

WHITE ROSE (PHASE 3)

PLAN OF SUBDIVISION

TOWNSHIP OF SOUTHGATE (DUNDALK)

GREY COUNTY

TRAFFIC IMPACT STUDY

SEPTEMBER, 2020



**TRITON  
ENGINEERING  
SERVICES  
LIMITED**  
Consulting Engineers

18 Robb Boulevard, Unit 8  
Orangeville, Ontario  
L9W 3L2

Tel: (519) 941-0330

Fax: (519) 941-1830

ORANGEVILLE X FERGUS X GRAVENHURST X HARRISTON

WHITE ROSE (PHASE 3)  
TRAFFIC IMPACT STUDY  
DUNDALK, GREY COUNTY

**Table of Contents**

1.0	INTRODUCTION .....	1
2.0	EXISTING CONDITIONS .....	1
2.1	Road Network .....	1
2.2	Key Intersections .....	2
2.3	Adjacent Land Use .....	2
3.0	PROPOSED DEVELOPMENT .....	3
4.0	EXISTING TRAFFIC.....	3
5.0	FUTURE BACKGROUND TRAFFIC .....	4
6.0	SITE GENERATED TRAFFIC .....	6
6.1	General.....	6
6.2	Trip Generation.....	6
7.0	FUTURE TRAFFIC.....	7
7.1	Level of Service Analysis.....	7
8.0	CONCLUSIONS AND RECOMMENDATIONS .....	9

WHITE ROSE (PHASE 3)  
TRAFFIC IMPACT STUDY  
DUNDALK, GREY COUNTY

## List of Tables

Table 1: Peak Hours.....	3
Table 2: 2020 Existing Traffic Level of Service .....	4
Table 3: 2025 Background Traffic Level of Service .....	5
Table 4: 2030 Background Traffic Level of Service .....	5
Table 5: Trip Generation Codes and Distribution .....	6
Table 6: 2025 Future Traffic Level of Service.....	7
Table 7: 2030 Future Traffic Level of Service.....	8

## List of Figures

Figure 1:	2020 Existing Peak Hour Traffic
Figure 2:	2025 Background Peak Hour Traffic
Figure 3:	2030 Background Peak Hour Traffic
Figure 4:	Development Peak Hour Trip Assignment
Figure 5:	Development Peak Hour Trip Distribution
Figure 6:	2025 Future Peak Hour Traffic
Figure 7:	2030 Future Peak Hour Traffic

## Appendices

Appendix A - Draft Plan of Subdivision
Appendix B - Level of Service Definitions
Appendix C - Level of Service Analysis Outputs

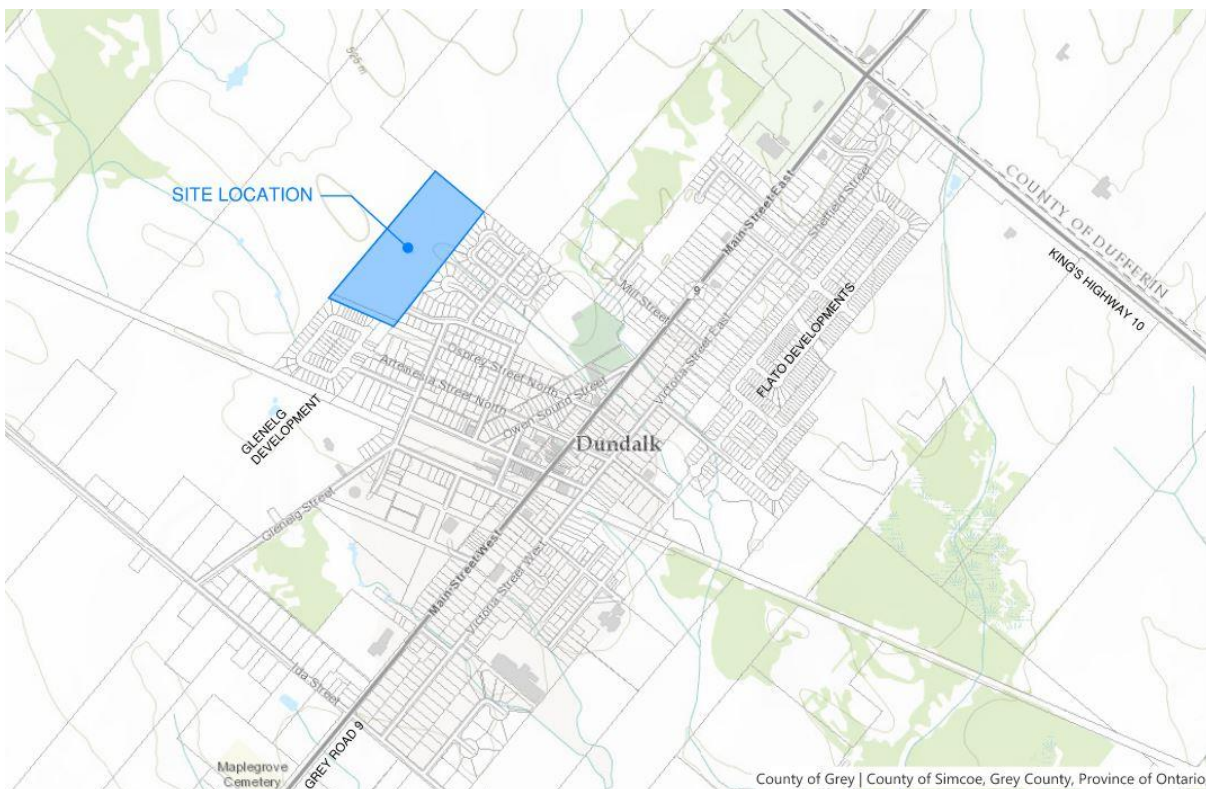
## 1.0 INTRODUCTION

Triton Engineering Services Limited (TESL) has been retained by White Rose Park to prepare a Traffic Impact Study (TIS) in support of a Draft Plan Application for a proposed residential development located in the Community of Dundalk, Township of Southgate. The purpose of this study is to address the impact of this development on Grey Road 9 (Main Street East) and to determine what road and intersection improvements may be required.

## 2.0 EXISTING CONDITIONS

### 2.1 Road Network

The proposed site is located on the northwest side of Dundalk at the end of Bradley Street. The location of the proposed site is shown on the Key Plan below.



Key Plan

The road network in Dundalk has a skewed orientation. To provide clarity throughout this study, King's Highway 10, Osprey Street, Artemesia Street, Proton Street, Dundalk Street, and Ida Street have been designated as north-south roads and Glenelg Street and Grey Road 9 (Main Street) have been designated as east-west roads.

Grey Road 9 is an east-west county road with one lane in each direction and is named Main Street West/East with a posted speed of 50km/h within the limits of Dundalk. Grey Road 9 has on street parking on both sides of the road between Dundalk Street and Artemesia Street.

The remaining streets are local roads with one lane in each direction and a posted or assumed speed limit of 40km/h within the boundary of Dundalk.

## **2.2 Key Intersections**

This study reviews seven key intersections with arterial and collector roads that will see increases to traffic volumes due to the development. The intersection of Ida Street and Glenelg Street is a rural tee intersection on the west side of Dundalk, with stop control provided on the Glenelg Street approach.

The intersection of Grey Road 9 and Ida Street is a 4-leg intersection with stop control provided on the Ida Street approaches. The east leg on Grey Road 9 has curb and paved boulevard on the north side of the road that terminates at the intersection.

The intersection of Dundalk Street and Grey Road 9 is a tee intersection, with stop control provided on the Dundalk Street approach. On street parking is provided on the east leg of Grey Road 9 and there are sidewalks on both sides of Grey Road 9.

The intersection of Proton Street and Grey Road 9 is a 4-leg intersection, with stop control provided on the Proton Street approaches. On street parking is provided on both legs of Grey Road 9 and the north leg of Proton Street. There are sidewalks on both side of the road for all four legs of the intersection.

The intersection of Artemesia Street and Grey Road 9 is a 4-leg intersection, with stop control provided on the Artemesia Street approaches. On street parking is provided on the west leg of Grey Road 9 and there are sidewalks on both sides of Grey Road 9 and Artemesia Street.

The intersection of Osprey Street and Grey Road 9 is a 4-leg intersection, with stop control provided on the Osprey Street approaches. There are sidewalks on both sides of Grey Road 9 and Osprey Street.

The intersection of Owen Sound Street and Grey Road 9 is a tee intersection, with stop control provided on the Owen Sound Street approach. There are sidewalks on both sides of Grey Road 9 and on the north side of Owen Sound Street.

## **2.3 Adjacent Land Use**

The site is bounded by existing residential neighbourhoods to the south, a new residential plan of subdivision to the west, agricultural lands to the north, and wetlands to the east.

### 3.0 PROPOSED DEVELOPMENT

MHBC have provided a draft plan of subdivision, enclosed in Appendix A.

The proposed development consists of 33 single-family dwellings, 24 townhouses, and 34 senior dwellings. The development has two proposed accesses, with 'Street A' connecting to Todd Crescent (Phase 1/2 of White Rose Park) and 'Street B' connecting to the north end of Bradley Street.

### 4.0 EXISTING TRAFFIC

Weekday morning and afternoon peak period traffic counts were undertaken as part of the Glenelg Residential Subdivision TIS in 2018 by C.F. Crozier & Associates Inc. (Crozier) at the intersection of Glenelg Street and Ida Street, the intersection of Grey Road 9 and Ida Street, and the intersection of Grey Road 9 and Dundalk Street. Since these counts were undertaken, there have been no major developments in the surrounding area and are considered acceptable. The traffic volumes were converted into 2020 existing traffic volumes by applying a 1.5% growth rate. This growth rate is consistent with the Glenelg development TIS and the Flato development TIS conducted in 2016 by Crozier.

A traffic count was undertaken at the intersection of Owen Sound Street and Grey Road 9 during the morning and afternoon peak periods on September 8, 2020. Traffic counts were not undertaken at the Proton Street and Artemesia Street intersections with Grey Road 9 as the increase to traffic volumes generated by White Rose Park at these intersections is expected to be very minor, as shown in Figure 5. It is assumed that if increased traffic volumes can be accommodated by the Dundalk Street and Grey Road 9 intersection, then the Proton Street and Artemesia Street intersections will also be able to accommodate the increased traffic volumes.

The existing peak hours for the four intersections and their respective traffic volumes are illustrated on Figure 1 and Table 1 lists the peak hours for each traffic count.

**Table 1: Peak Hours**

Intersection	Peak Hour
Ida Street and Glenelg Street	8:00-9:00 am
	4:15-5:15 pm
Grey Road 9 and Ida Street	7:45-8:45 am
	5:00-6:00 pm
Grey Road 9 and Dundalk Street	8:00-9:00 am
	5:00-6:00 pm
Grey Road 9 and Owen Sound Street	8:00-9:00 am
	4:15-5:15 pm

Existing levels of service were analysed based on the *Highway Capacity Manual, 2000*, using Synchro 10 software version 10.1. Level of service definitions are included in Appendix B. The detailed capacity analysis outputs are included in Appendix C. Table 2 outlines the existing levels of service for the intersection.

**Table 2: 2020 Existing Traffic Level of Service**

Intersection	Movement	Level of Service (Delay, s)	
		Weekday AM	Weekday PM
<b>Ida Street and Glenelg Street (Unsignalized)</b>	EB left-right	A (8.5)	A (8.7)
	NB thru-right	A (0.0)	A (0.0)
	SB thru-left	A (2.1)	A (1.6)
<b>Ida Street and Grey Road 9 (Unsignalized)</b>	EB left-thru-right	A (0.3)	A (0.6)
	WB left-thru-right	A (2.3)	A (0.8)
	NB left-thru-right	A (9.6)	B (11.2)
	SB left-thru-right	B (10.8)	B (11.8)
<b>Grey Road 9 and Dundalk Street (Unsignalized)</b>	EB left-thru	A (0.6)	A (0.2)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	A (9.7)	A (10.5)
<b>Grey Road 9 and Owen Sound Street (Unsignalized)</b>	EB left-thru	A (0.1)	A (0.1)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	B (10.8)	B (11.9)

The movements for all four intersections are operating at a very good or good level of service with minor delays during the AM and PM Peak Hours.

## 5.0 FUTURE BACKGROUND TRAFFIC

It is anticipated that the development will be constructed within five years. For the purposes of this study, a five- and ten-year horizon was selected to analyze the road network. The Glenelg Residential Development TIS (Crozier, 2018) provides future traffic volumes for the Ida Street/Glenelg Street, Ida Street/Grey Road 9, and Grey Road 9/Dundalk Street intersections for the horizon years 2023 and 2028. This future traffic includes the trips generated and network distribution from the Glenelg development located on the north side of Dundalk and the Flato developments located on the east side of Dundalk (see key plan for locations). The 1.5% growth rate was applied to this future traffic to determine the 2025 and 2030 horizon year background traffic volumes.

For the intersection of Owen Sound Street and Grey Road 9, the 1.5% growth rate has been applied to the existing 2020 traffic volumes to determine the 2025 and 2030 horizon year background traffic volumes. The trips generated by the Glenelg development that travel to King's Highway 10 were added to the background volumes. The distribution of the Flato generated traffic provides 30% of trips generated travel westerly on Grey Road 9, with 20% dispersing downtown Dundalk and 10% traveling beyond Ida Street. This



approach is consistent with previous traffic impact studies in Dundalk. For a conservative approach, it was assumed that the 30% of trips generated by the Flato Developments would enter the Owen Sound Street and Grey Road 9 intersection and be distributed following the existing traffic patterns. The Glenelg and Flato development generated traffic volumes have been added to the background traffic volumes at this intersection.

The 2025 and 2030 background traffic volumes for all four intersections have been illustrated in Figures 2 and 3, respectively.

Levels of service were calculated for the Weekday AM and PM peaks at the intersections using the background traffic volumes for 2025 and 2030 and are summarized in Table 3 and Table 4, respectively.

**Table 3: 2025 Background Traffic Level of Service**

Intersection	Movement	Level of Service (Delay, s)	
		Weekday AM	Weekday PM
<b>Ida Street and Glenelg Street (Unsignalized)</b>	EB left-right	A (8.8)	A (8.9)
	NB thru-right	A (0.0)	A (0.0)
	SB thru-left	A (2.6)	A (2.9)
<b>Ida Street and Grey Road 9 (Unsignalized)</b>	EB left-thru-right	A (0.5)	A (0.9)
	WB left-thru-right	A (1.8)	A (0.7)
	NB left-thru-right	B (10.2)	B (12.8)
	SB left-thru-right	B (11.4)	B (13.2)
<b>Grey Road 9 and Dundalk Street (Unsignalized)</b>	EB left-thru	A (0.6)	A (0.3)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	B (12.6)	B (13.6)
<b>Grey Road 9 and Owen Sound Street (Unsignalized)</b>	EB left-thru	A (0.1)	A (0.1)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	B (13.6)	C (16.7)

**Table 4: 2030 Background Traffic Level of Service**

Intersection	Movement	Level of Service (Delay, s)	
		Weekday AM	Weekday PM
<b>Ida Street and Glenelg Street (Unsignalized)</b>	EB left-right	A (8.8)	A (8.9)
	NB thru-right	A (0.0)	A (0.0)
	SB thru-left	A (2.5)	A (2.8)
<b>Ida Street and Grey Road 9 (Unsignalized)</b>	EB left-thru-right	A (0.5)	A (1.0)
	WB left-thru-right	A (1.8)	A (0.7)
	NB left-thru-right	B (10.3)	B (13.4)
	SB left-thru-right	B (11.7)	B (14.0)
<b>Grey Road 9 and Dundalk Street (Unsignalized)</b>	EB left-thru	A (0.7)	A (0.4)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	B (13.2)	B (14.4)



Intersection	Movement	Level of Service (Delay, s)	
		Weekday AM	Weekday PM
<b>Grey Road 9 and Owen Sound Street (Unsignalized)</b>	EB left-thru	A (0.1)	A (0.1)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	B (14.0)	C (17.4)

The levels of service remain consistent for most movements due to the increase in traffic volumes during the 2025 and 2030 years with slightly increased delays. The northbound movement at the Ida Street and Grey Road 9 intersection operates at a LOS 'B' during the 2025 AM peak hour, the southbound movement at the Grey Road 9 and Dundalk Street operates at a LOS 'B' during the 2025 AM and PM peak hours, and the southbound movement at the Grey Road 9 and Owen Sound Street intersection operates at a LOS 'C' during the 2025 PM peak hour. All movements are still operating with acceptable delays.

## 6.0 SITE GENERATED TRAFFIC

### 6.1 General

Trip generation is forecast for future developments from studies of similar developments. The *Institute of Transportation Engineers (ITE) Trip Generation Manual, 8<sup>th</sup> Edition* was used in this analysis. Trips generated from residential condominium/townhouse land uses are considered primary trips.

### 6.2 Trip Generation

The ITE Code and the calculated number of trips generated by the development are shown in Table 5.

**Table 5: Trip Generation Codes and Distribution**

Land Use	ITE Code	Description	Trips Generated per Unit					
			Weekday AM			Weekday PM		
			Total	Entering	Exiting	Total	Entering	Exiting
Residential	210	Single-Family Detached Housing	31	8	23	36	23	13
Residential	230	Residential Condominium/Townhouse	17	3	14	19	13	6
Residential	252	Senior Adult Housing – Attached	5	2	3	6	5	1
<b>Development Total</b>			<b>53</b>	<b>13</b>	<b>40</b>	<b>61</b>	<b>41</b>	<b>20</b>

The trip distribution used by the Glenelg and Flato Developments was applied to the White Rose Phase 3 development and is described below:

- 60% to/from Highway 10 via the Owen Sound Street/Grey Road 9 intersection;
- 10% to/from the north via the Ida Street/Glenelg Street intersection;
- 10% to/from the west via Dundalk Street and Grey Road 9; and,
- 20% to/from downtown Dundalk via Dundalk Street, Proton Street, Artemesia Street, and Osprey Street.

This distribution is illustrated on Figure 4 and the trips assigned to the road network is illustrated on Figure 5.

## 7.0 FUTURE TRAFFIC

The total development generated traffic was added to the 2025 and 2030 background traffic volumes to determine the total 2025 and 2030 future peak hour traffic, as illustrated in Figures 6 and 7, respectively.

### 7.1 Level of Service Analysis

A level of service analysis was carried out to determine the impact of the trips generated by the development on the existing intersections during the Weekday AM and PM peak hours. The detailed capacity analyses are included in Appendix C. Table 6 and Table 7 summarize the future levels of service for 2025 and 2030 respectively.

**Table 6: 2025 Future Traffic Level of Service**

Intersection	Movement	Level of Service (Delay, s)	
		Weekday AM	Weekday PM
<b>Ida Street and Glenelg Street (Unsignalized)</b>	EB left-right	A (8.8)	A (8.9)
	NB thru-right	A (0.0)	A (0.0)
	SB thru-left	A (2.7)	A (3.2)
<b>Ida Street and Grey Road 9 (Unsignalized)</b>	EB left-thru-right	A (0.5)	A (0.9)
	WB left-thru-right	A (1.7)	A (0.7)
	NB left-thru-right	B (10.2)	B (12.9)
	SB left-thru-right	B (11.4)	B (13.3)
<b>Grey Road 9 and Dundalk Street (Unsignalized)</b>	EB left-thru	A (0.7)	A (0.5)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	B (12.6)	B (13.7)
<b>Grey Road 9 and Owen Sound Street (Unsignalized)</b>	EB left-thru	A (0.1)	A (0.1)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	B (14.2)	C (17.5)

**Table 7: 2030 Future Traffic Level of Service**

Intersection	Movement	Level of Service (Delay, s)	
		Weekday AM	Weekday PM
<b>Ida Street and Glenelg Street (Unsignalized)</b>	EB left-right	A (8.8)	A (9.0)
	NB thru-right	A (0.0)	A (0.0)
	SB thru-left	A (2.6)	A (3.2)
<b>Ida Street and Grey Road 9 (Unsignalized)</b>	EB left-thru-right	A (0.5)	A (1.0)
	WB left-thru-right	A (1.8)	A (0.7)
	NB left-thru-right	B (10.3)	B (13.5)
	SB left-thru-right	B (11.8)	B (14.1)
<b>Grey Road 9 and Dundalk Street (Unsignalized)</b>	EB left-thru	A (0.7)	A (0.5)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	B (13.3)	B (14.6)
<b>Grey Road 9 and Owen Sound Street (Unsignalized)</b>	EB left-thru	A (0.1)	A (0.1)
	WB thru-right	A (0.0)	A (0.0)
	SB left-right	B (14.7)	C (18.3)

The levels of service for the intersection experience no change with the additional trips generated by the development, with very minor increases in delays. The trips generated by the development can be fully accommodated by all four intersections. The intersections of Proton Street and Grey Road 9 and Artemesia Street and Grey Road 9 will have minimal increase in traffic volumes due to the White Rose Park Phase 3 development as shown on Figures 4 and 5. This minimal traffic volume will have no discernable impact on the delays at the intersections as evidenced by the minor increases in delays at the Grey Road 9 and Dundalk Street intersection.

As noted previously, as there will be no discernable increase in delays at the analysed intersections, it can be concluded that there will also be no discernable impact at the minor intersections that will receive less development traffic.

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

- The proposed development can be accommodated on the existing road network with no significant adverse effects on the existing or future operating conditions;
- The existing intersections will operate at acceptable levels of service during the Weekday AM and PM peak hours with the addition of the development generated traffic;
- No intersection improvements are required as a result of the proposed development.

TRITON ENGINEERING SERVICES LIMITED

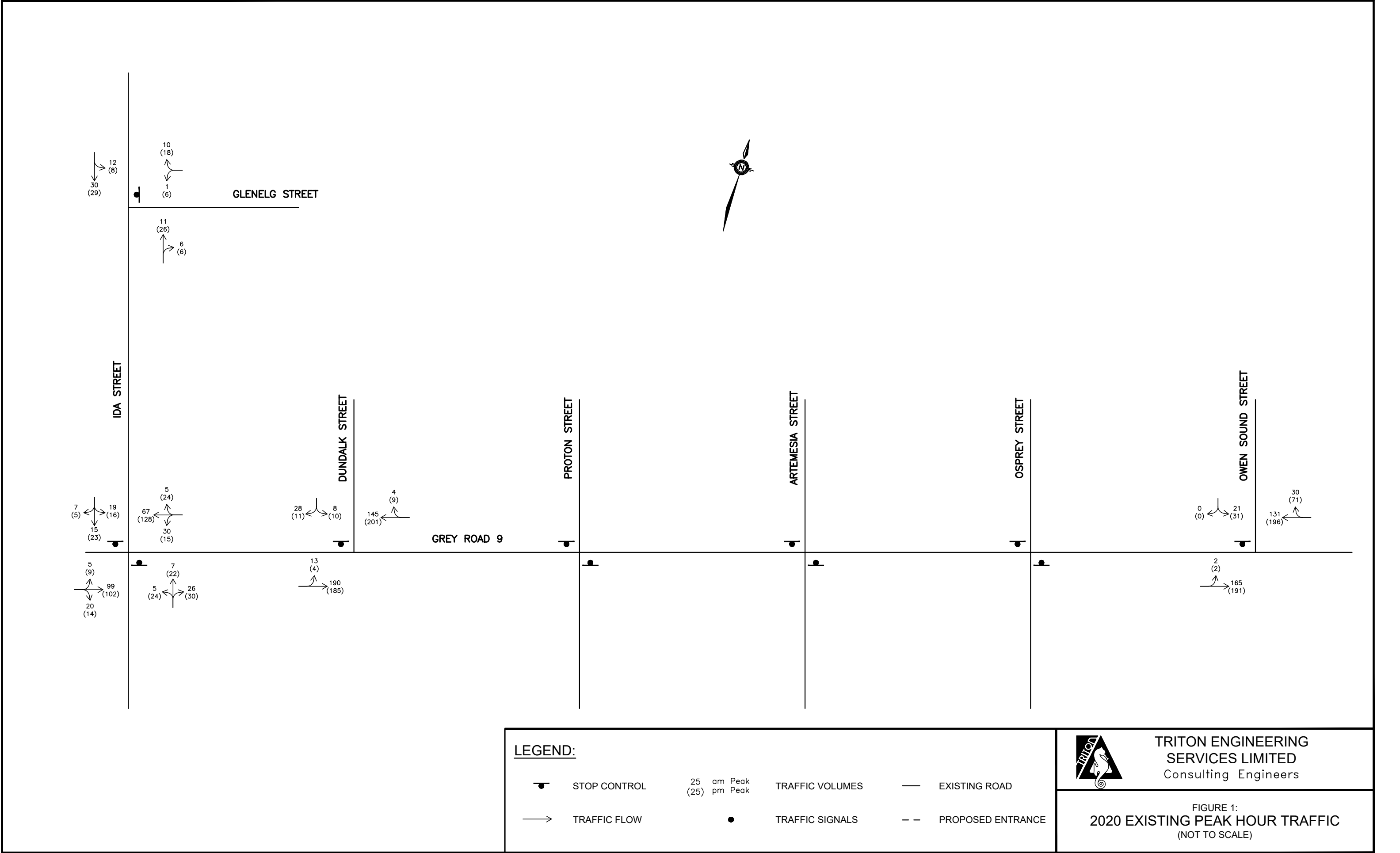


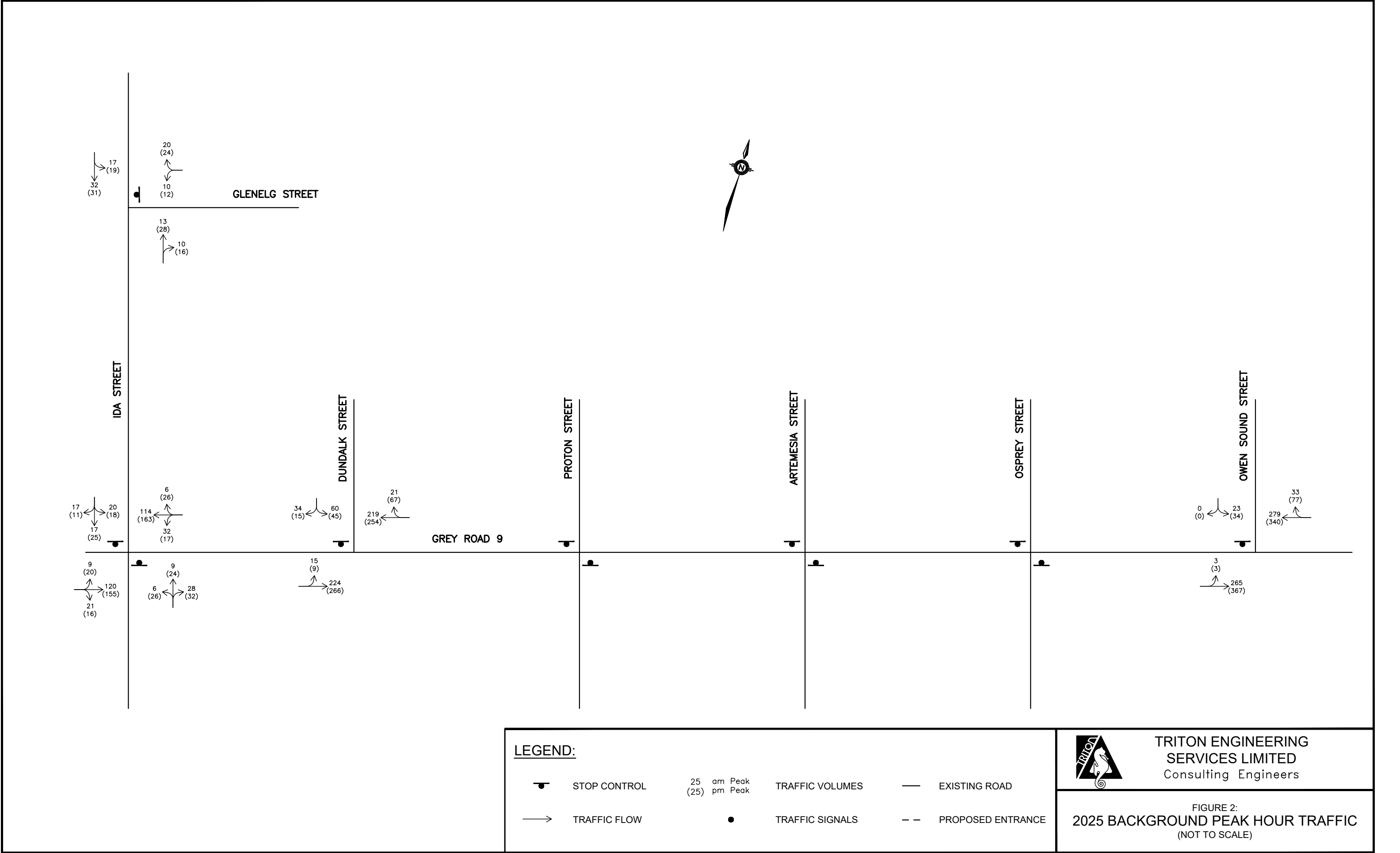
Taylor Kramp, P. Eng.



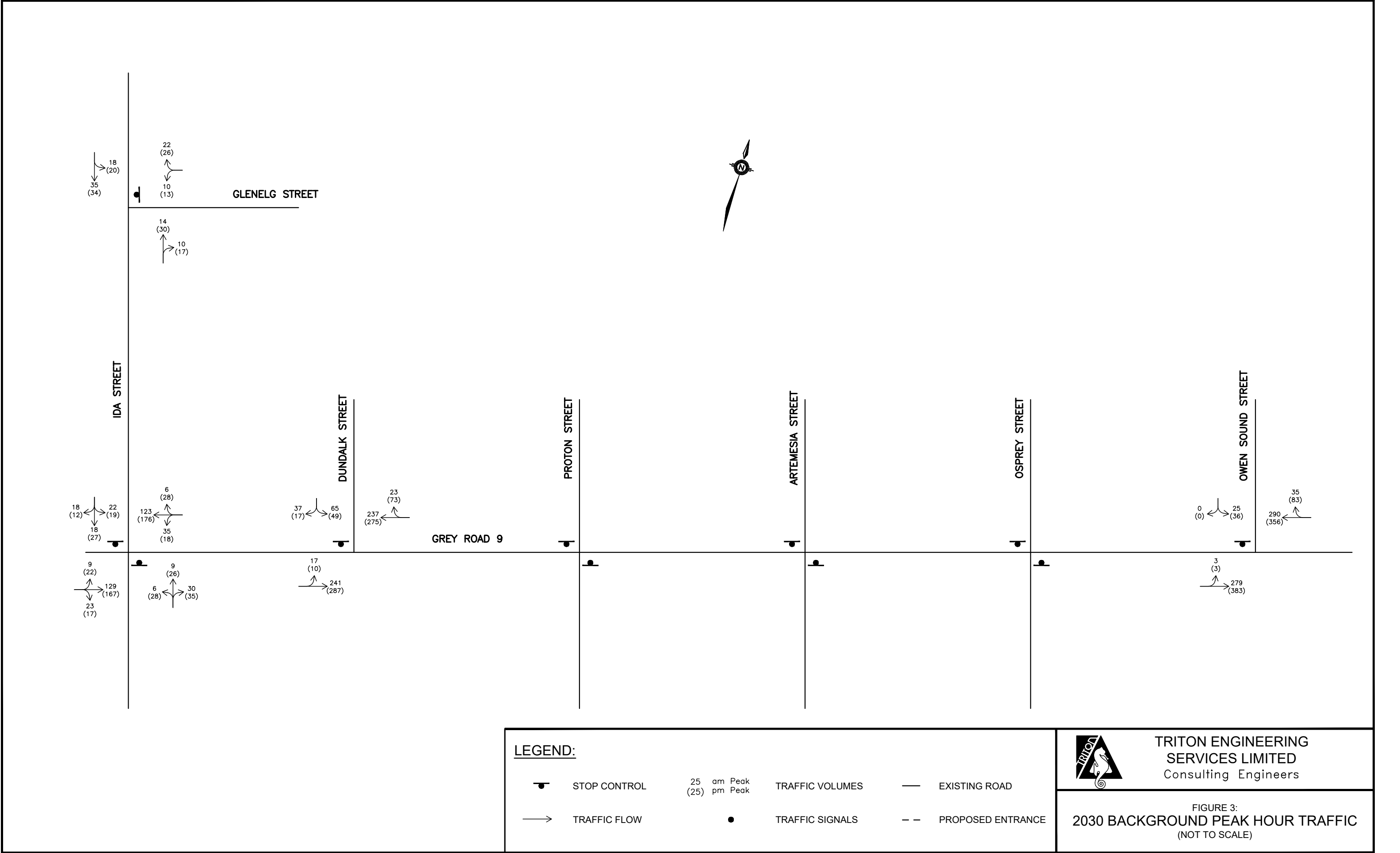
Howard Wray, P. Eng.

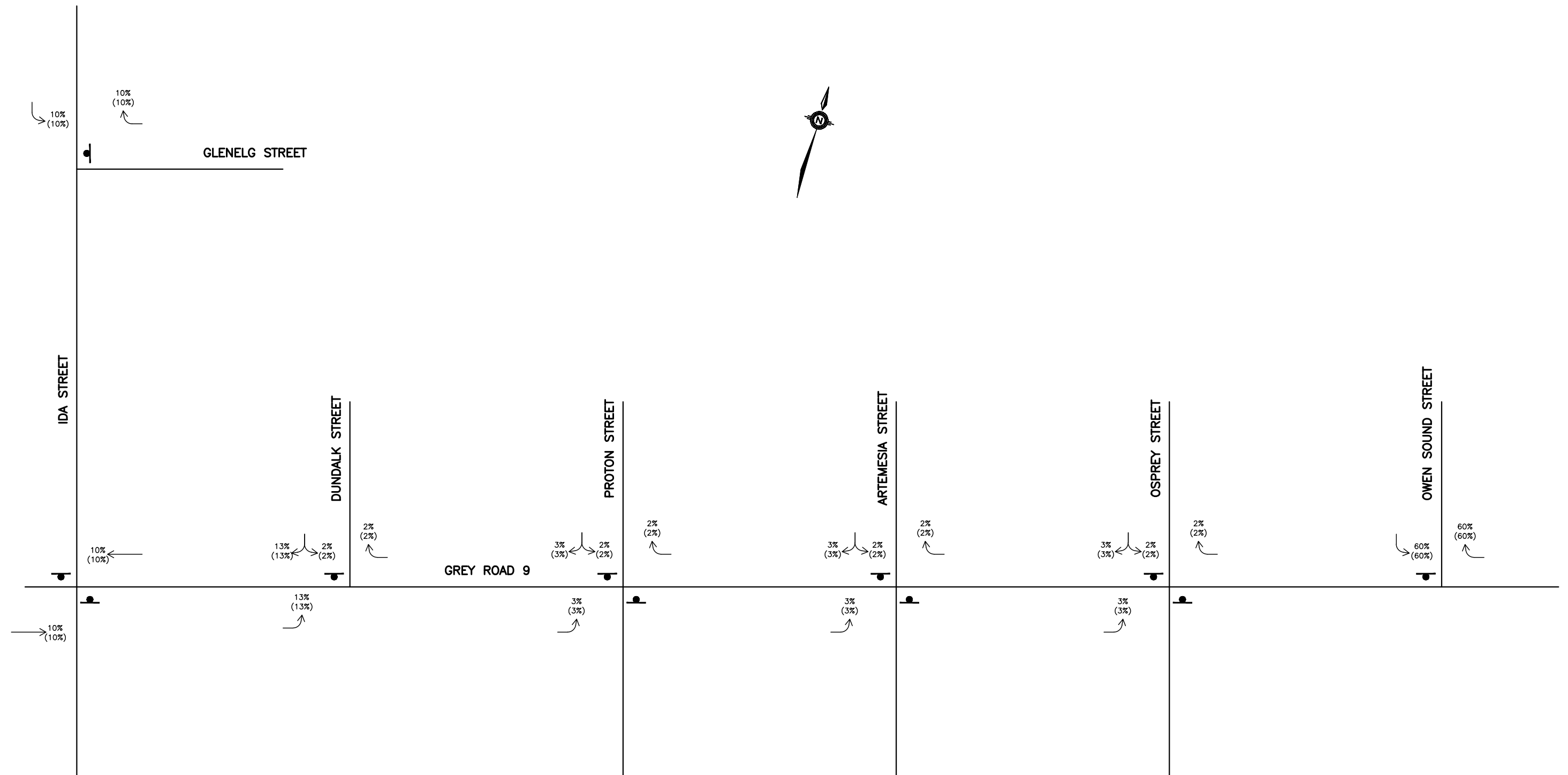
## FIGURES

















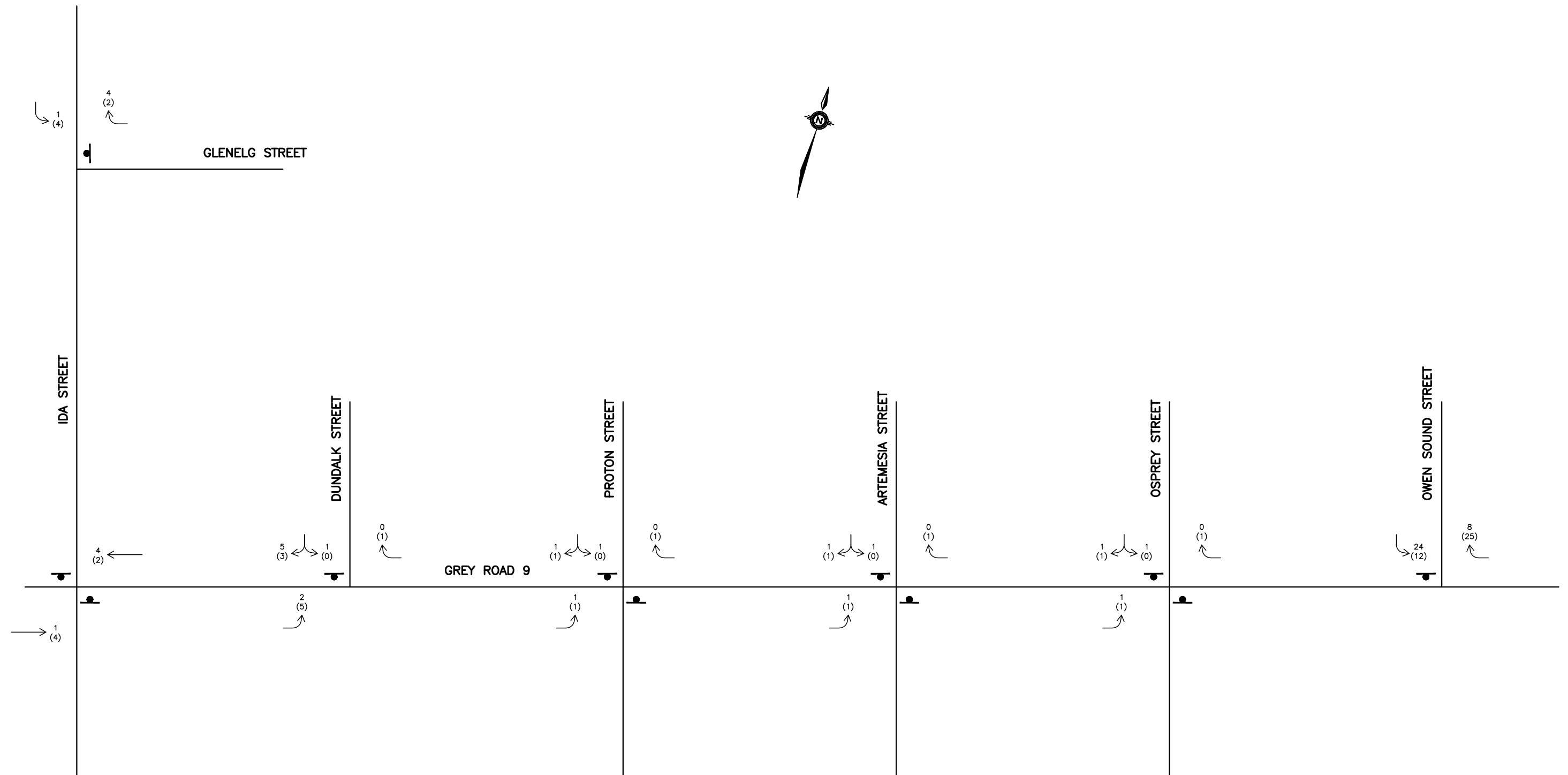
**LEGEND:**

- |   |              |   |                 |   |                   |
|---|--------------|---|-----------------|---|-------------------|
|  | STOP CONTROL |  | TRAFFIC VOLUMES |  | EXISTING ROAD     |
|  | TRAFFIC FLOW |  | TRAFFIC SIGNALS |  | PROPOSED ENTRANCE |








TRITON ENGINEERING  
SERVICES LIMITED  
Consulting Engineers

FIGURE 4:  
DEVELOPMENT PEAK HOUR TRIP  
ASSIGNMENT  
(NOT TO SCALE)



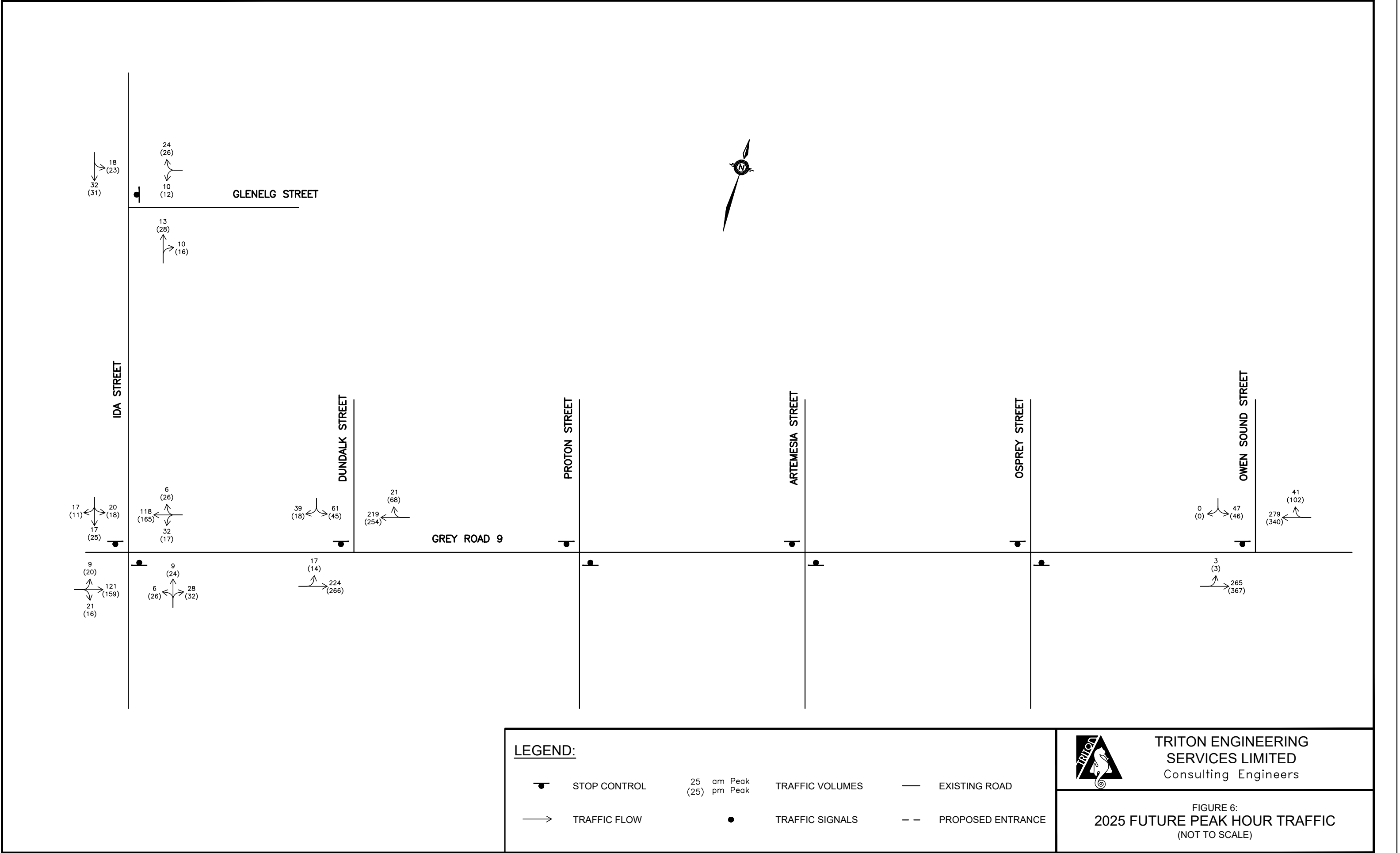
**LEGEND:**

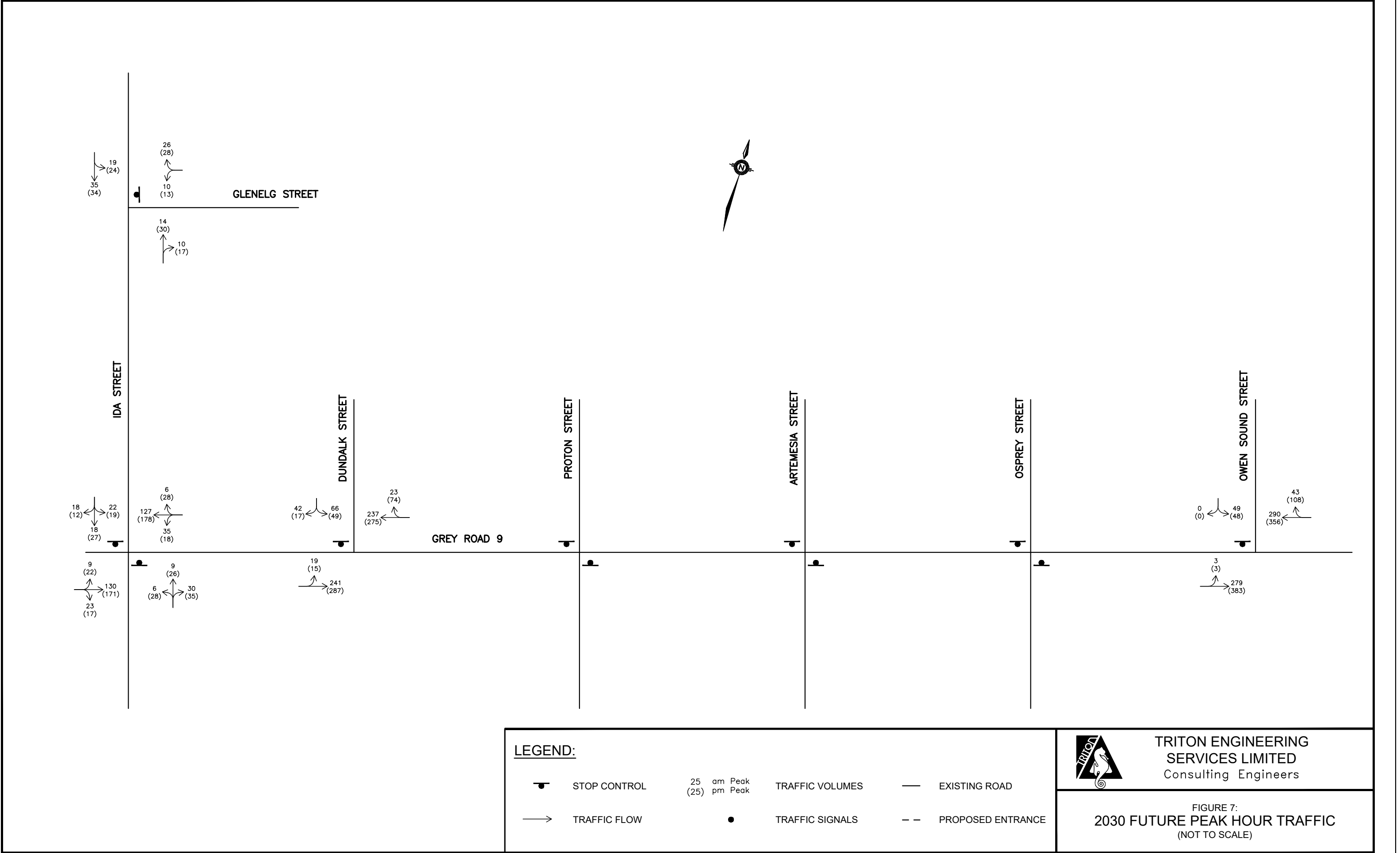
- |   |              |   |                   |   |               |
|---|--------------|---|-------------------|---|---------------|
|  | STOP CONTROL |  | TRAFFIC SIGNALS   |  | EXISTING ROAD |
|  | TRAFFIC FLOW |  | PROPOSED ENTRANCE |   |               |



TRITON ENGINEERING  
SERVICES LIMITED  
Consulting Engineers

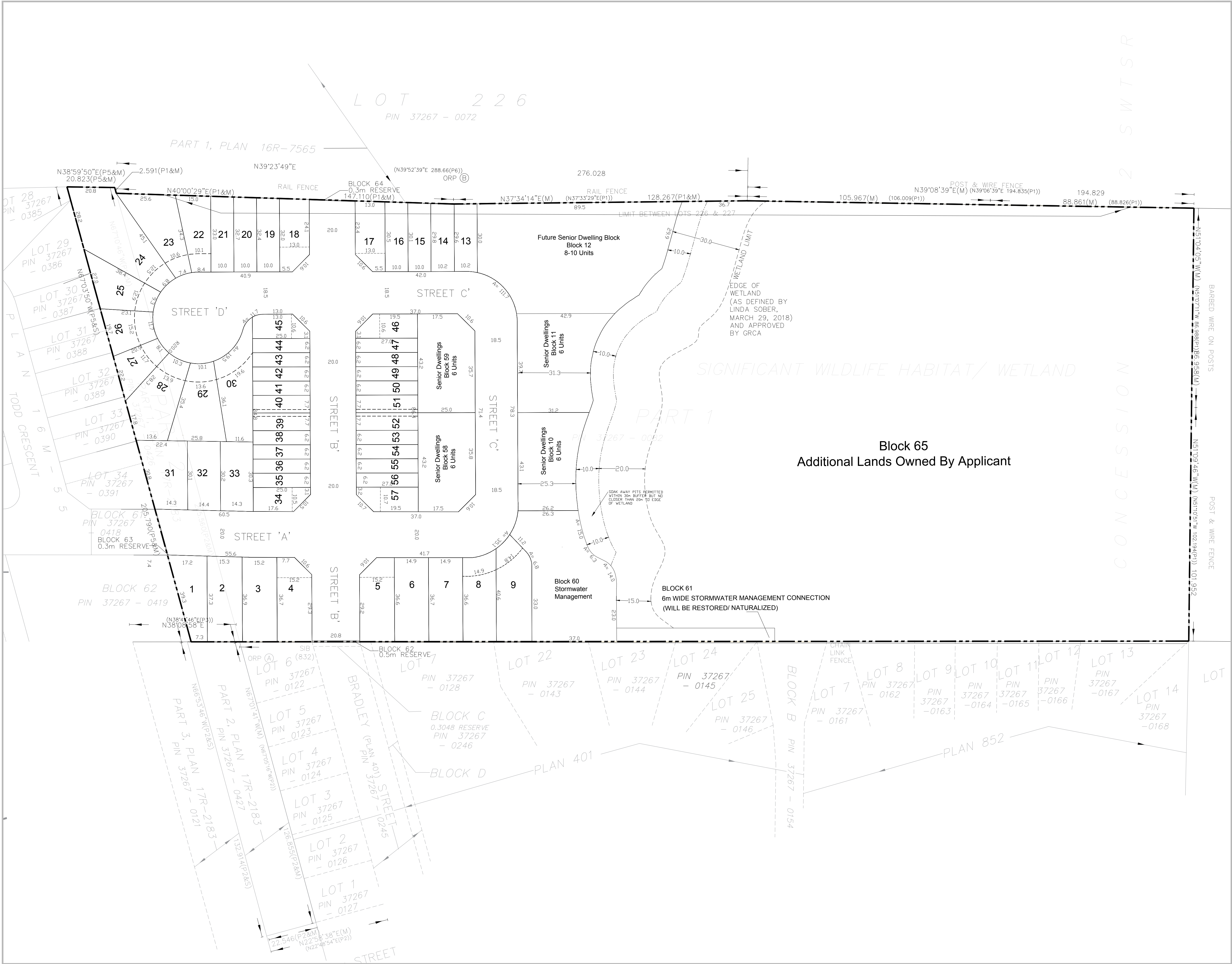
FIGURE 5:  
DEVELOPMENT PEAK HOUR TRIP  
DISTRIBUTION  
(NOT TO SCALE)





## **APPENDIX A**

### **Draft Plan of Subdivision**





## **APPENDIX B**

### **Level of Service Definitions**

## LEVEL OF SERVICE

### Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)	Impact on Minor Street Traffic
A	$\leq 10$	Little or no delay
B	>10-15	Short traffic delays
C	> 15-25	Average traffic delays
D	> 25-35	Long traffic delays
E	> 35-50	Very long traffic delays
F	> 50	Unacceptable traffic delays

Source: Transportation Research Board, 2000.










## **APPENDIX C**

### **Level of Service Analysis Outputs**

# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	10	11	6	12	30
Future Volume (Veh/h)	1	10	11	6	12	30
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	1	13	14	8	15	38
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	86	18			22	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	86	18			22	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	907	1061			1593	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	14	22	53			
Volume Left	1	0	15			
Volume Right	13	8	0			
cSH	1048	1700	1593			
Volume to Capacity	0.01	0.01	0.01			
Queue Length 95th (m)	0.3	0.0	0.2			
Control Delay (s)	8.5	0.0	2.1			
Lane LOS	A		A			
Approach Delay (s)	8.5	0.0	2.1			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay		2.6				
Intersection Capacity Utilization		18.9%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

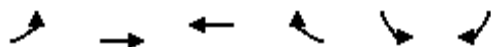
09-13-2020




												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	99	20	30	67	5	5	7	26	19	15	7
Future Volume (Veh/h)	5	99	20	30	67	5	5	7	26	19	15	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	5	105	21	32	71	5	5	7	28	20	16	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	76			126			278	266	116	294	274	74
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	76			126			278	266	116	294	274	74
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			99	99	97	97	97	99
cM capacity (veh/h)	1523			1460			644	624	937	620	618	988
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	131	108	40	43								
Volume Left	5	32	5	20								
Volume Right	21	5	28	7								
cSH	1523	1460	818	659								
Volume to Capacity	0.00	0.02	0.05	0.07								
Queue Length 95th (m)	0.1	0.5	1.2	1.7								
Control Delay (s)	0.3	2.3	9.6	10.8								
Lane LOS	A	A	A	B								
Approach Delay (s)	0.3	2.3	9.6	10.8								
Approach LOS			A	B								
Intersection Summary												
Average Delay			3.6									
Intersection Capacity Utilization			24.7%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020

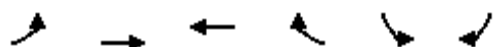


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	190	145	4	8	28
Future Volume (Veh/h)	13	190	145	4	8	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	14	209	159	4	9	31
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	163				398	161
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	163				398	161
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	96
cM capacity (veh/h)	1416				601	884
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	223	163	40			
Volume Left	14	0	9			
Volume Right	0	4	31			
cSH	1416	1700	799			
Volume to Capacity	0.01	0.10	0.05			
Queue Length 95th (m)	0.2	0.0	1.3			
Control Delay (s)	0.6	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.6	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			30.7%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	165	131	30	21	0
Future Volume (Veh/h)	2	165	131	30	21	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	183	146	33	23	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	179				350	162
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	179				350	162
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				96	100
cM capacity (veh/h)	1397				647	882
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	185	179	23			
Volume Left	2	0	23			
Volume Right	0	33	0			
cSH	1397	1700	647			
Volume to Capacity	0.00	0.11	0.04			
Queue Length 95th (m)	0.0	0.0	0.9			
Control Delay (s)	0.1	0.0	10.8			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	10.8			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			20.3%	ICU Level of Service		A
Analysis Period (min)			15			



# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	18	26	6	8	29
Future Volume (Veh/h)	6	18	26	6	8	29
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	21	30	7	9	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	84	34			37	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	84	34			37	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			99	
cM capacity (veh/h)	912	1040			1574	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	28	37	42			
Volume Left	7	0	9			
Volume Right	21	7	0			
cSH	1005	1700	1574			
Volume to Capacity	0.03	0.02	0.01			
Queue Length 95th (m)	0.7	0.0	0.1			
Control Delay (s)	8.7	0.0	1.6			
Lane LOS	A		A			
Approach Delay (s)	8.7	0.0	1.6			
Approach LOS	A					
Intersection Summary						
Average Delay		2.9				
Intersection Capacity Utilization		18.5%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

09-13-2020




												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	102	14	15	128	24	24	22	30	16	23	5
Future Volume (Veh/h)	9	102	14	15	128	24	24	22	30	16	23	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	10	116	16	17	145	27	27	25	34	18	26	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	172			132			356	350	124	383	344	158
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	172			132			356	350	124	383	344	158
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			95	96	96	97	95	99
cM capacity (veh/h)	1405			1453			567	563	927	528	567	887
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	142	189	86	50								
Volume Left	10	17	27	18								
Volume Right	16	27	34	6								
cSH	1405	1453	668	577								
Volume to Capacity	0.01	0.01	0.13	0.09								
Queue Length 95th (m)	0.2	0.3	3.5	2.3								
Control Delay (s)	0.6	0.8	11.2	11.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.8	11.2	11.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			24.5%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020

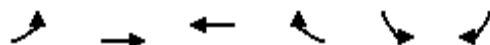


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	185	201	9	10	11
Future Volume (Veh/h)	4	185	201	9	10	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	206	223	10	11	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	233				442	228
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233				442	228
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	99
cM capacity (veh/h)	1335				571	811
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	210	233	23			
Volume Left	4	0	11			
Volume Right	0	10	12			
cSH	1335	1700	676			
Volume to Capacity	0.00	0.14	0.03			
Queue Length 95th (m)	0.1	0.0	0.8			
Control Delay (s)	0.2	0.0	10.5			
Lane LOS	A		B			
Approach Delay (s)	0.2	0.0	10.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			22.9%		ICU Level of Service	
Analysis Period (min)			15			
			A			

# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	2	191	196	71	31	0
Future Volume (Veh/h)	2	191	196	71	31	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	208	213	77	34	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	290				464	252
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290				464	252
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				94	100
cM capacity (veh/h)	1272				556	787
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	210	290	34			
Volume Left	2	0	34			
Volume Right	0	77	0			
cSH	1272	1700	556			
Volume to Capacity	0.00	0.17	0.06			
Queue Length 95th (m)	0.0	0.0	1.6			
Control Delay (s)	0.1	0.0	11.9			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			24.6%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	20	13	10	17	32
Future Volume (Veh/h)	10	20	13	10	17	32
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	13	26	17	13	22	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	108	24			30	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	108	24			30	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			99	
cM capacity (veh/h)	876	1053			1583	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	39	30	63			
Volume Left	13	0	22			
Volume Right	26	13	0			
cSH	987	1700	1583			
Volume to Capacity	0.04	0.02	0.01			
Queue Length 95th (m)	1.0	0.0	0.3			
Control Delay (s)	8.8	0.0	2.6			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	2.6			
Approach LOS	A					
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization			19.3%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

09-13-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	120	21	32	114	6	6	9	28	20	17	17
Future Volume (Veh/h)	9	120	21	32	114	6	6	9	28	20	17	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	128	22	34	121	6	6	10	30	21	18	18
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	127			150			378	354	139	386	362	124
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	127			150			378	354	139	386	362	124
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			99	98	97	96	97	98
cM capacity (veh/h)	1459			1431			541	554	909	533	548	927
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	160	161	46	57								
Volume Left	10	34	6	21								
Volume Right	22	6	30	18								
cSH	1459	1431	740	622								
Volume to Capacity	0.01	0.02	0.06	0.09								
Queue Length 95th (m)	0.2	0.6	1.6	2.4								
Control Delay (s)	0.5	1.8	10.2	11.4								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.5	1.8	10.2	11.4								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			30.8%		ICU Level of Service		A					
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	15	224	219	21	60	34
Future Volume (Veh/h)	15	224	219	21	60	34
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	16	246	241	23	66	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	264				530	252
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264				530	252
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				87	95
cM capacity (veh/h)	1300				503	786
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	262	264	103			
Volume Left	16	0	66			
Volume Right	0	23	37			
cSH	1300	1700	578			
Volume to Capacity	0.01	0.16	0.18			
Queue Length 95th (m)	0.3	0.0	5.2			
Control Delay (s)	0.6	0.0	12.6			
Lane LOS	A		B			
Approach Delay (s)	0.6	0.0	12.6			
Approach LOS			B			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			36.2%	ICU Level of Service		A
Analysis Period (min)			15			






# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	265	279	33	23	0
Future Volume (Veh/h)	3	265	279	33	23	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	294	310	37	26	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	347				628	328
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	347				628	328
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				94	100
cM capacity (veh/h)	1212				445	713
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	297	347	26			
Volume Left	3	0	26			
Volume Right	0	37	0			
cSH	1212	1700	445			
Volume to Capacity	0.00	0.20	0.06			
Queue Length 95th (m)	0.1	0.0	1.5			
Control Delay (s)	0.1	0.0	13.6			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	13.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			26.7%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	24	28	16	19	31
Future Volume (Veh/h)	12	24	28	16	19	31
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	14	28	32	18	22	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	121	41			50	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121	41			50	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			99	
cM capacity (veh/h)	862	1030			1557	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	42	50	58			
Volume Left	14	0	22			
Volume Right	28	18	0			
cSH	967	1700	1557			
Volume to Capacity	0.04	0.03	0.01			
Queue Length 95th (m)	1.1	0.0	0.3			
Control Delay (s)	8.9	0.0	2.9			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	2.9			
Approach LOS	A					
Intersection Summary						
Average Delay		3.6				
Intersection Capacity Utilization		19.3%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

09-13-2020




												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	155	16	17	163	26	26	24	32	18	25	11
Future Volume (Veh/h)	20	155	16	17	163	26	26	24	32	18	25	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	23	176	18	19	185	30	30	27	36	20	28	13
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	215			194			496	484	185	518	478	200
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	215			194			496	484	185	518	478	200
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			93	94	96	95	94	98
cM capacity (veh/h)	1355			1379			445	468	857	418	472	841
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	217	234	93	61								
Volume Left	23	19	30	20								
Volume Right	18	30	36	13								
cSH	1355	1379	556	497								
Volume to Capacity	0.02	0.01	0.17	0.12								
Queue Length 95th (m)	0.4	0.3	4.8	3.3								
Control Delay (s)	0.9	0.7	12.8	13.2								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.9	0.7	12.8	13.2								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization			27.1%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020

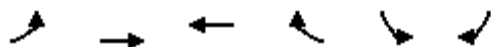





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	266	254	67	45	15
Future Volume (Veh/h)	9	266	254	67	45	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	10	296	282	74	50	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	356				635	319
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	356				635	319
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				89	98
cM capacity (veh/h)	1203				439	722
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	306	356	67			
Volume Left	10	0	50			
Volume Right	0	74	17			
cSH	1203	1700	487			
Volume to Capacity	0.01	0.21	0.14			
Queue Length 95th (m)	0.2	0.0	3.8			
Control Delay (s)	0.3	0.0	13.6			
Lane LOS	A		B			
Approach Delay (s)	0.3	0.0	13.6			
Approach LOS			B			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			31.3%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	367	340	77	34	0
Future Volume (Veh/h)	3	367	340	77	34	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	399	370	84	37	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	454				817	412
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	454				817	412
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				89	100
cM capacity (veh/h)	1107				345	640
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	402	454	37			
Volume Left	3	0	37			
Volume Right	0	84	0			
cSH	1107	1700	345			
Volume to Capacity	0.00	0.27	0.11			
Queue Length 95th (m)	0.1	0.0	2.9			
Control Delay (s)	0.1	0.0	16.7			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	16.7			
Approach LOS			C			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			32.6%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	22	14	10	18	35
Future Volume (Veh/h)	10	22	14	10	18	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	13	28	18	13	23	45
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	116	24			31	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	116	24			31	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	97			99	
cM capacity (veh/h)	868	1052			1582	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	41	31	68			
Volume Left	13	0	23			
Volume Right	28	13	0			
cSH	986	1700	1582			
Volume to Capacity	0.04	0.02	0.01			
Queue Length 95th (m)	1.0	0.0	0.4			
Control Delay (s)	8.8	0.0	2.5			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	2.5			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay		3.8				
Intersection Capacity Utilization		19.5%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

09-13-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	129	23	35	123	6	6	9	30	22	18	18
Future Volume (Veh/h)	9	129	23	35	123	6	6	9	30	22	18	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	137	24	37	131	6	6	10	32	23	19	19
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	137			161			406	380	149	414	389	134
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	137			161			406	380	149	414	389	134
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			99	98	96	95	96	98
cM capacity (veh/h)	1447			1418			516	534	898	509	528	915
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	171	174	48	61								
Volume Left	10	37	6	23								
Volume Right	24	6	32	19								
cSH	1447	1418	727	598								
Volume to Capacity	0.01	0.03	0.07	0.10								
Queue Length 95th (m)	0.2	0.6	1.7	2.7								
Control Delay (s)	0.5	1.8	10.3	11.7								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.5	1.8	10.3	11.7								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			33.6%	ICU Level of Service					A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020



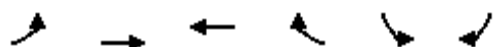
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	241	237	23	65	37
Future Volume (Veh/h)	17	241	237	23	65	37
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	19	265	260	25	71	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	285				576	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	285				576	272
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				85	95
cM capacity (veh/h)	1277				472	766
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	284	285	112			
Volume Left	19	0	71			
Volume Right	0	25	41			
cSH	1277	1700	549			
Volume to Capacity	0.01	0.17	0.20			
Queue Length 95th (m)	0.4	0.0	6.1			
Control Delay (s)	0.7	0.0	13.2			
Lane LOS	A		B			
Approach Delay (s)	0.7	0.0	13.2			
Approach LOS			B			
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			39.2%	ICU Level of Service		A
Analysis Period (min)			15			



# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	3	279	290	35	25	0
Future Volume (Veh/h)	3	279	290	35	25	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	310	322	39	28	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	361				658	342
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	361				658	342
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				93	100
cM capacity (veh/h)	1198				428	701
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	313	361	28			
Volume Left	3	0	28			
Volume Right	0	39	0			
cSH	1198	1700	428			
Volume to Capacity	0.00	0.21	0.07			
Queue Length 95th (m)	0.1	0.0	1.7			
Control Delay (s)	0.1	0.0	14.0			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	14.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			27.4%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	26	30	17	20	34
Future Volume (Veh/h)	13	26	30	17	20	34
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	30	34	20	23	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	129	44			54	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	129	44			54	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			99	
cM capacity (veh/h)	853	1026			1551	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	45	54	62			
Volume Left	15	0	23			
Volume Right	30	20	0			
cSH	961	1700	1551			
Volume to Capacity	0.05	0.03	0.01			
Queue Length 95th (m)	1.2	0.0	0.4			
Control Delay (s)	8.9	0.0	2.8			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	2.8			
Approach LOS	A					
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			19.6%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

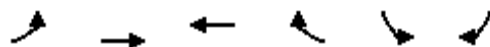
09-13-2020




												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	167	17	18	176	28	28	26	35	19	27	12
Future Volume (Veh/h)	22	167	17	18	176	28	28	26	35	19	27	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	25	190	19	20	200	32	32	30	40	22	31	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	232			209			535	522	200	560	515	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	232			209			535	522	200	560	515	216
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			92	93	95	94	93	98
cM capacity (veh/h)	1336			1362			414	444	841	386	448	824
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	234	252	102	67								
Volume Left	25	20	32	22								
Volume Right	19	32	40	14								
cSH	1336	1362	530	468								
Volume to Capacity	0.02	0.01	0.19	0.14								
Queue Length 95th (m)	0.5	0.4	5.6	4.0								
Control Delay (s)	1.0	0.7	13.4	14.0								
Lane LOS	A	A	B	B								
Approach Delay (s)	1.0	0.7	13.4	14.0								
Approach LOS			B	B								
Intersection Summary												
Average Delay			4.1									
Intersection Capacity Utilization			28.9%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020

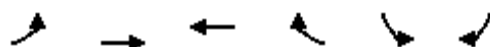


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	287	275	73	49	17
Future Volume (Veh/h)	10	287	275	73	49	17
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	319	306	81	54	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	387				688	346
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387				688	346
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				87	97
cM capacity (veh/h)	1171				409	697
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	330	387	73			
Volume Left	11	0	54			
Volume Right	0	81	19			
cSH	1171	1700	458			
Volume to Capacity	0.01	0.23	0.16			
Queue Length 95th (m)	0.2	0.0	4.5			
Control Delay (s)	0.4	0.0	14.4			
Lane LOS	A		B			
Approach Delay (s)	0.4	0.0	14.4			
Approach LOS			B			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			33.6%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	383	356	83	36	0
Future Volume (Veh/h)	3	383	356	83	36	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	416	387	90	39	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	477				854	432
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	477				854	432
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				88	100
cM capacity (veh/h)	1085				328	624
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	419	477	39			
Volume Left	3	0	39			
Volume Right	0	90	0			
cSH	1085	1700	328			
Volume to Capacity	0.00	0.28	0.12			
Queue Length 95th (m)	0.1	0.0	3.2			
Control Delay (s)	0.1	0.0	17.4			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	17.4			
Approach LOS			C			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			33.8%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	24	13	10	18	32
Future Volume (Veh/h)	10	24	13	10	18	32
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	13	31	17	13	23	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	110	24			30	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	110	24			30	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	97			99	
cM capacity (veh/h)	874	1053			1583	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	44	30	64			
Volume Left	13	0	23			
Volume Right	31	13	0			
cSH	993	1700	1583			
Volume to Capacity	0.04	0.02	0.01			
Queue Length 95th (m)	1.1	0.0	0.4			
Control Delay (s)	8.8	0.0	2.7			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	2.7			
Approach LOS	A					
Intersection Summary						
Average Delay		4.1				
Intersection Capacity Utilization		19.3%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

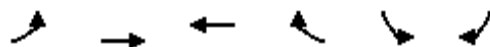
09-13-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	121	21	32	118	6	6	9	28	20	17	17
Future Volume (Veh/h)	9	121	21	32	118	6	6	9	28	20	17	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	129	22	34	126	6	6	10	30	21	18	18
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	132			151			384	360	140	392	368	129
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132			151			384	360	140	392	368	129
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			99	98	97	96	97	98
cM capacity (veh/h)	1453			1430			536	550	908	528	544	921
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	161	166	46	57								
Volume Left	10	34	6	21								
Volume Right	22	6	30	18								
cSH	1453	1430	737	617								
Volume to Capacity	0.01	0.02	0.06	0.09								
Queue Length 95th (m)	0.2	0.6	1.6	2.4								
Control Delay (s)	0.5	1.7	10.2	11.4								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.5	1.7	10.2	11.4								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			31.0%	ICU Level of Service					A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020



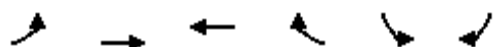
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	224	219	21	61	39
Future Volume (Veh/h)	17	224	219	21	61	39
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	19	246	241	23	67	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	264				536	252
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264				536	252
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				87	95
cM capacity (veh/h)	1300				498	786
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	265	264	110			
Volume Left	19	0	67			
Volume Right	0	23	43			
cSH	1300	1700	581			
Volume to Capacity	0.01	0.16	0.19			
Queue Length 95th (m)	0.4	0.0	5.5			
Control Delay (s)	0.7	0.0	12.6			
Lane LOS	A		B			
Approach Delay (s)	0.7	0.0	12.6			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			2.5			
Intersection Capacity Utilization			38.2%	ICU Level of Service		A
Analysis Period (min)			15			






# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	265	279	41	47	0
Future Volume (Veh/h)	3	265	279	41	47	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	294	310	46	52	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	356				633	333
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	356				633	333
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				88	100
cM capacity (veh/h)	1203				443	709
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	297	356	52			
Volume Left	3	0	52			
Volume Right	0	46	0			
cSH	1203	1700	443			
Volume to Capacity	0.00	0.21	0.12			
Queue Length 95th (m)	0.1	0.0	3.2			
Control Delay (s)	0.1	0.0	14.2			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	14.2			
Approach LOS			B			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			27.2%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	26	28	16	23	31
Future Volume (Veh/h)	12	26	28	16	23	31
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	14	30	32	18	26	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	129	41			50	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	129	41			50	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			98	
cM capacity (veh/h)	851	1030			1557	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	44	50	62			
Volume Left	14	0	26			
Volume Right	30	18	0			
cSH	965	1700	1557			
Volume to Capacity	0.05	0.03	0.02			
Queue Length 95th (m)	1.1	0.0	0.4			
Control Delay (s)	8.9	0.0	3.2			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	3.2			
Approach LOS	A					
Intersection Summary						
Average Delay		3.8				
Intersection Capacity Utilization		19.6%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

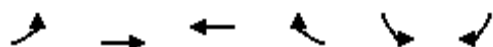
09-13-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	159	16	17	165	26	26	24	32	18	25	11
Future Volume (Veh/h)	20	159	16	17	165	26	26	24	32	18	25	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	23	181	18	19	188	30	30	27	36	20	28	13
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	218			199			504	492	190	526	486	203
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	218			199			504	492	190	526	486	203
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			93	94	96	95	94	98
cM capacity (veh/h)	1352			1373			439	463	852	413	467	838
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	222	237	93	61								
Volume Left	23	19	30	20								
Volume Right	18	30	36	13								
cSH	1352	1373	551	492								
Volume to Capacity	0.02	0.01	0.17	0.12								
Queue Length 95th (m)	0.4	0.3	4.8	3.4								
Control Delay (s)	0.9	0.7	12.9	13.3								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.9	0.7	12.9	13.3								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.9									
Intersection Capacity Utilization			27.3%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020

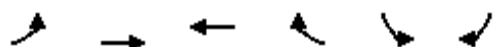


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	14	266	254	68	45	18
Future Volume (Veh/h)	14	266	254	68	45	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	296	282	76	50	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	358				648	320
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	358				648	320
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				88	97
cM capacity (veh/h)	1201				429	721
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	312	358	70			
Volume Left	16	0	50			
Volume Right	0	76	20			
cSH	1201	1700	485			
Volume to Capacity	0.01	0.21	0.14			
Queue Length 95th (m)	0.3	0.0	4.0			
Control Delay (s)	0.5	0.0	13.7			
Lane LOS	A		B			
Approach Delay (s)	0.5	0.0	13.7			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			1.5			
Intersection Capacity Utilization			35.7%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	367	340	102	46	0
Future Volume (Veh/h)	3	367	340	102	46	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	399	370	111	50	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	481				830	426
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	481				830	426
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				85	100
cM capacity (veh/h)	1082				339	629
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	402	481	50			
Volume Left	3	0	50			
Volume Right	0	111	0			
cSH	1082	1700	339			
Volume to Capacity	0.00	0.28	0.15			
Queue Length 95th (m)	0.1	0.0	4.1			
Control Delay (s)	0.1	0.0	17.5			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	17.5			
Approach LOS			C			
<b>Intersection Summary</b>						
Average Delay			1.0			
Intersection Capacity Utilization			34.1%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	26	14	10	19	35
Future Volume (Veh/h)	10	26	14	10	19	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	13	33	18	13	24	45
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	118	24			31	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	118	24			31	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			98	
cM capacity (veh/h)	865	1052			1582	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	46	31	69			
Volume Left	13	0	24			
Volume Right	33	13	0			
cSH	991	1700	1582			
Volume to Capacity	0.05	0.02	0.02			
Queue Length 95th (m)	1.2	0.0	0.4			
Control Delay (s)	8.8	0.0	2.6			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	2.6			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay		4.0				
Intersection Capacity Utilization		19.6%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

09-13-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	130	23	35	127	6	6	9	30	22	18	18
Future Volume (Veh/h)	9	130	23	35	127	6	6	9	30	22	18	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	138	24	37	135	6	6	10	32	23	19	19
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	141			162			410	385	150	419	394	138
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	141			162			410	385	150	419	394	138
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			99	98	96	95	96	98
cM capacity (veh/h)	1442			1417			512	531	896	505	525	910
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	172	178	48	61								
Volume Left	10	37	6	23								
Volume Right	24	6	32	19								
cSH	1442	1417	725	594								
Volume to Capacity	0.01	0.03	0.07	0.10								
Queue Length 95th (m)	0.2	0.6	1.7	2.7								
Control Delay (s)	0.5	1.8	10.3	11.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.5	1.8	10.3	11.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			33.8%	ICU Level of Service					A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020



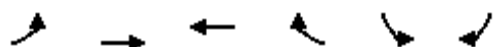
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	241	237	23	66	42
Future Volume (Veh/h)	19	241	237	23	66	42
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	21	265	260	25	73	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	285				580	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	285				580	272
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				84	94
cM capacity (veh/h)	1277				469	766
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	286	285	119			
Volume Left	21	0	73			
Volume Right	0	25	46			
cSH	1277	1700	552			
Volume to Capacity	0.02	0.17	0.22			
Queue Length 95th (m)	0.4	0.0	6.5			
Control Delay (s)	0.7	0.0	13.3			
Lane LOS	A		B			
Approach Delay (s)	0.7	0.0	13.3			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			2.6			
Intersection Capacity Utilization			41.2%	ICU Level of Service		A
Analysis Period (min)			15			



# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020












Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	279	290	43	49	0
Future Volume (Veh/h)	3	279	290	43	49	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	310	322	48	54	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	370				662	346
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	370				662	346
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				87	100
cM capacity (veh/h)	1189				426	697
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	313	370	54			
Volume Left	3	0	54			
Volume Right	0	48	0			
cSH	1189	1700	426			
Volume to Capacity	0.00	0.22	0.13			
Queue Length 95th (m)	0.1	0.0	3.5			
Control Delay (s)	0.1	0.0	14.7			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	14.7			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			1.1			
Intersection Capacity Utilization			27.9%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 1: Ida Street & Glenelg Street

















09-13-2020

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	28	30	17	24	34
Future Volume (Veh/h)	13	28	30	17	24	34
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	15	32	34	20	28	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	139	44			54	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	139	44			54	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			98	
cM capacity (veh/h)	839	1026			1551	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	47	54	67			
Volume Left	15	0	28			
Volume Right	32	20	0			
cSH	958	1700	1551			
Volume to Capacity	0.05	0.03	0.02			
Queue Length 95th (m)	1.2	0.0	0.4			
Control Delay (s)	9.0	0.0	3.2			
Lane LOS	A		A			
Approach Delay (s)	9.0	0.0	3.2			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay		3.8				
Intersection Capacity Utilization		19.8%		ICU Level of Service		A
Analysis Period (min)		15				

# HCM Unsignalized Intersection Capacity Analysis

## 2: Ida Street & Grey Road 9

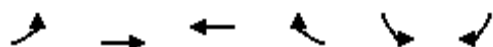
09-13-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	171	17	18	178	28	28	26	35	19	27	12
Future Volume (Veh/h)	22	171	17	18	178	28	28	26	35	19	27	12
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	25	194	19	20	202	32	32	30	40	22	31	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	234			213			541	528	204	566	521	218
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			213			541	528	204	566	521	218
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			92	93	95	94	93	98
cM capacity (veh/h)	1333			1357			410	441	837	382	445	822
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	238	254	102	67								
Volume Left	25	20	32	22								
Volume Right	19	32	40	14								
cSH	1333	1357	526	464								
Volume to Capacity	0.02	0.01	0.19	0.14								
Queue Length 95th (m)	0.5	0.4	5.7	4.0								
Control Delay (s)	1.0	0.7	13.5	14.1								
Lane LOS	A	A	B	B								
Approach Delay (s)	1.0	0.7	13.5	14.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay			4.1									
Intersection Capacity Utilization			29.1%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Grey Road 9 & Dundalk Street

09-13-2020

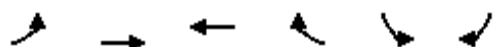


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	287	275	74	49	17
Future Volume (Veh/h)	15	287	275	74	49	17
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	319	306	82	54	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	388				700	347
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	388				700	347
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				86	97
cM capacity (veh/h)	1170				400	696
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	336	388	73			
Volume Left	17	0	54			
Volume Right	0	82	19			
cSH	1170	1700	449			
Volume to Capacity	0.01	0.23	0.16			
Queue Length 95th (m)	0.4	0.0	4.6			
Control Delay (s)	0.5	0.0	14.6			
Lane LOS	A		B			
Approach Delay (s)	0.5	0.0	14.6			
Approach LOS			B			
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			37.8%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 4: Grey Road 9 & Owen Sound Street

09-13-2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	383	356	108	48	0
Future Volume (Veh/h)	3	383	356	108	48	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	416	387	117	52	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	504				868	446
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	504				868	446
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				84	100
cM capacity (veh/h)	1061				322	613
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	419	504	52			
Volume Left	3	0	52			
Volume Right	0	117	0			
cSH	1061	1700	322			
Volume to Capacity	0.00	0.30	0.16			
Queue Length 95th (m)	0.1	0.0	4.5			
Control Delay (s)	0.1	0.0	18.3			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	18.3			
Approach LOS			C			
<b>Intersection Summary</b>						
Average Delay			1.0			
Intersection Capacity Utilization			35.3%	ICU Level of Service		A
Analysis Period (min)			15			