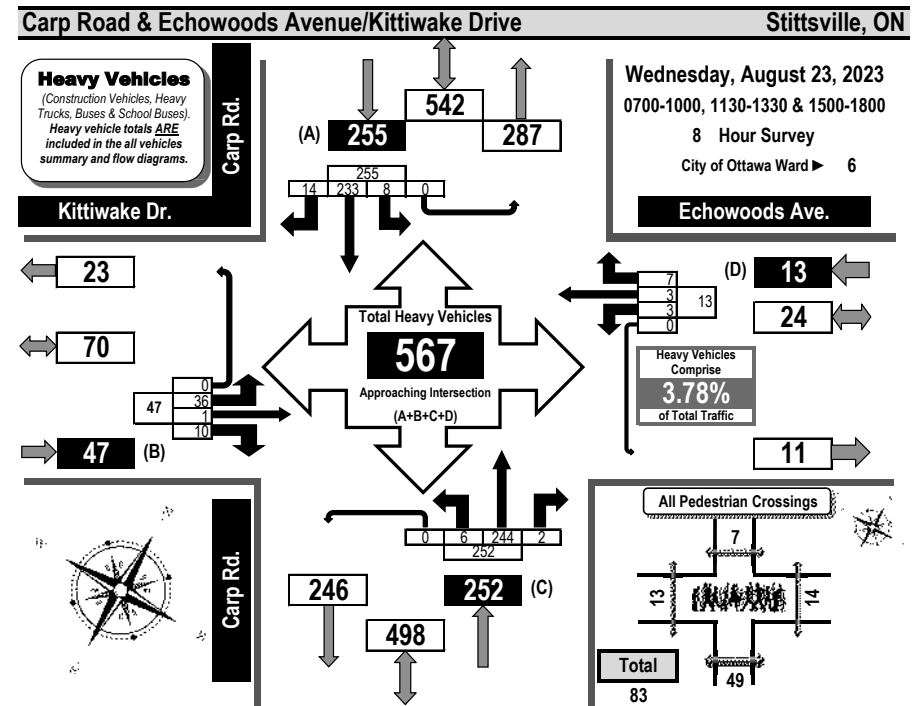
Printed on: 8/30/2023

Prepared by: thetrafficsspecialist@gmail.com

Flow Diagrams: OFF Peak



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



		Kittiwake Dr.					Echowoods Ave.					Carp Rd.					Carp Rd.				
		Eastbound					Westbound					Northbound					Southbound				
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	10	0	2	0	12	0	0	0	0	0	0	14	0	0	14	3	52	1	0	56	82
0800-0900	7	0	2	0	9	0	0	1	0	1	2	26	0	0	28	0	33	0	0	33	71
0900-1000	3	1	0	0	4	0	1	1	0	2	0	33	0	0	33	0	38	1	0	39	78
1130-1230	8	0	4	0	12	1	2	1	0	4	1	36	1	0	38	2	34	2	0	38	92
1230-1330	4	0	0	0	4	0	0	0	0	0	2	42	0	0	44	1	34	2	0	37	85
1500-1600	3	0	1	0	4	1	0	2	0	3	1	33	1	0	35	1	19	2	0	22	64
1600-1700	0	0	0	0	0	0	0	0	0	0	0	42	0	0	42	1	15	2	0	18	60
1700-1800	1	0	1	0	2	1	0	2	0	3	0	18	0	0	18	0	8	4	0	12	35
Totals	36	1	10	0	47	3	3	7	0	13	6	244	2	0	252	8	233	14	0	255	567

Comments:

OC Transpo and Para Transpo buses and school buses comprise 4.76% of the heavy vehicle traffic. The bicycle totals include 11 varieties of E-bicycles and E-scooters (stand-up types). A total of 6 bicycles and E-bicycles/E-scooters used the bicycle lane along the west side of Carp Road south of Kittiwake Drive.

Printed on: 8/30/2023

Prepared by: thetrafficsspecialist@gmail.com

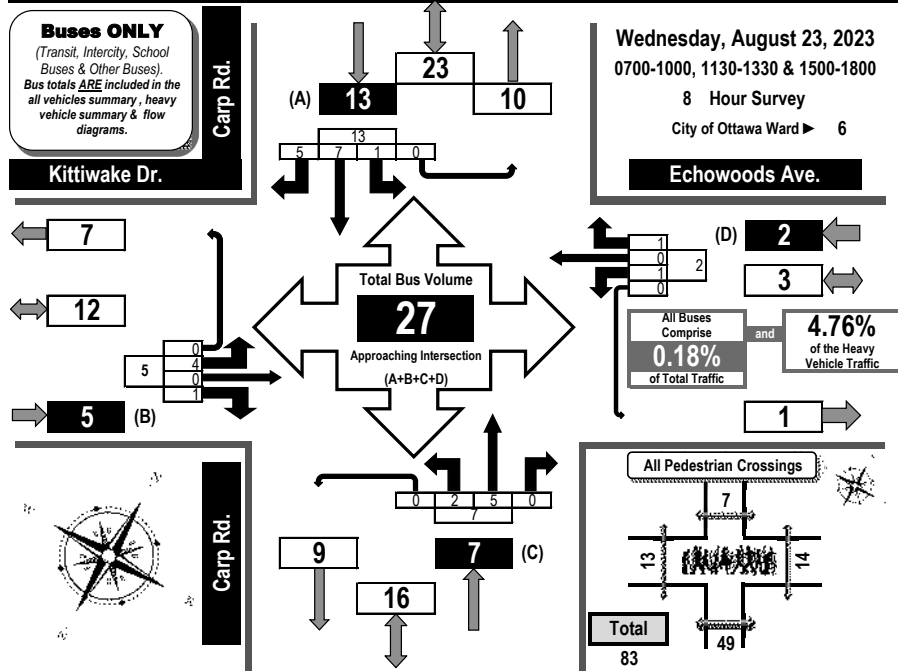
Summary: Heavy Vehicles



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



Carp Road & Echowoods Avenue/Kittiwake Drive Stittsville, ON



Time Period	Kittiwake Dr. Eastbound				Echowoods Ave. Westbound				Carp Rd. Northbound				Carp Rd. Southbound				SB Tot	GR Tot
	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT		
0700-0800	2	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	1	3
0800-0900	1	0	0	0	1	0	0	1	0	1	0	0	1	0	2	0	0	2
0900-1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
1130-1230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
1230-1330	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
1500-1600	1	0	1	0	2	1	0	0	1	1	1	0	2	1	1	1	0	3
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	3
1700-1800	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	2	0	2
Totals	4	0	1	0	5	1	0	1	0	2	2	5	0	7	1	7	5	13

Comments:

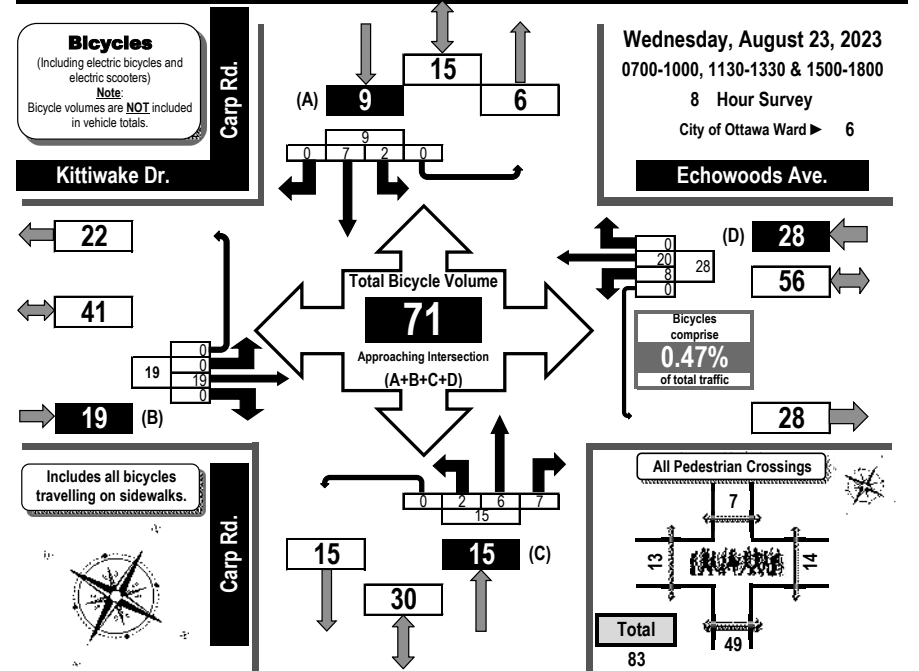
OC Transpo and Para Transpo buses and school buses comprise 4.76% of the heavy vehicle traffic. The bicycle totals include 11 varieties of E-bicycles and E-scooters (stand-up types). A total of 6 bicycles and E-bicycles/E-scooters used the bicycle lane along the west side of Carp Road south of Kittiwake Drive.



Turning Movement Count Bicycle Summary Flow Diagram



Carp Road & Echowoods Avenue/Kittiwake Drive Stittsville, ON



Time Period	Kittiwake Dr. Eastbound				Echowoods Ave. Westbound				Carp Rd. Northbound				Carp Rd. Southbound				SB Tot	GR Tot
	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT	LT	ST	RT	UT		
0700-0800	0	2	0	0	2	0	0	0	0	1	4	0	0	5	1	0	0	1
0800-0900	0	1	0	0	1	1	2	0	3	0	2	0	0	2	0	0	0	0
0900-1000	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	2
1130-1230	0	3	0	0	3	2	6	0	8	1	0	3	0	4	0	1	0	1
1230-1330	0	6	0	0	6	1	3	0	4	0	0	2	0	2	0	0	0	0
1500-1600	0	1	0	0	1	1	3	0	4	0	0	2	0	2	0	1	0	1
1600-1700	0	2	0	0	2	2	2	0	4	0	0	0	0	0	0	1	0	1
1700-1800	0	4	0	0	4	0	4	0	4	0	0	0	0	0	1	3	0	4
Totals	0	19	0	0	19	8	20	0	28	2	6	7	0	15	2	7	0	9

Comments:

OC Transpo and Para Transpo buses and school buses comprise 4.76% of the heavy vehicle traffic. The bicycle totals include 11 varieties of E-bicycles and E-scooters (stand-up types). A total of 6 bicycles and E-bicycles/E-scooters used the bicycle lane along the west side of Carp Road south of Kittiwake Drive.



Turning Movement Count Pedestrian Crossings Summary and Flow Diagram



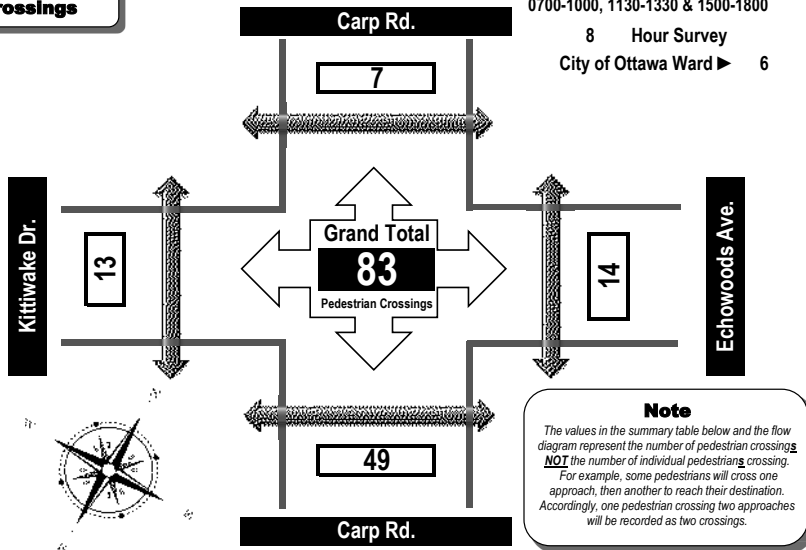
Carp Road & Echowoods Avenue/Kittiwake Drive

Stittsville, ON

Pedestrian Crossings

Wednesday, August 23, 2023
0700-1000, 1130-1330 & 1500-1800

8 Hour Survey
City of Ottawa Ward 6



Time Period	West Side Crossing Kittiwake Dr.	East Side Crossing Echowoods Ave.	Street Total	South Side Crossing Carp Rd.	North Side Crossing Carp Rd.	Street Total	Grand Total
0700-0800	3	3	6	3	0	3	9
0800-0900	1	1	2	8	0	8	10
0900-1000	0	0	0	4	0	4	4
1130-1230	3	1	4	7	0	7	11
1230-1330	1	0	1	8	4	12	13
1500-1600	0	0	0	5	2	7	7
1600-1700	2	8	10	9	1	10	20
1700-1800	3	1	4	5	0	5	9
Totals	13	14	27	49	7	56	83

Comments:

OC Transpo and Para Transpo buses and school buses comprise 4.76% of the heavy vehicle traffic. The bicycle totals include 11 varieties of E-bicycles and E-scooters (stand-up types). A total of 6 bicycles and E-bicycles/E-scooters used the bicycle lane along the west side of Carp Road south of Kittiwake Drive.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEY LANE

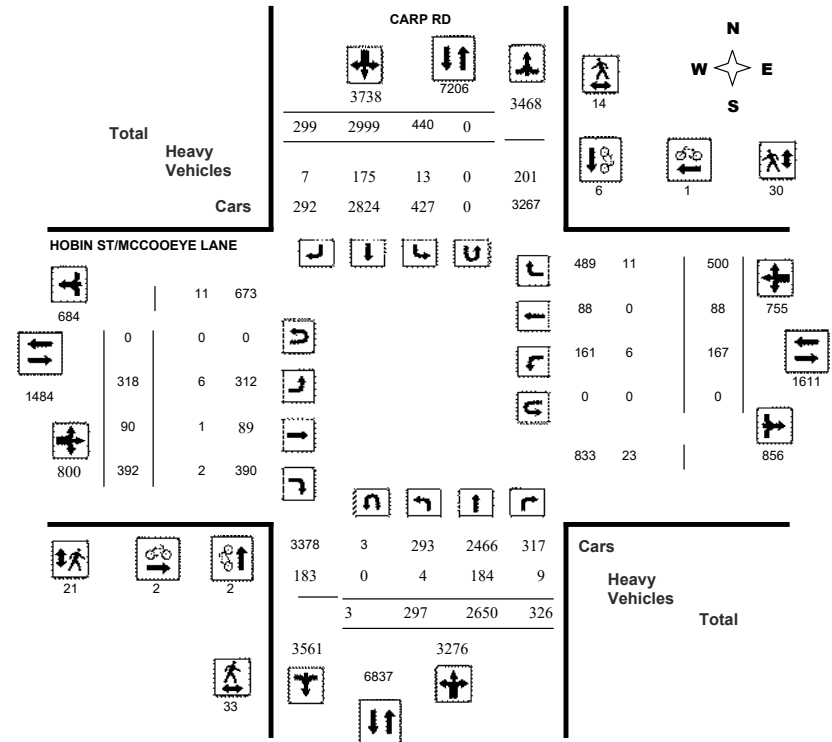
Survey Date: Thursday, May 04, 2017

Start Time: 07:00

WO No: 36998

Device: Miovision

Full Study Diagram





Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEY LANE

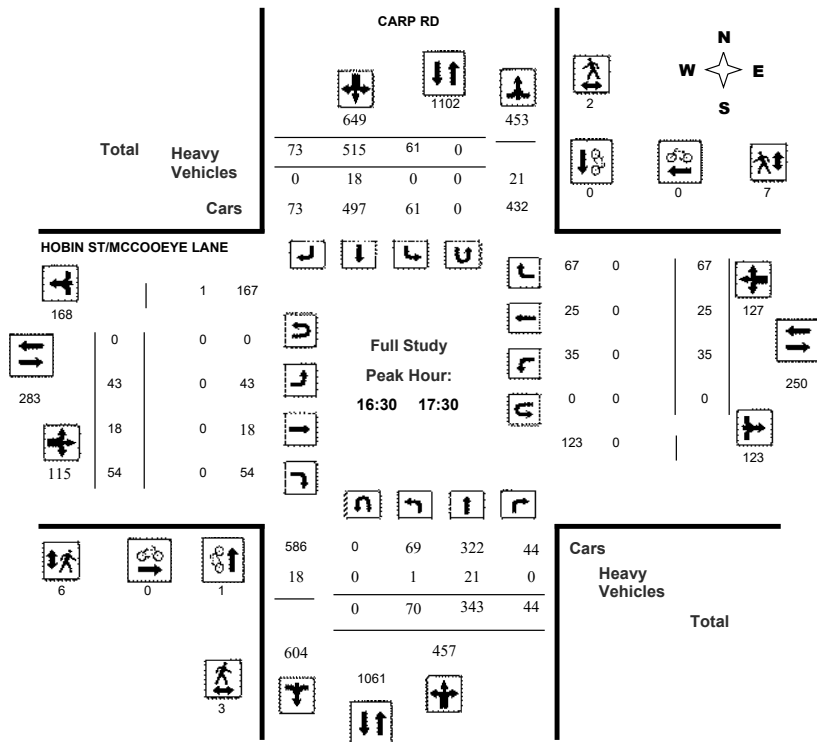
Survey Date: Thursday, May 04, 2017

Start Time: 07:00

WO No: 36998

Device: Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

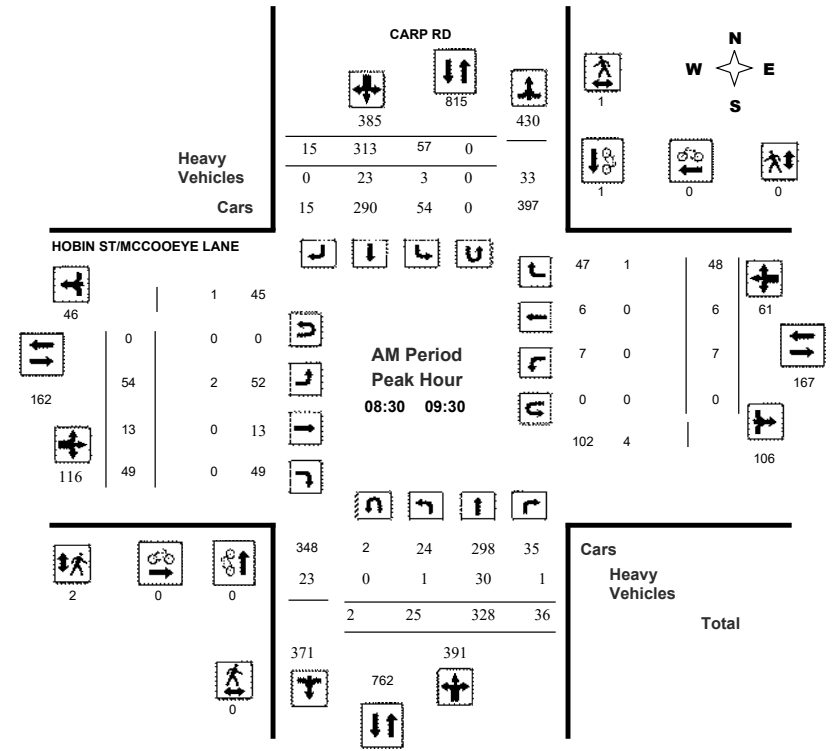
CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017

Start Time: 07:00

WO No: 36998

Device: Miovision



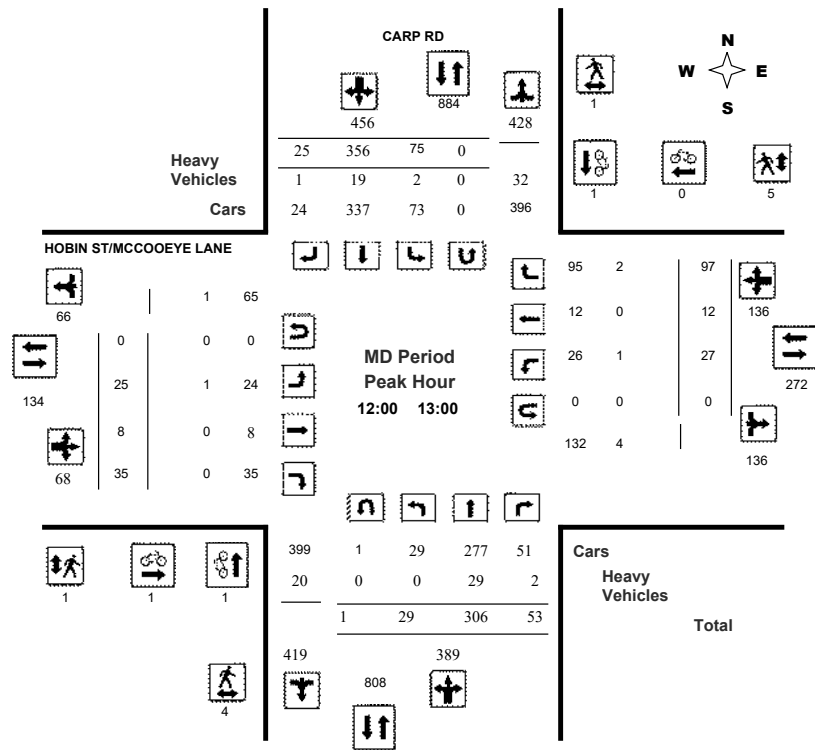
Comments



Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
CARP RD @ HOBIN ST/MCCOOEYE LANE

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

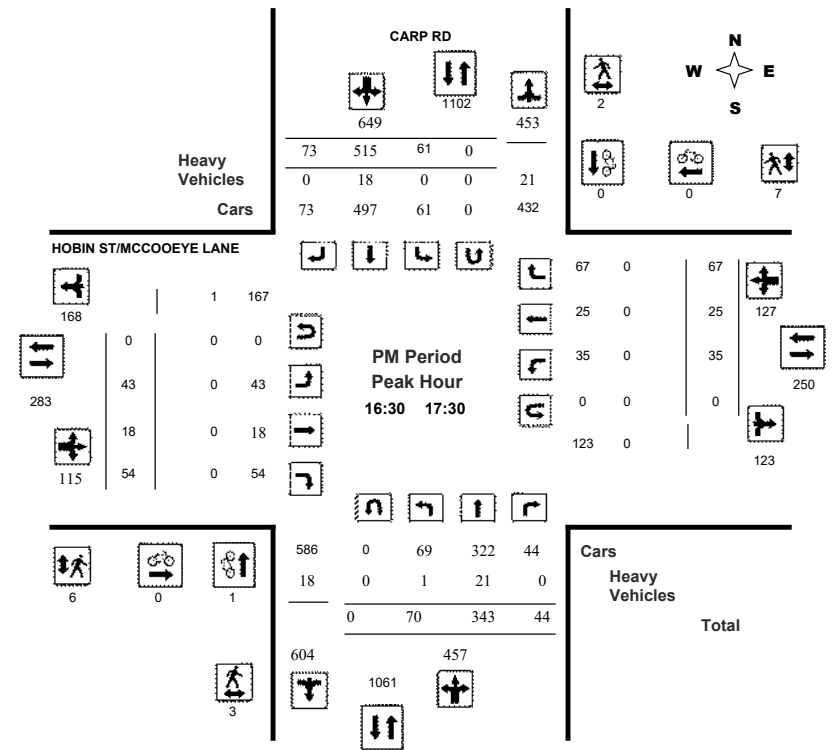
WO No: 36998
Device: Miovision



Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
CARP RD @ HOBIN ST/MCCOOEYE LANE

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

WO No: 36998
Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEYE LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, May 04, 2017

Total Observed U-Turns

AADT Factor

Northbound: 3 Southbound: 0

Eastbound: 0 Westbound: 0

.90

CARP RD										HOBIN ST/MCCOOEYE LANE											
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	11	352	27	390	40	255	17	312	702	72	8	63	143	10	3	43	56	199	901		
08:00 09:00	22	343	23	388	48	293	17	358	746	43	16	52	111	8	2	49	59	170	916		
09:00 10:00	27	317	43	387	50	293	11	354	741	51	7	49	107	10	6	54	70	177	918		
11:30 12:30	24	311	60	395	65	368	19	452	847	26	11	33	70	20	8	86	114	184	1031		
12:30 13:30	30	294	39	363	73	345	28	446	809	23	7	43	73	32	14	80	126	199	1008		
15:00 16:00	39	353	48	440	51	440	59	550	990	24	13	47	84	24	13	72	109	193	1183		
16:00 17:00	60	362	38	460	65	507	69	641	1101	47	14	45	106	33	23	58	114	220	1321		
17:00 18:00	84	318	48	450	48	498	79	625	1075	32	14	60	106	30	19	58	107	213	1288		
Sub Total	297	2650	326	3273	440	2999	299	3738	7011	318	90	392	800	167	88	500	755	1555	8566		
U Turns	3			3	0			0	3	0			0	0			0	0	3		
Total	300	2650	326	3276	440	2999	299	3738	7014	318	90	392	800	167	88	500	755	1555	8569		
EQ 12Hr	417	3683	453	4553	612	4169	416	5197	9750	442	125	545	1112	232	122	695	1049	2161	11911		
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39							
AVG 12Hr	375	3315	408	4098	551	3752	374	4677	8775	398	112	490	1000	209	110	626	945	1945	10720		
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														.90							
AVG 24Hr	491	4343	534	5368	722	4915	490	6127	11495	521	147	642	1310	274	144	820	1238	2548	14043		
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

CARP RD @ HOBIN ST/MCCOOEYE LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

CARP RD										HOBIN ST/MCCOOEYE LANE											
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	77	9	88	12	61	4	77	165	17	0	8	25	0	1	11	12	37	202		
07:15-07:30	0	99	3	102	10	55	5	70	172	17	4	13	34	2	0	16	18	52	224		
07:30-07:45	5	94	5	104	4	68	4	76	180	21	2	18	41	3	1	8	12	53	233		
07:45-08:00	4	82	10	96	14	71	4	89	185	17	2	24	43	5	1	8	14	57	242		
08:00-08:15	8	88	8	104	14	68	7	89	193	13	4	17	34	3	0	15	18	52	245		
08:15-08:30	2	96	3	101	6	74	3	83	184	10	5	13	28	1	0	13	14	42	226		
08:30-08:45	6	86	2	94	16	69	5	90	184	11	4	10	25	0	1	11	12	37	221		
08:45-09:00	8	73	10	91	12	82	2	96	187	9	3	12	24	4	1	10	15	39	226		
09:00-09:15	9	82	9	100	15	70	6	91	191	17	3	17	37	1	2	14	17	54	245		
09:15-09:30	4	87	15	106	14	92	2	108	214	17	3	10	30	2	2	13	17	47	261		
09:30-09:45	7	79	9	95	8	70	2	80	175	9	1	12	22	7	1	15	23	45	220		
09:45-10:00	7	69	10	86	13	61	1	75	161	8	0	10	18	0	1	12	13	31	192		
11:30-11:45	5	82	17	104	12	80	4	96	200	10	5	12	27	4	2	16	22	49	249		
11:45-12:00	4	69	12	85	18	117	6	141	226	4	0	6	10	4	3	20	27	37	263		
12:00-12:15	7	95	18	120	18	90	3	111	231	6	2	8	16	6	1	25	32	48	279		
12:15-12:30	9	65	13	87	17	81	6	104	191	6	4	7	17	6	2	25	33	50	241		
12:30-12:45	7	53	8	68	19	82	6	107	175	5	1	8	14	10	0	28	38	52	227		
12:45-13:00	7	93	14	114	21	103	10	134	248	8	1	12	21	5	9	19	33	54	302		
13:00-13:15	9	84	11	104	20	72	6	98	202	4	1	12	17	5	1	11	17	34	236		
13:15-13:30	7	64	6	77	13	88	6	107	184	6	4	11	21	12	4	22	38	59	243		
15:00-15:15	7	87	10	104	12	111	9	132	236	9	4	10	23	9	2	7	18	41	277		
15:15-15:30	10	71	12	93	12	111	14	137	230	1	2	10	13	4	2	18	24	37	267		
15:30-15:45	10	103	11	124	13	107	20	140	264	3	5	10	18	7	4	22	33	51	315		
15:45-16:00	12	92	15	119	14	111	16	141	260	11	2	17	30	4	5	25	34	64	324		
16:00-16:15	14	101	9	124	16	117	17	150	274	10	4	7	21	8	5	11	24	45	319		
16:15-16:30	17	78	14	109	14	134	16	164	273	12	3	12	27	7	4	15	26	53	326		
16:30-16:45	18	89	8	115	19	124	16	159	274	15	4	14	33	12	7	16	35	68	342		
16:45-17:00	11	94	7	112	16	132	20	168	280	10	3	12	25	6	7	16	29	54	334		
17:00-17:15	20	82	10	112	12	134	16	162	274	8	3	15	26	10	5	13	28	54	328		
17:15-17:30	21	78	19	118	14	125	21	160	278	10	8	13	31	7	6	22	35	66	344		
17:30-17:45	21	82	10	113	8	129	26	163	276	6	2	18	26	6	4	15	25	51	327		
17:45-18:00	22	76	9	107	14	110	16	140	247	8	1	14	23	7	4	8	19	42	289		
Total:	300	2650	326	3276	440	2999	299	3738	7014	318	90	392	800	167	88	500	755	1555	8569		

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEYE LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

		CARP RD			HOBIN ST/MCCOOEYE LANE			Grand Total
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15		0	0	0	0	0	0	0
07:15 07:30		0	1	1	0	0	0	1
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	1	1	0	0	0	1
09:30 09:45		0	1	1	0	0	0	1
09:45 10:00		0	2	2	0	1	1	3
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	1	1	0	0	0	1
12:15 12:30		1	0	1	0	0	0	1
12:30 12:45		0	0	0	0	0	0	0
12:45 13:00		0	0	0	1	0	1	1
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	1	0	1	1
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		1	0	1	0	0	0	1
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		2	6	8	2	1	3	11



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEYE LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

		CARP RD			HOBIN ST/MCCOOEYE LANE			Grand Total
Time Period		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	
07:00 07:15		0	0	0	0	1	1	1
07:15 07:30		0	1	1	1	0	1	2
07:30 07:45		2	1	3	1	0	1	4
07:45 08:00		0	0	0	1	0	1	1
08:00 08:15		5	0	5	1	0	1	6
08:15 08:30		0	0	0	0	2	2	2
08:30 08:45		0	1	1	0	0	0	1
08:45 09:00		0	0	0	0	0	0	0
09:00 09:15		0	0	0	2	0	2	2
09:15 09:30		0	0	0	0	0	0	0
09:30 09:45		0	1	1	0	3	3	4
09:45 10:00		0	2	2	1	0	1	3
11:30 11:45		0	0	0	1	0	1	1
11:45 12:00		0	1	1	0	0	0	1
12:00 12:15		1	0	1	0	2	2	3
12:15 12:30		1	0	1	0	0	0	1
12:30 12:45		0	1	1	1	1	2	3
12:45 13:00		2	0	2	0	2	2	4
13:00 13:15		1	1	2	1	1	2	4
13:15 13:30		4	1	5	3	1	4	9
15:00 15:15		1	0	1	0	3	3	4
15:15 15:30		1	0	1	0	1	1	2
15:30 15:45		3	1	4	0	3	3	7
15:45 16:00		2	0	2	0	0	0	2
16:00 16:15		1	0	1	1	2	3	4
16:15 16:30		2	0	2	0	1	1	3
16:30 16:45		2	2	4	1	4	5	9
16:45 17:00		0	0	0	0	3	3	3
17:00 17:15		0	0	0	2	0	2	2
17:15 17:30		1	0	1	3	0	3	4
17:30 17:45		1	1	2	0	0	0	2
17:45 18:00		3	0	3	1	0	1	4
Total		33	14	47	21	30	51	98



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

CARP RD										HOBIN ST/MCCOOEYE LANE										
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	4	0	4	1	11	1	13	17	0	0	0	0	0	0	0	0	17	
07:15	07:30	0	6	0	6	1	6	1	8	14	0	0	0	0	0	0	2	2	16	
07:30	07:45	0	3	0	3	0	8	0	8	11	0	0	1	1	0	0	0	1	12	
07:45	08:00	0	10	1	11	2	3	0	5	16	0	0	0	0	1	0	0	1	17	
08:00	08:15	1	8	1	10	1	7	1	9	19	0	0	0	0	0	0	2	2	21	
08:15	08:30	0	3	0	3	0	3	0	3	6	0	0	0	0	1	0	1	2	8	
08:30	08:45	0	7	0	7	2	3	0	5	12	0	0	0	0	0	0	1	1	13	
08:45	09:00	1	4	0	5	0	8	0	8	13	0	0	0	0	0	0	0	0	13	
09:00	09:15	0	11	0	11	0	7	0	7	18	2	0	0	2	0	0	0	2	20	
09:15	09:30	0	8	1	9	1	5	0	6	15	0	0	0	0	0	0	0	0	15	
09:30	09:45	0	5	0	5	0	10	0	10	15	0	0	0	0	1	0	2	3	18	
09:45	10:00	0	9	0	9	0	3	0	3	12	0	0	0	0	0	0	0	0	12	
11:30	11:45	0	7	0	7	2	6	1	9	16	2	0	0	2	0	0	1	1	3	19
11:45	12:00	0	4	2	6	0	9	0	9	15	0	0	0	0	0	0	0	0	15	
12:00	12:15	0	12	1	13	0	5	0	5	18	0	0	0	0	0	0	0	0	18	
12:15	12:30	0	5	0	5	0	2	0	2	7	1	0	0	1	0	0	0	1	8	
12:30	12:45	0	3	0	3	2	5	0	7	10	0	0	0	0	1	0	1	2	12	
12:45	13:00	0	9	1	10	0	7	1	8	18	0	0	0	0	0	0	1	1	19	
13:00	13:15	0	4	1	5	0	2	2	4	9	0	0	0	0	0	0	0	0	9	
13:15	13:30	0	7	0	7	0	11	0	11	18	0	1	0	1	1	0	0	1	2	20
15:00	15:15	0	4	0	4	0	5	0	5	9	0	0	0	0	0	0	0	0	9	
15:15	15:30	0	7	0	7	0	6	0	6	13	0	0	0	0	0	0	0	0	13	
15:30	15:45	0	4	0	4	0	3	0	3	7	0	0	0	0	1	0	0	1	8	
15:45	16:00	0	5	0	5	0	3	0	3	8	1	0	1	2	0	0	0	2	10	
16:00	16:15	0	4	0	4	1	5	0	6	10	0	0	0	0	0	0	0	0	10	
16:15	16:30	0	6	1	7	0	6	0	6	13	0	0	0	0	0	0	0	0	13	
16:30	16:45	1	8	0	9	0	6	0	6	15	0	0	0	0	0	0	0	0	15	
16:45	17:00	0	5	0	5	0	6	0	6	11	0	0	0	0	0	0	0	0	11	
17:00	17:15	0	4	0	4	0	2	0	2	6	0	0	0	0	0	0	0	0	6	
17:15	17:30	0	4	0	4	0	4	0	4	8	0	0	0	0	0	0	0	0	8	
17:30	17:45	0	2	0	2	0	3	0	3	5	0	0	0	0	0	0	0	0	5	
17:45	18:00	1	2	0	3	0	5	0	5	8	0	0	0	0	0	0	0	0	8	
Total:	None	4	184	9	197	13	175	7	195	392	6	1	2	9	6	0	11	17	26	418



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ HOBIN ST/MCCOOEY LANE

Survey Date: Thursday, May 04, 2017

WO No: 36998

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

		CARP RD				HOBIN ST/MCCOOEY LANE					
		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	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0	0	0	0
08:30	08:45	1	0	0	0	0	0	0	0	1	1
08:45	09:00	1	0	0	0	0	0	0	0	1	1
09:00	09:15	0	0	0	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0	0	0	0
12:15	12:30	1	0	0	0	0	0	0	0	1	1
12:30	12:45	0	0	0	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0	0	0	0
13:30	13:45	0	0	0	0	0	0	0	0	0	0
13:45	14:00	0	0	0	0	0	0	0	0	0	0
14:00	14:15	0	0	0	0	0	0	0	0	0	0
14:15	14:30	0	0	0	0	0	0	0	0	0	0
14:30	14:45	0	0	0	0	0	0	0	0	0	0
14:45	15:00	0	0	0	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0	0	0	0
Total		3	0	0	0	0	0	0	0	3	3



Transportation Services - Traffic Services

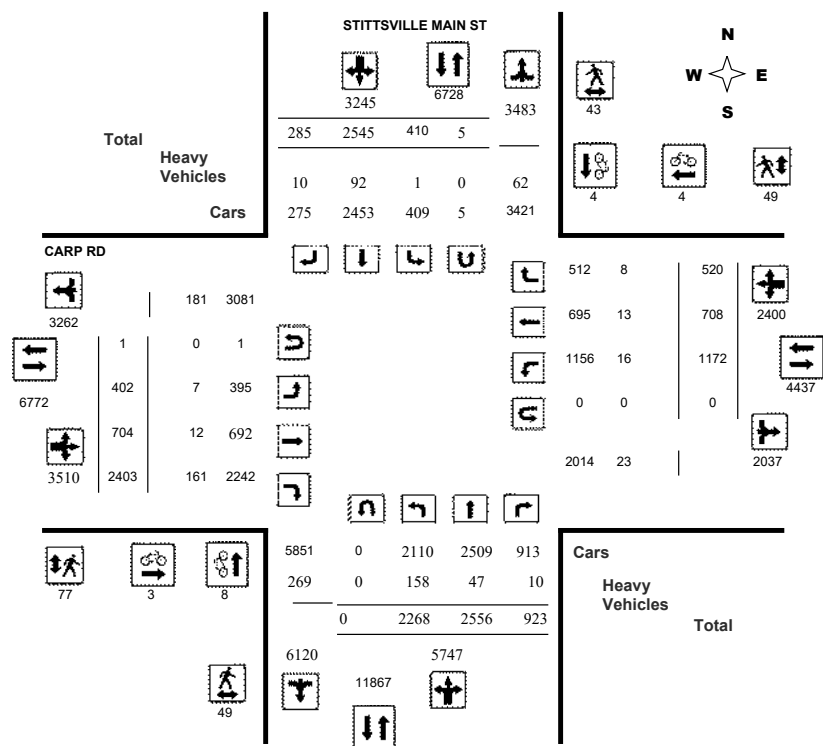
Turning Movement Count - Study Results

CARP RD @ STITTSVILLE MAIN ST

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

WO No: 36999
Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

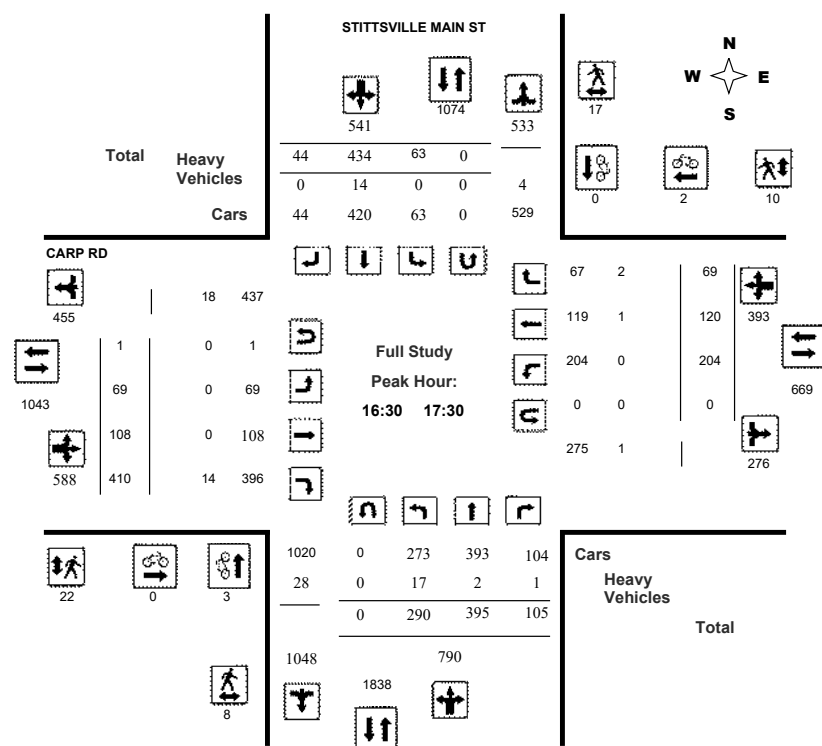
Turning Movement Count - Study Results

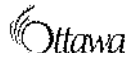
CARP RD @ STITTSVILLE MAIN ST

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

WO No: 36999
Device: Miovision

Full Study Peak Hour Diagram

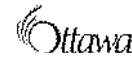
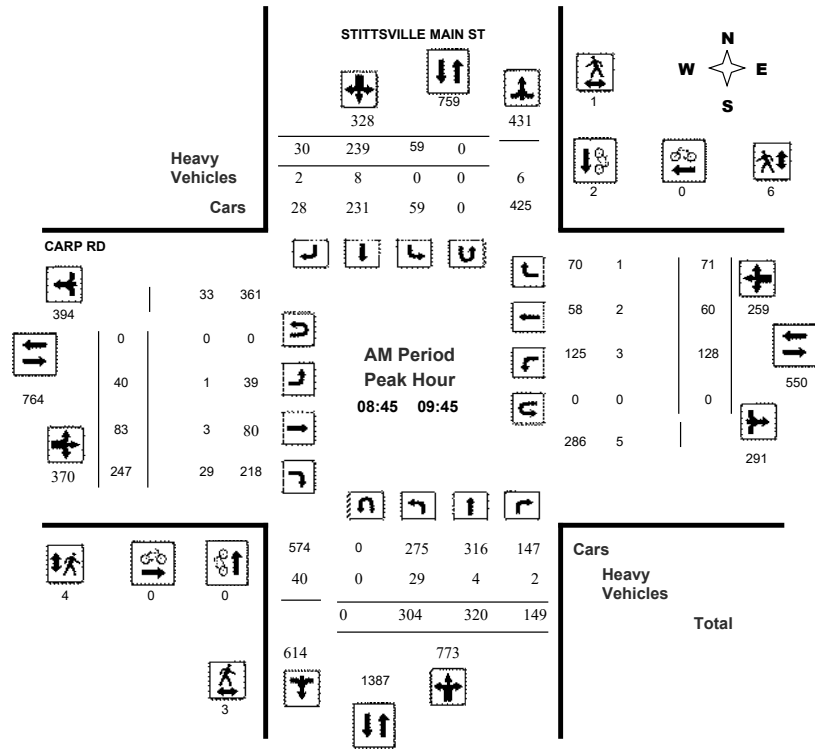




Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
CARP RD @ STITTVILLE MAIN ST

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

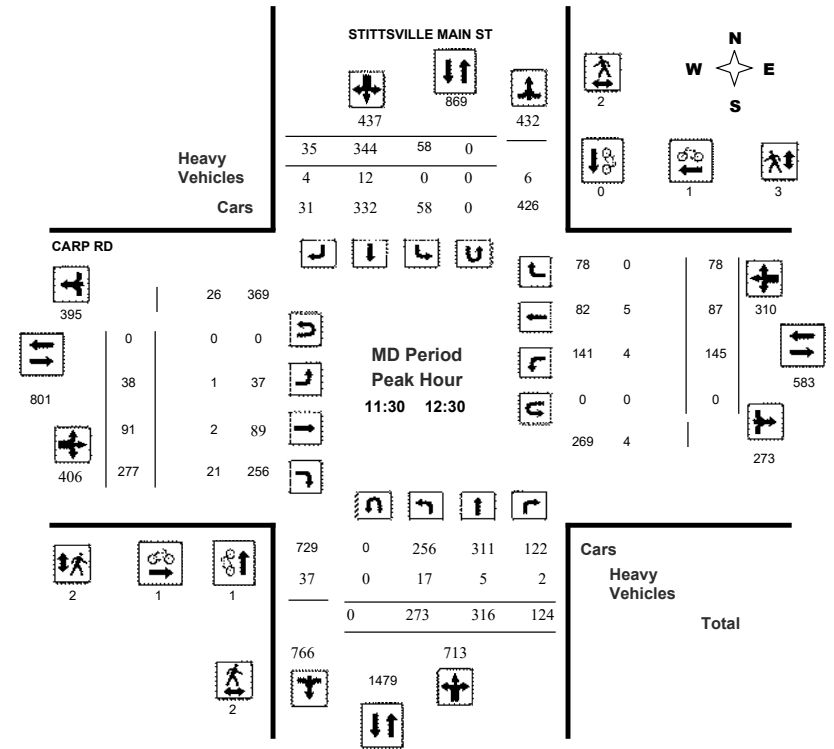
WO No: 36999
Device: Miovision



Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
CARP RD @ STITTVILLE MAIN ST

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

WO No: 36999
Device: Miovision

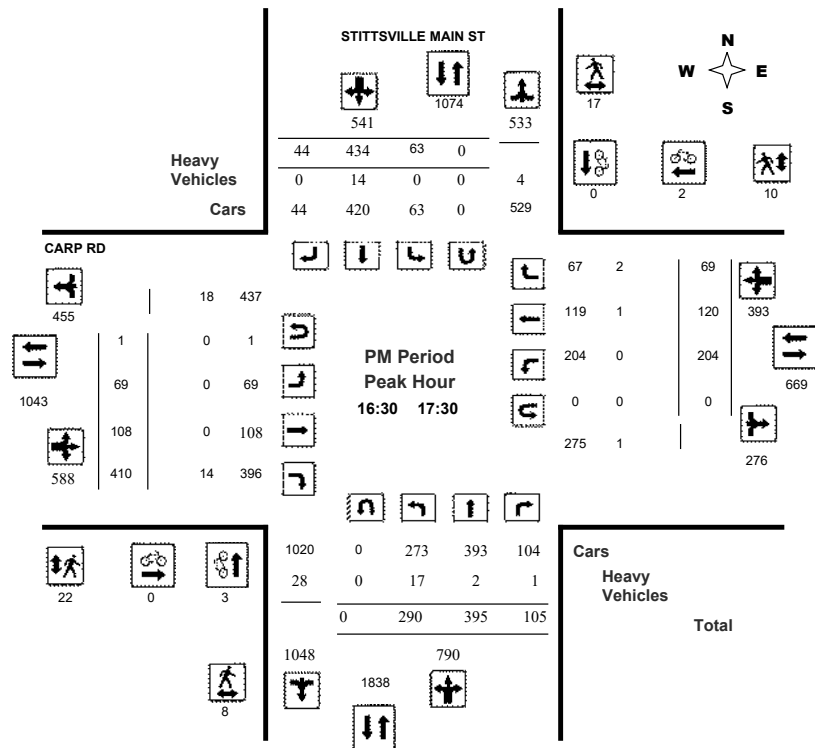




Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
CARP RD @ STITTSTVILLE MAIN ST

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

WO No: 36999
Device: Miovision



Transportation Services - Traffic Services
Turning Movement Count - Study Results
CARP RD @ STITTSTVILLE MAIN ST

Survey Date: Thursday, May 04, 2017
Start Time: 07:00

WO No: 36999
Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, May 04, 2017

Total Observed U-Turns
Northbound: 0 Southbound: 5
Eastbound: 1 Westbound: 0
AADT Factor
.90

STITTSTVILLE MAIN ST										CARP 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	314	238	118	670	32	160	25	217	887	47	59	218	324	75	56	52	183	507	1394
08:00 09:00	304	288	124	716	48	222	21	291	1007	40	72	239	351	94	65	56	215	566	1573
09:00 10:00	291	326	148	765	54	241	27	322	1087	43	76	229	348	128	66	74	268	616	1703
11:30 12:30	273	316	124	713	58	344	35	437	1150	38	91	277	406	145	87	78	310	716	1866
12:30 13:30	249	305	97	651	52	285	33	370	1021	56	85	277	418	163	78	79	320	738	1759
15:00 16:00	263	325	107	695	62	415	60	537	1232	54	98	356	508	179	118	60	357	865	2097
16:00 17:00	290	385	116	791	50	424	31	505	1296	65	112	390	567	197	126	57	380	947	2243
17:00 18:00	284	373	89	746	54	454	53	561	1307	59	111	417	587	191	112	64	367	954	2261
Sub Total	2268	2556	923	5747	410	2545	285	3240	8987	402	704	2403	3509	1172	708	520	2400	5909	14896
U Turns	0				5				5	1				0				1	6
Total	2268	2556	923	5747	410	2545	285	3245	8992	402	704	2403	3510	1172	708	520	2400	5910	14902
EQ 12Hr	3153	3553	1283	7988	570	3538	396	4511	12499	559	979	3340	4879	1629	984	723	3336	8215	20714
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39					
AVG 12Hr	2674	3014	1088	6776	483	3001	336	3826	11249	474	830	2833	4138	1382	835	613	2830	7394	18643
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														0.9					
AVG 24Hr	3503	3948	1426	8876	633	3931	440	5012	13888	621	1087	3711	5421	1810	1093	803	3707	9128	23016
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

CARP RD @ STITTSVILLE MAIN ST

Survey Date: Thursday, May 04, 2017

WO No: 36999

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

STITTSVILLE MAIN ST												CARP 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	75	45	27	147	5	38	6	49	7	9	11	48	68	13	12	11	36	7	300			
07:15	07:30	77	59	22	158	6	40	7	53	9	11	14	51	76	9	17	18	44	9	331			
07:30	07:45	83	65	33	181	7	32	7	46	10	12	13	58	83	25	14	9	48	10	358			
07:45	08:00	79	69	36	184	14	50	5	69	22	15	21	61	97	28	13	14	55	22	405			
08:00	08:15	85	79	34	198	8	43	6	57	13	12	20	53	85	23	13	13	49	13	389			
08:15	08:30	72	73	37	182	12	57	2	71	10	15	16	63	94	22	28	17	67	10	414			
08:30	08:45	80	69	27	176	7	57	3	67	10	7	17	54	78	19	8	16	43	10	364			
08:45	09:00	67	67	26	160	21	65	10	96	6	6	19	69	94	30	16	10	56	6	406			
09:00	09:15	83	76	46	205	16	52	6	74	17	9	21	54	84	33	16	14	63	17	426			
09:15	09:30	80	105	48	233	9	57	7	73	12	15	24	68	107	31	15	29	75	12	488			
09:30	09:45	74	72	29	175	13	65	7	85	10	10	19	56	85	34	13	18	65	10	410			
09:45	10:00	54	73	25	152	16	67	7	90	12	9	12	51	72	30	22	13	65	12	379			
11:30	11:45	77	68	35	180	9	83	7	99	6	10	27	54	91	30	18	24	72	6	442			
11:45	12:00	80	82	32	174	21	85	9	115	17	7	19	90	116	40	21	17	78	17	483			
12:00	12:15	80	80	32	192	14	94	12	120	11	8	25	72	105	41	29	19	89	11	506			
12:15	12:30	56	86	25	167	14	82	7	103	6	13	20	61	94	34	19	18	71	6	435			
12:30	12:45	52	90	33	175	9	59	5	73	9	17	18	66	101	43	11	18	72	9	421			
12:45	13:00	76	78	23	177	16	82	11	109	9	15	25	86	126	34	22	26	82	9	494			
13:00	13:15	72	76	26	174	16	71	11	98	10	10	21	56	87	51	22	17	90	10	449			
13:15	13:30	49	61	15	125	11	73	6	92	11	14	21	69	104	35	23	18	76	11	397			
15:00	15:15	64	79	32	175	16	105	16	139	12	13	23	89	125	43	23	10	76	12	515			
15:15	15:30	59	71	24	154	17	96	9	122	11	14	26	85	125	48	28	24	100	11	501			
15:30	15:45	66	83	21	170	18	115	21	154	9	12	22	93	127	50	35	15	100	9	551			
15:45	16:00	74	92	30	196	11	99	14	125	8	15	27	89	131	38	32	11	81	8	533			
16:00	16:15	83	87	30	200	12	90	14	116	8	14	19	95	128	43	29	16	88	8	532			
16:15	16:30	66	82	27	175	13	119	2	134	12	14	44	91	149	48	29	11	88	12	546			
16:30	16:45	75	108	23	206	15	106	6	127	10	21	25	105	152	53	34	13	100	10	585			
16:45	17:00	66	108	36	210	10	109	9	128	9	16	24	99	139	53	34	17	104	9	581			
17:00	17:15	73	107	17	197	21	108	14	143	8	16	28	115	159	54	28	15	97	8	596			
17:15	17:30	76	72	29	177	17	111	15	143	7	16	31	91	138	44	24	24	92	7	550			
17:30	17:45	68	86	26	180	8	112	14	134	3	19	29	114	162	53	33	15	101	3	577			
17:45	18:00	67	108	17	192	8	123	10	141	4	8	23	97	128	40	27	10	77	4	538			
Total:		2268	2556	923	5747	410	2545	285	3245	318	402	704	2403	3510	1172	708	520	2400	318	14,902			

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ STITTSVILLE MAIN ST

Survey Date: Thursday, May 04, 2017

WO No: 36999

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

STITTSVILLE MAIN ST				CARP RD			
Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 07:15	0	0	0	0	1	1	1
07:15 07:30	0	0	0	1	0	1	1
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	1	0	1	0	0	0	1
08:45 09:00	0	1	1	0	0	0	1
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	1	1	0	0	0	1
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	1	0	1	1
12:15 12:30	1	0	1	0	1	1	2
12:30 12:45	0	1	1	0	0	0	1
12:45 13:00	0	0	0	1	0	1	1
13:00 13:15	0	1	1	0	0	0	1
13:15 13:30	1	0	1	0	0	0	1
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	2	0	2	0	0	0	2
16:30 16:45	1	0	1	0	0	0	1
16:45 17:00	2	0	2	0	2	2	4
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	8	4	12	3	4	7	19



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ STITTSTVILLE MAIN ST

Survey Date: Thursday, May 04, 2017

WO No: 36999

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

STITTSTVILLE MAIN ST

CARP RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	2	0	2	2
07:15 07:30	0	0	0	0	1	1	1
07:30 07:45	0	0	0	0	1	1	1
07:45 08:00	3	0	3	0	0	0	3
08:00 08:15	3	2	5	1	0	1	6
08:15 08:30	0	0	0	2	0	2	2
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	1	1	1
09:00 09:15	0	1	1	1	3	4	5
09:15 09:30	3	0	3	2	2	4	7
09:30 09:45	0	0	0	1	0	1	1
09:45 10:00	3	2	5	2	0	2	7
11:30 11:45	1	0	1	2	0	2	3
11:45 12:00	1	0	1	0	2	2	3
12:00 12:15	0	1	1	0	1	1	2
12:15 12:30	0	1	1	0	0	0	1
12:30 12:45	4	1	5	3	2	5	10
12:45 13:00	1	0	1	3	2	5	6
13:00 13:15	4	0	4	5	0	5	9
13:15 13:30	1	1	2	2	2	4	6
15:00 15:15	2	4	6	2	4	6	12
15:15 15:30	1	1	2	7	2	9	11
15:30 15:45	2	3	5	3	2	5	10
15:45 16:00	5	4	9	7	0	7	16
16:00 16:15	6	3	9	3	6	9	18
16:15 16:30	1	1	2	5	1	6	8
16:30 16:45	4	4	8	8	2	10	18
16:45 17:00	2	7	9	9	3	12	21
17:00 17:15	1	3	4	1	2	3	7
17:15 17:30	1	3	4	4	3	7	11
17:30 17:45	0	1	1	1	6	7	8
17:45 18:00	0	0	0	1	1	2	2
Total	49	43	92	77	49	126	218



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ STITTSTVILLE MAIN ST

Survey Date: Thursday, May 04, 2017

WO No: 36999

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

STITTSTVILLE MAIN ST

CARP RD

Time Period	Northbound				Southbound				Eastbound				Westbound				Grand Total			
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT		W TOT	STR TOT	
07:00	07:15	5	1	0	6	0	1	0	1	7	0	0	12	12	0	0	0	0	12	19
07:15	07:30	3	1	0	4	0	5	0	5	9	0	0	4	4	0	1	1	2	6	15
07:30	07:45	4	3	1	8	0	2	0	2	10	0	2	7	9	1	1	0	2	11	21
07:45	08:00	8	6	1	15	0	7	0	7	22	1	1	2	4	2	1	2	5	9	31
08:00	08:15	9	4	0	13	0	0	0	0	13	1	1	4	6	1	0	0	1	7	20
08:15	08:30	2	2	2	6	1	3	0	4	10	1	0	3	4	0	0	1	1	5	15
08:30	08:45	5	1	0	6	0	4	0	4	10	0	0	4	4	0	0	0	0	4	14
08:45	09:00	4	1	0	5	0	1	0	1	6	0	1	7	8	1	1	0	2	10	16
09:00	09:15	12	1	1	14	0	3	0	3	17	0	0	7	7	0	0	0	0	7	24
09:15	09:30	7	1	1	9	0	2	1	3	12	0	0	6	6	0	1	1	2	8	20
09:30	09:45	6	1	0	7	0	2	1	3	10	1	2	9	12	2	0	0	2	14	24
09:45	10:00	6	2	0	8	0	4	0	4	12	0	1	5	6	0	1	0	1	7	19
11:30	11:45	2	0	1	3	0	1	2	3	6	0	2	6	8	1	1	0	2	10	16
11:45	12:00	7	2	1	10	0	6	1	7	17	0	0	10	10	1	1	0	2	12	29
12:00	12:15	6	1	0	7	0	3	1	4	11	0	0	4	4	1	3	0	4	8	19
12:15	12:30	2	2	0	4	0	2	0	2	6	1	0	1	2	1	0	0	1	3	9
12:30	12:45	4	3	0	7	0	2	0	2	9	1	1	5	7	0	0	1	1	8	17
12:45	13:00	4	1	0	5	0	1	3	4	9	0	0	7	7	2	0	0	2	9	18
13:00	13:15	5	2	0	7	0	3	0	3	10	0	0	1	1	0	1	0	1	2	12
13:15	13:30	6	2	0	8	0	3	0	3	11	0	1	11	12	2	0	0	2	14	25
15:00	15:15	3	2	1	6	0	6	0	6	12	0	0	4	4	0	0	0	0	4	16
15:15	15:30	7	0	0	7	0	3	1	4	11	0	0	6	6	1	0	0	1	7	18
15:30	15:45	3	1	0	4	0	5	0	5	9	0	0	4	4	0	0	0	0	4	13
15:45	16:00	4	0	0	4	0	4	0	4	8	0	0	5	5	0	0	0	0	5	13
16:00	16:15	4	2	0	6	0	2	0	2	8	1	0	0	1	0	0	0	0	1	9
16:15	16:30	8	1	0	9	0	3	0	3	12	0	0	5	5	0	0	0	0	5	17
16:30	16:45	7	0	0	7	0	3	0	3	10	0	0	4	4	0	0	0	0	4	14
16:45	17:00	4	1	0	5	0	4	0	4	9	0	0	5	5	0	0	1	1	6	15
17:00	17:15	2	1	0	3	0	5	0	5	8	0	0	2	2	0	1	0	1	3	11
17:15	17:30	4	0	1	5	0	2	0	2	7	0	0	3	3	0	0	1	1	4	11
17:30	17:45	2	1	0	3	0	0	0	0	3	0	0	3	3	0	0	0	0	3	6
17:45	18:00	3	1	0	4	0	0	0	0	4	0	0	5	5	0	0	0	0	5	9
Total: None		158	47	10	215	1	92	10	103	318	7	12	161	180	16	13	8	37	217	535



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARP RD @ STITTSVILLE MAIN ST

Survey Date: Thursday, May 04, 2017

WO No: 36999

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

STITTSVILLE MAIN ST

CARP RD

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	2	0	0	2
15:00	15:15	0	2	0	0	2
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	1	0	0	1
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	1	0	1
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	5	1	0	6

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

Existing

AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↖	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↑	↗	↖	↓	↖
Traffic Volume (vph)	5	129	17	66	92	13	30	11	173	21	10	3
Future Volume (vph)	5	129	17	66	92	13	30	11	173	21	10	3
Satd. Flow (prot)	1658	1685	0	1658	1670	0	0	1642	1483	1658	1689	0
Flt Permitted	0.682			0.654				0.775		0.728		
Satd. Flow (perm)	1190	1685	0	1141	1670	0	0	1319	1483	1270	1689	0
Satd. Flow (RTOR)		11			11				192		3	
Lane Group Flow (vph)	6	162	0	73	116	0	0	45	192	23	14	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4		4	8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	28.0	28.0		28.0	28.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		33.1	33.1	33.1	27.1	27.1	
Total Split (s)	48.0	48.0		48.0	48.0		37.0	37.0	37.0	37.0	37.0	
Total Split (%)	56.5%	56.5%		56.5%	56.5%		43.5%	43.5%	43.5%	43.5%	43.5%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
Act Effct Green (s)	44.7	44.7		44.7	44.7		10.3	10.3	10.3	10.3	10.3	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.15	0.15	0.15	0.15	0.15	
v/c Ratio	0.01	0.14		0.10	0.10		0.23	0.49	0.12	0.05		
Control Delay	4.2	4.5		4.7	4.2		26.7	9.2	24.9	21.2		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay	4.2	4.5		4.7	4.2		26.7	9.2	24.9	21.2		
LOS	A	A		A	A		C	A	C	C		
Approach Delay		4.5			4.4		12.5			23.5		
Approach LOS		A			A		B			C		
Queue Length 50th (m)	0.2	5.8		2.7	3.9		4.7	0.0	2.4	1.1		
Queue Length 95th (m)	1.2	12.1		6.8	8.9		12.7	15.0	8.0	5.4		
Internal Link Dist (m)		182.4			355.8		521.0			146.6		
Turn Bay Length (m)	66.0			98.0				10.0	24.5			
Base Capacity (vph)	788	1120		756	1110		608	787	585	780		
Starvation Cap Reductn	0	0		0	0		0	0	0	0		
Spillback Cap Reductn	0	0		0	0		0	0	0	0		
Storage Cap Reductn	0	0		0	0		0	0	0	0		
Reduced v/c Ratio	0.01	0.14		0.10	0.10		0.07	0.24	0.04	0.02		
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 67.5												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.49												

Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report
Page 1

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

Existing

AM Peak Hour

Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 71.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

↖ Ø2	↖ Ø4
48 s	37 s
↖ Ø6	↖ Ø8
48 s	37 s

Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report
Page 2

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

Existing

AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖	↖		↖		↖	↖	↖
Traffic Volume (vph)	29	398	0	0	172	1	0	0	0	4	0	4
Future Volume (vph)	29	398	0	0	172	1	0	0	0	4	0	4
Satd. Flow (prot)	1580	3283	0	1745	1712	1483	0	1745	0	0	1353	1483
Flt Permitted	0.637											
Satd. Flow (perm)	1060	3283	0	1745	1712	1483	0	1745	0	0	1424	1483
Satd. Flow (RTOR)					29							27
Lane Group Flow (vph)	32	442	0	0	191	1	0	0	0	0	4	4
Turn Type	Perm	NA		Perm	NA	Perm			custom	NA	custom	
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		30.1	30.1	30.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	90.0	90.0		90.0	90.0	90.0	35.0	35.0		35.0	35.0	35.0
Total Split (%)	72.0%	72.0%		72.0%	72.0%	72.0%	28.0%	28.0%		28.0%	28.0%	28.0%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.3	6.3		6.3	6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	120.5	120.5			120.5	120.5				10.0	10.0	
Actuated g/C Ratio	0.96	0.96			0.96	0.96				0.08	0.08	
v/c Ratio	0.03	0.14			0.12	0.00				0.04	0.03	
Control Delay	1.0	0.7			1.4	0.0				54.0	0.2	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	1.0	0.7			1.4	0.0				54.0	0.2	
LOS	A	A			A	A				D	A	
Approach Delay		0.8			1.4					27.1		
Approach LOS		A			A					C		
Queue Length 50th (m)	0.0	0.0			0.0	0.0				0.9	0.0	
Queue Length 95th (m)	2.8	12.4			20.2	m0.0				4.7	0.0	
Internal Link Dist (m)		355.8			168.3			30.9		31.1		
Turn Bay Length (m)	140.0					100.0						
Base Capacity (vph)	1022	3165			1651	1431				326	361	
Starvation Cap Reductn	0	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.03	0.14			0.12	0.00				0.01	0.01	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 14 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report

Page 3

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

Existing

AM Peak Hour

Maximum v/c Ratio: 0.14

Intersection Signal Delay: 1.3

Intersection LOS: A

Intersection Capacity Utilization 43.7%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

↖ Ø2 (R)	↖ Ø4
90 s	35 s
↖ Ø6 (R)	↖ Ø8
90 s	35 s

Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report

Page 4

Lanes, Volumes, Timings

3: Hazeldean Road & Jackson Trails Centre

Existing

AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations	↩	↗	↗		↩	↗	
Traffic Volume (vph)	27	218	246	5	1	6	
Future Volume (vph)	27	218	246	5	1	6	
Satd. Flow (prot)	1523	3191	3070	0	1658	1293	
Flt Permitted	0.580				0.950		
Satd. Flow (perm)	930	3191	3070	0	1658	1293	
Satd. Flow (RTOR)			3			7	
Lane Group Flow (vph)	30	242	279	0	1	7	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	75.7	75.7	75.7		34.3	34.3	5.0
Total Split (%)	65.8%	65.8%	65.8%		29.8%	29.8%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	110.5	110.5	110.5		10.0	10.0	
Actuated g/C Ratio	0.96	0.96	0.96		0.09	0.09	
v/c Ratio	0.03	0.08	0.09		0.01	0.06	
Control Delay	1.1	0.8	0.8		48.0	28.3	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	1.1	0.8	0.8		48.0	28.3	
LOS	A	A	A		D	C	
Approach Delay		0.8	0.8		30.8		
Approach LOS		A	A		C		
Queue Length 50th (m)	0.0	0.0	0.0		0.2	0.0	
Queue Length 95th (m)	2.8	7.2	8.2		1.9	4.5	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	893	3065	2949		403	320	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.03	0.08	0.09		0.00	0.02	

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 75 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report
Page 5

Lanes, Volumes, Timings

3: Hazeldean Road & Jackson Trails Centre

Existing

AM Peak Hour

Maximum v/c Ratio: 0.09

Intersection Signal Delay: 1.2

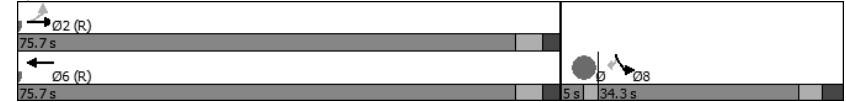
Intersection LOS: A

Intersection Capacity Utilization 40.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report
Page 6

Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

Existing
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↩↩	↩	↩	↩	↩	↩	↩↩	↩	↩	↩	↩
Traffic Volume (vph)	215	246	60	20	157	291	63	401	14	213	303	88
Future Volume (vph)	215	246	60	20	157	291	63	401	14	213	303	88
Satd. Flow (prot)	1626	2998	0	1537	1648	1469	1523	3253	0	1580	1712	1375
Flt Permitted	0.381			0.547			0.950			0.950		
Satd. Flow (perm)	650	2998	0	881	1648	1441	1514	3253	0	1574	1712	1335
Satd. Flow (RTOR)		28				323		3				137
Lane Group Flow (vph)	239	340	0	22	174	323	70	462	0	237	337	98
Turn Type	pm+pt	NA		Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		8		8	5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	15.0	55.0		40.0	40.0	40.0	16.0	54.0		16.0	54.0	54.0
Total Split (%)	12.0%	44.0%		32.0%	32.0%	32.0%	12.8%	43.2%		12.8%	43.2%	43.2%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	C-Max			None	C-Max	C-Max
Act Effct Green (s)	35.5	35.0		20.0	20.0	20.0	10.1	47.9		23.4	63.7	63.7
Actuated g/C Ratio	0.28	0.28		0.16	0.16	0.16	0.08	0.38		0.19	0.51	0.51
v/c Ratio	0.94	0.40		0.16	0.66	0.64	0.57	0.37		0.80	0.39	0.13
Control Delay	82.7	33.0		43.8	60.0	10.6	73.1	28.6		62.5	37.4	13.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	82.7	33.0		43.8	60.0	10.6	73.1	28.6		62.5	37.4	13.4
LOS	F	C		D	E	B	E	C		E	D	B
Approach Delay		53.5			28.6			34.5			42.7	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	50.3	33.2		4.8	41.3	0.0	16.7	42.2		58.5	57.2	1.2
Queue Length 95th (m)	#69.0	39.2		11.1	56.3	23.0	#34.1	56.2		#141.0	114.1	19.7
Internal Link Dist (m)		168.3			634.2			616.4			97.8	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	254	1177		235	440	621	133	1248		295	872	747
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.94	0.29		0.09	0.40	0.52	0.53	0.37		0.80	0.39	0.13

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 107 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

Existing
AM Peak Hour

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 40.3

Intersection LOS: D

Intersection Capacity Utilization 78.4%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Carp Road & Hazeldean Road



Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

Existing

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	205	17	25	52	13	112	17	820	25	33	533	46
Future Volume (vph)	205	17	25	52	13	112	17	820	25	33	533	46
Satd. Flow (prot)	1642	1516	0	0	1552	0	1510	1721	0	1658	1679	1483
Flt Permitted	0.557				0.891		0.329			0.085		
Satd. Flow (perm)	963	1516	0	0	1400	0	523	1721	0	148	1679	1448
Satd. Flow (RTOR)		28			70			2				78
Lane Group Flow (vph)	228	47	0	0	196	0	19	939	0	37	592	51
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	30.3	30.3		29.3	29.3		10.6	32.0		10.6	32.0	32.0
Total Split (s)	43.0	43.0		43.0	43.0		11.0	71.0		11.0	71.0	71.0
Total Split (%)	34.4%	34.4%		34.4%	34.4%		8.8%	56.8%		8.8%	56.8%	56.8%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	2.3
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	32.0	32.0		32.0	32.0		77.6	73.9		78.8	76.3	76.3
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.62	0.59		0.63	0.61	0.61
v/c Ratio	0.93	0.11		0.48	0.05		0.05	0.92		0.23	0.58	0.06
Control Delay	86.0	17.6		27.8	9.1		36.2	12.8		19.9	1.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	86.0	17.6		27.8	9.1		36.2	12.8		19.9	1.4	
LOS	F	B		C	A		D	B		B	A	
Approach Delay		74.3			27.8			35.7			18.1	
Approach LOS		E			C			D			B	
Queue Length 50th (m)	53.1	3.4		25.0	1.0		~249.0	3.3		79.4	0.0	
Queue Length 95th (m)	#93.9	12.6		46.6	m3.1 m#321.2			7.8		146.0	2.9	
Internal Link Dist (m)		65.8		95.1			144.9			438.0		
Turn Bay Length (m)	65.5				24.5			36.0			36.8	
Base Capacity (vph)	282	464		460	368		1017	163		1024	913	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.81	0.10		0.43	0.05		0.92	0.23		0.58	0.06	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 7 (6%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report

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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

Existing

AM Peak Hour

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 34.3

Intersection LOS: C

Intersection Capacity Utilization 87.0%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

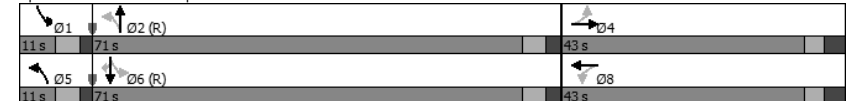
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue



Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report

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Lanes, Volumes, Timings

6: Carp Road & Hobin Street/McCooye Lane

Existing

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	13	49	7	6	48	27	328	36	57	313	15
Future Volume (vph)	54	13	49	7	6	48	27	328	36	57	313	15
Satd. Flow (prot)	0	1593	0	0	1526	0	1626	1617	0	1610	1654	0
Flt Permitted		0.832			0.963		0.544			0.518		
Satd. Flow (perm)	0	1356	0	0	1479	0	929	1617	0	878	1654	0
Satd. Flow (RTOR)		46			53			12			5	
Lane Group Flow (vph)	0	128	0	0	68	0	30	404	0	63	365	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	27.6	27.6		27.6	27.6		29.8	29.8		29.8	29.8	
Total Split (s)	28.0	28.0		28.0	28.0		52.0	52.0		52.0	52.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		65.0%	65.0%		65.0%	65.0%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		13.0			13.0		59.9	59.9		59.9	59.9	
Actuated g/C Ratio		0.16			0.16		0.75	0.75		0.75	0.75	
v/c Ratio		0.50			0.24		0.04	0.33		0.10	0.29	
Control Delay		25.6			12.7		3.7	3.6		5.7	6.0	
Queue Delay		0.0			0.0		0.0	0.2		0.0	0.0	
Total Delay		25.6			12.7		3.7	3.9		5.7	6.0	
LOS		C			B		A	A		A	A	
Approach Delay		25.6			12.7			3.9			5.9	
Approach LOS		C			B			A			A	
Queue Length 50th (m)		11.8			2.1		0.8	10.7		2.3	15.3	
Queue Length 95th (m)		23.3			10.5		m2.2	20.5		9.3	43.1	
Internal Link Dist (m)		50.8			31.9			88.7			616.4	
Turn Bay Length (m)							28.0			44.0		
Base Capacity (vph)		412			452		695	1213		657	1239	
Starvation Cap Reductn		0			0		0	288		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.31			0.15		0.04	0.44		0.10	0.29	
Intersection Summary												
Cycle Length: 80												
Actuated Cycle Length: 80												
Offset: 65 (81%), Referenced to phase 4:NBT and 8:SBTL, Start of Green												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings

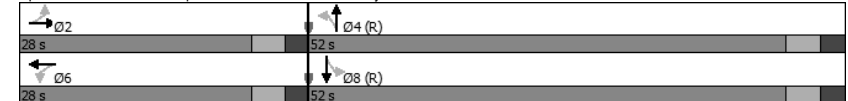
6: Carp Road & Hobin Street/McCooye Lane

Existing

AM Peak Hour

Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 7.9	Intersection LOS: A
Intersection Capacity Utilization 56.9%	ICU Level of Service B
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Carp Road & Hobin Street/McCooye Lane



Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

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Lanes, Volumes, Timings
7: Stittsville Main Street & Carp Road

Existing
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	↑	↗	↖	↑	↗	↖	↑	↗	↖	↑	↗
Traffic Volume (vph)	40	83	247	128	60	71	304	320	149	59	239	30
Future Volume (vph)	40	83	247	128	60	71	304	320	149	59	239	30
Satd. Flow (prot)	1642	1712	1351	1658	1578	0	1537	1646	0	1658	1728	1414
Flt Permitted	0.664			0.697			0.487			0.416		
Satd. Flow (perm)	1146	1712	1317	1211	1578	0	785	1646	0	724	1728	1374
Satd. Flow (RTOR)			274		76			34				115
Lane Group Flow (vph)	44	92	274	142	146	0	338	522	0	66	266	33
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.9	29.9		10.5	29.1		10.5	29.5	29.5
Total Split (s)	30.0	30.0	30.0	30.0	30.0		15.0	35.0		15.0	35.0	35.0
Total Split (%)	37.5%	37.5%	37.5%	37.5%	37.5%		18.8%	43.8%		18.8%	43.8%	43.8%
Yellow Time (s)	3.3	3.3	3.3	3.7	3.7		3.3	3.3		3.3	3.7	3.7
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		2.2	1.8		2.2	1.8	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.9	5.9		5.5	5.1		5.5	5.5	5.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.8	15.8	15.8	15.4	15.4		52.3	43.6		42.9	36.1	36.1
Actuated g/C Ratio	0.20	0.20	0.20	0.19	0.19		0.65	0.54		0.54	0.45	0.45
v/c Ratio	0.19	0.27	0.57	0.61	0.40		0.54	0.57		0.14	0.34	0.05
Control Delay	30.1	30.9	16.6	39.8	16.6		11.2	17.3		7.6	17.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	30.1	30.9	16.6	39.8	16.6		11.2	17.3		7.6	17.6	0.1
LOS	C	C	B	D	B		B	B		A	B	A
Approach Delay		21.3			28.1			14.9			14.2	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	6.1	12.8	0.3	20.1	9.2		18.4	47.2		2.9	25.5	0.0
Queue Length 95th (m)	15.0	25.4	35.7	33.3	21.3		42.8	#111.5		9.2	49.1	0.0
Internal Link Dist (m)		88.7			74.0			130.8			407.0	
Turn Bay Length (m)	38.0		53.0	21.5			79.5			52.0		37.5
Base Capacity (vph)	350	524	593	364	528		624	911		523	780	683
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.13	0.18	0.46	0.39	0.28		0.54	0.57		0.13	0.34	0.05

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings
7: Stittsville Main Street & Carp Road

Existing
AM Peak Hour

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 18.1

Intersection LOS: B

Intersection Capacity Utilization 74.1%

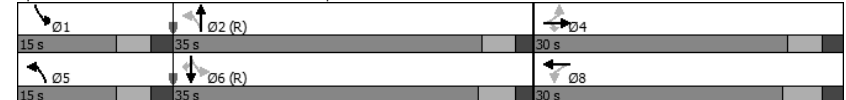
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Stittsville Main Street & Carp Road



Scenario 1 6310 Hazeldean Road 11:59 pm 08/05/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

Existing

PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖			↖	↖	↖	↖	
Traffic Volume (vph)	10	141	35	251	257	39	32	27	189	28	21	3
Future Volume (vph)	10	141	35	251	257	39	32	27	189	28	21	3
Satd. Flow (prot)	1658	1693	0	1658	1696	0	0	1698	1483	1658	1604	0
Flt Permitted	0.562			0.634				0.816		0.714		
Satd. Flow (perm)	981	1693	0	1106	1696	0	0	1424	1449	1242	1604	0
Satd. Flow (RTOR)		17			10				210		3	
Lane Group Flow (vph)	11	196	0	279	329	0	0	66	210	31	26	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4		4	8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		27.1	27.1	27.1	27.1	27.1	
Total Split (s)	83.0	83.0		83.0	83.0		47.0	47.0	47.0	47.0	47.0	
Total Split (%)	63.8%	63.8%		63.8%	63.8%		36.2%	36.2%	36.2%	36.2%	36.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	104.6	104.6		104.6	104.6		13.0	13.0	13.0	13.0	13.0	
Actuated g/C Ratio	0.80	0.80		0.80	0.80		0.10	0.10	0.10	0.10	0.10	
v/c Ratio	0.01	0.14		0.31	0.24		0.46	0.63	0.25	0.16	0.16	
Control Delay	3.4	3.2		4.8	3.2		64.6	15.4	57.0	48.9	48.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	3.4	3.2		4.8	3.2		64.6	15.4	57.0	48.9	48.9	
LOS	A	A		A	A		E	B	E	D	D	
Approach Delay		3.2			3.9		27.2			53.3		
Approach LOS		A			A		C			D		
Queue Length 50th (m)	0.4	7.4		11.3	9.3		16.5	0.0	7.6	5.6		
Queue Length 95th (m)	2.2	18.4		65.1	46.8		29.0	22.0	16.4	13.6		
Internal Link Dist (m)		182.4			355.8		521.0			146.6		
Turn Bay Length (m)	66.0			98.0				10.0	24.5			
Base Capacity (vph)	788	1365		889	1366		448	599	390	506		
Starvation Cap Reductn	0	0		0	0		0	0	0	0		
Spillback Cap Reductn	0	0		0	0		0	0	0	0		
Storage Cap Reductn	0	0		0	0		0	0	0	0		
Reduced v/c Ratio	0.01	0.14		0.31	0.24		0.15	0.35	0.08	0.05		

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 126 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report

Page 1

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

Existing

PM Peak Hour

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 11.8

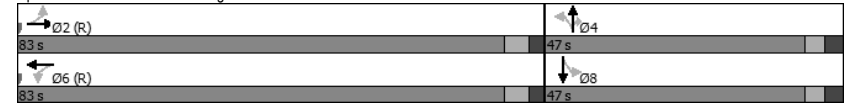
Intersection LOS: B

Intersection Capacity Utilization 51.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road



Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report

Page 2

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

Existing

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↕	↩	↩	↕	↕	↩	↕	↩	↩	↕	↕
Traffic Volume (vph)	51	292	0	0	565	6	0	0	0	42	0	37
Future Volume (vph)	51	292	0	0	565	6	0	0	0	42	0	37
Satd. Flow (prot)	1658	3283	0	1745	1745	1483	0	1745	0	0	1658	1483
Flt Permitted	0.405									0.757		
Satd. Flow (perm)	705	3283	0	1745	1745	1438	0	1745	0	0	1321	1483
Satd. Flow (RTOR)						28						41
Lane Group Flow (vph)	57	324	0	0	628	7	0	0	0	0	47	41
Turn Type	Perm	NA		Perm	NA	Perm				custom	NA	custom
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		34.1	34.1	34.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	93.0	93.0		93.0	93.0	93.0	37.0	37.0		37.0	37.0	37.0
Total Split (%)	71.5%	71.5%		71.5%	71.5%	71.5%	28.5%	28.5%		28.5%	28.5%	28.5%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.3	6.3		6.3	6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	110.8	110.8			110.8	110.8				11.3	11.3	
Actuated g/C Ratio	0.85	0.85			0.85	0.85				0.09	0.09	
v/c Ratio	0.09	0.12			0.42	0.01				0.41	0.25	
Control Delay	3.4	2.7			2.7	0.2				66.8	19.3	
Queue Delay	0.0	0.0			0.2	0.0				0.0	0.0	
Total Delay	3.4	2.7			2.9	0.2				66.8	19.3	
LOS	A	A			A	A				E	B	
Approach Delay		2.8			2.9					44.6		
Approach LOS		A			A					D		
Queue Length 50th (m)	2.0	6.0			20.9	0.0				11.8	0.0	
Queue Length 95th (m)	6.8	13.7			m40.8	m0.0				23.7	10.7	
Internal Link Dist (m)		355.8			168.3			30.9			31.1	
Turn Bay Length (m)	140.0					100.0						
Base Capacity (vph)	601	2798			1487	1230				311	381	
Starvation Cap Reductn	0	0			263	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.09	0.12			0.51	0.01				0.15	0.11	
Intersection Summary												
Cycle Length: 130												
Actuated Cycle Length: 130												
Offset: 35 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 70												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

Existing

PM Peak Hour

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 6.2

Intersection LOS: A

Intersection Capacity Utilization 63.4%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

→ Ø2 (R)	↕ Ø4
93 s	37 s
← Ø6 (R)	↕ Ø8
93 s	37 s

Lanes, Volumes, Timings

3: Hazeldean Road & Jackson Trails Centre

Existing

PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations	↰	↰↰	↰↰		↰	↰	
Traffic Volume (vph)	65	355	477	14	15	39	
Future Volume (vph)	65	355	477	14	15	39	
Satd. Flow (prot)	1658	3316	3298	0	1580	1469	
Flt Permitted	0.448				0.950		
Satd. Flow (perm)	777	3316	3298	0	1580	1469	
Satd. Flow (RTOR)			5			43	
Lane Group Flow (vph)	72	394	546	0	17	43	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	80.7	80.7	80.7		34.3	34.3	5.0
Total Split (%)	67.3%	67.3%	67.3%		28.6%	28.6%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	101.8	101.8	101.8		10.0	10.0	
Actuated g/C Ratio	0.85	0.85	0.85		0.08	0.08	
v/c Ratio	0.11	0.14	0.20		0.13	0.27	
Control Delay	2.7	2.3	2.4		53.5	19.5	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	2.7	2.3	2.4		53.5	19.5	
LOS	A	A	A		D	B	
Approach Delay		2.3	2.4		29.1		
Approach LOS		A	A		C		
Queue Length 50th (m)	2.8	8.3	12.0		3.8	0.0	
Queue Length 95th (m)	5.7	11.3	15.7		11.1	11.1	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	659	2814	2800		368	375	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.11	0.14	0.20		0.05	0.11	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 99 (83%), Referenced to phase 2:EBTL and 6:WBT, Start of Green							
Natural Cycle: 75							
Control Type: Actuated-Coordinated							

Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings

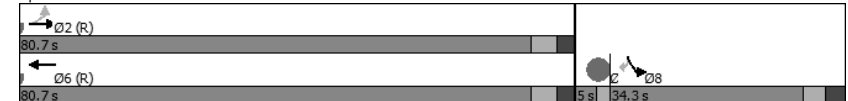
3: Hazeldean Road & Jackson Trails Centre

Existing

PM Peak Hour

Maximum v/c Ratio: 0.27	
Intersection Signal Delay: 3.9	Intersection LOS: A
Intersection Capacity Utilization 47.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

Existing
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↰	↰	↰	↰	↰	↰↱	↰	↰	↰	↰
Traffic Volume (vph)	130	339	86	46	408	397	97	392	21	293	450	227
Future Volume (vph)	130	339	86	46	408	397	97	392	21	293	450	227
Satd. Flow (prot)	1658	3154	0	1470	1745	1455	1658	3185	0	1658	1745	1483
Flt Permitted	0.137			0.481			0.950			0.950		
Satd. Flow (perm)	239	3154	0	741	1745	1427	1654	3185	0	1653	1745	1433
Satd. Flow (RTOR)		29				421		4				240
Lane Group Flow (vph)	144	473	0	51	453	441	108	459	0	326	500	252
Turn Type	pm+pt	NA		Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		8		8	5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	13.0	58.0		45.0	45.0	45.0	19.0	34.0		38.0	53.0	53.0
Total Split (%)	10.0%	44.6%		34.6%	34.6%	34.6%	14.6%	26.2%		29.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	C-Max			None	C-Max	C-Max
Act Effct Green (s)	50.0	49.5		36.5	36.5	36.5	11.9	32.8		29.0	49.9	49.9
Actuated g/C Ratio	0.38	0.38		0.28	0.28	0.28	0.09	0.25		0.22	0.38	0.38
v/c Ratio	0.86	0.39		0.25	0.93	0.63	0.72	0.57		0.88	0.75	0.36
Control Delay	73.7	29.4		38.8	71.3	8.6	82.6	46.8		60.2	57.2	18.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	73.7	29.4		38.8	71.3	8.6	82.6	46.8		60.2	57.2	18.0
LOS	E	C		D	E	A	F	D		E	E	B
Approach Delay		39.7			40.2			53.6			48.9	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	26.0	45.3		9.9	110.6	3.7	27.1	56.3		84.8	129.5	20.7
Queue Length 95th (m)	#60.5	62.6		21.4	#167.8	32.9	#50.6	75.1		m106.4	m159.5	m33.4
Internal Link Dist (m)		168.3			634.2			616.4			97.4	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	167	1264		218	515	718	165	806		408	670	698
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.86	0.37		0.23	0.88	0.61	0.65	0.57		0.80	0.75	0.36

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 8 (6%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

Existing
PM Peak Hour

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 45.4

Intersection LOS: D

Intersection Capacity Utilization 90.5%

ICU Level of Service E

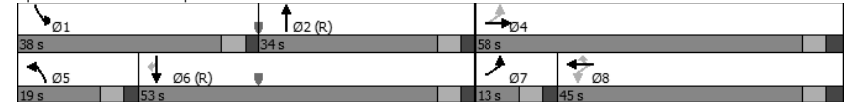
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Carp Road & Hazeldean Road



Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report
Page 8

Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

Existing

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	130	22	50	55	22	85	58	742	34	114	861	144
Future Volume (vph)	130	22	50	55	22	85	58	742	34	114	861	144
Satd. Flow (prot)	1658	1520	0	0	1594	0	1658	1668	0	1658	1745	1483
Flt Permitted	0.523				0.855		0.152			0.192		
Satd. Flow (perm)	913	1520	0	0	1375	0	265	1668	0	335	1745	1446
Satd. Flow (RTOR)		56			37			4				75
Lane Group Flow (vph)	144	80	0	0	179	0	64	862	0	127	957	160
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	29.3	29.3		29.3	29.3		10.6	32.0		10.6	32.0	32.0
Total Split (s)	30.0	30.0		30.0	30.0		11.0	89.0		11.0	89.0	89.0
Total Split (%)	23.1%	23.1%		23.1%	23.1%		8.5%	68.5%		8.5%	68.5%	68.5%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	2.3
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	22.4	22.4		22.4	22.4		90.0	84.1		91.3	86.5	86.5
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.69	0.65		0.70	0.67	0.67
v/c Ratio	0.92	0.26		0.67	0.27		0.27	0.80		0.43	0.82	0.16
Control Delay	106.1	19.9		52.6	5.2		5.2	14.5		10.1	25.2	5.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.2		0.0	0.0	0.0
Total Delay	106.1	19.9		52.6	5.2		5.2	14.7		10.1	25.2	5.3
LOS	F	B		D	A		A	B		B	C	A
Approach Delay		75.3			52.6			14.1			21.1	
Approach LOS		E			D			B			C	
Queue Length 50th (m)	36.2	5.2		34.1	2.1		62.5	8.6		183.6	7.8	
Queue Length 95th (m)	#74.4	19.1		59.6	m3.5		m56.0	14.5		259.8	16.3	
Internal Link Dist (m)		73.3			85.0			145.3			438.0	
Turn Bay Length (m)	65.5						24.0			36.0		36.8
Base Capacity (vph)	166	322		280	241		1080	292		1161	987	
Starvation Cap Reductn	0	0		0	0		17	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.87	0.25		0.64	0.27		0.81	0.43		0.82	0.16	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 11 (8%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report

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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

Existing

PM Peak Hour

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 25.5

Intersection LOS: C

Intersection Capacity Utilization 83.5%

ICU Level of Service E

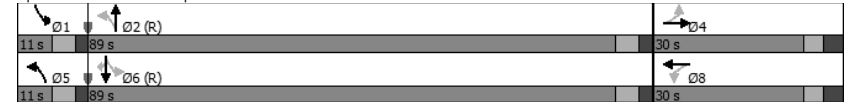
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue



Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report

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Lanes, Volumes, Timings

6: Carp Road & Hobin Street/McCooye Lane

Existing

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	18	54	35	25	67	70	343	44	61	515	73
Future Volume (vph)	43	18	54	35	25	67	70	343	44	61	515	73
Satd. Flow (prot)	0	1586	0	0	1578	0	1658	1652	0	1658	1691	0
Fit Permitted		0.774			0.853		0.364			0.497		
Satd. Flow (perm)	0	1249	0	0	1364	0	633	1652	0	862	1691	0
Satd. Flow (RTOR)		47			59			14			15	
Lane Group Flow (vph)	0	128	0	0	141	0	78	430	0	68	653	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	27.6	27.6		27.6	27.6		29.8	29.8		29.8	29.8	
Total Split (s)	28.0	28.0		28.0	28.0		62.0	62.0		62.0	62.0	
Total Split (%)	31.1%	31.1%		31.1%	31.1%		68.9%	68.9%		68.9%	68.9%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.3	2.3		2.3	2.3		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		13.2			13.2		65.4	65.4		65.4	65.4	
Actuated g/C Ratio		0.15			0.15		0.73	0.73		0.73	0.73	
v/c Ratio		0.57			0.56		0.17	0.36		0.11	0.53	
Control Delay		32.4			29.1		5.8	6.1		5.2	8.1	
Queue Delay		0.0			0.0		0.0	1.2		0.0	0.0	
Total Delay		32.4			29.1		5.8	7.3		5.2	8.1	
LOS		C			C		A	A		A	A	
Approach Delay		32.4			29.1			7.1			7.9	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		13.4			13.5		3.3	18.0		2.6	35.3	
Queue Length 95th (m)		27.0			27.7		m5.5	m25.7		9.6	91.6	
Internal Link Dist (m)		112.2			60.6			88.7			616.4	
Turn Bay Length (m)							28.0			44.0		
Base Capacity (vph)		346			383		459	1203		626	1232	
Starvation Cap Reductn		0			0		0	540		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.37			0.37		0.17	0.65		0.11	0.53	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 76 (84%), Referenced to phase 4:NBT and 8:SBTL, Start of Green												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings

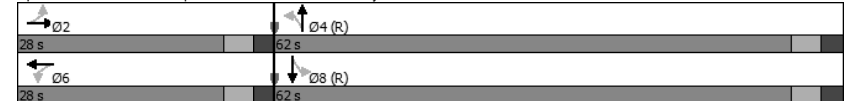
6: Carp Road & Hobin Street/McCooye Lane

Existing

PM Peak Hour

Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 11.7	Intersection LOS: B
Intersection Capacity Utilization 67.5%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 6: Carp Road & Hobin Street/McCooye Lane



Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

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Lanes, Volumes, Timings
7: Stittsville Main Street & Carp Road

Existing
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	70	108	410	204	120	69	290	395	105	63	434	44
Future Volume (vph)	70	108	410	204	120	69	290	395	105	63	434	44
Satd. Flow (prot)	1658	1745	1469	1658	1611	0	1595	1674	0	1658	1728	1483
Flt Permitted	0.626			0.511			0.134			0.316		
Satd. Flow (perm)	1065	1745	1417	881	1611	0	222	1674	0	549	1728	1394
Satd. Flow (RTOR)			351		41			15				154
Lane Group Flow (vph)	78	120	456	227	210	0	322	556	0	70	482	49
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	28.1	28.1	28.1	10.1	28.1		10.5	29.5		10.5	29.5	29.5
Total Split (s)	29.0	29.0	29.0	15.0	44.0		14.0	32.0		14.0	32.0	32.0
Total Split (%)	32.2%	32.2%	32.2%	16.7%	48.9%		15.6%	35.6%		15.6%	35.6%	35.6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	1.8	1.8	1.8	1.8	1.8		2.2	2.2		2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.1	5.1	5.1	5.1	5.1		5.5	5.5		5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	16.1	16.1	16.1	31.1	31.1		46.2	37.7		33.7	26.5	26.5
Actuated g/C Ratio	0.18	0.18	0.18	0.35	0.35		0.51	0.42		0.37	0.29	0.29
v/c Ratio	0.41	0.38	0.84	0.58	0.36		0.89	0.78		0.24	0.95	0.09
Control Delay	41.7	38.9	31.2	27.6	18.0		53.4	35.8		15.2	62.0	0.4
Queue Delay	0.0	0.0	0.1	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	41.7	38.9	31.3	27.6	18.0		53.4	35.8		15.2	62.0	0.4
LOS	D	D	C	C	B		D	D		B	E	A
Approach Delay	33.9				23.0				42.2			
Approach LOS	C				C				D			
Queue Length 50th (m)	13.3	20.2	28.0	30.7	22.1		36.9	78.6		5.2	81.2	0.0
Queue Length 95th (m)	m25.0	35.3	72.4	41.7	33.2		#116.8	#170.3		14.2	#139.7	0.0
Internal Link Dist (m)	88.7				74.0				130.8			
Turn Bay Length (m)	38.0		53.0	21.5			79.5			52.0		37.5
Base Capacity (vph)	282	463	634	390	719		362	710		318	508	519
Starvation Cap Reductn	0	0	7	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.28	0.26	0.73	0.58	0.29		0.89	0.78		0.22	0.95	0.09

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 2 (2%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report
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Lanes, Volumes, Timings
7: Stittsville Main Street & Carp Road

Existing
PM Peak Hour

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 39.0

Intersection LOS: D

Intersection Capacity Utilization 82.0%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Stittsville Main Street & Carp Road

14 s	32 s	15 s	29 s
14 s	32 s	44 s	

Scenario 1 6310 Hazeldean Road 11:59 pm 08/25/2023 Existing

Synchro 11 Report
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Appendix D

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
2/2/2018	2018	9:15	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2/12/2018	2018	8:45	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	04 - Slush	0	0	0	0
2/18/2018	2018	10:22	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
3/14/2018	2018	22:45	CARP RD @ HAZELEDAN RD (0000086)	02 - Rain	07 - Dark	01 - Traffic signal	0	03 - P.D. only	07 - SMV other	06 - Ice	0	0	0	0
5/16/2018	2018	10:44	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	0	0	0	0
5/18/2018	2018	9:20	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
6/25/2018	2018	16:09	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
7/13/2018	2018	10:09	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
8/7/2018	2018	8:54	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
8/9/2018	2018	17:30	CARP RD @ HAZELEDAN RD (0000086)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
9/27/2018	2018	13:55	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
11/1/2018	2018	17:04	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	05 - Dusk	01 - Traffic signal	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
11/21/2018	2018	17:08	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	07 - Dark	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	06 - Ice	0	0	0	0
12/2/2018	2018	14:42	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	04 - Slush	0	0	0	0
1/23/2019	2019	7:10	CARP RD @ HAZELEDAN RD (0000086)	04 - Freezing Rain	03 - Dawn	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	03 - Loose snow	0	0	0	0
4/20/2019	2019	13:53	CARP RD @ HAZELEDAN RD (0000086)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
4/28/2019	2019	3:30	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	07 - SMV other	02 - Wet	0	0	0	0
5/17/2019	2019	11:23	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	1	0
8/23/2019	2019	10:40	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Rear end	01 - Dry	0	0	0	0
12/31/2019	2019	12:05	CARP RD @ HAZELEDAN RD (0000086)	04 - Freezing Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	07 - SMV other	06 - Ice	0	0	0	0
1/3/2020	2020	9:44	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
1/28/2020	2020	7:50	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	03 - Dawn	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
2/24/2020	2020	20:30	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	01 - Dry	0	0	0	0
3/9/2020	2020	16:51	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
6/17/2020	2020	15:39	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	05 - Turning movement	01 - Dry	0	1	0	0
10/13/2020	2020	16:03	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
11/7/2020	2020	15:00	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
1/12/2021	2021	15:00	CARP RD @ HAZELEDAN RD (0000086)	03 - Snow	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	02 - Wet	0	0	0	0
2/13/2021	2021	10:46	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	99 - Other	01 - Dry	0	0	0	0
2/16/2021	2021	13:12	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	05 - Packed snow	0	0	0	0
4/25/2021	2021	14:17	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
8/5/2021	2021	14:25	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
8/9/2021	2021	11:15	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
8/23/2021	2021	12:35	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
8/26/2021	2021	12:35	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
9/1/2021	2021	16:20	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
9/23/2021	2021	16:12	CARP RD @ HAZELEDAN RD (0000086)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
9/25/2021	2021	10:15	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
10/1/2021	2021	16:04	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	0	0	0	0
10/21/2021	2021	13:57	CARP RD @ HAZELEDAN RD (0000086)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	05 - Turning movement	02 - Wet	0	0	0	0
10/24/2021	2021	8:00	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
1/6/2022	2022	13:00	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
3/30/2022	2022	7:43	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	99 - Other	01 - Dry	0	0	0	0
4/11/2022	2022	15:50	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
4/19/2022	2022	17:55	CARP RD @ HAZELEDAN RD (0000086)	02 - Rain	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	03 - Rear end	02 - Wet	0	0	0	0
9/27/2022	2022	16:15	CARP RD @ HAZELEDAN RD (0000086)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	0	0	0	0
5/12/2018	2018	10:18	HAZELEDAN RD @ WEST RIDGE DR (0010365)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	1	0	0
12/15/2018	2018	18:05	HAZELEDAN RD @ WEST RIDGE DR (0010365)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	99 - Other	02 - Wet	0	0	0	0
1/10/2019	2019	18:00	HAZELEDAN RD @ WEST RIDGE DR (0010365)	01 - Clear	07 - Dark	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
4/7/2019	2019	14:30	HAZELEDAN RD @ WEST RIDGE DR (0010365)	01 - Clear	01 - Daylight	01 - Traffic signal	0	02 - Non-fatal injury	05 - Turning movement	01 - Dry	0	0	0	0
5/3/2019	2019	13:17	HAZELEDAN RD @ WEST RIDGE DR (0010365)	02 - Rain	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
12/16/2019	2019	7:48	HAZELEDAN RD @ WEST RIDGE DR (0010365)	03 - Snow	03 - Dawn	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	05 - Packed snow	0	0	0	0
1/17/2020	2020	9:32	HAZELEDAN RD @ WEST RIDGE DR (0010365)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
6/19/2020	2020	10:35	HAZELEDAN RD @ WEST RIDGE DR (0010365)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	1	0
5/26/2021	2021	17:00	HAZELEDAN RD @ WEST RIDGE DR (0010365)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	04 - Sideswipe	01 - Dry	0	0	0	0
11/5/2021	2021	15:45	HAZELEDAN RD @ WEST RIDGE DR (0010365)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
11/7/2021	2021	13:36	HAZELEDAN RD @ WEST RIDGE DR (0010365)	01 - Clear	01 - Daylight	01 - Traffic signal	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2/3/2018	2018	8:18	HAZELEDAN RD bwnn CARP RD & KITTIWAKE DR (_ 32A3E1)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	03 - Loose snow	0	0	0	0
5/25/2020	2020	12:45	HAZELEDAN RD bwnn CARP RD & KITTIWAKE DR (_ 32A3E1)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	05 - Turning movement	01 - Dry	0	0	0	0
2/24/2021	2021	16:33	HAZELEDAN RD bwnn CARP RD & KITTIWAKE DR (_ 32A3E1)	03 - Snow	01 - Daylight	10 - No control	0	03 - P.D. only	07 - SMV other	06 - Ice	0	0	0	0

Appendix E

TDM Checklist

TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)

Legend	
REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
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

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	☐
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☐
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☐
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (<i>see Official Plan policy 4.3.3</i>)	☐
REQUIRED	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (<i>see Official Plan policy 4.3.12</i>)	☒

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (<i>see Official Plan policy 4.3.10</i>)	☒
REQUIRED	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (<i>see Official Plan policy 4.3.10</i>)	☒
REQUIRED	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (<i>see Official Plan policy 4.3.11</i>)	☒
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☐
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☐
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (<i>see Official Plan policy 4.3.6</i>)	☒
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (<i>see Zoning By-law Section 111</i>)	☒
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (<i>see Zoning By-law Section 111</i>)	☒
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☐
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (<i>see Zoning By-law Section 111</i>)	☒
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
2.3 Bicycle repair station		
BETTER	2.3.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses (<i>see Zoning By-law Section 94</i>)	☐
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☒
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (<i>see Zoning By-law Section 104</i>)	☐
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (<i>see Zoning By-law Section 111</i>)	☐
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐

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 F

MMLOS Analysis

Consultant	CGH Transportation Inc.	Project	6310 Hazeldean Road
Scenario	Existing/Future	Date	12/13/2023
Comments			

[illegible]

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation Inc.	Project	6310 Hazeldean Road
Scenario	Existing/Future	Date	2025-08-08
Comments			

SEGMENTS			Hazeldean Rd		
			Existing		Future
Pedestrian	Sidewalk Width	-	≥ 2 m		≥ 2 m
	Boulevard Width		< 0.5		> 2 m
	Avg Daily Curb Lane Traffic Volume		> 3000		> 3000
	Operating Speed		> 60 km/h		> 60 km/h
	On-Street Parking		no		no
	Exposure to Traffic PLoS		F	-	D
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		-	-	-
Level of Service		-	-	-	
Bicycle	Type of Cycling Facility	C	Curbside Bike Lane		Physically Separated
	Number of Travel Lanes		≤ 1 each direction		
	Operating Speed		>50 to 70 km/h		
	# of Lanes & Operating Speed LoS		C	-	-
	Bike Lane (+ Parking Lane) Width		≥ 1.8 m		
	Bike Lane Width LoS		A	-	-
	Bike Lane Blockages		Rare		
	Blockage LoS		A	-	-
	Median Refuge Width (no median = < 1.8 m)				
	No. of Lanes at Unsignalized Crossing				
	Sidestreet Operating Speed				
	Unsignalized Crossing - Lowest LoS		-	-	A
	Level of Service			C	-
Transit	Facility Type	-			
	Friction or Ratio Transit:Posted Speed				
	Level of Service			-	-
Truck	Truck Lane Width	B	> 3.7 m		> 3.7 m
	Travel Lanes per Direction		1		> 1
	Level of Service			B	-

Appendix G

TRANS Model Plots

TRANS Regional Model

Version 2.16 - Assigned Dec, 2021

AM Peak Hour Total Traffic Volume

Stittsville Growth

2011 Model - Basecase

User Initials: TIMW

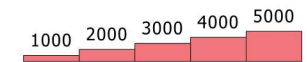
Plot Prepared: Dec, 2021

EMME Scenario: 23711

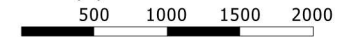


Legend

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 a 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.

M

TRANS Regional Model

Version 2.16 - Assigned Dec, 2021

AM Peak Hour Total Traffic Volume

Stittsville Growth

2031 Model - Basecase

User Initials: TIMW

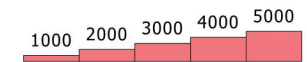
Plot Prepared: Dec, 2021

EMME Scenario: 21811

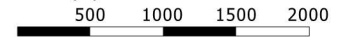


Legend

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.

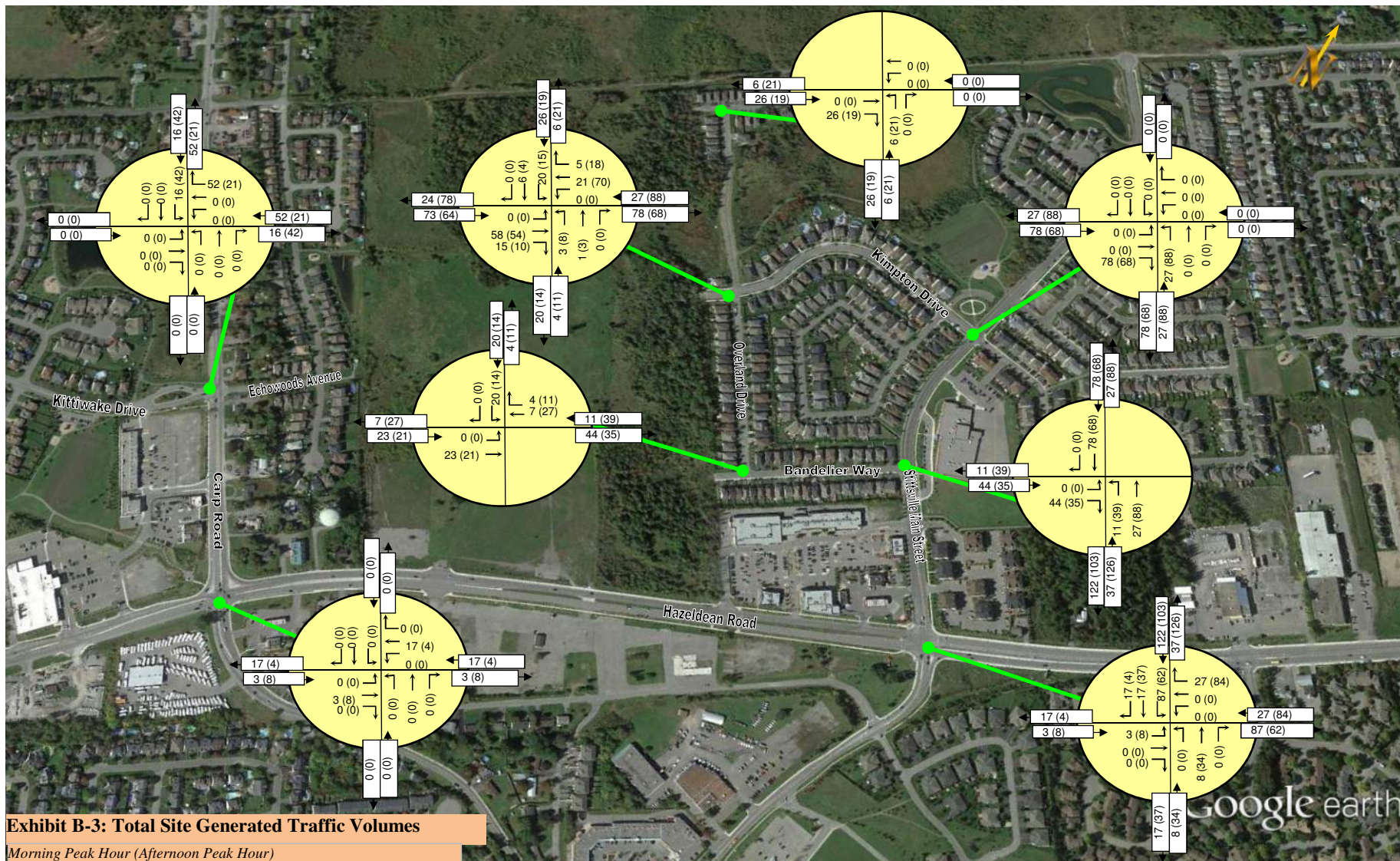
Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena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

M

Appendix H

Background Development Volumes



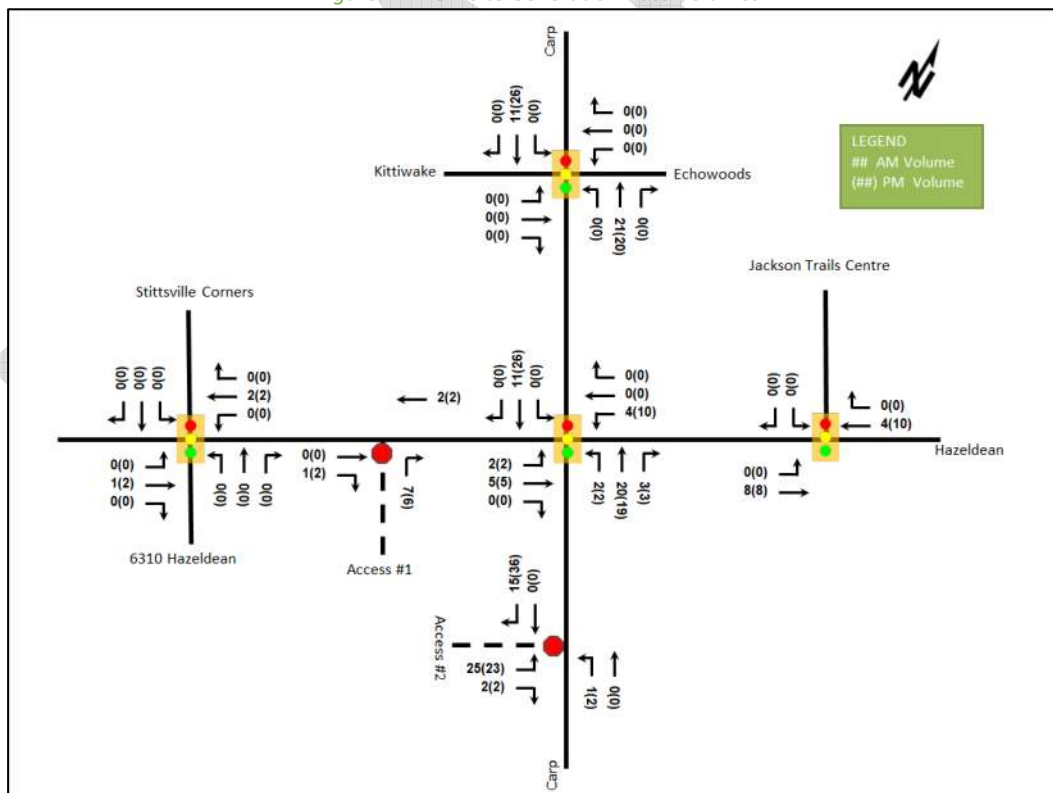
4.4 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. Table 12 summarizes the proportional assignment to the study area roadways, and Figure 14 illustrates the new site generated volumes.

Table 12: Trip Assignment

To/From	Via
North	30% Carp Road (N)
South	5% Carp Road (S)
East	35% Carp Road (N) 25% Hazeldean Road (E)
West	5% Hazeldean Road (W)
Total	100%

Figure 14: New Site Generation Auto Volumes

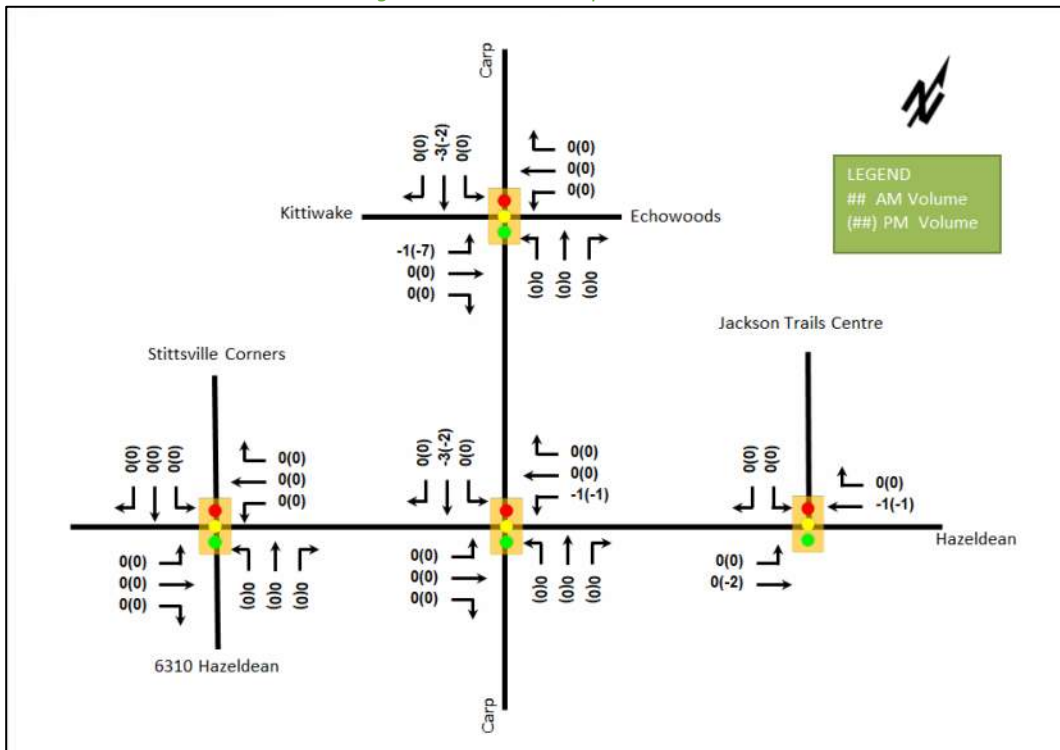


4.5 Trip Reductions

Based on the existing RV sales building of approximately 10,000 sq. ft. using the ITE trip generation rates for the land use of Recreational Vehicle Sales (LUC 842), and the commercial generator mode shares for Kanata/Stittsville,

the estimated trip generation of the existing site is 6 AM and 10 PM peak hour two-way vehicle trips. The trip assignment of the estimated reduced volumes is illustrated in Figure 15.

Figure 15: Estimated Trip Reductions



Appendix I

Synchro Intersection Worksheets – 2027 Future Background Conditions

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2027 Future Background

AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↖	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↑	↗	↖	↓	↖
Traffic Volume (vph)	5	373	17	66	231	13	30	11	173	21	10	3
Future Volume (vph)	5	373	17	66	231	13	30	11	173	21	10	3
Satd. Flow (prot)	1658	1701	0	1658	1684	0	0	1642	1483	1658	1684	0
Flt Permitted	0.607			0.531				0.776		0.730		
Satd. Flow (perm)	1059	1701	0	927	1684	0	0	1320	1483	1274	1684	0
Satd. Flow (RTOR)		4			5				173		3	
Lane Group Flow (vph)	5	390	0	66	244	0	0	41	173	21	13	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Detector Phase	2	2		6	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	28.0	28.0		28.0	28.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		27.1	27.1	27.1	27.1	27.1	
Total Split (s)	48.0	48.0		48.0	48.0		37.0	37.0	37.0	37.0	37.0	
Total Split (%)	56.5%	56.5%		56.5%	56.5%		43.5%	43.5%	43.5%	43.5%	43.5%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
Act Effct Green (s)	45.1	45.1		45.1	45.1		10.2	10.2	10.2	10.2	10.2	
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.15	0.15	0.15	0.15	0.15	
v/c Ratio	0.01	0.34		0.11	0.22		0.21	0.47	0.11	0.05		
Control Delay	4.2	6.0		4.8	5.0		26.5	9.2	24.8	21.2		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay	4.2	6.0		4.8	5.0		26.5	9.2	24.8	21.2		
LOS	A	A		A	A		C	A	C	C		
Approach Delay		6.0			5.0		12.5			23.4		
Approach LOS		A			A		B			C		
Queue Length 50th (m)	0.2	17.3		2.5	9.7		4.3	0.0	2.2	1.0		
Queue Length 95th (m)	1.1	30.4		6.4	18.0		12.0	14.2	7.4	5.0		
Internal Link Dist (m)		115.7			359.5		126.0			49.9		
Turn Bay Length (m)	66.0			98.0				10.0	24.5			
Base Capacity (vph)	704	1133		617	1122		605	774	584	774		
Starvation Cap Reductn	0	0		0	0		0	0	0	0		
Spillback Cap Reductn	0	0		0	0		0	0	0	0		
Storage Cap Reductn	0	0		0	0		0	0	0	0		
Reduced v/c Ratio	0.01	0.34		0.11	0.22		0.07	0.22	0.04	0.02		
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 67.8												
Natural Cycle: 65												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.47												

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2027 Future Background

AM Peak Hour

Intersection Signal Delay: 7.8	Intersection LOS: A
Intersection Capacity Utilization 71.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

↖ Ø2	↖ Ø4
48 s	37 s
↖ Ø6	↖ Ø8
48 s	37 s

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2027 Future Background

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↕	↩	↩	↕	↕	↩	↕	↩	↩	↕	↕
Traffic Volume (vph)	29	542	0	0	311	1	0	0	0	4	0	4
Future Volume (vph)	29	542	0	0	311	1	0	0	0	4	0	4
Satd. Flow (prot)	1580	3283	0	1745	1712	1483	0	1745	0	0	1353	1483
Flt Permitted	0.571											
Satd. Flow (perm)	950	3283	0	1745	1712	1483	0	1745	0	0	1424	1483
Satd. Flow (RTOR)						29						27
Lane Group Flow (vph)	29	542	0	0	311	1	0	0	0	0	4	4
Turn Type	Perm	NA		Perm	NA	Perm				custom	NA	custom
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		30.1	30.1	30.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	90.0	90.0		90.0	90.0	90.0	35.0	35.0		35.0	35.0	35.0
Total Split (%)	72.0%	72.0%		72.0%	72.0%	72.0%	28.0%	28.0%		28.0%	28.0%	28.0%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.3	6.3		6.3	6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	120.5	120.5			120.5	120.5				10.0	10.0	
Actuated g/C Ratio	0.96	0.96			0.96	0.96				0.08	0.08	
v/c Ratio	0.03	0.17			0.19	0.00				0.04	0.03	
Control Delay	1.0	0.8			0.7	0.0				54.0	0.2	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	1.0	0.8			0.7	0.0				54.0	0.2	
LOS	A	A			A	A				D	A	
Approach Delay		0.8			0.7					27.1		
Approach LOS		A			A					C		
Queue Length 50th (m)	0.0	0.0			0.0	0.0				0.9	0.0	
Queue Length 95th (m)	2.6	15.4			6.5	m0.0				4.7	0.0	
Internal Link Dist (m)		359.5			168.3			30.9		31.1		
Turn Bay Length (m)	140.0					100.0						
Base Capacity (vph)	916	3165			1651	1431				326	361	
Starvation Cap Reductn	0	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.03	0.17			0.19	0.00				0.01	0.01	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 37 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report

Page 3

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2027 Future Background

AM Peak Hour

Maximum v/c Ratio: 0.19

Intersection Signal Delay: 1.0

Intersection LOS: A

Intersection Capacity Utilization 44.1%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

→ Ø2 (R)	↕ Ø4
90 s	35 s
← Ø6 (R)	↕ Ø8
90 s	35 s

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

3: Hazeldean Road & Jackson Trails Centre

2027 Future Background

AM Peak Hour

	↖	→	←	↗	↘	↙	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations	↖	↗	↗		↖	↗	
Traffic Volume (vph)	27	503	489	5	1	6	
Future Volume (vph)	27	503	489	5	1	6	
Satd. Flow (prot)	1523	3191	3071	0	1658	1293	
Flt Permitted	0.471				0.950		
Satd. Flow (perm)	755	3191	3071	0	1658	1293	
Satd. Flow (RTOR)			2			6	
Lane Group Flow (vph)	27	503	494	0	1	6	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	75.7	75.7	75.7		34.3	34.3	5.0
Total Split (%)	65.8%	65.8%	65.8%		29.8%	29.8%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	110.5	110.5	110.5		10.0	10.0	
Actuated g/C Ratio	0.96	0.96	0.96		0.09	0.09	
v/c Ratio	0.04	0.16	0.17		0.01	0.05	
Control Delay	1.2	0.9	0.9		48.0	29.0	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	1.2	0.9	0.9		48.0	29.0	
LOS	A	A	A		D	C	
Approach Delay		0.9	0.9		31.7		
Approach LOS		A	A		C		
Queue Length 50th (m)	0.0	0.0	0.0		0.2	0.0	
Queue Length 95th (m)	2.6	14.7	14.6		1.9	4.2	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	725	3065	2950		403	319	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.16	0.17		0.00	0.02	
Intersection Summary							
Cycle Length: 115							
Actuated Cycle Length: 115							
Offset: 75 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Green							
Natural Cycle: 75							
Control Type: Actuated-Coordinated							

Lanes, Volumes, Timings

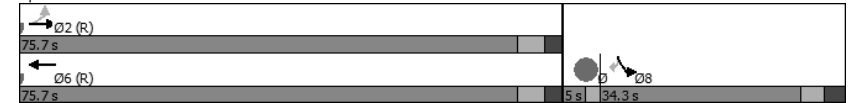
3: Hazeldean Road & Jackson Trails Centre

2027 Future Background

AM Peak Hour

Maximum v/c Ratio: 0.17	
Intersection Signal Delay: 1.1	Intersection LOS: A
Intersection Capacity Utilization 42.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



Lanes, Volumes, Timings

4: Carp Road & Hazeldean Road

2027 Future Background

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	217	268	60	33	164	362	65	472	22	238	315	88
Future Volume (vph)	217	268	60	33	164	362	65	472	22	238	315	88
Satd. Flow (prot)	1626	3008	0	1537	1648	1469	1523	3242	0	3066	1712	1375
Flt Permitted	0.396			0.554			0.950			0.950		
Satd. Flow (perm)	676	3008	0	892	1648	1441	1514	3242	0	3047	1712	1335
Satd. Flow (RTOR)		25				351		4				137
Lane Group Flow (vph)	217	328	0	33	164	362	65	494	0	238	315	88
Turn Type	pm+pt	NA		Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	15.0	55.0		40.0	40.0	40.0	16.0	54.0		16.0	54.0	54.0
Total Split (%)	12.0%	44.0%		32.0%	32.0%	32.0%	12.8%	43.2%		12.8%	43.2%	43.2%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	C-Max			None	C-Max	C-Max
Act Effct Green (s)	35.0	34.5		19.5	19.5	19.5	9.7	56.9		14.9	64.5	64.5
Actuated g/C Ratio	0.28	0.28		0.16	0.16	0.16	0.08	0.46		0.12	0.52	0.52
v/c Ratio	0.85	0.39		0.24	0.64	0.70	0.55	0.33		0.65	0.36	0.12
Control Delay	65.2	33.3		46.8	59.4	12.5	72.6	23.7		57.2	35.4	13.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	65.2	33.3		46.8	59.4	12.5	72.6	23.7		57.2	35.4	13.8
LOS	E	C		D	E	B	E	C		E	D	B
Approach Delay		46.0			28.3			29.4			40.5	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	45.3	32.4		7.3	38.9	2.4	15.5	39.8		29.1	38.0	0.0
Queue Length 95th (m)	57.4	37.9		15.1	53.2	27.6	30.4	60.2		55.9	104.7	15.4
Internal Link Dist (m)		168.3			634.2			336.3			266.7	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	256	1180		238	440	642	130	1478		364	883	755
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.85	0.28		0.14	0.37	0.56	0.50	0.33		0.65	0.36	0.12

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 107 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

4: Carp Road & Hazeldean Road

2027 Future Background

AM Peak Hour

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 36.1

Intersection LOS: D

Intersection Capacity Utilization 74.5%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Carp Road & Hazeldean Road



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

2027 Future Background

AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	205	17	25	52	13	179	17	1015	25	55	570	46
Future Volume (vph)	205	17	25	52	13	179	17	1015	25	55	570	46
Satd. Flow (prot)	1642	1516	0	1658	1483	0	1510	3269	0	1658	3159	0
Flt Permitted	0.533			0.730			0.404			0.202		
Satd. Flow (perm)	921	1516	0	1262	1483	0	642	3269	0	352	3159	0
Satd. Flow (RTOR)		25			158			3			10	
Lane Group Flow (vph)	205	42	0	52	192	0	17	1040	0	55	616	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	30.3	30.3		29.3	29.3		10.6	32.0		10.6	32.0	
Total Split (s)	43.0	43.0		43.0	43.0		11.0	71.0		11.0	71.0	
Total Split (%)	34.4%	34.4%		34.4%	34.4%		8.8%	56.8%		8.8%	56.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	30.5	30.5		30.5	30.5		77.8	72.9		80.4	77.8	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.62	0.58		0.64	0.62	
v/c Ratio	0.92	0.11		0.17	0.40		0.04	0.55		0.19	0.31	
Control Delay	86.9	18.1		36.0	10.9		8.9	17.0		10.6	13.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	86.9	18.1		36.0	10.9		8.9	17.0		10.6	13.2	
LOS	F	B		D	B		A	B		B	B	
Approach Delay		75.2			16.2			16.9			12.9	
Approach LOS		E			B			B			B	
Queue Length 50th (m)	48.4	3.2		10.0	6.4		0.8	89.9		4.6	32.0	
Queue Length 95th (m)	#83.2	11.6		19.7	24.4		m2.7	129.6		10.4	58.3	
Internal Link Dist (m)		65.8			95.1			266.7			438.0	
Turn Bay Length (m)	65.5						24.5			36.0		
Base Capacity (vph)	270	462		370	547		438	1908		288	1970	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.76	0.09		0.14	0.35		0.04	0.55		0.19	0.31	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 7 (6%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

2027 Future Background

AM Peak Hour

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 22.1

Intersection LOS: C

Intersection Capacity Utilization 79.2%

ICU Level of Service D

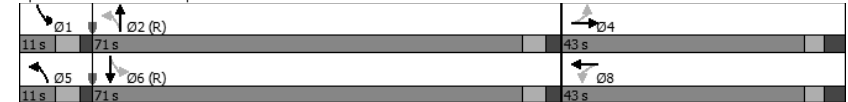
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2027 Future Background

PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖			↖	↖	↖	↖	
Traffic Volume (vph)	10	362	35	251	470	39	32	27	189	28	21	3
Future Volume (vph)	10	362	35	251	470	39	32	27	189	28	21	3
Satd. Flow (prot)	1658	1722	0	1658	1710	0	0	1700	1483	1658	1602	0
Flt Permitted	0.460			0.524				0.818		0.719		
Satd. Flow (perm)	803	1722	0	914	1710	0	0	1427	1483	1255	1602	0
Satd. Flow (RTOR)		7			6				189		3	
Lane Group Flow (vph)	10	397	0	251	509	0	0	59	189	28	24	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4		4	8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		27.1	27.1	27.1	27.1	27.1	
Total Split (s)	83.0	83.0		83.0	83.0		47.0	47.0	47.0	47.0	47.0	
Total Split (%)	63.8%	63.8%		63.8%	63.8%		36.2%	36.2%	36.2%	36.2%	36.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	104.8	104.8		104.8	104.8		12.8	12.8	12.8	12.8	12.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81		0.10	0.10	0.10	0.10	0.10	
v/c Ratio	0.02	0.29		0.34	0.37		0.42	0.60	0.23	0.15	0.15	
Control Delay	3.4	4.1		9.0	8.8		63.1	15.2	56.7	48.6	48.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	3.4	4.1		9.0	8.8		63.1	15.2	56.7	48.6	48.6	
LOS	A	A		A	A		E	B	E	D	D	
Approach Delay		4.0			8.8		26.6			53.0		
Approach LOS		A			A		C			D		
Queue Length 50th (m)	0.4	18.0		30.7	72.2		14.8	0.0	6.9	5.1		
Queue Length 95th (m)	2.0	41.5		70.0	121.9		26.7	20.6	15.4	12.6		
Internal Link Dist (m)		96.2			363.2		170.2			47.0		
Turn Bay Length (m)	66.0			98.0				10.0	24.5			
Base Capacity (vph)	647	1390		737	1380		448	596	394	506		
Starvation Cap Reductn	0	0		0	0		0	0	0	0		
Spillback Cap Reductn	0	0		0	0		0	0	0	0		
Storage Cap Reductn	0	0		0	0		0	0	0	0		
Reduced v/c Ratio	0.02	0.29		0.34	0.37		0.13	0.32	0.07	0.05		
Intersection Summary												
Cycle Length: 130												
Actuated Cycle Length: 130												
Offset: 126 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 65												
Control Type: Actuated-Coordinated												

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report
Page 1

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2027 Future Background

PM Peak Hour

Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 12.1	Intersection LOS: B
Intersection Capacity Utilization 62.6%	ICU Level of Service B
Analysis Period (min) 15	
Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road	

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report
Page 2

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2027 Future Background

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	51	528	0	0	735	6	0	0	0	42	0	37
Future Volume (vph)	51	528	0	0	735	6	0	0	0	42	0	37
Satd. Flow (prot)	1658	3283	0	1745	1745	1483	0	1745	0	0	1658	1483
Flt Permitted	0.355									0.757		
Satd. Flow (perm)	620	3283	0	1745	1745	1438	0	1745	0	0	1321	1483
Satd. Flow (RTOR)						28						37
Lane Group Flow (vph)	51	528	0	0	735	6	0	0	0	0	42	37
Turn Type	Perm	NA		Perm	NA	Perm				custom	NA	custom
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		34.1	34.1	34.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	93.0	93.0		93.0	93.0	93.0	37.0	37.0		37.0	37.0	37.0
Total Split (%)	71.5%	71.5%		71.5%	71.5%	71.5%	28.5%	28.5%		28.5%	28.5%	28.5%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.3	6.3		6.3	6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	111.1	111.1			111.1	111.1				11.0	11.0	
Actuated g/C Ratio	0.85	0.85			0.85	0.85				0.08	0.08	
v/c Ratio	0.10	0.19			0.49	0.00				0.38	0.23	
Control Delay	3.7	3.0			2.6	0.0				65.8	19.9	
Queue Delay	0.0	0.0			0.3	0.0				0.0	0.0	
Total Delay	3.7	3.0			2.9	0.0				65.8	19.9	
LOS	A	A			A	A				E	B	
Approach Delay		3.0			2.8					44.3		
Approach LOS		A			A					D		
Queue Length 50th (m)	1.9	10.8			6.3	0.0				10.5	0.0	
Queue Length 95th (m)	7.8	27.2			m19.8	m0.0				21.9	10.6	
Internal Link Dist (m)		363.2			168.3			30.9			31.1	
Turn Bay Length (m)	140.0					100.0						
Base Capacity (vph)	529	2804			1490	1232				311	378	
Starvation Cap Reductn	0	0			252	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.10	0.19			0.59	0.00				0.14	0.10	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 47 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report

Page 3

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2027 Future Background

PM Peak Hour

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 5.3

Intersection LOS: A

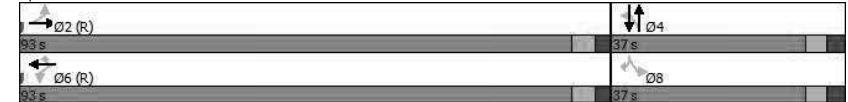
Intersection Capacity Utilization 63.4%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

3: Hazeldean Road & Jackson Trails Centre

2027 Future Background

PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations	↩	↗	↖		↩	↗	
Traffic Volume (vph)	65	641	903	14	15	39	
Future Volume (vph)	65	641	903	14	15	39	
Satd. Flow (prot)	1658	3316	3307	0	1580	1469	
Flt Permitted	0.308				0.950		
Satd. Flow (perm)	536	3316	3307	0	1580	1469	
Satd. Flow (RTOR)			2			39	
Lane Group Flow (vph)	65	641	917	0	15	39	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	80.7	80.7	80.7		34.3	34.3	5.0
Total Split (%)	67.3%	67.3%	67.3%		28.6%	28.6%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	101.8	101.8	101.8		10.0	10.0	
Actuated g/C Ratio	0.85	0.85	0.85		0.08	0.08	
v/c Ratio	0.14	0.23	0.33		0.11	0.25	
Control Delay	3.2	2.5	2.9		53.2	19.7	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.2	2.5	2.9		53.2	19.7	
LOS	A	A	A		D	B	
Approach Delay		2.6	2.9		29.0		
Approach LOS		A	A		C		
Queue Length 50th (m)	2.6	14.7	23.4		3.3	0.0	
Queue Length 95th (m)	5.7	19.0	29.4		10.2	10.7	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	454	2814	2806		368	372	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.14	0.23	0.33		0.04	0.10	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 99 (83%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings

3: Hazeldean Road & Jackson Trails Centre

2027 Future Background

PM Peak Hour

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 3.6

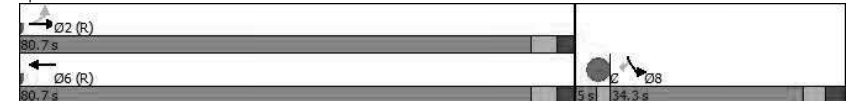
Intersection LOS: A

Intersection Capacity Utilization 59.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2027 Future Background
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↱	↰	↰	↰	↰	↰↱	↱	↰	↰	↰
Traffic Volume (vph)	132	357	86	66	438	486	99	411	29	392	532	227
Future Volume (vph)	132	357	86	66	438	486	99	411	29	392	532	227
Satd. Flow (prot)	1658	3159	0	1470	1745	1455	1658	3175	0	3216	1745	1483
Flt Permitted	0.147			0.495			0.950			0.950		
Satd. Flow (perm)	257	3159	0	763	1745	1427	1654	3175	0	3199	1745	1433
Satd. Flow (RTOR)		27				480		5				203
Lane Group Flow (vph)	132	443	0	66	438	486	99	440	0	392	532	227
Turn Type	pm+pt	NA	Perm	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		8			5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	13.0	58.0		45.0	45.0	45.0	19.0	34.0		38.0	53.0	53.0
Total Split (%)	10.0%	44.6%		34.6%	34.6%	34.6%	14.6%	26.2%		29.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	C-Max			None	C-Max	C-Max
Act Effct Green (s)	49.3	48.8		35.8	35.8	35.8	11.6	41.3		21.1	50.9	50.9
Actuated g/C Ratio	0.38	0.38		0.28	0.28	0.28	0.09	0.32		0.16	0.39	0.39
v/c Ratio	0.77	0.37		0.31	0.91	0.66	0.67	0.43		0.75	0.78	0.33
Control Delay	55.8	24.8		40.9	69.5	8.0	79.3	37.9		51.0	50.9	17.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	55.8	24.8		40.9	69.5	8.0	79.3	37.9		51.0	50.9	17.8
LOS	E	C		D	E	A	E	D		D	D	B
Approach Delay		32.0			37.4			45.5			44.4	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	19.3	32.0		13.1	105.6	1.1	24.7	47.7		50.3	143.4	22.1
Queue Length 95th (m)	#36.3	37.2		26.3	#159.3	30.2	#43.9	67.7		64.5	#188.1	46.3
Internal Link Dist (m)		168.3			634.2			339.9			266.7	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	171	1265		225	515	759	165	1013		791	683	684
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.77	0.35		0.29	0.85	0.64	0.60	0.43		0.50	0.78	0.33

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 129 (99%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2027 Future Background
PM Peak Hour

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 40.3

Intersection LOS: D

Intersection Capacity Utilization 88.6%

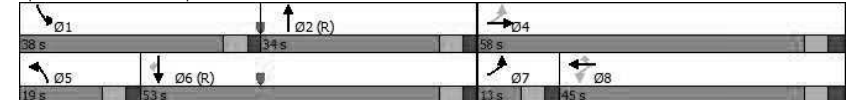
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Carp Road & Hazeldean Road



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

2027 Future Background

PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	130	22	50	55	22	122	58	803	34	174	1057	144
Future Volume (vph)	130	22	50	55	22	122	58	803	34	174	1057	144
Satd. Flow (prot)	1658	1545	0	1658	1506	0	1658	3173	0	1658	3246	0
Flt Permitted	0.565			0.710			0.191			0.296		
Satd. Flow (perm)	985	1545	0	1233	1506	0	333	3173	0	516	3246	0
Satd. Flow (RTOR)		50			122			6			23	
Lane Group Flow (vph)	130	72	0	55	144	0	58	837	0	174	1201	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.3	29.3		29.3	29.3		10.6	32.0		10.6	32.0	
Total Split (s)	30.0	30.0		30.0	30.0		11.0	89.0		11.0	89.0	
Total Split (%)	23.1%	23.1%		23.1%	23.1%		8.5%	68.5%		8.5%	68.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	21.0	21.0		21.0	21.0		90.9	84.9		93.1	87.8	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.70	0.65		0.72	0.68	
v/c Ratio	0.82	0.25		0.28	0.42		0.20	0.40		0.41	0.55	
Control Delay	88.4	20.4		50.3	15.2		4.7	13.1		8.4	12.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	88.4	20.4		50.3	15.2		4.7	13.1		8.4	12.7	
LOS	F	C		D	B		A	B		A	B	
Approach Delay		64.2			24.9			12.5			12.2	
Approach LOS		E			C			B			B	
Queue Length 50th (m)	31.7	4.7		12.2	4.7		3.2	73.1		12.2	84.9	
Queue Length 95th (m)	#61.9	18.1		24.8	23.3		m2.2	79.6		19.2	103.5	
Internal Link Dist (m)		73.3			85.0			266.7			438.0	
Turn Bay Length (m)	65.5						24.5			36.0		
Base Capacity (vph)	179	322		224	374		289	2073		424	2198	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.73	0.22		0.25	0.39		0.20	0.40		0.41	0.55	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 29 (22%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

2027 Future Background

PM Peak Hour

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 17.2

Intersection LOS: B

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2027 Future Background

Synchro 11 Report

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Appendix J

Synchro Intersection Worksheets – 2032 Future Background Conditions

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2032 Future Background

AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	5	382	17	66	231	13	30	11	173	21	10	3
Future Volume (vph)	5	382	17	66	231	13	30	11	173	21	10	3
Satd. Flow (prot)	1658	1703	0	1658	1684	0	0	1642	1483	1658	1684	0
Flt Permitted	0.607			0.525				0.776		0.730		
Satd. Flow (perm)	1059	1703	0	916	1684	0	0	1320	1483	1274	1684	0
Satd. Flow (RTOR)		4			5				173		3	
Lane Group Flow (vph)	5	399	0	66	244	0	0	41	173	21	13	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		8	4		
Detector Phase	2	2		6	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	28.0	28.0		28.0	28.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		27.1	27.1	27.1	27.1	27.1	
Total Split (s)	48.0	48.0		48.0	48.0		37.0	37.0	37.0	37.0	37.0	
Total Split (%)	56.5%	56.5%		56.5%	56.5%		43.5%	43.5%	43.5%	43.5%	43.5%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
Act Effct Green (s)	45.1	45.1		45.1	45.1		10.2	10.2	10.2	10.2	10.2	
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.15	0.15	0.15	0.15	0.15	
v/c Ratio	0.01	0.35		0.11	0.22		0.21	0.47	0.11	0.05		
Control Delay	4.2	6.1		4.8	5.0		26.5	9.2	24.8	21.2		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay	4.2	6.1		4.8	5.0		26.5	9.2	24.8	21.2		
LOS	A	A		A	A		C	A	C	C		
Approach Delay		6.0			5.0		12.5			23.4		
Approach LOS		A			A		B			C		
Queue Length 50th (m)	0.2	17.8		2.5	9.7		4.3	0.0	2.2	1.0		
Queue Length 95th (m)	1.1	31.3		6.4	18.0		12.0	14.2	7.4	5.0		
Internal Link Dist (m)		115.7			359.5		126.0			49.9		
Turn Bay Length (m)	66.0			98.0				10.0	24.5			
Base Capacity (vph)	704	1134		609	1122		605	774	584	774		
Starvation Cap Reductn	0	0		0	0		0	0	0	0		
Spillback Cap Reductn	0	0		0	0		0	0	0	0		
Storage Cap Reductn	0	0		0	0		0	0	0	0		
Reduced v/c Ratio	0.01	0.35		0.11	0.22		0.07	0.22	0.04	0.02		
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 67.8												
Natural Cycle: 65												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.47												

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings

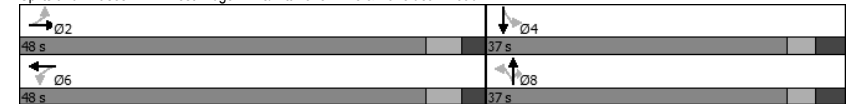
1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2032 Future Background

AM Peak Hour

Intersection Signal Delay: 7.8	Intersection LOS: A
Intersection Capacity Utilization 71.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report
Page 2

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2032 Future Background

AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰	↰		↰↱			↰	↰
Traffic Volume (vph)	29	555	0	0	311	1	0	0	0	4	0	4
Future Volume (vph)	29	555	0	0	311	1	0	0	0	4	0	4
Satd. Flow (prot)	1580	3283	0	1745	1712	1483	0	1745	0	0	1353	1483
Flt Permitted	0.571											
Satd. Flow (perm)	950	3283	0	1745	1712	1483	0	1745	0	0	1424	1483
Satd. Flow (RTOR)					29							27
Lane Group Flow (vph)	29	555	0	0	311	1	0	0	0	0	4	4
Turn Type	Perm	NA		Perm	NA	Perm				custom	NA	custom
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		30.1	30.1	30.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	90.0	90.0		90.0	90.0	90.0	35.0	35.0		35.0	35.0	35.0
Total Split (%)	72.0%	72.0%		72.0%	72.0%	72.0%	28.0%	28.0%		28.0%	28.0%	28.0%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.3	6.3		6.3	6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	120.5	120.5			120.5	120.5				10.0	10.0	
Actuated g/C Ratio	0.96	0.96			0.96	0.96				0.08	0.08	
v/c Ratio	0.03	0.18			0.19	0.00				0.04	0.03	
Control Delay	1.0	0.8			0.7	0.0				54.0	0.2	
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	
Total Delay	1.0	0.8			0.7	0.0				54.0	0.2	
LOS	A	A			A	A				D	A	
Approach Delay		0.8			0.7					27.1		
Approach LOS		A			A					C		
Queue Length 50th (m)	0.0	0.0			0.0	0.0				0.9	0.0	
Queue Length 95th (m)	2.6	15.8			6.5	m0.0				4.7	0.0	
Internal Link Dist (m)		359.5			168.3			30.9		31.1		
Turn Bay Length (m)	140.0					100.0						
Base Capacity (vph)	916	3165			1651	1431				326	361	
Starvation Cap Reductn	0	0			0	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.03	0.18			0.19	0.00				0.01	0.01	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 37 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report

Page 3

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2032 Future Background

AM Peak Hour

Maximum v/c Ratio: 0.19

Intersection Signal Delay: 1.0

Intersection LOS: A

Intersection Capacity Utilization 44.1%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

↰ Ø2 (R)	↱ Ø4
90 s	35 s
↰ Ø6 (R)	↱ Ø8
90 s	35 s

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

3: Hazeldean Road & Jackson Trails Centre

2032 Future Background

AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations	↩	↗	↗		↩	↗	
Traffic Volume (vph)	27	515	489	5	1	6	
Future Volume (vph)	27	515	489	5	1	6	
Satd. Flow (prot)	1523	3191	3071	0	1658	1293	
Flt Permitted	0.471				0.950		
Satd. Flow (perm)	755	3191	3071	0	1658	1293	
Satd. Flow (RTOR)			2			6	
Lane Group Flow (vph)	27	515	494	0	1	6	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	75.7	75.7	75.7		34.3	34.3	5.0
Total Split (%)	65.8%	65.8%	65.8%		29.8%	29.8%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	110.5	110.5	110.5		10.0	10.0	
Actuated g/C Ratio	0.96	0.96	0.96		0.09	0.09	
v/c Ratio	0.04	0.17	0.17		0.01	0.05	
Control Delay	1.2	0.9	0.9		48.0	29.0	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	1.2	0.9	0.9		48.0	29.0	
LOS	A	A	A		D	C	
Approach Delay		0.9	0.9		31.7		
Approach LOS		A	A		C		
Queue Length 50th (m)	0.0	0.0	0.0		0.2	0.0	
Queue Length 95th (m)	2.6	15.2	14.6		1.9	4.2	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	725	3065	2950		403	319	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.17	0.17		0.00	0.02	
Intersection Summary							
Cycle Length: 115							
Actuated Cycle Length: 115							
Offset: 75 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Green							
Natural Cycle: 75							
Control Type: Actuated-Coordinated							

Lanes, Volumes, Timings

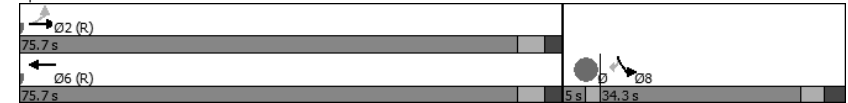
3: Hazeldean Road & Jackson Trails Centre

2032 Future Background

AM Peak Hour

Maximum v/c Ratio: 0.17	
Intersection Signal Delay: 1.1	Intersection LOS: A
Intersection Capacity Utilization 42.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2032 Future Background
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	217	275	60	33	164	365	65	531	22	240	319	88
Future Volume (vph)	217	275	60	33	164	365	65	531	22	240	319	88
Satd. Flow (prot)	1626	3008	0	1537	1648	1469	1523	3248	0	3066	1712	1375
Flt Permitted	0.396			0.550			0.950			0.950		
Satd. Flow (perm)	676	3008	0	886	1648	1441	1514	3248	0	3049	1712	1335
Satd. Flow (RTOR)		24				322		4				137
Lane Group Flow (vph)	217	335	0	33	164	365	65	553	0	240	319	88
Turn Type	pm+pt	NA		Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		8		8	5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	15.0	55.0		40.0	40.0	40.0	16.0	54.0		16.0	54.0	54.0
Total Split (%)	12.0%	44.0%		32.0%	32.0%	32.0%	12.8%	43.2%		12.8%	43.2%	43.2%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	C-Max			None	C-Max	C-Max
Act Effct Green (s)	35.0	34.5		19.5	19.5	19.5	9.7	56.7		15.1	64.5	64.5
Actuated g/C Ratio	0.28	0.28		0.16	0.16	0.16	0.08	0.45		0.12	0.52	0.52
v/c Ratio	0.85	0.40		0.24	0.64	0.74	0.55	0.37		0.65	0.36	0.12
Control Delay	65.2	33.6		46.9	59.4	16.8	72.6	24.4		56.8	35.5	13.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	65.2	33.6		46.9	59.4	16.8	72.6	24.4		56.8	35.5	13.8
LOS	E	C		D	E	B	E	C		E	D	B
Approach Delay		46.0			31.0			29.4			40.4	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	45.3	33.3		7.3	38.9	9.5	15.5	45.8		29.3	38.5	0.0
Queue Length 95th (m)	57.5	39.0		15.1	53.2	37.2	30.4	68.1		56.3	105.7	15.4
Internal Link Dist (m)		168.3			634.2			336.3			266.7	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	256	1179		236	440	620	130	1476		369	883	755
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.85	0.28		0.14	0.37	0.59	0.50	0.37		0.65	0.36	0.12

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 107 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2032 Future Background
AM Peak Hour

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 36.7

Intersection LOS: D

Intersection Capacity Utilization 74.7%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Carp Road & Hazeldean Road



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

2032 Future Background

AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	205	17	25	52	13	179	17	1137	25	55	576	46
Future Volume (vph)	205	17	25	52	13	179	17	1137	25	55	576	46
Satd. Flow (prot)	1642	1516	0	1658	1483	0	1510	3273	0	1658	3159	0
Flt Permitted	0.533			0.730			0.401			0.165		
Satd. Flow (perm)	921	1516	0	1262	1483	0	637	3273	0	288	3159	0
Satd. Flow (RTOR)		25			137			3			10	
Lane Group Flow (vph)	205	42	0	52	192	0	17	1162	0	55	622	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	30.3	30.3		29.3	29.3		10.6	32.0		10.6	32.0	
Total Split (s)	43.0	43.0		43.0	43.0		11.0	71.0		11.0	71.0	
Total Split (%)	34.4%	34.4%		34.4%	34.4%		8.8%	56.8%		8.8%	56.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	30.5	30.5		30.5	30.5		77.8	72.9		80.4	77.8	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.62	0.58		0.64	0.62	
v/c Ratio	0.92	0.11		0.17	0.41		0.04	0.61		0.22	0.32	
Control Delay	86.9	18.1		36.0	14.2		9.1	18.8		11.2	13.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	86.9	18.1		36.0	14.2		9.1	18.8		11.2	13.2	
LOS	F	B		D	B		A	B		B	B	
Approach Delay		75.2			18.8			18.6			13.0	
Approach LOS		E			B			B			B	
Queue Length 50th (m)	48.4	3.2		10.0	10.5		0.9	108.4		4.6	32.4	
Queue Length 95th (m)	#83.2	11.6		19.7	29.2		m2.7	150.0		10.4	58.9	
Internal Link Dist (m)		65.8			95.1			266.7			438.0	
Turn Bay Length (m)	65.5						24.5			36.0		
Base Capacity (vph)	270	462		370	532		435	1911		250	1970	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.76	0.09		0.14	0.36		0.04	0.61		0.22	0.32	

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 7 (6%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

2032 Future Background

AM Peak Hour

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 23.0

Intersection LOS: C

Intersection Capacity Utilization 82.7%

ICU Level of Service E

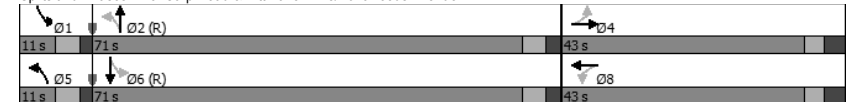
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2032 Future Background

PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖			↖	↖	↖	↖	
Traffic Volume (vph)	10	362	35	251	481	39	32	27	189	28	21	3
Future Volume (vph)	10	362	35	251	481	39	32	27	189	28	21	3
Satd. Flow (prot)	1658	1722	0	1658	1710	0	0	1700	1483	1658	1602	0
Flt Permitted	0.454			0.524				0.818		0.719		
Satd. Flow (perm)	792	1722	0	914	1710	0	0	1427	1483	1255	1602	0
Satd. Flow (RTOR)		7			5				189		3	
Lane Group Flow (vph)	10	397	0	251	520	0	0	59	189	28	24	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		27.1	27.1	27.1	27.1	27.1	
Total Split (s)	83.0	83.0		83.0	83.0		47.0	47.0	47.0	47.0	47.0	
Total Split (%)	63.8%	63.8%		63.8%	63.8%		36.2%	36.2%	36.2%	36.2%	36.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		6.1	6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	104.8	104.8		104.8	104.8		12.8	12.8	12.8	12.8	12.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81		0.10	0.10	0.10	0.10	0.10	
v/c Ratio	0.02	0.29		0.34	0.38		0.42	0.60	0.23	0.15		
Control Delay	3.4	4.1		8.7	8.7		63.1	15.2	56.7	48.6		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay	3.4	4.1		8.7	8.7		63.1	15.2	56.7	48.6		
LOS	A	A		A	A		E	B	E	D		
Approach Delay		4.0			8.7			26.6			53.0	
Approach LOS		A			A			C			D	
Queue Length 50th (m)	0.4	18.0		29.0	71.6		14.8	0.0	6.9	5.1		
Queue Length 95th (m)	2.0	41.5		69.1	125.4		26.7	20.6	15.4	12.6		
Internal Link Dist (m)		96.2			363.2			170.2			47.0	
Turn Bay Length (m)	66.0			98.0					10.0	24.5		
Base Capacity (vph)	638	1390		737	1380		448	596	394	506		
Starvation Cap Reductn	0	0		0	0		0	0	0	0		
Spillback Cap Reductn	0	0		0	0		0	0	0	0		
Storage Cap Reductn	0	0		0	0		0	0	0	0		
Reduced v/c Ratio	0.02	0.29		0.34	0.38		0.13	0.32	0.07	0.05		
Intersection Summary												
Cycle Length: 130												
Actuated Cycle Length: 130												
Offset: 126 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 65												
Control Type: Actuated-Coordinated												

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report
Page 1

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2032 Future Background

PM Peak Hour

Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 12.0	Intersection LOS: B
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	
Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road	

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report
Page 2

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2032 Future Background

PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖	↖		↖		↖	↖	↖
Traffic Volume (vph)	51	528	0	0	753	6	0	0	0	42	0	37
Future Volume (vph)	51	528	0	0	753	6	0	0	0	42	0	37
Satd. Flow (prot)	1658	3283	0	1745	1745	1483	0	1745	0	0	1658	1483
Flt Permitted	0.347									0.757		
Satd. Flow (perm)	604	3283	0	1745	1745	1438	0	1745	0	0	1321	1483
Satd. Flow (RTOR)						28						37
Lane Group Flow (vph)	51	528	0	0	753	6	0	0	0	0	42	37
Turn Type	Perm	NA		Perm	NA	Perm			custom	NA	custom	
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		34.1	34.1	34.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	93.0	93.0		93.0	93.0	93.0	37.0	37.0		37.0	37.0	37.0
Total Split (%)	71.5%	71.5%		71.5%	71.5%	71.5%	28.5%	28.5%		28.5%	28.5%	28.5%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.3	6.3		6.3	6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	111.1	111.1			111.1	111.1				11.0	11.0	
Actuated g/C Ratio	0.85	0.85			0.85	0.85				0.08	0.08	
v/c Ratio	0.10	0.19			0.51	0.00				0.38	0.23	
Control Delay	3.8	3.0			2.8	0.0				65.8	19.9	
Queue Delay	0.0	0.0			0.3	0.0				0.0	0.0	
Total Delay	3.8	3.0			3.1	0.0				65.8	19.9	
LOS	A	A			A	A				E	B	
Approach Delay		3.0			3.1					44.3		
Approach LOS		A			A					D		
Queue Length 50th (m)	1.9	10.8			6.6	0.0				10.5	0.0	
Queue Length 95th (m)	7.8	27.2			m22.3	m0.0				21.9	10.6	
Internal Link Dist (m)		363.2			168.3			30.9			31.1	
Turn Bay Length (m)	140.0					100.0						
Base Capacity (vph)	515	2804			1490	1232				311	378	
Starvation Cap Reductn	0	0			249	0				0	0	
Spillback Cap Reductn	0	0			0	0				0	0	
Storage Cap Reductn	0	0			0	0				0	0	
Reduced v/c Ratio	0.10	0.19			0.61	0.00				0.14	0.10	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 47 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report

Page 3

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2032 Future Background

PM Peak Hour

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 5.4

Intersection LOS: A

Intersection Capacity Utilization 63.4%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

↖ Ø2 (R)	↖ Ø4
93 s	37 s
↖ Ø6 (R)	↖ Ø8
93 s	37 s

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

3: Hazeldean Road & Jackson Trails Centre

2032 Future Background

PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations	↩	↗	↖		↩	↗	
Traffic Volume (vph)	65	641	924	14	15	39	
Future Volume (vph)	65	641	924	14	15	39	
Satd. Flow (prot)	1658	3316	3307	0	1580	1469	
Flt Permitted	0.300				0.950		
Satd. Flow (perm)	522	3316	3307	0	1580	1469	
Satd. Flow (RTOR)			2			39	
Lane Group Flow (vph)	65	641	938	0	15	39	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	80.7	80.7	80.7		34.3	34.3	5.0
Total Split (%)	67.3%	67.3%	67.3%		28.6%	28.6%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	101.8	101.8	101.8		10.0	10.0	
Actuated g/C Ratio	0.85	0.85	0.85		0.08	0.08	
v/c Ratio	0.15	0.23	0.33		0.11	0.25	
Control Delay	3.2	2.5	2.9		53.2	19.7	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.2	2.5	2.9		53.2	19.7	
LOS	A	A	A		D	B	
Approach Delay		2.6	2.9		29.0		
Approach LOS		A	A		C		
Queue Length 50th (m)	2.6	14.7	24.3		3.3	0.0	
Queue Length 95th (m)	5.7	19.0	30.2		10.2	10.7	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	443	2814	2806		368	372	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.15	0.23	0.33		0.04	0.10	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 99 (83%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings

3: Hazeldean Road & Jackson Trails Centre

2032 Future Background

PM Peak Hour

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 3.6

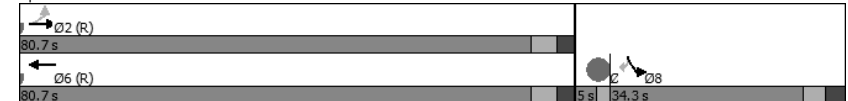
Intersection LOS: A

Intersection Capacity Utilization 60.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2032 Future Background
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	132	357	86	66	449	545	99	416	29	435	599	227
Future Volume (vph)	132	357	86	66	449	545	99	416	29	435	599	227
Satd. Flow (prot)	1658	3159	0	1470	1745	1455	1658	3175	0	3216	1745	1483
Flt Permitted	0.142			0.495			0.950			0.950		
Satd. Flow (perm)	247	3159	0	763	1745	1427	1654	3175	0	3199	1745	1433
Satd. Flow (RTOR)		27				525		5				181
Lane Group Flow (vph)	132	443	0	66	449	545	99	445	0	435	599	227
Turn Type	pm+pt	NA	Perm	NA	Perm	Prot	NA	Prot	NA	Prot	NA	Perm
Protected Phases	7	4		8			5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	13.0	58.0		45.0	45.0	45.0	19.0	34.0		38.0	53.0	53.0
Total Split (%)	10.0%	44.6%		34.6%	34.6%	34.6%	14.6%	26.2%		29.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	C-Max			None	C-Max	C-Max
Act Effct Green (s)	50.0	49.5		36.5	36.5	36.5	11.6	39.0		22.8	50.2	50.2
Actuated g/C Ratio	0.38	0.38		0.28	0.28	0.28	0.09	0.30		0.18	0.39	0.39
v/c Ratio	0.78	0.36		0.31	0.92	0.70	0.67	0.47		0.77	0.89	0.34
Control Delay	57.2	24.5		40.6	70.0	9.2	79.3	40.0		49.2	59.4	19.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	57.2	24.5		40.6	70.0	9.2	79.3	40.0		49.2	59.4	19.0
LOS	E	C		D	E	A	E	D		D	E	B
Approach Delay		32.0			36.9			47.2			48.6	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	19.3	32.0		13.1	109.3	3.7	24.7	49.4		55.8	163.6	25.8
Queue Length 95th (m)	#37.3	37.2		26.3	#165.7	37.7	#43.9	70.0		70.3	#227.6	50.8
Internal Link Dist (m)		168.3			634.2			339.9			266.7	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	169	1265		225	515	791	165	955		791	674	664
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.78	0.35		0.29	0.87	0.69	0.60	0.47		0.55	0.89	0.34

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 129 (99%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

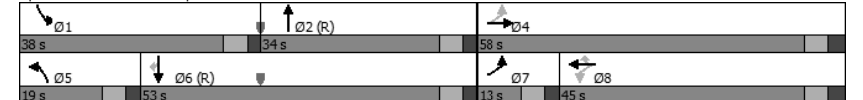
Synchro 11 Report
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Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2032 Future Background
PM Peak Hour

Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 42.0	Intersection LOS: D
Intersection Capacity Utilization 92.8%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: Carp Road & Hazeldean Road



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report
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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

2032 Future Background

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	130	22	50	55	22	122	58	813	34	174	1185	144
Future Volume (vph)	130	22	50	55	22	122	58	813	34	174	1185	144
Satd. Flow (prot)	1658	1545	0	1658	1506	0	1658	3173	0	1658	3253	0
Flt Permitted	0.558			0.710			0.159			0.293		
Satd. Flow (perm)	972	1545	0	1233	1506	0	277	3173	0	510	3253	0
Satd. Flow (RTOR)		50			122			6			20	
Lane Group Flow (vph)	130	72	0	55	144	0	58	847	0	174	1329	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.3	29.3		29.3	29.3		10.6	32.0		10.6	32.0	
Total Split (s)	30.0	30.0		30.0	30.0		11.0	89.0		11.0	89.0	
Total Split (%)	23.1%	23.1%		23.1%	23.1%		8.5%	68.5%		8.5%	68.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	20.2	20.2		20.2	20.2		91.6	85.4		93.8	88.3	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.70	0.66		0.72	0.68	
v/c Ratio	0.86	0.26		0.29	0.43		0.23	0.41		0.41	0.60	
Control Delay	96.6	20.6		51.0	15.5		4.9	11.9		8.3	13.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	96.6	20.6		51.0	15.5		4.9	11.9		8.3	13.6	
LOS	F	C		D	B		A	B		A	B	
Approach Delay		69.5			25.3			11.5			13.0	
Approach LOS		E			C			B			B	
Queue Length 50th (m)	32.2	4.8		12.4	4.8		1.9	72.3		11.6	100.6	
Queue Length 95th (m)	#62.5	18.1		24.8	23.3		m2.3	78.7		19.2	121.9	
Internal Link Dist (m)		73.3			85.0			266.7			438.0	
Turn Bay Length (m)	65.5						24.5			36.0		
Base Capacity (vph)	177	322		224	374		257	2085		425	2215	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.73	0.22		0.25	0.39		0.23	0.41		0.41	0.60	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 29 (22%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report

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Lanes, Volumes, Timings

5: Carp Road & Kittiwake Drive/Echowoods Avenue

2032 Future Background

PM Peak Hour

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 17.5

Intersection LOS: B

Intersection Capacity Utilization 81.7%

ICU Level of Service D

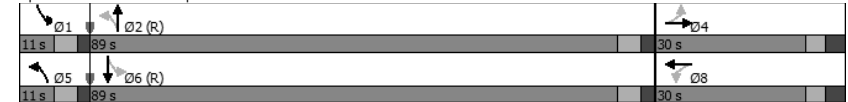
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue



Scenario 1 6310 Hazeldean 11:59 pm 12/05/2023 2032 Future Background

Synchro 11 Report

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Appendix K

Synchro Intersection Worksheets – 2027 Future Total Conditions

Lanes, Volumes, Timings

2027 Future Total

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	374	17	67	234	13	30	11	173	21	10	3
Future Volume (vph)	5	374	17	67	234	13	30	11	173	21	10	3
Satd. Flow (prot)	1658	1701	0	1658	1684	0	0	1642	1483	1658	1684	0
Flt Permitted	0.606			0.531				0.776		0.730		
Satd. Flow (perm)	1058	1701	0	927	1684	0	0	1320	1483	1274	1684	0
Satd. Flow (RTOR)		4			5				173		3	
Lane Group Flow (vph)	5	391	0	67	247	0	0	41	173	21	13	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8		8	4		
Detector Phase	2	2		6	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	28.0	28.0		28.0	28.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		27.1	27.1	27.1	27.1	27.1	
Total Split (s)	48.0	48.0		48.0	48.0		37.0	37.0	37.0	37.0	37.0	
Total Split (%)	56.5%	56.5%		56.5%	56.5%		43.5%	43.5%	43.5%	43.5%	43.5%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3			6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
Act Effect Green (s)	45.1	45.1		45.1	45.1			10.2	10.2	10.2	10.2	
Actuated g/C Ratio	0.67	0.67		0.67	0.67			0.15	0.15	0.15	0.15	
v/c Ratio	0.01	0.35		0.11	0.22			0.21	0.47	0.11	0.05	
Control Delay	4.2	6.0		4.8	5.1			26.5	9.2	24.8	21.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	4.2	6.0		4.8	5.1			26.5	9.2	24.8	21.2	
LOS	A	A		A	A			C	A	C	C	
Approach Delay		6.0			5.0			12.5			23.4	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	0.2	17.4		2.5	9.8			4.3	0.0	2.2	1.0	
Queue Length 95th (m)	1.1	30.6		6.5	18.3			12.0	14.2	7.4	5.0	
Internal Link Dist (m)		115.7			359.5			126.0			49.9	
Turn Bay Length (m)	66.0			98.0					10.0	24.5		
Base Capacity (vph)	704	1133		617	1122			605	774	584	774	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.01	0.35		0.11	0.22			0.07	0.22	0.04	0.02	
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 67.8												
Natural Cycle: 65												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.47												

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2027 Future Total

AM Peak Hour

Intersection Signal Delay: 7.8

Intersection LOS: A

Intersection Capacity Utilization 71.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

 Ø2	 Ø4
48 s	37 s
 Ø6	 Ø8
48 s	37 s

Lanes, Volumes, Timings

2027 Future Total

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	542	2	21	311	1	4	0	49	4	0	4
Future Volume (vph)	29	542	2	21	311	1	4	0	49	4	0	4
Satd. Flow (prot)	1580	3280	0	1658	1712	1483	0	1521	0	0	1353	1483
Flt Permitted	0.571			0.449				0.972			0.874	
Satd. Flow (perm)	950	3280	0	784	1712	1483	0	1484	0	0	1245	1483
Satd. Flow (RTOR)		1				29		49				27
Lane Group Flow (vph)	29	544	0	21	311	1	0	53	0	0	4	4
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		custom	NA	custom
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		30.1	30.1	30.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	90.0	90.0		90.0	90.0	90.0	35.0	35.0		35.0	35.0	35.0
Total Split (%)	72.0%	72.0%		72.0%	72.0%	72.0%	28.0%	28.0%		28.0%	28.0%	28.0%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1		6.3			6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	107.1	107.1		107.1	107.1	107.1		10.0			10.0	10.0
Actuated g/C Ratio	0.86	0.86		0.86	0.86	0.86		0.08			0.08	0.08
v/c Ratio	0.04	0.19		0.03	0.21	0.00		0.33			0.04	0.03
Control Delay	2.2	2.3		1.0	1.0	0.0		22.3			54.2	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	2.2	2.3		1.0	1.0	0.0		22.3			54.2	0.2
LOS	A	A		A	A	A		C			D	A
Approach Delay		2.3			1.0			22.3			27.3	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	1.1	11.8		0.0	0.4	0.0		0.9			0.9	0.0
Queue Length 95th (m)	2.6	15.4		m1.2	10.0	m0.0		13.4			4.7	0.0
Internal Link Dist (m)		359.5			168.3			30.9			31.1	
Turn Bay Length (m)	140.0			30.0		100.0						
Base Capacity (vph)	813	2810		671	1466	1274		378			285	361
Starvation Cap Reductn	0	0		0	0	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	0.04	0.19		0.03	0.21	0.00		0.14			0.01	0.01
Intersection Summary												
Cycle Length: 125												
Actuated Cycle Length: 125												
Offset: 37 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 65												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2027 Future Total
AM Peak Hour

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 3.1

Intersection LOS: A

Intersection Capacity Utilization 49.5%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

 Ø2 (R)	 Ø4
90 s	35 s
 Ø6 (L)	 Ø8
90 s	35 s

Lanes, Volumes, Timings
3: Hazeldean Road & Jackson Trails Centre

2027 Future Total
AM Peak Hour

							
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations							
Traffic Volume (vph)	27	516	495	5	1	6	
Future Volume (vph)	27	516	495	5	1	6	
Satd. Flow (prot)	1523	3191	3071	0	1658	1293	
Flt Permitted	0.469				0.950		
Satd. Flow (perm)	752	3191	3071	0	1658	1293	
Satd. Flow (RTOR)			2			6	
Lane Group Flow (vph)	27	516	500	0	1	6	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	75.7	75.7	75.7		34.3	34.3	5.0
Total Split (%)	65.8%	65.8%	65.8%		29.8%	29.8%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	110.5	110.5	110.5		10.0	10.0	
Actuated g/C Ratio	0.96	0.96	0.96		0.09	0.09	
v/c Ratio	0.04	0.17	0.17		0.01	0.05	
Control Delay	1.2	0.9	0.9		48.0	29.0	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	1.2	0.9	0.9		48.0	29.0	
LOS	A	A	A		D	C	
Approach Delay		0.9	0.9		31.7		
Approach LOS		A	A		C		
Queue Length 50th (m)	0.0	0.0	0.0		0.2	0.0	
Queue Length 95th (m)	2.6	15.2	14.7		1.9	4.2	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	722	3065	2950		403	319	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.17	0.17		0.00	0.02	
Intersection Summary							
Cycle Length: 115							
Actuated Cycle Length: 115							
Offset: 75 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Green							
Natural Cycle: 75							
Control Type: Actuated-Coordinated							

Lanes, Volumes, Timings 3: Hazeldean Road & Jackson Trails Centre

2027 Future Total
AM Peak Hour

Maximum v/c Ratio: 0.17

Intersection Signal Delay: 1.1

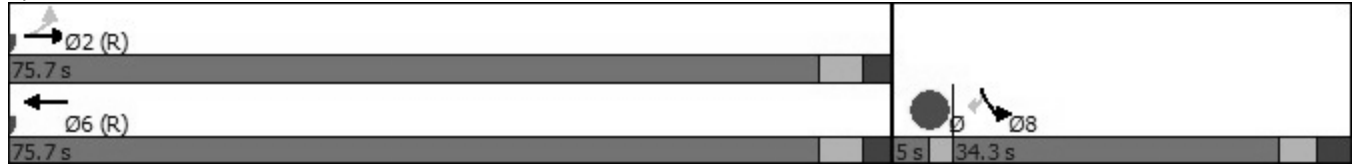
Intersection LOS: A

Intersection Capacity Utilization 42.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2027 Future Total
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	281	62	33	170	362	66	472	22	238	315	103
Future Volume (vph)	251	281	62	33	170	362	66	472	22	238	315	103
Satd. Flow (prot)	1626	3008	0	1537	1648	1469	1523	3242	0	3066	1712	1375
Flt Permitted	0.387			0.546			0.950			0.950		
Satd. Flow (perm)	660	3008	0	879	1648	1441	1514	3242	0	3047	1712	1335
Satd. Flow (RTOR)		24				343		4				137
Lane Group Flow (vph)	251	343	0	33	170	362	66	494	0	238	315	103
Turn Type	pm+pt	NA		Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	15.0	55.0		40.0	40.0	40.0	16.0	54.0		16.0	54.0	54.0
Total Split (%)	12.0%	44.0%		32.0%	32.0%	32.0%	12.8%	43.2%		12.8%	43.2%	43.2%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	35.3	34.8		19.8	19.8	19.8	9.8	56.6		14.9	64.2	64.2
Actuated g/C Ratio	0.28	0.28		0.16	0.16	0.16	0.08	0.45		0.12	0.51	0.51
v/c Ratio	0.99	0.40		0.24	0.65	0.70	0.55	0.34		0.65	0.36	0.14
Control Delay	91.8	32.3		46.6	59.8	13.3	72.8	23.9		57.0	35.7	15.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	91.8	32.3		46.6	59.8	13.3	72.8	23.9		57.0	35.7	15.3
LOS	F	C		D	E	B	E	C		E	D	B
Approach Delay		57.5			29.3			29.6			40.3	
Approach LOS		E			C			C			D	
Queue Length 50th (m)	~54.9	34.2		7.3	40.3	4.1	15.8	40.1		29.1	38.2	0.0
Queue Length 95th (m)	#77.3	40.8		15.1	55.3	29.9	31.0	60.2		#55.9	105.1	20.1
Internal Link Dist (m)		168.3			634.2			336.3			266.7	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	254	1179		234	440	636	130	1470		364	878	752
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.99	0.29		0.14	0.39	0.57	0.51	0.34		0.65	0.36	0.14

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 107 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 4: Carp Road & Hazeldean Road

2027 Future Total
AM Peak Hour

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 39.4

Intersection LOS: D

Intersection Capacity Utilization 76.5%

ICU Level of Service D

Analysis Period (min) 15

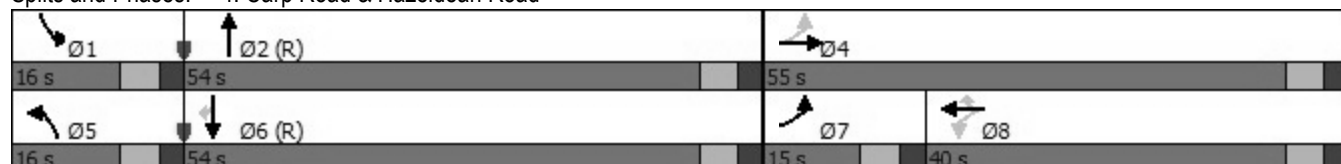
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Carp Road & Hazeldean Road



Lanes, Volumes, Timings
5: Carp Road & Kittiwake Drive/Echowoods Avenue

2027 Future Total
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	17	25	52	13	179	17	1049	25	55	585	46
Future Volume (vph)	205	17	25	52	13	179	17	1049	25	55	585	46
Satd. Flow (prot)	1642	1516	0	1658	1483	0	1510	3273	0	1658	3159	0
Flt Permitted	0.533			0.730			0.396			0.191		
Satd. Flow (perm)	921	1516	0	1262	1483	0	629	3273	0	333	3159	0
Satd. Flow (RTOR)		25			152			3			10	
Lane Group Flow (vph)	205	42	0	52	192	0	17	1074	0	55	631	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	30.3	30.3		29.3	29.3		10.6	32.0		10.6	32.0	
Total Split (s)	43.0	43.0		43.0	43.0		11.0	71.0		11.0	71.0	
Total Split (%)	34.4%	34.4%		34.4%	34.4%		8.8%	56.8%		8.8%	56.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	30.5	30.5		30.5	30.5		77.8	72.9		80.4	77.8	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.62	0.58		0.64	0.62	
v/c Ratio	0.92	0.11		0.17	0.40		0.04	0.56		0.20	0.32	
Control Delay	86.9	18.1		36.0	11.7		9.5	18.1		10.8	13.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	86.9	18.1		36.0	11.7		9.5	18.1		10.8	13.2	
LOS	F	B		D	B		A	B		B	B	
Approach Delay		75.2			16.9			18.0			13.0	
Approach LOS		E			B			B			B	
Queue Length 50th (m)	48.4	3.2		10.0	7.6		0.9	96.5		4.6	33.0	
Queue Length 95th (m)	#83.2	11.6		19.7	25.8		m2.8	m129.2		10.4	60.0	
Internal Link Dist (m)		65.8			95.1			266.7			438.0	
Turn Bay Length (m)	65.5						24.5			36.0		
Base Capacity (vph)	270	462		370	542		431	1911		276	1970	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.76	0.09		0.14	0.35		0.04	0.56		0.20	0.32	

Intersection Summary

Cycle Length: 125
 Actuated Cycle Length: 125
 Offset: 7 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 5: Carp Road & Kittiwake Drive/Echowoods Avenue

2027 Future Total
AM Peak Hour

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 22.6

Intersection LOS: C

Intersection Capacity Utilization 80.2%

ICU Level of Service D

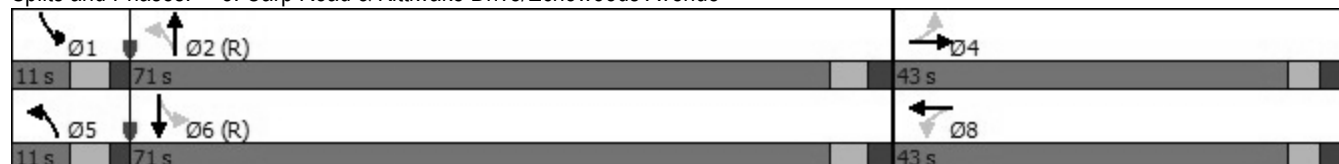
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue



Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2027 Future Total

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	365	35	252	472	39	32	27	190	28	21	3
Future Volume (vph)	10	365	35	252	472	39	32	27	190	28	21	3
Satd. Flow (prot)	1658	1722	0	1658	1710	0	0	1700	1483	1658	1602	0
Flt Permitted	0.459			0.522				0.818		0.719		
Satd. Flow (perm)	801	1722	0	911	1710	0	0	1427	1483	1255	1602	0
Satd. Flow (RTOR)		6			6				190		3	
Lane Group Flow (vph)	10	400	0	252	511	0	0	59	190	28	24	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		27.1	27.1	27.1	27.1	27.1	
Total Split (s)	83.0	83.0		83.0	83.0		47.0	47.0	47.0	47.0	47.0	
Total Split (%)	63.8%	63.8%		63.8%	63.8%		36.2%	36.2%	36.2%	36.2%	36.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3			6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	104.8	104.8		104.8	104.8			12.8	12.8	12.8	12.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.10	0.10	0.10	0.10	
v/c Ratio	0.02	0.29		0.34	0.37			0.42	0.60	0.23	0.15	
Control Delay	3.4	4.1		8.9	8.6			63.1	15.2	56.7	48.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	3.4	4.1		8.9	8.6			63.1	15.2	56.7	48.6	
LOS	A	A		A	A			E	B	E	D	
Approach Delay		4.1			8.7			26.6			53.0	
Approach LOS		A			A			C			D	
Queue Length 50th (m)	0.4	18.3		29.7	69.2			14.8	0.0	6.9	5.1	
Queue Length 95th (m)	2.0	42.0		67.1	116.7			26.7	20.6	15.4	12.6	
Internal Link Dist (m)		96.2			363.2			170.2			47.0	
Turn Bay Length (m)	66.0			98.0					10.0	24.5		
Base Capacity (vph)	645	1389		734	1380			448	596	394	506	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.02	0.29		0.34	0.37			0.13	0.32	0.07	0.05	
Intersection Summary												
Cycle Length: 130												
Actuated Cycle Length: 130												
Offset: 126 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 65												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2027 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 12.0

Intersection LOS: B

Intersection Capacity Utilization 62.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

 Ø2 (L) 83 s	 Ø4 47 s
 Ø5 (R) 83 s	 Ø8 47 s

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2027 Future Total

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	528	4	51	735	6	3	0	41	42	0	37
Future Volume (vph)	51	528	4	51	735	6	3	0	41	42	0	37
Satd. Flow (prot)	1658	3280	0	1658	1745	1483	0	1521	0	0	1658	1483
Flt Permitted	0.355			0.454				0.974			0.924	
Satd. Flow (perm)	618	3280	0	791	1745	1438	0	1486	0	0	1612	1483
Satd. Flow (RTOR)		1				28		41				37
Lane Group Flow (vph)	51	532	0	51	735	6	0	44	0	0	42	37
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		custom	NA	custom
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		34.1	34.1	34.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	93.0	93.0		93.0	93.0	93.0	37.0	37.0		37.0	37.0	37.0
Total Split (%)	71.5%	71.5%		71.5%	71.5%	71.5%	28.5%	28.5%		28.5%	28.5%	28.5%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1		6.3			6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	111.0	111.0		111.0	111.0	111.0		11.1			11.1	11.1
Actuated g/C Ratio	0.85	0.85		0.85	0.85	0.85		0.09			0.09	0.09
v/c Ratio	0.10	0.19		0.08	0.49	0.00		0.27			0.30	0.23
Control Delay	3.8	3.0		1.4	2.4	0.0		21.5			61.3	19.8
Queue Delay	0.0	0.0		0.0	0.3	0.0		0.0			0.0	0.0
Total Delay	3.8	3.0		1.4	2.7	0.0		21.5			61.3	19.8
LOS	A	A		A	A	A		C			E	B
Approach Delay		3.1			2.6			21.5			41.8	
Approach LOS		A			A			C			D	
Queue Length 50th (m)	1.9	10.8		0.4	6.8	0.0		0.7			10.4	0.0
Queue Length 95th (m)	7.9	27.8		m2.0	m24.6	m0.0		12.0			21.6	10.5
Internal Link Dist (m)		363.2			168.3			30.9			31.1	
Turn Bay Length (m)	140.0			30.0		100.0						
Base Capacity (vph)	527	2800		675	1489	1231		382			380	378
Starvation Cap Reductn	0	0		0	254	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	0.10	0.19		0.08	0.60	0.00		0.12			0.11	0.10
Intersection Summary												
Cycle Length: 130												
Actuated Cycle Length: 130												
Offset: 47 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 75												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2027 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 5.4

Intersection LOS: A

Intersection Capacity Utilization 73.1%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

 Ø2 (R)	 Ø4
93 s	37 s
 Ø6 (R)	 Ø8
93 s	37 s

Lanes, Volumes, Timings
3: Hazeldean Road & Jackson Trails Centre

2027 Future Total
PM Peak Hour

							
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations							
Traffic Volume (vph)	65	652	917	14	15	39	
Future Volume (vph)	65	652	917	14	15	39	
Satd. Flow (prot)	1658	3316	3307	0	1580	1469	
Flt Permitted	0.303				0.950		
Satd. Flow (perm)	527	3316	3307	0	1580	1469	
Satd. Flow (RTOR)			2			39	
Lane Group Flow (vph)	65	652	931	0	15	39	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	80.7	80.7	80.7		34.3	34.3	5.0
Total Split (%)	67.3%	67.3%	67.3%		28.6%	28.6%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	101.8	101.8	101.8		10.0	10.0	
Actuated g/C Ratio	0.85	0.85	0.85		0.08	0.08	
v/c Ratio	0.15	0.23	0.33		0.11	0.25	
Control Delay	3.2	2.5	2.9		53.2	19.7	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.2	2.5	2.9		53.2	19.7	
LOS	A	A	A		D	B	
Approach Delay		2.6	2.9		29.0		
Approach LOS		A	A		C		
Queue Length 50th (m)	2.6	15.1	24.0		3.3	0.0	
Queue Length 95th (m)	5.7	19.3	29.8		10.2	10.7	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	447	2814	2806		368	372	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.15	0.23	0.33		0.04	0.10	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 99 (83%), Referenced to phase 2:EBTL and 6:WBT, Start of Green							
Natural Cycle: 75							
Control Type: Actuated-Coordinated							

Lanes, Volumes, Timings 3: Hazeldean Road & Jackson Trails Centre

2027 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 3.6

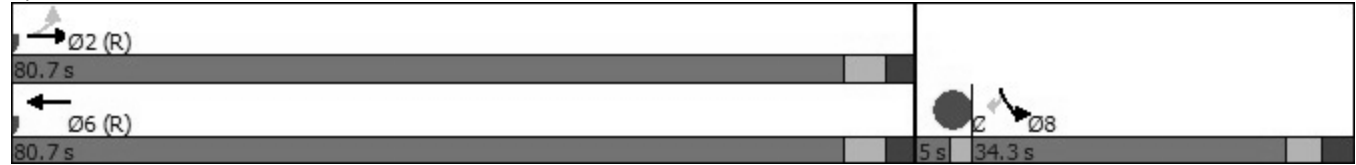
Intersection LOS: A

Intersection Capacity Utilization 59.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2027 Future Total
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	368	87	66	452	486	101	411	29	392	532	263
Future Volume (vph)	161	368	87	66	452	486	101	411	29	392	532	263
Satd. Flow (prot)	1658	3159	0	1470	1745	1455	1658	3175	0	3216	1745	1483
Flt Permitted	0.138			0.490			0.950			0.950		
Satd. Flow (perm)	240	3159	0	755	1745	1427	1654	3175	0	3199	1745	1433
Satd. Flow (RTOR)		26				465		5				236
Lane Group Flow (vph)	161	455	0	66	452	486	101	440	0	392	532	263
Turn Type	pm+pt	NA		Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	13.0	58.0		45.0	45.0	45.0	19.0	34.0		38.0	53.0	53.0
Total Split (%)	10.0%	44.6%		34.6%	34.6%	34.6%	14.6%	26.2%		29.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	50.0	49.5		36.5	36.5	36.5	11.6	40.7		21.1	50.2	50.2
Actuated g/C Ratio	0.38	0.38		0.28	0.28	0.28	0.09	0.31		0.16	0.39	0.39
v/c Ratio	0.96	0.37		0.31	0.92	0.66	0.68	0.44		0.75	0.79	0.38
Control Delay	91.3	24.9		40.7	71.1	8.9	80.1	38.3		50.8	51.9	18.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	91.3	24.9		40.7	71.1	8.9	80.1	38.3		50.8	51.9	18.1
LOS	F	C		D	E	A	F	D		D	D	B
Approach Delay		42.2			39.0			46.1			44.0	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	23.8	33.5		13.1	110.3	3.9	25.2	47.7		50.5	143.6	26.3
Queue Length 95th (m)	#57.0	40.1		26.3	#167.3	35.2	#45.8	67.7		64.5	#188.2	53.6
Internal Link Dist (m)		168.3			634.2			339.9			266.7	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	167	1264		223	515	749	165	998		791	673	698
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.96	0.36		0.30	0.88	0.65	0.61	0.44		0.50	0.79	0.38

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 129 (99%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 4: Carp Road & Hazeldean Road

2027 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 42.5

Intersection LOS: D

Intersection Capacity Utilization 91.0%

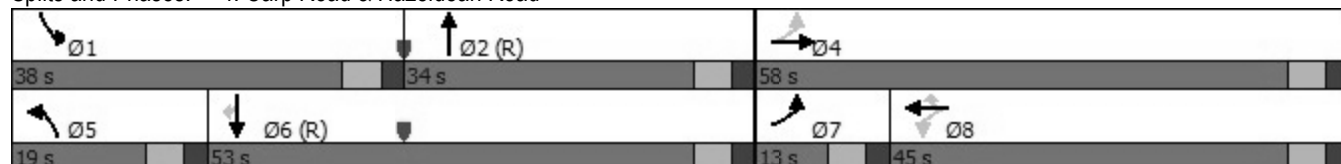
ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Carp Road & Hazeldean Road



Lanes, Volumes, Timings
5: Carp Road & Kittiwake Drive/Echowoods Avenue

2027 Future Total
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	22	50	55	22	122	58	832	34	174	1093	144
Future Volume (vph)	130	22	50	55	22	122	58	832	34	174	1093	144
Satd. Flow (prot)	1658	1545	0	1658	1506	0	1658	3173	0	1658	3249	0
Flt Permitted	0.558			0.710			0.183			0.286		
Satd. Flow (perm)	972	1545	0	1233	1506	0	319	3173	0	498	3249	0
Satd. Flow (RTOR)		50			122			6			22	
Lane Group Flow (vph)	130	72	0	55	144	0	58	866	0	174	1237	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.3	29.3		29.3	29.3		10.6	32.0		10.6	32.0	
Total Split (s)	30.0	30.0		30.0	30.0		11.0	89.0		11.0	89.0	
Total Split (%)	23.1%	23.1%		23.1%	23.1%		8.5%	68.5%		8.5%	68.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	20.2	20.2		20.2	20.2		91.6	85.4		93.8	88.3	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.70	0.66		0.72	0.68	
v/c Ratio	0.86	0.26		0.29	0.43		0.20	0.42		0.42	0.56	
Control Delay	96.6	20.6		51.0	15.5		4.3	12.2		8.4	12.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	96.6	20.6		51.0	15.5		4.3	12.2		8.4	12.8	
LOS	F	C		D	B		A	B		A	B	
Approach Delay		69.5			25.3			11.7			12.3	
Approach LOS		E			C			B			B	
Queue Length 50th (m)	32.2	4.8		12.4	4.8		2.4	72.6		11.6	89.2	
Queue Length 95th (m)	#62.5	18.1		24.8	23.3		m2.0	m77.2		19.2	108.3	
Internal Link Dist (m)		73.3			85.0			266.7			438.0	
Turn Bay Length (m)	65.5						24.5			36.0		
Base Capacity (vph)	177	322		224	374		285	2085		417	2212	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.73	0.22		0.25	0.39		0.20	0.42		0.42	0.56	
Intersection Summary												
Cycle Length: 130												
Actuated Cycle Length: 130												
Offset: 29 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings 5: Carp Road & Kittiwake Drive/Echowoods Avenue

2027 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 17.3

Intersection LOS: B

Intersection Capacity Utilization 79.0%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue

 Ø1	 Ø2 (R)	 Ø4
11 s	89 s	30 s
 Ø5	 Ø6 (R)	 Ø8
11 s	89 s	30 s

Appendix L

Synchro Intersection Worksheets – 2032 Future Total Conditions

Lanes, Volumes, Timings

2032 Future Total

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	383	17	67	234	13	30	11	173	21	10	3
Future Volume (vph)	5	383	17	67	234	13	30	11	173	21	10	3
Satd. Flow (prot)	1658	1703	0	1658	1684	0	0	1642	1483	1658	1684	0
Flt Permitted	0.606			0.525				0.776		0.730		
Satd. Flow (perm)	1058	1703	0	916	1684	0	0	1320	1483	1274	1684	0
Satd. Flow (RTOR)		4			5				173		3	
Lane Group Flow (vph)	5	400	0	67	247	0	0	41	173	21	13	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8		8	4		
Detector Phase	2	2		6	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	28.0	28.0		28.0	28.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		27.1	27.1	27.1	27.1	27.1	
Total Split (s)	48.0	48.0		48.0	48.0		37.0	37.0	37.0	37.0	37.0	
Total Split (%)	56.5%	56.5%		56.5%	56.5%		43.5%	43.5%	43.5%	43.5%	43.5%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3			6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None	None	None	None	
Act Effect Green (s)	45.1	45.1		45.1	45.1			10.2	10.2	10.2	10.2	
Actuated g/C Ratio	0.67	0.67		0.67	0.67			0.15	0.15	0.15	0.15	
v/c Ratio	0.01	0.35		0.11	0.22			0.21	0.47	0.11	0.05	
Control Delay	4.2	6.1		4.9	5.1			26.5	9.2	24.8	21.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	4.2	6.1		4.9	5.1			26.5	9.2	24.8	21.2	
LOS	A	A		A	A			C	A	C	C	
Approach Delay		6.1			5.0			12.5			23.4	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	0.2	17.9		2.5	9.8			4.3	0.0	2.2	1.0	
Queue Length 95th (m)	1.1	31.5		6.4	18.3			12.0	14.2	7.4	5.0	
Internal Link Dist (m)		115.7			359.5			126.0			49.9	
Turn Bay Length (m)	66.0			98.0					10.0	24.5		
Base Capacity (vph)	704	1134		609	1122			605	774	584	774	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.01	0.35		0.11	0.22			0.07	0.22	0.04	0.02	
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 67.8												
Natural Cycle: 65												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.47												

Intersection Signal Delay: 7.8

Intersection LOS: A

Intersection Capacity Utilization 71.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

 Ø2 48 s	 Ø4 37 s
 Ø6 48 s	 Ø8 37 s

HCM Signalized Intersection Capacity Analysis

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2032 Future Total
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	383	17	67	234	13	30	11	173	21	10	3
Future Volume (vph)	5	383	17	67	234	13	30	11	173	21	10	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.3	6.3		6.3	6.3			6.1	6.1	6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99			1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1658	1702		1658	1684			1642	1483	1658	1685	
Flt Permitted	0.61	1.00		0.52	1.00			0.78	1.00	0.73	1.00	
Satd. Flow (perm)	1057	1702		916	1684			1320	1483	1274	1685	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	383	17	67	234	13	30	11	173	21	10	3
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	147	0	3	0
Lane Group Flow (vph)	5	399	0	67	245	0	0	41	26	21	10	0
Heavy Vehicles (%)	2%	4%	2%	2%	5%	2%	3%	9%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	45.1	45.1		45.1	45.1			10.2	10.2	10.2	10.2	
Effective Green, g (s)	45.1	45.1		45.1	45.1			10.2	10.2	10.2	10.2	
Actuated g/C Ratio	0.67	0.67		0.67	0.67			0.15	0.15	0.15	0.15	
Clearance Time (s)	6.3	6.3		6.3	6.3			6.1	6.1	6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	704	1133		610	1121			198	223	191	253	
v/s Ratio Prot		c0.23			0.15							0.01
v/s Ratio Perm	0.00			0.07				c0.03	0.02	0.02		
v/c Ratio	0.01	0.35		0.11	0.22			0.21	0.12	0.11	0.04	
Uniform Delay, d1	3.8	4.9		4.1	4.4			25.2	24.9	24.8	24.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.9		0.4	0.4			0.5	0.2	0.3	0.1	
Delay (s)	3.8	5.8		4.4	4.9			25.7	25.1	25.1	24.6	
Level of Service	A	A		A	A			C	C	C	C	
Approach Delay (s)		5.8			4.8			25.2			24.9	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			10.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			67.7			Sum of lost time (s)				12.4		
Intersection Capacity Utilization			71.3%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2032 Future Total

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	555	2	21	311	1	4	0	49	4	0	4
Future Volume (vph)	29	555	2	21	311	1	4	0	49	4	0	4
Satd. Flow (prot)	1580	3280	0	1658	1712	1483	0	1521	0	0	1353	1483
Flt Permitted	0.571			0.443				0.972			0.874	
Satd. Flow (perm)	950	3280	0	773	1712	1483	0	1484	0	0	1245	1483
Satd. Flow (RTOR)		1				29		49				27
Lane Group Flow (vph)	29	557	0	21	311	1	0	53	0	0	4	4
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		custom	NA	custom
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		30.1	30.1	30.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	90.0	90.0		90.0	90.0	90.0	35.0	35.0		35.0	35.0	35.0
Total Split (%)	72.0%	72.0%		72.0%	72.0%	72.0%	28.0%	28.0%		28.0%	28.0%	28.0%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1		6.3			6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	107.1	107.1		107.1	107.1	107.1		10.0			10.0	10.0
Actuated g/C Ratio	0.86	0.86		0.86	0.86	0.86		0.08			0.08	0.08
v/c Ratio	0.04	0.20		0.03	0.21	0.00		0.33			0.04	0.03
Control Delay	2.2	2.3		1.0	1.0	0.0		22.3			54.2	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	2.2	2.3		1.0	1.0	0.0		22.3			54.2	0.2
LOS	A	A		A	A	A		C			D	A
Approach Delay		2.3			1.0			22.3			27.3	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	1.1	12.2		0.0	0.4	0.0		0.9			0.9	0.0
Queue Length 95th (m)	2.6	15.8		m1.2	10.1	m0.0		13.4			4.7	0.0
Internal Link Dist (m)		359.5			168.3			30.9			31.1	
Turn Bay Length (m)	140.0			30.0		100.0						
Base Capacity (vph)	813	2810		662	1466	1274		378			285	361
Starvation Cap Reductn	0	0		0	0	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	0.04	0.20		0.03	0.21	0.00		0.14			0.01	0.01

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 37 (30%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2032 Future Total
AM Peak Hour

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 3.1

Intersection LOS: A

Intersection Capacity Utilization 49.5%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

 Ø2 (R)	 Ø4
90 s	35 s
 Ø6 (L)	 Ø8
90 s	35 s

HCM Signalized Intersection Capacity Analysis

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2032 Future Total
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	555	2	21	311	1	4	0	49	4	0	4
Future Volume (vph)	29	555	2	21	311	1	4	0	49	4	0	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.1		6.1	6.1	6.1		6.3			6.3	6.3
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00			0.95	1.00
Satd. Flow (prot)	1580	3282		1658	1712	1483		1522			1353	1483
Flt Permitted	0.57	1.00		0.44	1.00	1.00		0.97			0.87	1.00
Satd. Flow (perm)	950	3282		774	1712	1483		1485			1245	1483
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	29	555	2	21	311	1	4	0	49	4	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	46	0	0	0	4
Lane Group Flow (vph)	29	557	0	21	311	1	0	7	0	0	4	0
Heavy Vehicles (%)	7%	3%	2%	2%	4%	2%	2%	2%	2%	25%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		custom	NA	custom
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	104.6	104.6		104.6	104.6	104.6		8.0			8.0	8.0
Effective Green, g (s)	104.6	104.6		104.6	104.6	104.6		8.0			8.0	8.0
Actuated g/C Ratio	0.84	0.84		0.84	0.84	0.84		0.06			0.06	0.06
Clearance Time (s)	6.1	6.1		6.1	6.1	6.1		6.3			6.3	6.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	794	2746		647	1432	1240		95			79	94
v/s Ratio Prot		0.17			c0.18							
v/s Ratio Perm	0.03			0.03		0.00		c0.00			0.00	0.00
v/c Ratio	0.04	0.20		0.03	0.22	0.00		0.08			0.05	0.00
Uniform Delay, d1	1.7	2.0		1.7	2.0	1.7		55.0			54.9	54.8
Progression Factor	1.00	1.00		0.41	0.29	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	0.2		0.1	0.3	0.0		0.3			0.3	0.0
Delay (s)	1.8	2.2		0.8	0.9	1.7		55.4			55.2	54.8
Level of Service	A	A		A	A	A		E			E	D
Approach Delay (s)		2.2			0.9			55.4			55.0	
Approach LOS		A			A			E			D	
Intersection Summary												
HCM 2000 Control Delay		5.0										
HCM 2000 Volume to Capacity ratio		0.21										
Actuated Cycle Length (s)		125.0										
Intersection Capacity Utilization		49.5%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Hazeldean Road & Jackson Trails Centre

2032 Future Total
AM Peak Hour

							
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations							
Traffic Volume (vph)	27	528	495	5	1	6	
Future Volume (vph)	27	528	495	5	1	6	
Satd. Flow (prot)	1523	3191	3071	0	1658	1293	
Flt Permitted	0.469				0.950		
Satd. Flow (perm)	752	3191	3071	0	1658	1293	
Satd. Flow (RTOR)			2			6	
Lane Group Flow (vph)	27	528	500	0	1	6	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	75.7	75.7	75.7		34.3	34.3	5.0
Total Split (%)	65.8%	65.8%	65.8%		29.8%	29.8%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	110.5	110.5	110.5		10.0	10.0	
Actuated g/C Ratio	0.96	0.96	0.96		0.09	0.09	
v/c Ratio	0.04	0.17	0.17		0.01	0.05	
Control Delay	1.2	0.9	0.9		48.0	29.0	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	1.2	0.9	0.9		48.0	29.0	
LOS	A	A	A		D	C	
Approach Delay		0.9	0.9		31.7		
Approach LOS		A	A		C		
Queue Length 50th (m)	0.0	0.0	0.0		0.2	0.0	
Queue Length 95th (m)	2.6	15.5	14.7		1.9	4.2	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	722	3065	2950		403	319	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.17	0.17		0.00	0.02	
Intersection Summary							
Cycle Length: 115							
Actuated Cycle Length: 115							
Offset: 75 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Green							
Natural Cycle: 75							
Control Type: Actuated-Coordinated							

Lanes, Volumes, Timings
3: Hazeldean Road & Jackson Trails Centre

2032 Future Total
AM Peak Hour

Maximum v/c Ratio: 0.17

Intersection Signal Delay: 1.1

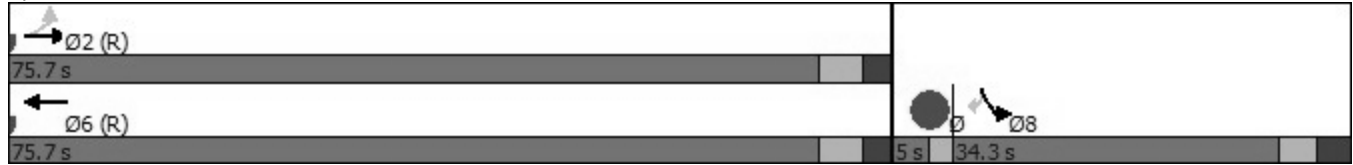
Intersection LOS: A

Intersection Capacity Utilization 42.6%

ICU Level of Service A

Analysis Period (min) 15

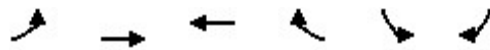
Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



HCM Signalized Intersection Capacity Analysis

3: Hazeldean Road & Jackson Trails Centre

2032 Future Total
AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	27	528	495	5	1	6
Future Volume (vph)	27	528	495	5	1	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.4	6.4	6.4		6.3	6.3
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1523	3191	3072		1658	1293
Flt Permitted	0.47	1.00	1.00		0.95	1.00
Satd. Flow (perm)	752	3191	3072		1658	1293
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	528	495	5	1	6
RTOR Reduction (vph)	0	0	0	0	0	6
Lane Group Flow (vph)	27	528	500	0	1	0
Heavy Vehicles (%)	11%	6%	10%	2%	2%	17%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		8	
Permitted Phases	2					8
Actuated Green, G (s)	100.3	100.3	100.3		2.0	2.0
Effective Green, g (s)	100.3	100.3	100.3		2.0	2.0
Actuated g/C Ratio	0.87	0.87	0.87		0.02	0.02
Clearance Time (s)	6.4	6.4	6.4		6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	655	2783	2679		28	22
v/s Ratio Prot		c0.17	0.16		c0.00	
v/s Ratio Perm	0.04					0.00
v/c Ratio	0.04	0.19	0.19		0.04	0.00
Uniform Delay, d1	1.0	1.1	1.1		55.6	55.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2		0.5	0.1
Delay (s)	1.1	1.3	1.3		56.1	55.6
Level of Service	A	A	A		E	E
Approach Delay (s)		1.3	1.3		55.7	
Approach LOS		A	A		E	
Intersection Summary						
HCM 2000 Control Delay			1.6		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.19			
Actuated Cycle Length (s)			115.0		Sum of lost time (s)	14.7
Intersection Capacity Utilization			42.6%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2032 Future Total
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	288	62	33	170	365	66	531	22	240	319	103
Future Volume (vph)	251	288	62	33	170	365	66	531	22	240	319	103
Satd. Flow (prot)	1626	3008	0	1537	1648	1469	1523	3248	0	3066	1712	1375
Flt Permitted	0.387			0.542			0.950			0.950		
Satd. Flow (perm)	660	3008	0	873	1648	1441	1514	3248	0	3049	1712	1335
Satd. Flow (RTOR)		24				314		4				137
Lane Group Flow (vph)	251	350	0	33	170	365	66	553	0	240	319	103
Turn Type	pm+pt	NA		Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	15.0	55.0		40.0	40.0	40.0	16.0	54.0		16.0	54.0	54.0
Total Split (%)	12.0%	44.0%		32.0%	32.0%	32.0%	12.8%	43.2%		12.8%	43.2%	43.2%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	35.3	34.8		19.8	19.8	19.8	9.8	56.4		15.1	64.2	64.2
Actuated g/C Ratio	0.28	0.28		0.16	0.16	0.16	0.08	0.45		0.12	0.51	0.51
v/c Ratio	0.99	0.41		0.24	0.65	0.74	0.55	0.38		0.65	0.36	0.14
Control Delay	91.9	32.5		46.7	59.8	17.8	72.8	24.6		56.7	35.9	15.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	91.9	32.5		46.7	59.8	17.8	72.8	24.6		56.7	35.9	15.4
LOS	F	C		D	E	B	E	C		E	D	B
Approach Delay		57.3			32.1			29.7			40.2	
Approach LOS		E			C			C			D	
Queue Length 50th (m)	~55.2	35.1		7.3	40.3	11.3	15.8	46.1		29.2	38.7	0.0
Queue Length 95th (m)	#76.8	41.9		15.1	55.3	39.6	31.0	68.1		#56.5	106.2	20.2
Internal Link Dist (m)		168.3			634.2			336.3			266.7	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	254	1179		233	440	615	130	1468		369	878	752
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.99	0.30		0.14	0.39	0.59	0.51	0.38		0.65	0.36	0.14

Intersection Summary

Cycle Length: 125

Actuated Cycle Length: 125

Offset: 107 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 4: Carp Road & Hazeldean Road

2032 Future Total
AM Peak Hour

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 39.9

Intersection LOS: D

Intersection Capacity Utilization 76.7%

ICU Level of Service D

Analysis Period (min) 15

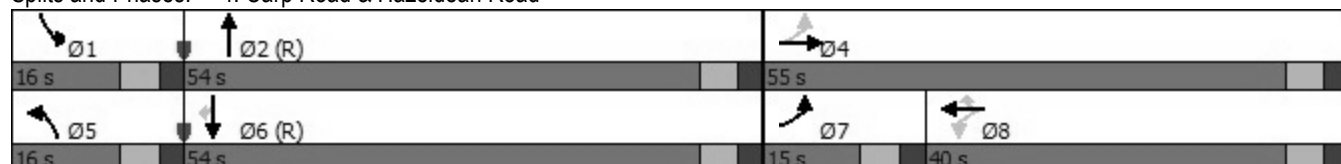
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Carp Road & Hazeldean Road



HCM Signalized Intersection Capacity Analysis

4: Carp Road & Hazeldean Road

2032 Future Total

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	288	62	33	170	365	66	531	22	240	319	103
Future Volume (vph)	251	288	62	33	170	365	66	531	22	240	319	103
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1624	3009		1530	1648	1439	1523	3248		3066	1712	1335
Flt Permitted	0.39	1.00		0.54	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	662	3009		873	1648	1439	1523	3248		3066	1712	1335
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	251	288	62	33	170	365	66	531	22	240	319	103
RTOR Reduction (vph)	0	17	0	0	0	264	0	2	0	0	0	51
Lane Group Flow (vph)	251	333	0	33	170	101	66	551	0	240	319	52
Confl. Peds. (#/hr)	4		4	4		4	4		5	5		4
Confl. Bikes (#/hr)			2			3						
Heavy Vehicles (%)	4%	9%	8%	10%	8%	3%	11%	3%	14%	7%	4%	10%
Turn Type	pm+pt	NA		Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8		8						6
Actuated Green, G (s)	34.8	34.8		19.8	19.8	19.8	8.5	56.4		15.1	63.0	63.0
Effective Green, g (s)	34.8	34.8		19.8	19.8	19.8	8.5	56.4		15.1	63.0	63.0
Actuated g/C Ratio	0.28	0.28		0.16	0.16	0.16	0.07	0.45		0.12	0.50	0.50
Clearance Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	252	837		138	261	227	103	1465		370	862	672
v/s Ratio Prot	c0.07	0.11			0.10		0.04	0.17		c0.08	c0.19	
v/s Ratio Perm	c0.21			0.04		0.07						0.04
v/c Ratio	1.00	0.40		0.24	0.65	0.44	0.64	0.38		0.65	0.37	0.08
Uniform Delay, d1	44.3	36.6		46.0	49.4	47.6	56.8	22.7		52.4	18.9	16.0
Progression Factor	0.95	0.94		1.00	1.00	1.00	1.00	1.00		0.91	1.61	8.77
Incremental Delay, d2	55.0	0.3		0.9	5.7	1.4	12.8	0.7		3.8	1.2	0.2
Delay (s)	97.2	34.8		46.9	55.1	49.0	69.6	23.4		51.3	31.5	140.5
Level of Service	F	C		D	E	D	E	C		D	C	F
Approach Delay (s)		60.9			50.7			28.3			55.7	
Approach LOS		E			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			48.9									
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			125.0									
Intersection Capacity Utilization			76.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
5: Carp Road & Kittiwake Drive/Echowoods Avenue

2032 Future Total
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	17	25	52	13	179	17	1171	25	55	591	46
Future Volume (vph)	205	17	25	52	13	179	17	1171	25	55	591	46
Satd. Flow (prot)	1642	1516	0	1658	1483	0	1510	3273	0	1658	3159	0
Flt Permitted	0.533			0.730			0.393			0.156		
Satd. Flow (perm)	921	1516	0	1262	1483	0	624	3273	0	272	3159	0
Satd. Flow (RTOR)		25			133			2			10	
Lane Group Flow (vph)	205	42	0	52	192	0	17	1196	0	55	637	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	30.3	30.3		29.3	29.3		10.6	32.0		10.6	32.0	
Total Split (s)	43.0	43.0		43.0	43.0		11.0	71.0		11.0	71.0	
Total Split (%)	34.4%	34.4%		34.4%	34.4%		8.8%	56.8%		8.8%	56.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	30.5	30.5		30.5	30.5		77.8	72.9		80.4	77.8	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.62	0.58		0.64	0.62	
v/c Ratio	0.92	0.11		0.17	0.42		0.04	0.63		0.23	0.32	
Control Delay	86.9	18.1		36.0	14.9		9.6	19.9		11.4	13.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	86.9	18.1		36.0	14.9		9.6	19.9		11.4	13.3	
LOS	F	B		D	B		A	B		B	B	
Approach Delay		75.2			19.4			19.7			13.1	
Approach LOS		E			B			B			B	
Queue Length 50th (m)	48.4	3.2		10.0	11.3		1.0	115.2		4.6	33.4	
Queue Length 95th (m)	#83.2	11.6		19.7	30.1		m2.9	m149.7		10.4	60.6	
Internal Link Dist (m)		65.8			95.1			266.7			438.0	
Turn Bay Length (m)	65.5						24.5			36.0		
Base Capacity (vph)	270	462		370	529		427	1910		240	1970	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.76	0.09		0.14	0.36		0.04	0.63		0.23	0.32	
Intersection Summary												
Cycle Length: 125												
Actuated Cycle Length: 125												
Offset: 7 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings 5: Carp Road & Kittiwake Drive/Echowoods Avenue

2032 Future Total
AM Peak Hour

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 23.5

Intersection LOS: C

Intersection Capacity Utilization 83.7%

ICU Level of Service E

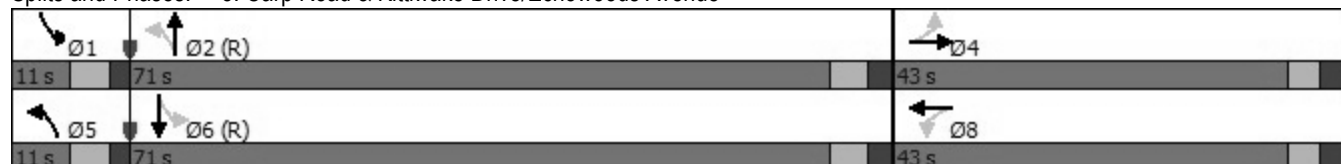
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue



HCM Signalized Intersection Capacity Analysis

5: Carp Road & Kittiwake Drive/Echowoods Avenue

2032 Future Total
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	17	25	52	13	179	17	1171	25	55	591	46
Future Volume (vph)	205	17	25	52	13	179	17	1171	25	55	591	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	0.86		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1642	1515		1643	1483		1509	3272		1658	3159	
Flt Permitted	0.53	1.00		0.73	1.00		0.39	1.00		0.16	1.00	
Satd. Flow (perm)	921	1515		1262	1483		624	3272		272	3159	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	205	17	25	52	13	179	17	1171	25	55	591	46
RTOR Reduction (vph)	0	19	0	0	101	0	0	1	0	0	4	0
Lane Group Flow (vph)	205	23	0	52	91	0	17	1195	0	55	633	0
Confl. Peds. (#/hr)			6	6			1		1	1		1
Confl. Bikes (#/hr)			1			1			1			2
Heavy Vehicles (%)	3%	2%	8%	2%	2%	2%	12%	3%	2%	2%	6%	2%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.5	30.5		30.5	30.5		74.0	71.8		79.2	74.4	
Effective Green, g (s)	30.5	30.5		30.5	30.5		74.0	71.8		79.2	74.4	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.59	0.57		0.63	0.60	
Clearance Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	224	369		307	361		384	1879		225	1880	
v/s Ratio Prot		0.02			0.06		0.00	c0.37		c0.01	c0.20	
v/s Ratio Perm	c0.22			0.04			0.03			0.15		
v/c Ratio	0.92	0.06		0.17	0.25		0.04	0.64		0.24	0.34	
Uniform Delay, d1	46.0	36.3		37.3	38.1		10.6	17.8		11.6	12.8	
Progression Factor	1.00	1.00		1.00	1.00		1.01	0.97		1.00	1.00	
Incremental Delay, d2	37.5	0.1		0.3	0.4		0.0	1.4		0.6	0.5	
Delay (s)	83.4	36.3		37.5	38.4		10.8	18.7		12.2	13.3	
Level of Service	F	D		D	D		B	B		B	B	
Approach Delay (s)		75.4			38.2			18.5			13.2	
Approach LOS		E			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.9			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			125.0			Sum of lost time (s)			17.9			
Intersection Capacity Utilization			83.7%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2032 Future Total

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	365	35	252	483	39	32	27	190	28	21	3
Future Volume (vph)	10	365	35	252	483	39	32	27	190	28	21	3
Satd. Flow (prot)	1658	1722	0	1658	1710	0	0	1700	1483	1658	1602	0
Flt Permitted	0.453			0.522				0.818		0.719		
Satd. Flow (perm)	791	1722	0	911	1710	0	0	1427	1483	1255	1602	0
Satd. Flow (RTOR)		6			5				190		3	
Lane Group Flow (vph)	10	400	0	252	522	0	0	59	190	28	24	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		6	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.3	36.3		36.3	36.3		27.1	27.1	27.1	27.1	27.1	
Total Split (s)	83.0	83.0		83.0	83.0		47.0	47.0	47.0	47.0	47.0	
Total Split (%)	63.8%	63.8%		63.8%	63.8%		36.2%	36.2%	36.2%	36.2%	36.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1	3.1	3.1	3.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3			6.1	6.1	6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None	None	None	None	
Act Effct Green (s)	104.8	104.8		104.8	104.8			12.8	12.8	12.8	12.8	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.10	0.10	0.10	0.10	
v/c Ratio	0.02	0.29		0.34	0.38			0.42	0.60	0.23	0.15	
Control Delay	3.4	4.1		8.6	8.6			63.1	15.2	56.7	48.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	3.4	4.1		8.6	8.6			63.1	15.2	56.7	48.6	
LOS	A	A		A	A			E	B	E	D	
Approach Delay		4.1			8.6			26.6			53.0	
Approach LOS		A			A			C			D	
Queue Length 50th (m)	0.4	18.3		29.3	72.3			14.8	0.0	6.9	5.1	
Queue Length 95th (m)	2.0	42.0		66.0	120.1			26.7	20.6	15.4	12.6	
Internal Link Dist (m)		96.2			363.2			170.2			47.0	
Turn Bay Length (m)	66.0			98.0					10.0	24.5		
Base Capacity (vph)	637	1389		734	1380			448	596	394	506	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.02	0.29		0.34	0.38			0.13	0.32	0.07	0.05	
Intersection Summary												
Cycle Length: 130												
Actuated Cycle Length: 130												
Offset: 126 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 65												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

2032 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 11.9

Intersection LOS: B

Intersection Capacity Utilization 63.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: West Ridge Drive/Kittiwake Drive & Hazeldean Road

 Ø2 (L) 83 s	 Ø4 47 s
 Ø5 (R) 83 s	 Ø8 47 s

Lanes, Volumes, Timings

2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2032 Future Total

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	528	4	51	753	6	3	0	41	42	0	37
Future Volume (vph)	51	528	4	51	753	6	3	0	41	42	0	37
Satd. Flow (prot)	1658	3280	0	1658	1745	1483	0	1521	0	0	1658	1483
Flt Permitted	0.347			0.454				0.974			0.924	
Satd. Flow (perm)	606	3280	0	791	1745	1438	0	1486	0	0	1612	1483
Satd. Flow (RTOR)		1				28		41				37
Lane Group Flow (vph)	51	532	0	51	753	6	0	44	0	0	42	37
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		custom	NA	custom
Protected Phases		2			6			4			4	
Permitted Phases	2			6		6	4			8		8
Detector Phase	2	2		6	6	6	4	4		8	4	8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	30.1	30.1		34.1	34.1	34.1	34.3	34.3		34.3	34.3	34.3
Total Split (s)	93.0	93.0		93.0	93.0	93.0	37.0	37.0		37.0	37.0	37.0
Total Split (%)	71.5%	71.5%		71.5%	71.5%	71.5%	28.5%	28.5%		28.5%	28.5%	28.5%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1		6.3			6.3	6.3
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	111.0	111.0		111.0	111.0	111.0		11.1			11.1	11.1
Actuated g/C Ratio	0.85	0.85		0.85	0.85	0.85		0.09			0.09	0.09
v/c Ratio	0.10	0.19		0.08	0.51	0.00		0.27			0.30	0.23
Control Delay	3.8	3.0		1.5	2.6	0.0		21.5			61.3	19.8
Queue Delay	0.0	0.0		0.0	0.3	0.0		0.0			0.0	0.0
Total Delay	3.8	3.0		1.5	2.9	0.0		21.5			61.3	19.8
LOS	A	A		A	A	A		C			E	B
Approach Delay		3.1			2.8			21.5			41.8	
Approach LOS		A			A			C			D	
Queue Length 50th (m)	1.9	10.8		0.4	6.6	0.0		0.7			10.4	0.0
Queue Length 95th (m)	7.9	27.8		m2.2	m27.1	m0.0		12.0			21.6	10.5
Internal Link Dist (m)		363.2			168.3			30.9			31.1	
Turn Bay Length (m)	140.0			30.0		100.0						
Base Capacity (vph)	517	2800		675	1489	1231		382			380	378
Starvation Cap Reductn	0	0		0	251	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	0.10	0.19		0.08	0.61	0.00		0.12			0.11	0.10

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 47 (36%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

2032 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 5.5

Intersection LOS: A

Intersection Capacity Utilization 74.1%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 6310 Hazeldean/Stittsville Corners & Hazeldean Road

 Ø2 (R)	 Ø4
93 s	37 s
 Ø6 (R)	 Ø8
93 s	37 s

Lanes, Volumes, Timings
3: Hazeldean Road & Jackson Trails Centre

2032 Future Total
PM Peak Hour

							
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø7
Lane Configurations		 	 				
Traffic Volume (vph)	65	652	938	14	15	39	
Future Volume (vph)	65	652	938	14	15	39	
Satd. Flow (prot)	1658	3316	3307	0	1580	1469	
Flt Permitted	0.296				0.950		
Satd. Flow (perm)	515	3316	3307	0	1580	1469	
Satd. Flow (RTOR)			2			39	
Lane Group Flow (vph)	65	652	952	0	15	39	
Turn Type	Perm	NA	NA		Prot	Perm	
Protected Phases		2	6		8		7
Permitted Phases	2					8	
Detector Phase	2	2	6		8	8	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0	1.0
Minimum Split (s)	24.4	24.4	33.4		34.3	34.3	5.0
Total Split (s)	80.7	80.7	80.7		34.3	34.3	5.0
Total Split (%)	67.3%	67.3%	67.3%		28.6%	28.6%	4%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3	2.0
All-Red Time (s)	2.7	2.7	2.7		3.0	3.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.4	6.4	6.4		6.3	6.3	
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max		None	None	None
Act Effct Green (s)	101.8	101.8	101.8		10.0	10.0	
Actuated g/C Ratio	0.85	0.85	0.85		0.08	0.08	
v/c Ratio	0.15	0.23	0.34		0.11	0.25	
Control Delay	3.3	2.5	2.9		53.2	19.7	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.3	2.5	2.9		53.2	19.7	
LOS	A	A	A		D	B	
Approach Delay		2.6	2.9		29.0		
Approach LOS		A	A		C		
Queue Length 50th (m)	2.6	15.1	24.7		3.3	0.0	
Queue Length 95th (m)	5.8	19.3	30.8		10.2	10.7	
Internal Link Dist (m)		634.2	235.6		86.5		
Turn Bay Length (m)	49.0					13.5	
Base Capacity (vph)	437	2814	2806		368	372	
Starvation Cap Reductn	0	0	0		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.15	0.23	0.34		0.04	0.10	
Intersection Summary							
Cycle Length: 120							
Actuated Cycle Length: 120							
Offset: 99 (83%), Referenced to phase 2:EBTL and 6:WBT, Start of Green							
Natural Cycle: 75							
Control Type: Actuated-Coordinated							

Lanes, Volumes, Timings 3: Hazeldean Road & Jackson Trails Centre

2032 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 3.6

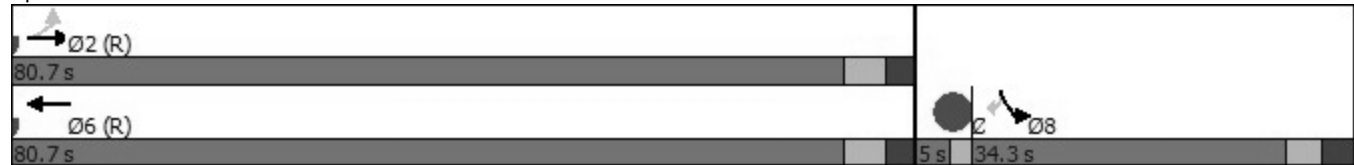
Intersection LOS: A

Intersection Capacity Utilization 60.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Hazeldean Road & Jackson Trails Centre



Lanes, Volumes, Timings
4: Carp Road & Hazeldean Road

2032 Future Total
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	368	87	66	463	545	101	416	29	435	599	263
Future Volume (vph)	161	368	87	66	463	545	101	416	29	435	599	263
Satd. Flow (prot)	1658	3159	0	1470	1745	1455	1658	3175	0	3216	1745	1483
Flt Permitted	0.133			0.490			0.950			0.950		
Satd. Flow (perm)	232	3159	0	755	1745	1427	1654	3175	0	3199	1745	1433
Satd. Flow (RTOR)		26				509		5				209
Lane Group Flow (vph)	161	455	0	66	463	545	101	445	0	435	599	263
Turn Type	pm+pt	NA		Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8		8						6
Detector Phase	7	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0	10.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.1	39.6		39.6	39.6	39.6	11.0	32.1		11.0	32.1	32.1
Total Split (s)	13.0	58.0		45.0	45.0	45.0	19.0	34.0		38.0	53.0	53.0
Total Split (%)	10.0%	44.6%		34.6%	34.6%	34.6%	14.6%	26.2%		29.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7
All-Red Time (s)	2.4	2.9		2.9	2.9	2.9	2.3	2.4		2.3	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.1	6.6		6.6	6.6	6.6	6.0	6.1		6.0	6.1	6.1
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	50.6	50.1		37.1	37.1	37.1	11.6	38.3		22.8	49.5	49.5
Actuated g/C Ratio	0.39	0.39		0.29	0.29	0.29	0.09	0.29		0.18	0.38	0.38
v/c Ratio	0.97	0.37		0.31	0.93	0.71	0.68	0.47		0.77	0.90	0.39
Control Delay	94.0	24.5		40.4	71.5	10.1	80.1	40.4		48.7	61.0	19.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	94.0	24.5		40.4	71.5	10.1	80.1	40.4		48.7	61.0	19.5
LOS	F	C		D	E	B	F	D		D	E	B
Approach Delay		42.7			38.4			47.8			48.5	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	23.8	33.5		13.1	113.9	6.7	25.2	49.4		55.8	163.7	31.1
Queue Length 95th (m)	#59.3	40.1		26.3	#173.7	43.7	#45.8	70.0		70.3	#227.9	59.0
Internal Link Dist (m)		168.3			634.2			339.9			266.7	
Turn Bay Length (m)	95.0			53.5			41.0			80.0		
Base Capacity (vph)	166	1264		223	515	780	165	940		791	664	675
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.97	0.36		0.30	0.90	0.70	0.61	0.47		0.55	0.90	0.39

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 129 (99%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 4: Carp Road & Hazeldean Road

2032 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 44.3

Intersection LOS: D

Intersection Capacity Utilization 95.3%

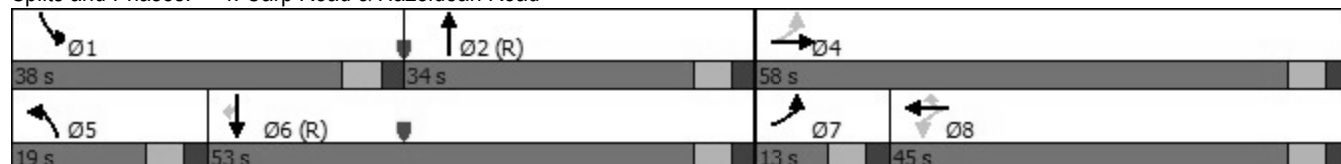
ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Carp Road & Hazeldean Road



Lanes, Volumes, Timings
5: Carp Road & Kittiwake Drive/Echowoods Avenue

2032 Future Total
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	22	50	55	22	122	58	842	34	174	1221	144
Future Volume (vph)	130	22	50	55	22	122	58	842	34	174	1221	144
Satd. Flow (prot)	1658	1545	0	1658	1506	0	1658	3172	0	1658	3254	0
Flt Permitted	0.558			0.710			0.151			0.283		
Satd. Flow (perm)	972	1545	0	1233	1506	0	263	3172	0	493	3254	0
Satd. Flow (RTOR)		50			122			6			19	
Lane Group Flow (vph)	130	72	0	55	144	0	58	876	0	174	1365	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	29.3	29.3		29.3	29.3		10.6	32.0		10.6	32.0	
Total Split (s)	30.0	30.0		30.0	30.0		11.0	89.0		11.0	89.0	
Total Split (%)	23.1%	23.1%		23.1%	23.1%		8.5%	68.5%		8.5%	68.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.7	3.7		3.7	3.7	
All-Red Time (s)	3.3	3.3		3.3	3.3		1.9	2.3		1.9	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3		5.6	6.0		5.6	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	20.2	20.2		20.2	20.2		91.6	85.4		93.8	88.3	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.70	0.66		0.72	0.68	
v/c Ratio	0.86	0.26		0.29	0.43		0.23	0.42		0.42	0.62	
Control Delay	96.6	20.6		51.0	15.5		4.8	11.4		8.5	14.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	96.6	20.6		51.0	15.5		4.8	11.4		8.5	14.0	
LOS	F	C		D	B		A	B		A	B	
Approach Delay		69.5			25.3			11.0			13.4	
Approach LOS		E			C			B			B	
Queue Length 50th (m)	32.2	4.8		12.4	4.8		1.7	71.8		11.6	105.4	
Queue Length 95th (m)	#62.5	18.1		24.8	23.3		m2.1	m76.6		19.2	127.6	
Internal Link Dist (m)		73.3			85.0			266.7			438.0	
Turn Bay Length (m)	65.5						24.5			36.0		
Base Capacity (vph)	177	322		224	374		248	2084		414	2215	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.73	0.22		0.25	0.39		0.23	0.42		0.42	0.62	

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 29 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings 5: Carp Road & Kittiwake Drive/Echowoods Avenue

2032 Future Total
PM Peak Hour

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 17.4

Intersection LOS: B

Intersection Capacity Utilization 82.7%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Carp Road & Kittiwake Drive/Echowoods Avenue

 Ø1	 Ø2 (R)	 Ø4
11 s	89 s	30 s
 Ø5	 Ø6 (R)	 Ø8
11 s	89 s	30 s