



**Gravel Pit  
Part Lot 31  
Southgate Road 04  
Southgate, ON  
Transportation Impact Study**

Paradigm Transportation Solutions Limited

March 2022  
220034



**Project Number**  
220034

**March 2022**

**Client**

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## Gravel Pit, Southgate Part Lot 31, Southgate Road 04, ON Transportation Impact Study



Erica Bayley, P.Eng.

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Version 0.0.1

# Executive Summary

## Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study for a gravel pit located on the north side of Southgate Road 04, between Southgate Township 19 Sideroad and Grey Road 8.

This Transportation Impact Study (TIS) includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for the assumed full build-out (2022) and five-year horizon (2027) from the assumed build-out, and any recommendations required to improve future traffic conditions.

## Development Concept

The property owner is proposing to operate the site with an annual tonnage of 100,000 tonnes. Vehicle access is proposed via the existing access onto Southgate Road 04. The proposed haulage route is east on Southgate Road 04 to Grey Road 8, then primarily south on Grey Road 8 to Highway 89.

## Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** The study area intersections are currently operating within acceptable levels of service and no critical movements during the AM and PM peak hours.
- ▶ **Trip Generation:** the gravel pit is forecast to generate approximately 12 inbound and 12 outbound truck trips during the AM and PM peak hours.
- ▶ **2027 Background Traffic Conditions:** the study area intersections are forecast to operate within acceptable levels of service with no specific problem movements during the AM and PM peak hours.
- ▶ **2027 Total Traffic Conditions:** the study area intersections are forecast to operate within acceptable levels of service with no specific problem movements during the AM and PM peak hours:
- ▶ The addition of the site generated traffic increases the overall delay at the study area intersections by one second or less during the AM and PM peak hours.



- ▶ **Remedial Measures:** Left-turn lanes are not warranted at the intersections of Highway 89 at Grey Road 8 and Grey Road 8 at Southgate Road 04.

## Recommendations

Based on the findings of this study, it is recommended that the development be approved with no requirement for off-site transportation improvements.



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# 1 Introduction

## 1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study for a gravel pit located on the north side of Southgate Road 04, between Southgate Township 19 Sideroad and Grey Road 8. **Figure 1.1** illustrates the location of the subject site.

This study determines the impacts of the additional traffic on the surrounding road network, and the remedial measures necessary (if any) to accommodate future traffic in a satisfactory manner. The scope of the study includes:

- ▶ Assessment of the current traffic and site conditions within the study area;
- ▶ Estimates of background traffic growth;
- ▶ Estimates of additional traffic generated by the subject site;
- ▶ Analysis of the impact of the future traffic on the surrounding road network for full build-out (year 2022) and five-years after full build-out (year 2027) horizon years; and
- ▶ Recommendations necessary to mitigate this future traffic in a satisfactory manner.

The study scope was developed in consultation with the Township of Southgate in February 2022. **Appendix A** contains the pre-study consultation material and response from the Township.

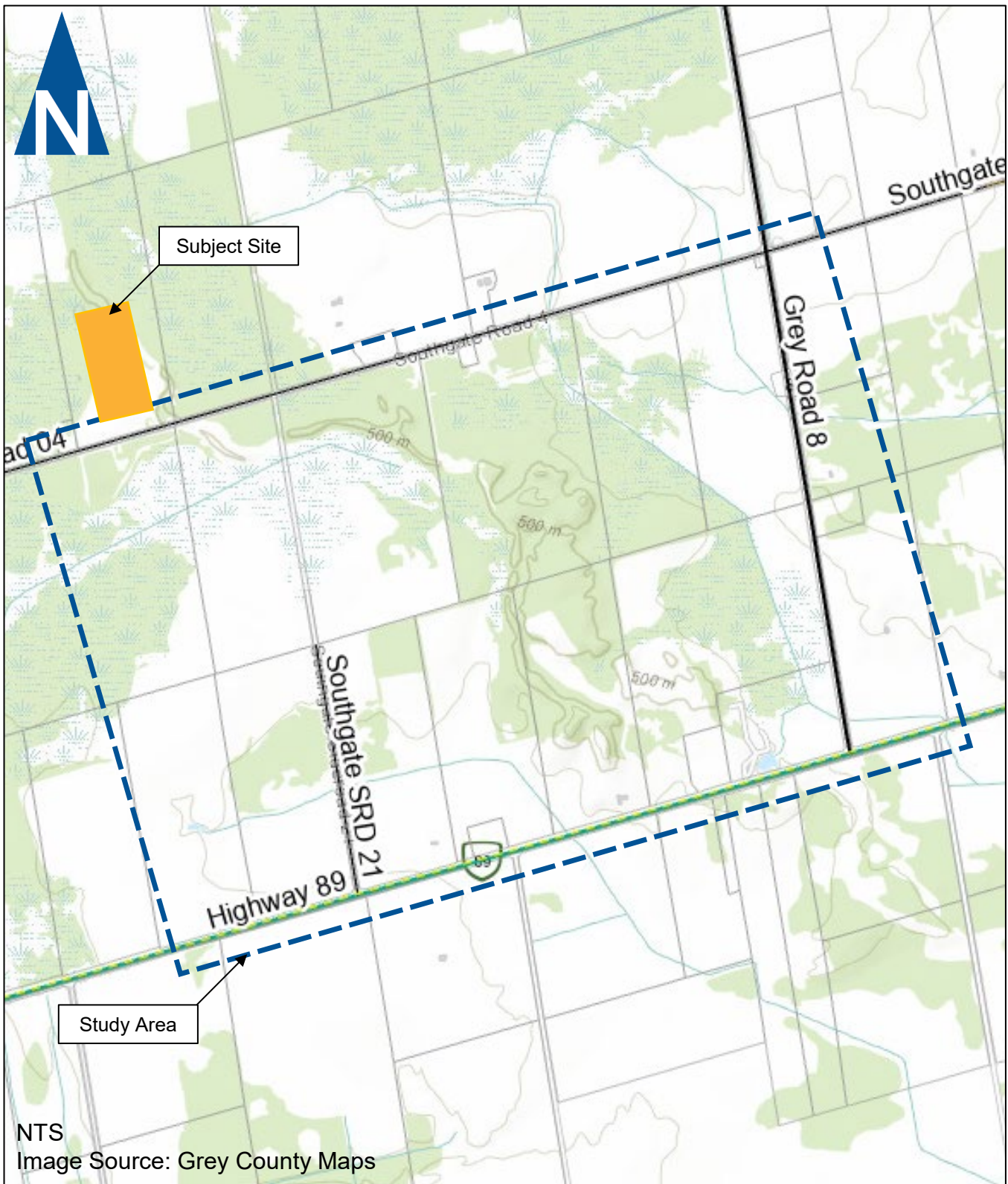
## 1.2 Study Area

The intersections assessed in this study include:

- ▶ Existing access connection to Southgate Road 04 (unsignalized);
- ▶ Southgate Road 04 & Grey Road 08 (unsignalized); and
- ▶ Grey Road 08 and Highway 89 (unsignalized).







## Location of Subject Site

Gravel Pit, Southgate Part Lot 31, Southgate Road 04, TIS  
220034

**Figure 1.1**



## 2 Existing Conditions

### 2.1 Road Characteristics

The roadways of interest within the study area include Highway 89, Grey Road 8, and Southgate Road 04. These roadways are under the jurisdiction of the Ministry of Transportation Ontario (MTO), Grey County, and the Township of Southgate Respectively<sup>1</sup> and are generally described as follows:

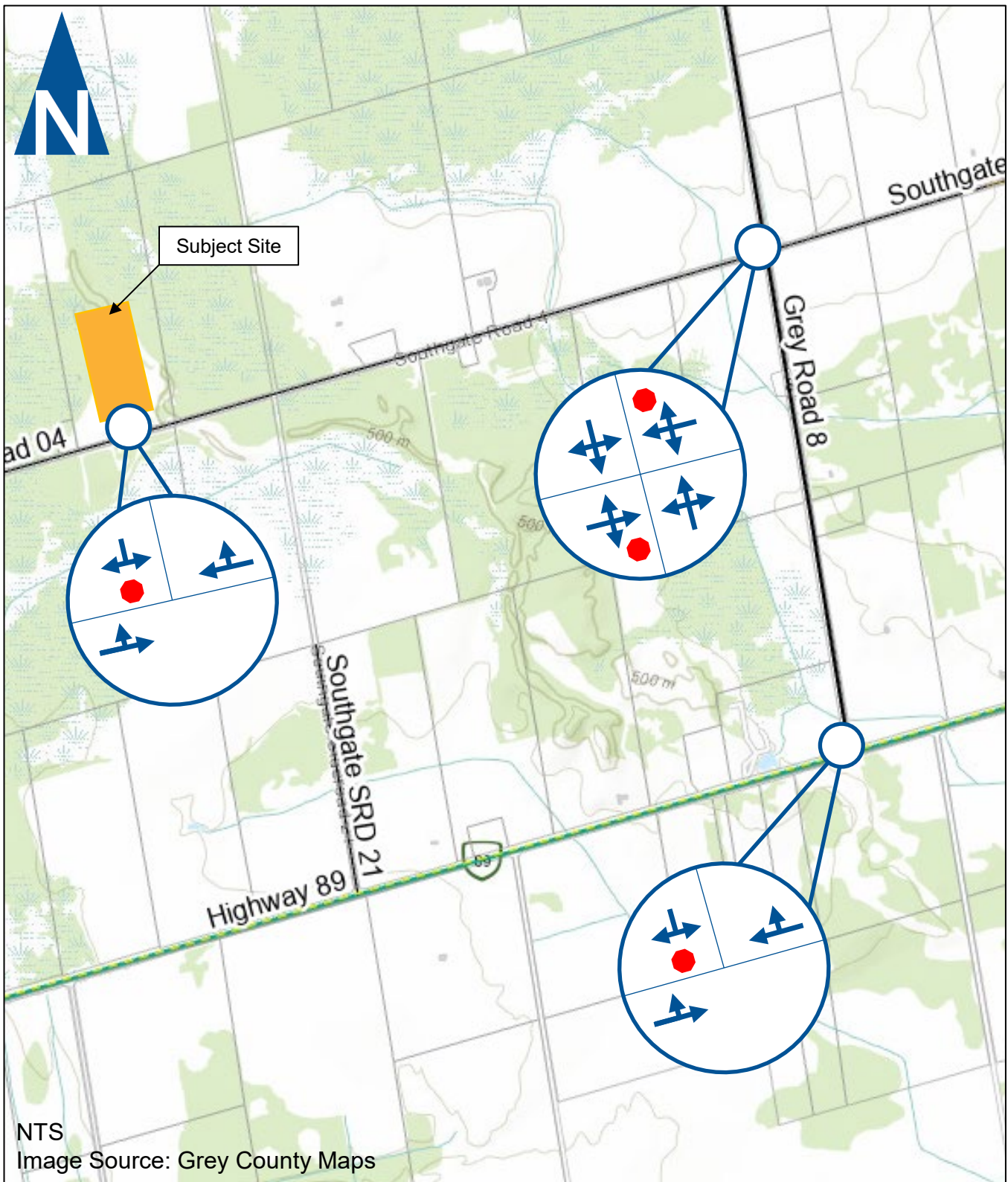
- ▶ **Highway 89** is designated as an arterial road within the study area. It has a two-lane cross-section with a speed limit of 80 km/h.
- ▶ **Grey Road 8** is designated as an arterial road within the study area. It has a two-lane cross-section with a speed limit of 80 km/h.
- ▶ **Southgate Road 04** is designated as a local road within the study area. It has a two-lane cross-section with a speed limit of 80 km/h.

**Figure 2.1** details the existing traffic control and lane configurations at the study area intersections.

---

<sup>1</sup> Township of Southgate Official Plan, Schedule 'B' – Transportation





## Existing Lane Configuration & Traffic Control

## 2.2 Traffic Volumes

Paradigm undertook turning movement counts at the study area intersections in March 2022.

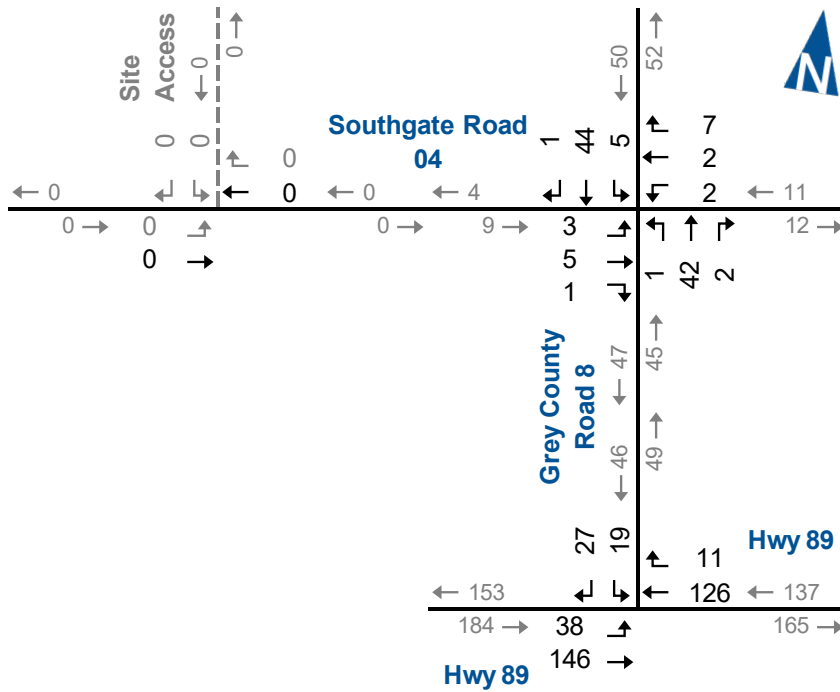
The heavy vehicles documented in the existing count data have been converted to passenger car units (PCE) using a factor of 3.0 PCE per vehicle.

**Appendix B** contains the observed traffic counts for the study area intersections.

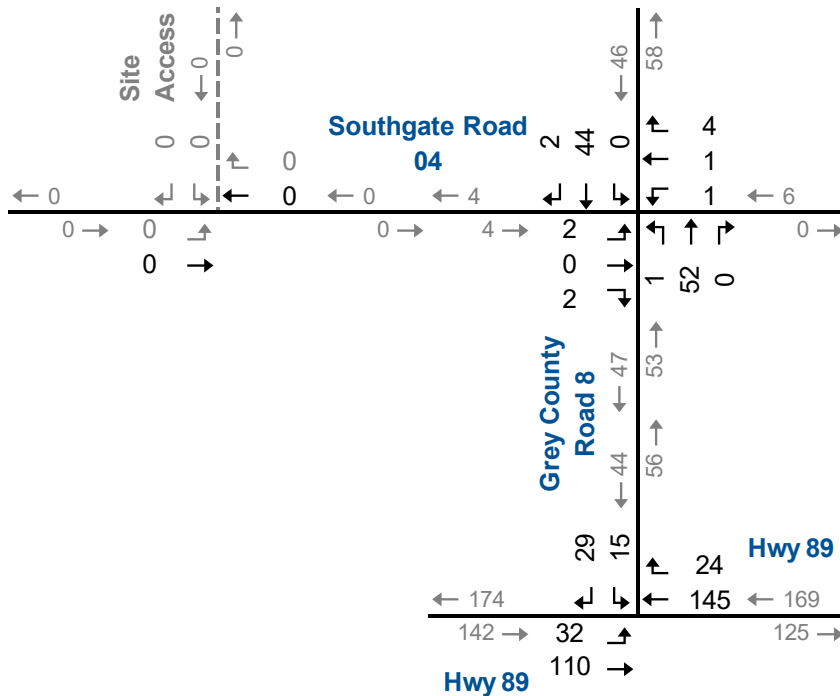
**Figure 2.2** illustrate the factored base year weekday AM and PM peak hour traffic volumes.



**AM Peak Hour**



**PM Peak Hour**



**Base Year Traffic Volumes**

## 2.3 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

The operations of the study intersections were evaluated using the existing lane configurations, traffic controls, and the base year traffic peak hour volumes.

The level of service conditions on the existing road network have been assessed using Synchro 10. As noted in MTO TIS guidelines<sup>2</sup>, movements are considered critical under the following conditions:

- ▶ Volume/capacity ratio (v/c ratio) for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above;

**Table 2.1** summarizes the existing intersection operations. The entries in the table indicating the AM and PM peak hour level of service (LOS), volume to capacity ratios (V/C), and 95th percentile queues experienced.

The study are intersections are currently operating with acceptable levels of service with no specific problem movements. **Appendix C** contains the detailed Synchro reports.

---

<sup>2</sup> Ministry of Transportation Ontario General Guidelines for the Preparation of Traffic Impact Studies, February 2021



**TABLE 2.1: BASE YEAR OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Highway 89 & Grey Road 8	TWSC	LOS Delay V/C Q	A 8 0.03 1	A 0 0.00 0	> > > >	A 2 2	< < < <	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	> > > >	A 0 0.00 0	> > > >	B 11 0.08 2	A A A A	A A A A	A A A A	A 11 11	
	Grey Road 8 & Southgate Road 04	TWSC	LOS Delay V/C Q	< < < <	A 10 0.01 0	> > > >	A 10 10	< < < <	A 9 0.02 0	> > > >	A 9 0.00 0	> > > >	A 0 0.00 0	> > > >	A 7 0.00 0	A A A A	A A A A	A A A A	A 1 1	
PM Peak Hour	Highway 89 & Grey Road 8	TWSC	LOS Delay V/C Q	A 8 0.02 1	A 0 0.00 0	> > > >	A 2 2	< < < <	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	> > > >	A 0 0.00 0	> > > >	A 10 0.06 2	A A A A	A A A A	A A A A	A 10 10	
	Grey Road 8 & Southgate Road 04	TWSC	LOS Delay V/C Q	< < < <	A 9 0.01 0	> > > >	A 9 9	< < < <	A 9 0.01 0	> > > >	A 9 0.00 0	> > > >	A 0 0.00 0	> > > >	A 0 0.00 0	A A A A	A A A A	A A A A	A 0 0	

MOE - Measure of Effectiveness                      Q - 95th Percentile Queue Length (m)  
 LOS - Level of Service                                      TWSC - Two-Way Stop Control  
 Delay - Average Delay per Vehicle in Seconds      </> - Shared with through movement  
 V/C - Volume to Capacity Ratio



## 3 Development Concept

### 3.1 Development Description

The subject site is located on the north side of Southgate Road 04, between Southgate Township 19 Sideroad and Grey Road 8

The property owner is proposing to operate the site with an annual tonnage of 100,000 tonnes.

Vehicle access is proposed via the existing access onto Southgate Road 04.

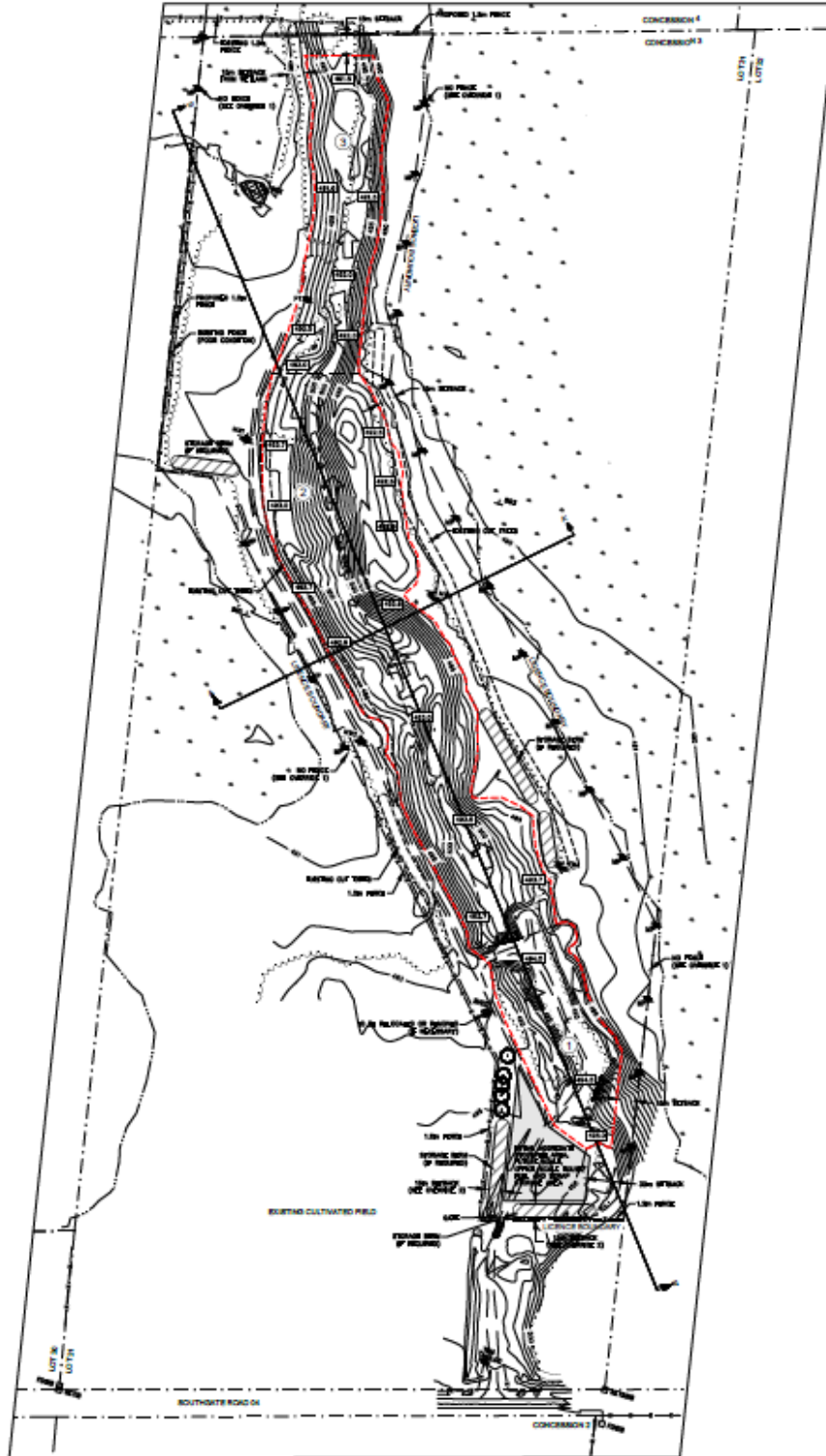
The proposed haulage route is east on Southgate Road 04 to Grey Road 8, then primarily south on Grey Road 8 to Highway 89.

**Figure 3.1** shows the proposed development concepts.

**Figure 3.2** illustrates the haul route.







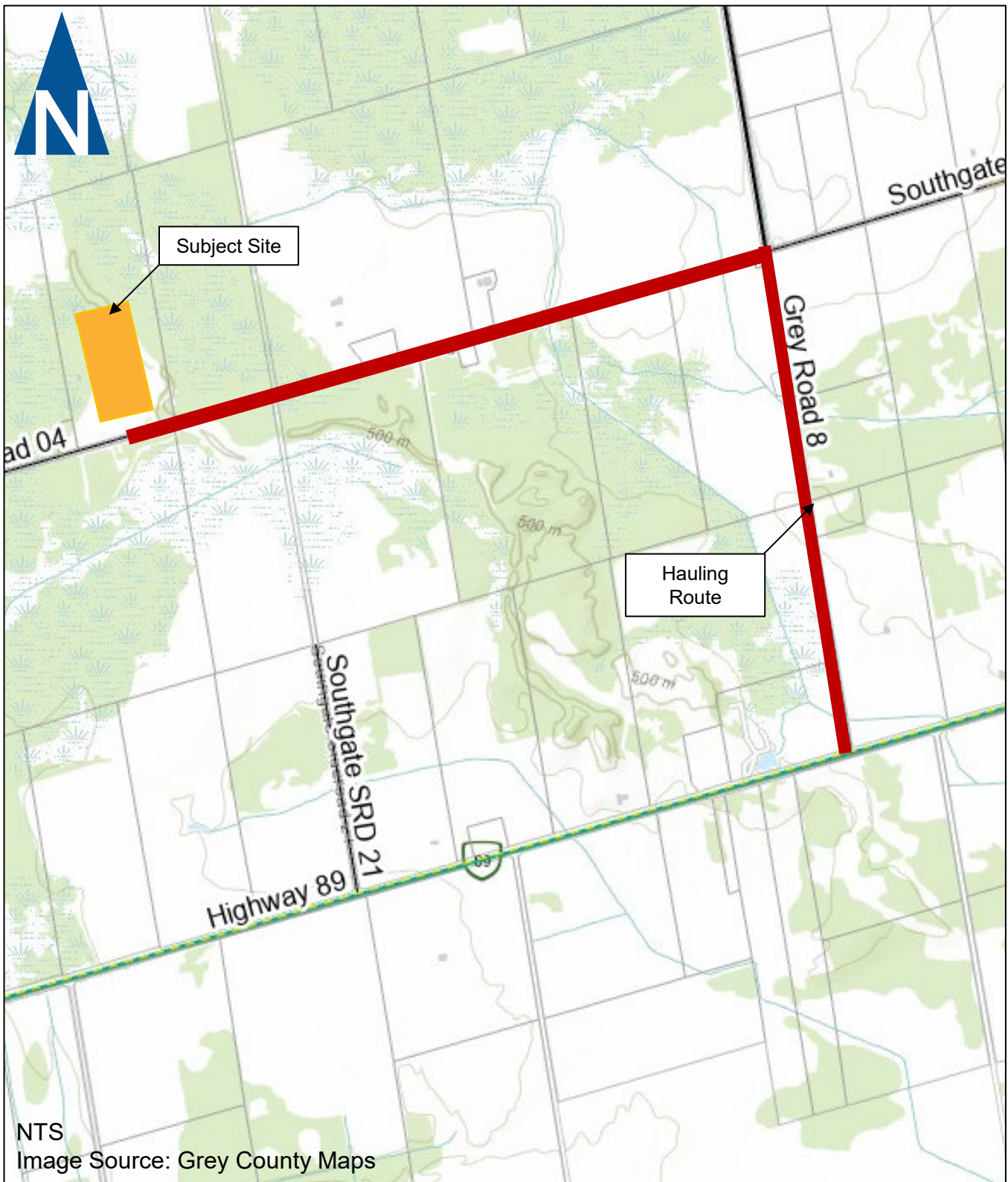
NTS



## Concept Plan

Gravel Pit, Southgate Part Lot 31, Southgate Road 04, TIS  
220034

Figure 3.1



## Hauling Route

Gravel Pit, Southgate Part Lot 31, Southgate Road 04, TIS  
220034

Figure 3.2

## 3.2 Site Trip Generation

The estimated trip generation is based on the number of trips made by trucks utilizing the proposed hauling route during the operation. It is expected that the trucks used for operations would be standard sized single unit trucks or tri-axle trucks, but will have the potential to use WB-19 tractor-trailer trucks. The number of forecast trips was calculated using the following information regarding expected pit operations:

- ▶ **Licensed Extraction Rate:** The maximum amount of tonnage applied for the aggregate licence is 100,000 tonnes per year. This rate represents the maximum amount of material that can be extracted from the site on yearly basis.
- ▶ **Pit Operations:** The operational plan for the pit notes that the trucks will be loaded between 7:00 AM and 6:00 PM daily on weekdays for a duration of 12 months. Realities of market forces and weather have shown that this activity can be sustained for 240 operating days per year.
- ▶ **Vehicle Size:** An average payload of 40 tonnes per truck was assumed for the purposes of the analysis.

**Table 3.1** summarizes the estimated daily average and peak hour traffic generation at the gravel pit. From the calculations, it was found that an average of 12 trips per hour can be expected.

**TABLE 3.1: TRIP GENERATION ESTIMATES**

Measure	Units	Input	Calculation
Annual Rate of Extraction	tonnes/year	100,000	
Operating Days per year	day/year	240	
Average Extraction per day	tonnes/day		417
Average Payload per truck	tonnes/truck	40	
Average Number of Trucks per day	trucks/day		10
Operating Hours per day	hours/day	11	
Average number of trucks per hour	trucks/hour		1
Peak Hour factor	dimensionless	0.25	
Peak Hour Truck Volume	trucks/hour		4
Passenger Car Equivalents	PCE's/truck	3	
Peak Hour Entering Volume	PCE's/hour		12
Peak Hour Exiting Volume	PCE's/hour		12

The distribution of the site traffic consists only of truck load transportation. The truck hauling involves two steps:

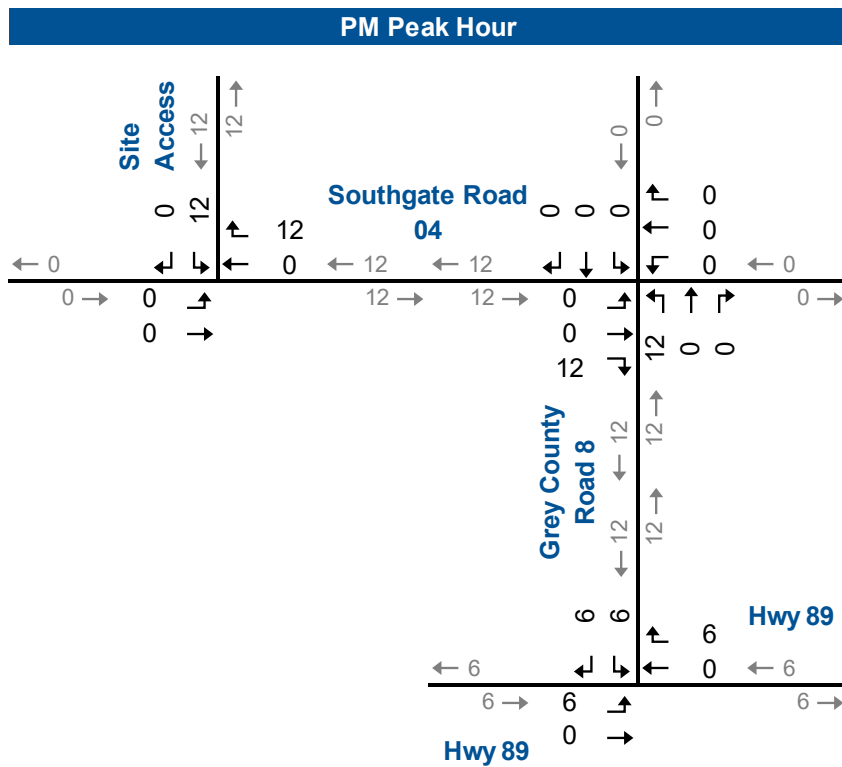
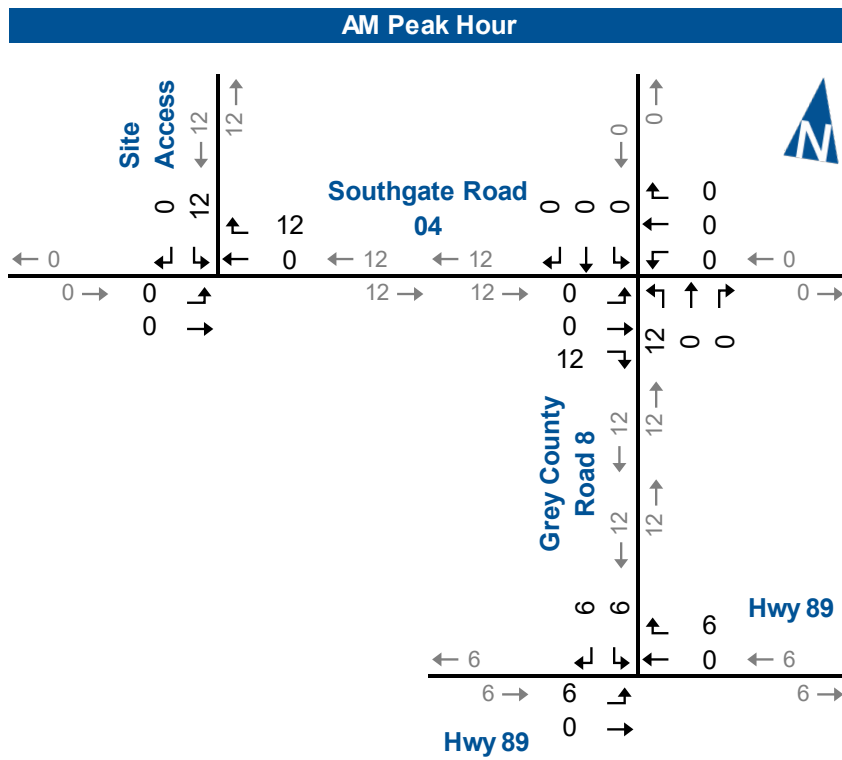


- ▶ A trip of the loaded truck from the proposed pit destined to Highway 89; and
- ▶ A return trip of the unloaded trucks to the proposed pit

Hence, the trips were evenly split between inbound and outbound trips.

**Figure 3.3** illustrates the site traffic volumes during the AM and PM peak hours.





## Site Generated Traffic Volumes

## 4 Evaluation of Future Traffic Conditions

The assessment of the future traffic conditions contained in this section includes the future traffic forecasts as well as the level of service analysis. A five-year horizon (2027) following the anticipated build-out of the subject site has been assessed to determine the impact of the subject site.

### 4.1 2027 Background Horizon

#### 4.1.1 2027 Background Traffic Growth

The 2027 background traffic volumes reflect an annual growth rate of 2.0% per annum applied to the existing volumes.

No other background developments were identified by the Township for inclusion in the background traffic volumes. It is assumed that the generalized growth rate would capture the traffic generated by any other development.

**Figure 4.1** illustrates the 2027 forecast background traffic volumes for the weekday AM and PM peak hours.

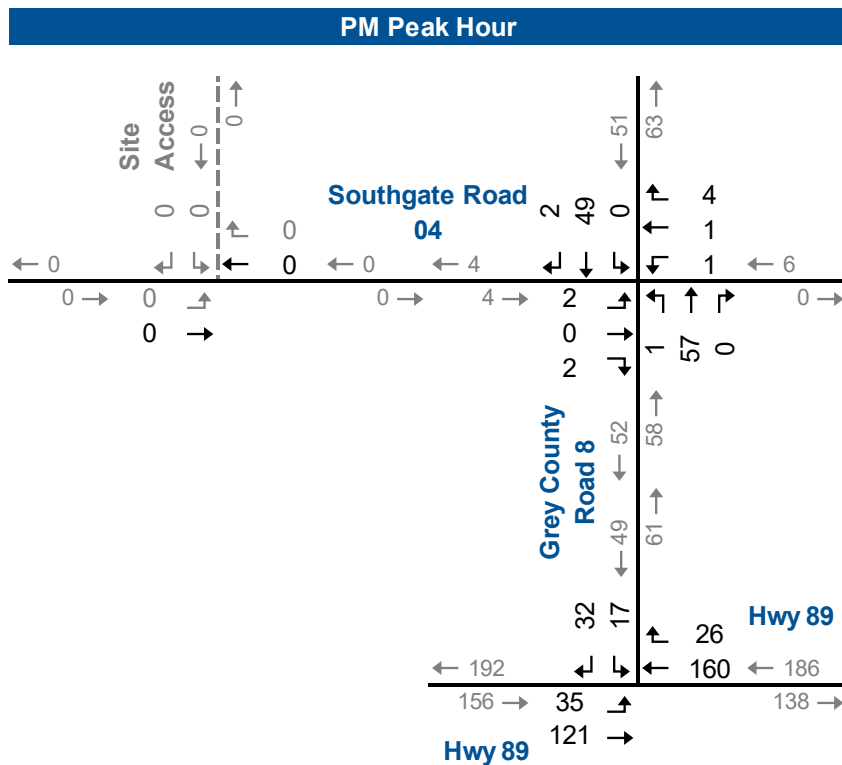
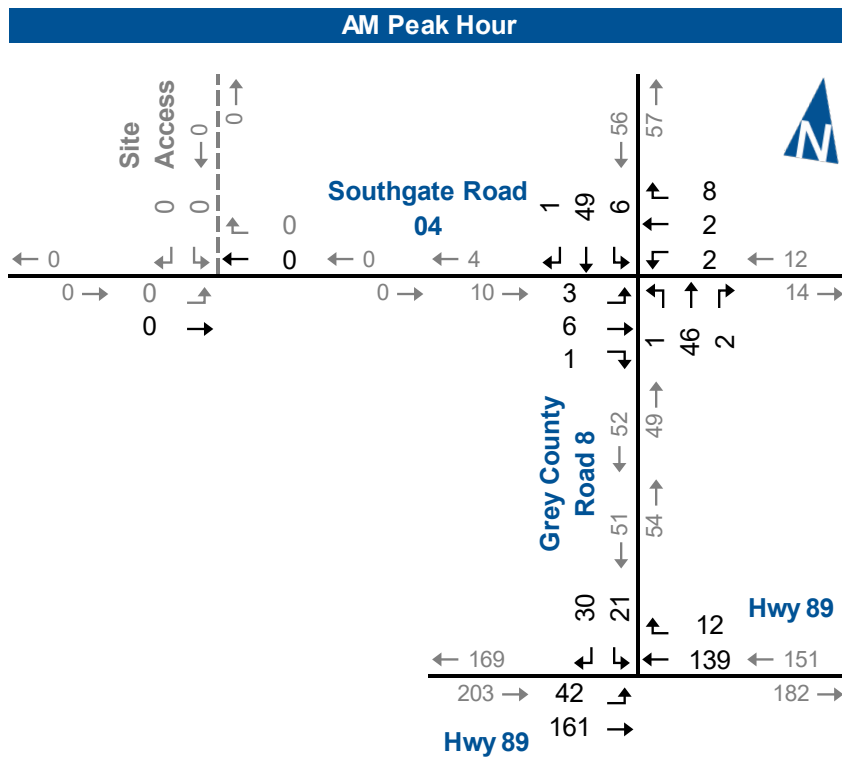
#### 4.1.2 2027 Background Traffic Operations

The operations at the study area intersections for the forecast background traffic scenario followed the same methodology used for the existing traffic conditions. **Table 4.1** details the level of service conditions.

The study area intersections are forecast to operate with acceptable levels of service with no critical movements during the weekday AM and PM peak hours.

**Appendix D** contains the supporting detailed Synchro 10 reports.





## 2027 Background Traffic Volumes



**TABLE 4.1: 2027 BACKGROUND OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Highway 89 & Grey Road 8	TWSC	LOS Delay V/C Q	A 8 0.04 1	A 0 0.00 0	> > > >	A 2	< < < <	A 0 0.00 0	A 0 0.00 0	A 0	> > > >	A 0	A A A A	A A A A	A A A A	A A A A	B 11 0.10 2	> > > >	B 11
	Grey Road 8 & Southgate Road 04	TWSC	LOS Delay V/C Q	< < < <	A 10 0.02 1	> > > >	A 10	< < < <	A 9 0.02 1	> > > >	A 9	> > > >	A 0	A 7 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 7 0.01 0	A 0 0.00 0	A 0 0.00 0
PM Peak Hour	Highway 89 & Grey Road 8	TWSC	LOS Delay V/C Q	A 8 0.03 1	A 0 0.00 0	> > > >	A 2	< < < <	A 0 0.00 0	A 0 0.00 0	A 0	> > > >	A 0	A A A A	A A A A	A A A A	A A A A	B 10 0.07 2	> > > >	B 10
	Grey Road 8 & Southgate Road 04	TWSC	LOS Delay V/C Q	< < < <	A 9 0.01 0	> > > >	A 9	< < < <	A 9 0.01 0	> > > >	A 9	> > > >	A 0	A 7 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 TWSC - Two-Way Stop Control  
 </> - Shared with through movement



## 4.2 2027 Total Traffic Horizon

### 4.2.1 2027 Total Traffic Volumes

**Figure 4.2** illustrates the forecast 2027 total (background + site traffic) traffic volumes.

### 4.2.2 2027 Total Traffic Operations

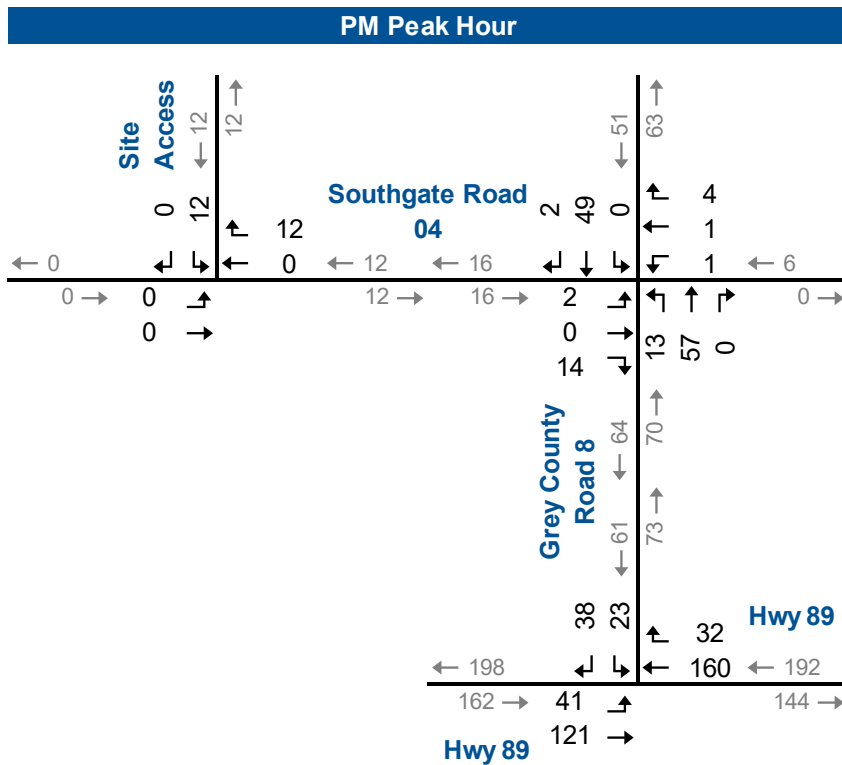
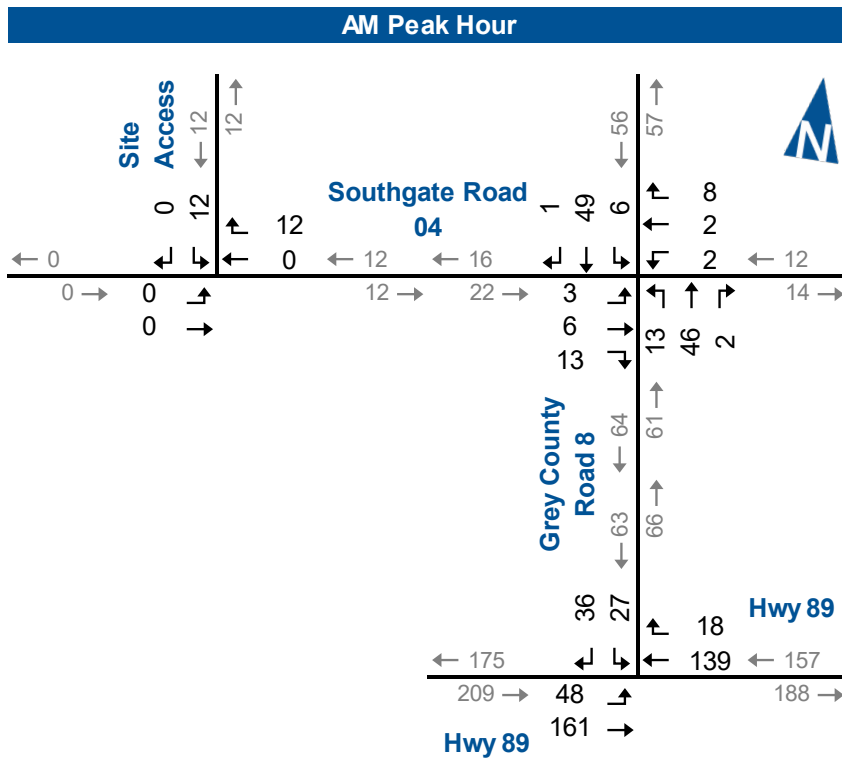
The study area intersection operations analysis for the future total traffic scenario followed the same methodology used for the existing and background traffic conditions. **Table 4.2** details the level of service conditions.

The study area intersections are forecast to operate with acceptable levels of service with no critical movements during the weekday AM and PM peak hours.

With the addition of the site generated traffic volumes, the overall intersection delays at the study area intersections increase by one second or less during the AM and PM peak hours.

**Appendix E** contains the supporting detailed Synchro 10 reports.





## 2027 Total Traffic Volumes



## 5 Remedial Measures

### 5.1 Left-Turn Lanes

The intersections of Highway 89 at Grey Road 8 and Grey Road 8 at Southgate Road 04 were assessed to determine if the projected traffic volumes warrant installation of left-turn lanes. The intersection of Southgate Road 04 at the site driveway was not evaluated because a potential left turn lane at that intersection would not be serving any trucks traveling along the haul route. The gravel pit traffic is also very low therefore, it is not anticipated that any capacity issue would arise without a left-turn lane. The warrants for left-turn lanes follow the requirements in the Ministry of Transportation's (MTO) Geometric Design Standards<sup>3</sup>. A design speed of 100 km/h (20 km/h over the posted limit) was used for Highway 89 and Grey Road 8.

The percentages of left-turning vehicles in the approaching volume were rounded to the nearest 5%, as nomographs are only provided for 5% increments. This apparent requirement is due to the nature of the warrant procedure that assumes a minimum of 5% of left turning vehicles in the advancing volume. Therefore, left-turn lanes are automatically not warranted for any left turning volume less than 5%.

**Table 5.1** summarizes the left-turn lane warrant for the intersections of Highway 89 at Grey Road 8 and Grey Road 8 at Southgate Road 04. The warrant analysis suggests that an eastbound left-turn lane at Highway 89 and Grey Road 8 and a northbound left-turn lane at Grey Road 8 and Southgate Road 04 are not warranted.

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<sup>3</sup> Design Supplement for TAC Geometric Design Guide for Canadian Roads, Ministry of Transportation Ontario, June 2017



**TABLE 5.1: LEFT-TURN LANE WARRANT SUMMARY – HIGHWAY 89 AND GREY ROAD 8**

Roadway	Highway 89		Grey Road 8	
Intersection	Grey Road 8		Southgate Road 04	
Approach Direction	Eastbound		Northbound	
Design Speed	100 km/h		100 km/h	
Horizon	Total 2027		Total 2027	
Peak Hour	AM	PM	AM	PM
Advancing Volume	209	162	61	70
Opposing Volume	157	192	56	51
Left Turning Traffic	48	41	13	13
% of Left Turning Traffic	23%	25%	21%	19%
Figure Used*	9A-24	9A-24	9A-23	9A-23
Warranted	No	No	No	No
Storage Length Required	-	-	-	-

\*Based on MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads - June 2017

**Appendix F** contains the left-turn lane warrant nomographs.

No changes to the existing lane geometrics are recommended at this time.



## 6 Conclusions and Recommendations

### 6.1 Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** The study area intersections are currently operating within acceptable levels of service and no critical movements during the AM and PM peak hours.
- ▶ **Trip Generation:** the gravel pit is forecast to generate approximately 12 inbound and 12 outbound truck trips during the AM and PM peak hours.
- ▶ **2027 Background Traffic Conditions:** the study area intersections are forecast to operate within acceptable levels of service with no specific problem movements during the AM and PM peak hours.
- ▶ **2027 Total Traffic Conditions:** the study area intersections are forecast to operate within acceptable levels of service with no specific problem movements during the AM and PM peak hours:
- ▶ The addition of the site generated traffic increases the overall delay at the study area intersections by one second or less during the AM and PM peak hours.
- ▶ **Remedial Measures:** Left-turn lanes are not warranted at the intersections of Highway 89 at Grey Road 8 and Grey Road 8 at Southgate Road 04.

### 6.2 Recommendations

Based on the findings of this study, it is recommended that the development be approved with no requirement for off-site transportation improvements.





# Appendix A

## Pre-Study Consultation



---

**From:** Jim Ellis <jellis@southgate.ca>

**Sent:** February 11, 2022 2:28 PM

**To:** Andrew Evans <aevans@ptsl.com>; Lisa Wilson <lwilson@southgate.ca>

**Cc:** Erica Bayley <ebayley@ptsl.com>

**Subject:** RE: (220034) Gravel Pit, Southgate Part Lot 31, Southgate Road 04 - Transportation Study Scope of Work

Good afternoon

The Southgate Road 04 road sections ID # 136 is surface treatment. The 2019 Roads Management Study had a Field Condition Rating of 6, Comfort rating of 7 and PCI of 64.26.

There are no > 3m bridge structures on this section, however the No 10 Municipal drainage works road cross culverts will need accessed with increased heavy truck traffic.

Staff will be monitoring this road section during spring thaw for break up and further investigation into conditions.

Please see response below in red

Please contact me for any inquiries

Regards

jim

***Jim Ellis, CRS S***

Public Works Manager

[jellis@southgate.ca](mailto:jellis@southgate.ca)



**Township of Southgate**

185667 Grey Road 9

RR #1  
Dundalk, ON N0C 1B0  
1-888-560-6607 x 250  
Fax 519-923-9262



---

**From:** Andrew Evans <[aevans@ptsl.com](mailto:aevans@ptsl.com)>  
**Sent:** February 10, 2022 9:08 AM  
**To:** Jim Ellis <[jellis@southgate.ca](mailto:jellis@southgate.ca)>; Lisa Wilson <[lwilson@southgate.ca](mailto:lwilson@southgate.ca)>  
**Cc:** Erica Bayley <[ebayley@ptsl.com](mailto:ebayley@ptsl.com)>  
**Subject:** (220034) Gravel Pit, Southgate Part Lot 31, Southgate Road 04 - Transportation Study Scope of Work

Greetings,

Paradigm Transportation Solutions Limited is preparing the Transportation Impact Assessment for a proposed gravel pit in the Township of Southgate, ON. Below is a brief description of the concept and our proposed terms of reference for the TIS.

Please review and provide comment at your earliest convenience.

### **SITE DESCRIPTION**

The subject site is located on the north side of Southgate Road 04, between Southgate Township 19 Sideroad and Grey Road 8. The property owner is proposing to operate the site with an annual tonnage of 100,000 tonnes. **The concept plan is attached.**

Vehicle access is proposed via the existing access onto Southgate Road 04. The proposed haulage route is east on Southgate Road 04 to Grey Road 8, then primarily south on Grey Road 8 to Highway 89.

### **PROPOSED TERMS OF REFERENCE**

Study Area Intersections:

- Existing access connection to Southgate Road 04 (unsignalized);
- Southgate Road 04 & Grey Road 8 (unsignalized); and
- Grey Road 8 and Highway 89 (unsignalized).

Horizon Year

- Five-years from the date the study is commissioned (Year 2027).

Analysis Periods:

- Weekday AM peak hour
- Weekday PM peak hour

Existing Data:

- Existing 8-hour TMC data for the above noted intersections.
- \*\*\*Please advise if we can undertake the turning movement counts now as restrictions are starting to lift.\*\*\*

Analysis

- Synchro 10, HCM 2000 analysis

#### Background Traffic

- Generalized growth rate. **To be identified by Township Southgate Planner**
- Active Development Applications. **To be identified by Township Southgate Planner**

#### Future Road Improvements

- **To be identified by Township No immediate improvements forecasted**

#### Trip Generation

- Vehicle trips generated by the proposed development will be forecast based on the annual tonnage for pit and anticipated daily tonnage.

#### Site Traffic Distribution

- Proposed haulage route

#### Report

- We will document the study methodologies, findings, and conclusions in a report with appendices containing the detailed analysis results and any data collected.

Please let us know your comments on the study.

Thank you and regards.

**Andrew Evans, M.Sc.**

*Transportation Planner*



#### **Paradigm Transportation Solutions Limited**

5A-150 Pinebush Road Cambridge ON N1R 8J8

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# Appendix B

## Traffic Data





Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@pts.com

Count Name: Grey County Road 8 & Soutgate  
Township Road 04  
Site Code: 220034  
Start Date: 03/09/2022  
Page No: 1

### Turning Movement Data

Start Time	Southgate Township Road 04 Eastbound						Southgate Township Road 04 Westbound						Grey County Road 8 Northbound						Grey County Road 8 Southbound						Int. Total	
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total		
7:00 AM	1	0	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0	5	0	6	0	0	0	6	12
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	9	0	2	0	0	0	2	11
7:30 AM	1	0	0	0	0	1	0	0	0	0	0	0	2	9	0	0	0	0	11	0	6	0	0	0	6	18
7:45 AM	1	1	1	0	0	3	0	0	1	0	0	1	0	5	0	0	0	0	5	0	7	0	0	0	7	16
Hourly Total	3	1	1	0	0	5	0	0	1	0	0	1	2	28	0	0	0	0	30	0	21	0	0	0	21	57
8:00 AM	0	1	0	0	0	1	0	0	1	0	0	1	0	12	1	0	0	0	13	1	8	1	0	0	10	25
8:15 AM	1	0	0	0	0	1	1	0	0	0	0	1	1	7	0	0	0	0	8	1	10	0	0	0	11	21
8:30 AM	1	1	0	0	0	2	1	2	1	0	0	4	0	12	1	0	0	0	13	1	11	0	0	0	12	31
8:45 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	5	1	0	0	0	6	0	7	0	0	0	7	14
Hourly Total	2	3	0	0	0	5	2	2	2	0	0	6	1	36	3	0	0	0	40	3	36	1	0	0	40	91
9:00 AM	0	0	1	0	0	1	1	0	0	0	0	1	0	5	2	0	0	0	7	0	7	1	0	0	8	17
9:15 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	11	1	0	0	0	12	0	6	0	0	0	6	19
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	1	6	2	5	2	0	0	9	15
9:45 AM	0	0	0	0	0	0	2	0	0	0	0	2	0	7	0	0	0	1	7	0	8	0	0	0	8	17
Hourly Total	0	0	2	0	0	2	3	0	0	0	0	3	0	29	3	0	0	2	32	2	26	3	0	0	31	68
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	1	0	1	0	0	2	0	0	0	0	0	0	0	4	0	0	0	0	4	0	5	0	0	0	5	11
11:45 AM	1	0	1	0	0	2	1	0	0	0	0	1	0	6	0	0	0	0	6	0	11	1	0	0	12	21
Hourly Total	2	0	2	0	0	4	1	0	0	0	0	1	0	10	0	0	0	0	10	0	16	1	0	0	17	32
12:00 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	6	1	0	0	0	7	0	5	0	0	0	5	13
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	1	2	0	0	0	3	6
12:30 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	4	1	0	0	0	5	0	8	0	0	0	8	14
12:45 PM	1	0	1	0	0	2	0	0	1	0	0	1	0	9	0	0	0	0	9	0	6	1	0	0	7	19
Hourly Total	1	0	1	0	0	2	0	1	2	0	0	3	0	22	2	0	0	0	24	1	21	1	0	0	23	52
1:00 PM	1	0	0	0	0	1	0	0	0	0	0	0	1	4	0	0	0	0	5	0	5	0	0	0	5	11
1:15 PM	0	1	0	0	0	1	1	0	0	0	0	1	0	8	2	0	0	0	10	0	8	1	0	0	9	21
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	1	0	0	0	2	1	0	0	0	0	1	1	12	2	0	0	0	15	0	13	1	0	0	14	32
3:00 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	9	0	0	0	0	9	1	15	1	0	0	17	27
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	13	0	0	0	0	14	0	6	0	0	0	6	20
3:30 PM	0	0	0	0	0	0	2	0	1	0	0	3	0	5	0	0	0	0	5	2	9	0	0	0	11	19
3:45 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	14	1	0	0	0	15	1	9	0	0	0	10	26
Hourly Total	0	0	0	0	0	0	4	0	1	0	0	5	1	41	1	0	0	0	43	4	39	1	0	0	44	92
4:00 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	8	0	0	0	0	8	0	14	1	0	0	15	24
4:15 PM	0	0	1	0	0	1	0	0	0	0	0	0	1	8	0	0	0	0	9	0	8	1	0	0	9	19









Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Grey County Road 8 & Soutgate  
Township Road 04  
Site Code: 220034  
Start Date: 03/09/2022  
Page No: 4

### Turning Movement Peak Hour Data (7:45 AM)

Start Time	Southgate Township Road 04 Eastbound						Southgate Township Road 04 Westbound						Grey County Road 8 Northbound						Grey County Road 8 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:45 AM	1	1	1	0	0	3	0	0	1	0	0	1	0	5	0	0	0	5	0	7	0	0	0	7	16
8:00 AM	0	1	0	0	0	1	0	0	1	0	0	1	0	12	1	0	0	13	1	8	1	0	0	10	25
8:15 AM	1	0	0	0	0	1	1	0	0	0	0	1	1	7	0	0	0	8	1	10	0	0	0	11	21
8:30 AM	1	1	0	0	0	2	1	2	1	0	0	4	0	12	1	0	0	13	1	11	0	0	0	12	31
Total	3	3	1	0	0	7	2	2	3	0	0	7	1	36	2	0	0	39	3	36	1	0	0	40	93
Approach %	42.9	42.9	14.3	0.0	-	-	28.6	28.6	42.9	0.0	-	-	2.6	92.3	5.1	0.0	-	-	7.5	90.0	2.5	0.0	-	-	-
Total %	3.2	3.2	1.1	0.0	-	7.5	2.2	2.2	3.2	0.0	-	7.5	1.1	38.7	2.2	0.0	-	41.9	3.2	38.7	1.1	0.0	-	43.0	-
PHF	0.750	0.750	0.250	0.000	-	0.583	0.500	0.250	0.750	0.000	-	0.438	0.250	0.750	0.500	0.000	-	0.750	0.750	0.818	0.250	0.000	-	0.833	0.750
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	3	2	1	0	-	6	2	2	1	0	-	5	1	33	2	0	-	36	2	32	1	0	-	35	82
% Cars & Light Goods	100.0	66.7	100.0	-	-	85.7	100.0	100.0	33.3	-	-	71.4	100.0	91.7	100.0	-	-	92.3	66.7	88.9	100.0	-	-	87.5	88.2
Buses	0	1	0	0	-	1	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Buses	0.0	33.3	0.0	-	-	14.3	0.0	0.0	33.3	-	-	14.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	2.2
Single-Unit Trucks	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	1	0	0	0	-	1	3
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	33.3	-	-	14.3	0.0	2.8	0.0	-	-	2.6	33.3	0.0	0.0	-	-	2.5	3.2
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	4	0	0	-	4	6
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	5.6	0.0	-	-	5.1	0.0	11.1	0.0	-	-	10.0	6.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-









Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Grey County Road 8 & Soutgate  
Township Road 04  
Site Code: 220034  
Start Date: 03/09/2022  
Page No: 8

### Turning Movement Peak Hour Data (5:00 PM)

Start Time	Southgate Township Road 04 Eastbound						Southgate Township Road 04 Westbound						Grey County Road 8 Northbound						Grey County Road 8 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	1	0	1	0	0	2	1	0	3	0	0	4	0	9	0	0	0	9	0	5	1	0	0	6	21
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	14	0	15	1	0	0	16	30
5:30 PM	0	0	0	0	0	0	0	1	1	0	0	2	1	13	0	0	0	14	0	10	0	0	0	10	26
5:45 PM	1	0	1	0	0	2	0	0	0	0	0	0	0	14	0	0	0	14	0	8	0	0	0	8	24
<b>Total</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>50</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>51</b>	<b>0</b>	<b>38</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>101</b>
Approach %	50.0	0.0	50.0	0.0	-	-	16.7	16.7	66.7	0.0	-	-	2.0	98.0	0.0	0.0	-	-	0.0	95.0	5.0	0.0	-	-	-
Total %	2.0	0.0	2.0	0.0	-	4.0	1.0	1.0	4.0	0.0	-	5.9	1.0	49.5	0.0	0.0	-	50.5	0.0	37.6	2.0	0.0	-	39.6	-
PHF	0.500	0.000	0.500	0.000	-	0.500	0.250	0.250	0.333	0.000	-	0.375	0.250	0.893	0.000	0.000	-	0.911	0.000	0.633	0.500	0.000	-	0.625	0.842
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	2	0	2	0	-	4	1	1	4	0	-	6	1	49	0	0	-	50	0	35	2	0	-	37	97
% Cars & Light Goods	100.0	-	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	98.0	-	-	-	98.0	-	92.1	100.0	-	-	92.5	96.0
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	3
% Single-Unit Trucks	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	-	7.9	0.0	-	-	7.5	3.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	2.0	-	-	-	2.0	-	0.0	0.0	-	-	0.0	1.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Highway 89 & Grey County Road  
8  
Site Code: 220034  
Start Date: 03/09/2022  
Page No: 1

### Turning Movement Data

Start Time	Highway 89 Eastbound					Highway 89 Westbound					Grey County Road 8 Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:00 AM	4	19	0	0	23	11	1	0	0	12	2	5	0	0	7	42
7:15 AM	7	32	0	0	39	14	2	0	0	16	0	2	0	0	2	57
7:30 AM	8	23	0	0	31	12	3	0	0	15	2	5	0	0	7	53
7:45 AM	4	30	0	0	34	22	2	0	0	24	5	2	0	0	7	65
Hourly Total	23	104	0	0	127	59	8	0	0	67	9	14	0	0	23	217
8:00 AM	9	23	0	0	32	23	3	0	0	26	4	4	0	0	8	66
8:15 AM	6	22	0	0	28	18	1	0	0	19	4	6	0	0	10	57
8:30 AM	11	23	0	0	34	29	5	0	0	34	8	5	0	0	13	81
8:45 AM	3	23	0	0	26	10	2	0	0	12	3	5	0	0	8	46
Hourly Total	29	91	0	0	120	80	11	0	0	91	19	20	0	0	39	250
9:00 AM	7	14	0	0	21	21	0	0	0	21	5	3	0	0	8	50
9:15 AM	10	24	0	0	34	17	3	0	0	20	1	5	0	0	6	60
9:30 AM	7	17	0	0	24	23	0	0	0	23	2	6	0	0	8	55
9:45 AM	6	23	0	0	29	17	1	0	0	18	2	7	0	0	9	56
Hourly Total	30	78	0	0	108	78	4	0	0	82	10	21	0	0	31	221
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	2	23	0	0	25	16	2	0	0	18	2	4	0	0	6	49
11:45 AM	5	21	0	0	26	18	3	0	0	21	4	8	0	0	12	59
Hourly Total	7	44	0	0	51	34	5	0	0	39	6	12	0	0	18	108
12:00 PM	3	17	0	0	20	16	1	0	0	17	4	1	0	0	5	42
12:15 PM	3	16	0	0	19	19	0	0	0	19	0	2	0	0	2	40
12:30 PM	4	23	0	0	27	16	4	0	0	20	3	6	0	0	9	56
12:45 PM	8	12	0	0	20	21	2	0	0	23	5	3	0	0	8	51
Hourly Total	18	68	0	0	86	72	7	0	0	79	12	12	0	0	24	189
1:00 PM	0	10	0	0	10	16	5	0	0	21	4	1	0	0	5	36
1:15 PM	7	24	0	0	31	22	2	0	0	24	4	5	0	0	9	64
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	7	34	0	0	41	38	7	0	0	45	8	6	0	0	14	100
3:00 PM	6	31	0	0	37	24	1	0	0	25	6	13	0	0	19	81
3:15 PM	9	18	0	0	27	28	7	0	0	35	2	4	0	0	6	68
3:30 PM	2	24	0	0	26	32	2	0	0	34	4	7	0	0	11	71
3:45 PM	6	21	0	0	27	32	8	0	0	40	3	6	0	0	9	76
Hourly Total	23	94	0	0	117	116	18	0	0	134	15	30	0	0	45	296
4:00 PM	4	22	0	0	26	25	6	0	0	31	4	10	0	0	14	71
4:15 PM	6	29	0	0	35	28	3	0	0	31	2	8	0	0	10	76
4:30 PM	6	23	0	0	29	25	4	0	0	29	6	10	0	0	16	74



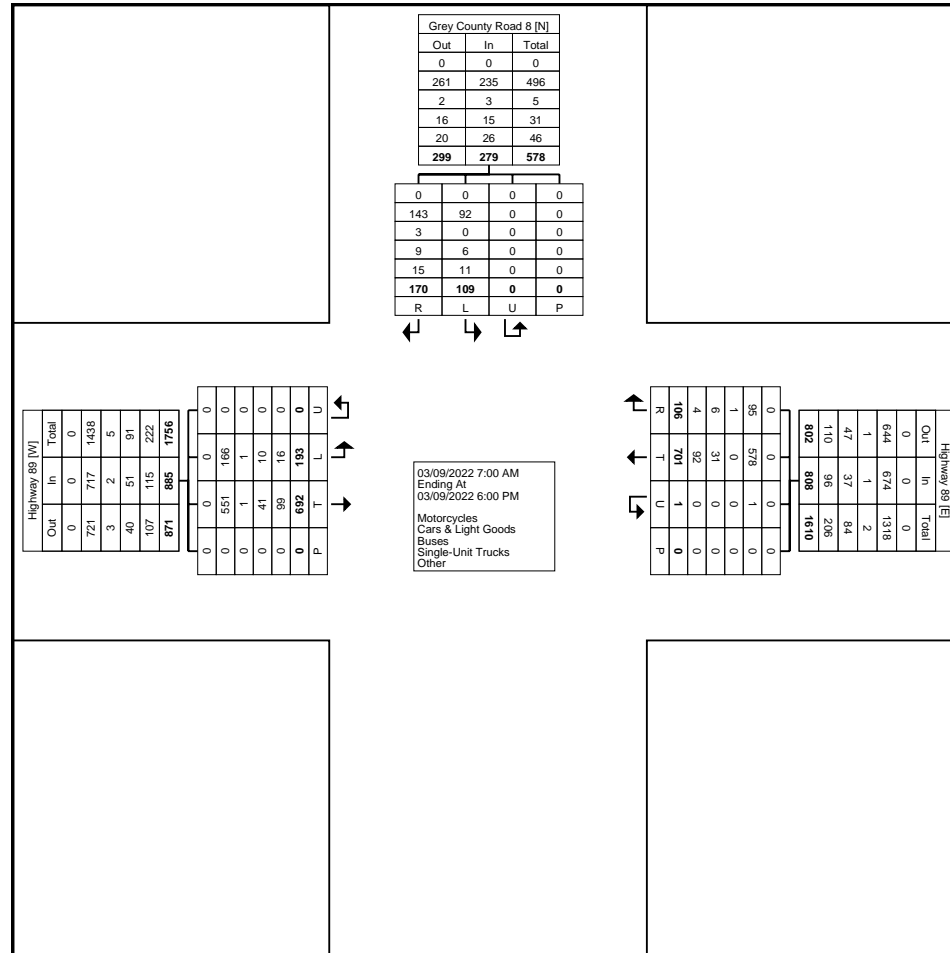




Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@pts1.com

Count Name: Highway 89 & Grey County Road 8  
8  
Site Code: 220034  
Start Date: 03/09/2022  
Page No: 3



Turning Movement Data Plot

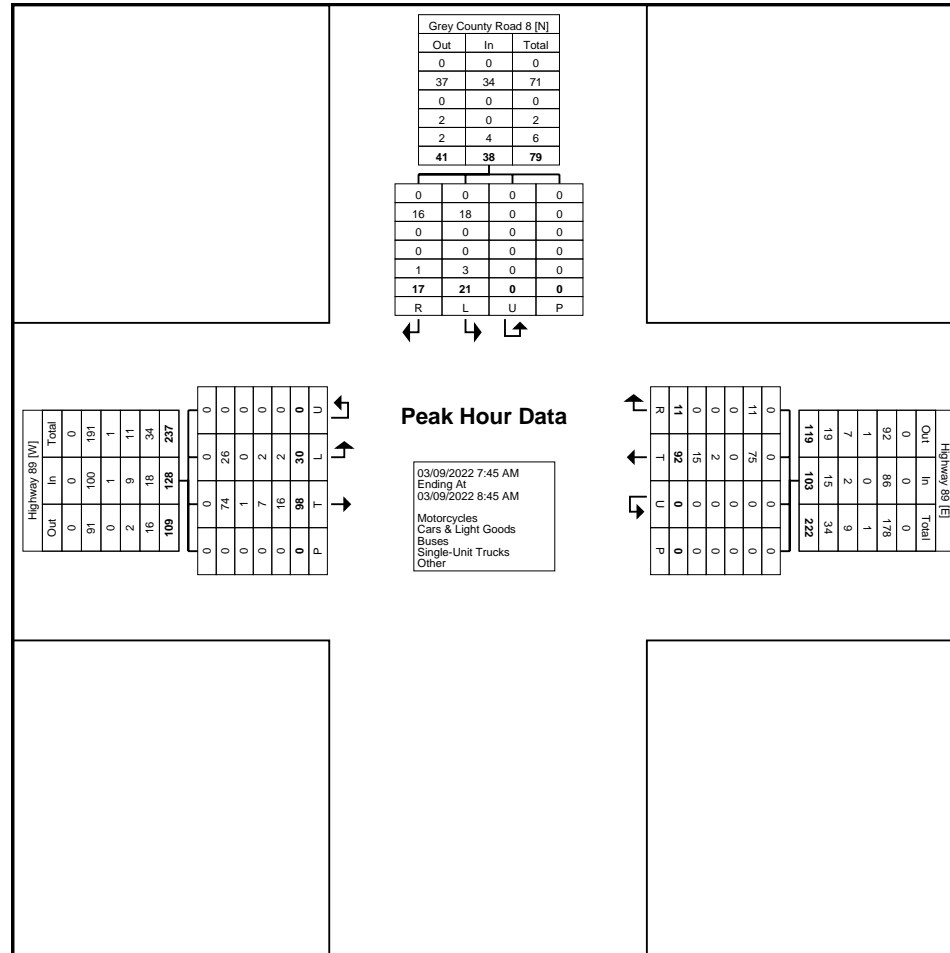




Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@pts.com

Count Name: Highway 89 & Grey County Road  
8  
Site Code: 220034  
Start Date: 03/09/2022  
Page No: 5



Turning Movement Peak Hour Data Plot (7:45 AM)

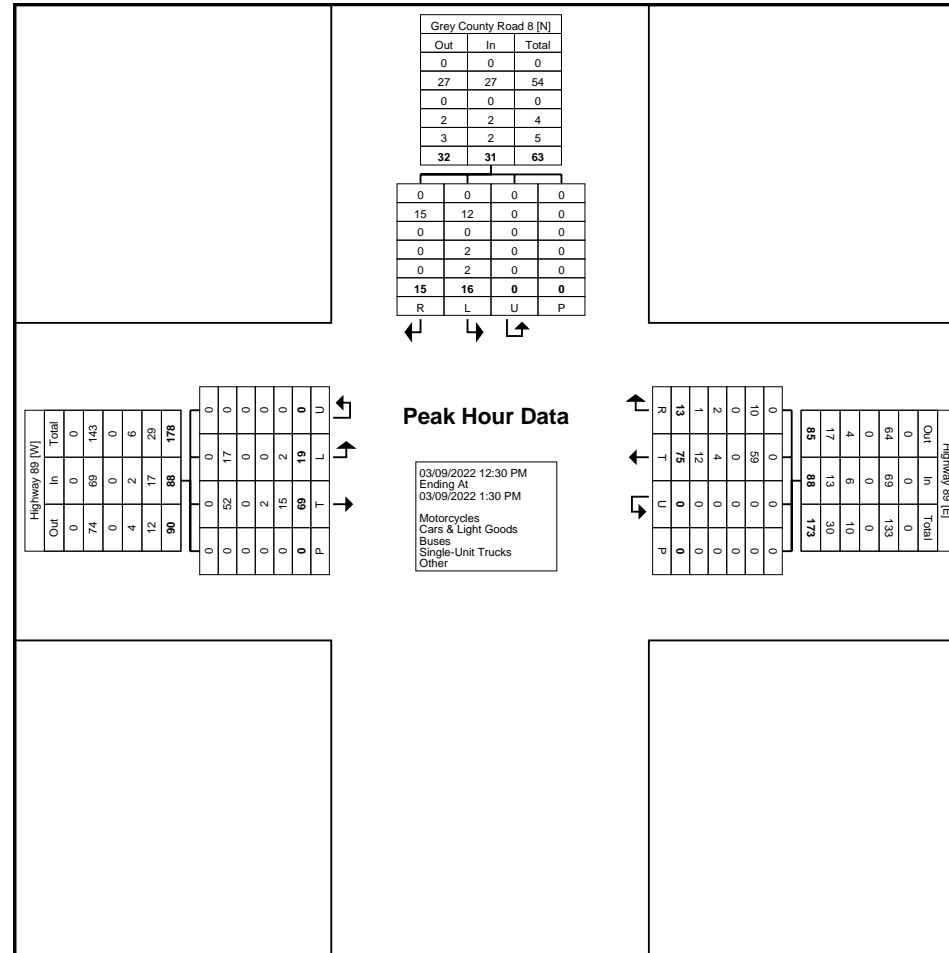




Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsll.com

Count Name: Highway 89 & Grey County Road  
8  
Site Code: 220034  
Start Date: 03/09/2022  
Page No: 7



Turning Movement Peak Hour Data Plot (12:30 PM)





# Appendix C

## Base Year Operation Reports





Lanes, Volumes, Timings  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2022 Base Year AM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	38	146	126	11	27	19
Future Volume (vph)	38	146	126	11	27	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.989		0.945		
Flt Protected		0.990		0.971		
Satd. Flow (prot)	0	1881	1879	0	1743	0
Flt Permitted		0.990		0.971		
Satd. Flow (perm)	0	1881	1879	0	1743	0
Link Speed (k/h)		80		80		
Link Distance (m)		427.8		2036.0		
Travel Time (s)		19.3		91.6		
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	46	176	152	13	33	23
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	222	165	0	56	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.4%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2022 Base Year AM

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	38	146	126	11	27	19
Future Vol, veh/h	38	146	126	11	27	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	46	176	152	13	33	23

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	165	0	427
Stage 1	-	-	159
Stage 2	-	-	268
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1426	-	588
Stage 1	-	-	875
Stage 2	-	-	782
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1426	-	567
Mov Cap-2 Maneuver	-	-	567
Stage 1	-	-	844
Stage 2	-	-	782

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1426	-	-	-	667
HCM Lane V/C Ratio	0.032	-	-	-	0.083
HCM Control Delay (s)	7.6	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2022 Base Year AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	3	5	1	2	2	7	1	42	2	5	44	1
Future Volume (vph)	3	5	1	2	2	7	1	42	2	5	44	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989			0.919			0.993			0.998		
Flt Protected	0.984			0.990			0.999			0.995		
Satd. Flow (prot)	0	1849	0	0	1729	0	0	1885	0	0	1887	0
Flt Permitted	0.984			0.990			0.999			0.995		
Satd. Flow (perm)	0	1849	0	0	1729	0	0	1885	0	0	1887	0
Link Speed (k/h)	80			80			80			80		
Link Distance (m)	2545.2			405.3			2036.0			221.1		
Travel Time (s)	114.5			18.2			91.6			9.9		
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	7	1	3	3	9	1	56	3	7	59	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	15	0	0	60	0	0	67	0
Sign Control	Stop		Stop		Free		Free		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	15.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2022 Base Year AM

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	3	5	1	2	2	7	1	42	2	5	44	1
Future Vol, veh/h	3	5	1	2	2	7	1	42	2	5	44	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	7	1	3	3	9	1	56	3	7	59	1

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	140	135	60	138
Stage 1	74	74	-	60
Stage 2	66	61	-	78
Critical Hdwy	7.1	6.5	6.2	7.1
Critical Hdwy Stg 1	6.1	5.5	-	6.1
Critical Hdwy Stg 2	6.1	5.5	-	6.1
Follow-up Hdwy	3.5	4	3.3	3.5
Pot Cap-1 Maneuver	835	760	1011	837
Stage 1	940	837	-	957
Stage 2	950	848	-	936
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	822	755	1011	826
Mov Cap-2 Maneuver	822	755	-	826
Stage 1	939	833	-	956
Stage 2	937	847	-	923

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	9	0.2	0.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1556	-	-	799	919	1558	-	-
HCM Lane V/C Ratio	0.001	-	-	0.015	0.016	0.004	-	-
HCM Control Delay (s)	7.3	0	-	9.6	9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

Lanes, Volumes, Timings  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2022 Base Year PM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	32	110	145	24	15	29
Future Volume (vph)	32	110	145	24	15	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction		0.980		0.911		
Fit Protected		0.989		0.983		
Satd. Flow (prot)	0	1879	1862	0	1701	0
Fit Permitted		0.989		0.983		
Satd. Flow (perm)	0	1879	1862	0	1701	0
Link Speed (k/h)		80		80		
Link Distance (m)		427.8		2036.0		
Travel Time (s)		19.3		91.6		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	34	117	154	26	16	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	151	180	0	47	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2022 Base Year PM

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	32	110	145	24	15	29
Future Vol, veh/h	32	110	145	24	15	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	34	117	154	26	16	31

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	180	0	352
Stage 1	-	-	167
Stage 2	-	-	185
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1408	-	650
Stage 1	-	-	867
Stage 2	-	-	852
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1408	-	633
Mov Cap-2 Maneuver	-	-	633
Stage 1	-	-	844
Stage 2	-	-	852

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1408	-	-	-	778
HCM Lane V/C Ratio	0.024	-	-	-	0.06
HCM Control Delay (s)	7.6	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Lanes, Volumes, Timings  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2022 Base Year PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	2	0	2	1	1	4	1	52	0	0	44	2
Future Volume (vph)	2	0	2	1	1	4	1	52	0	0	44	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction	0.932			0.904			0.999			0.995		
Fit Protected	0.976			0.993			0.999			0.999		
Satd. Flow (prot)	0	1728	0	0	1706	0	0	1898	0	0	1890	0
Fit Permitted	0.976			0.993			0.999			0.999		
Satd. Flow (perm)	0	1728	0	0	1706	0	0	1898	0	0	1890	0
Link Speed (k/h)	80			80			80			80		
Link Distance (m)	2545.2			405.3			2036.0			221.1		
Travel Time (s)	114.5			18.2			91.6			9.9		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	2	0	2	1	1	5	1	62	0	0	52	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	7	0	0	63	0	0	54	0
Sign Control	Stop		Stop		Free		Free		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.5%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2022 Base Year PM

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	2	0	2	1	1	4	1	52	0	0	44	2
Future Vol, veh/h	2	0	2	1	1	4	1	52	0	0	44	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	2	0	2	1	1	5	1	62	0	0	52	2

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	120	117	53	118
Stage 1	53	53	-	64
Stage 2	67	64	-	54
Critical Hdwy	7.1	6.5	6.2	7.1
Critical Hdwy Stg 1	6.1	5.5	-	6.1
Critical Hdwy Stg 2	6.1	5.5	-	6.1
Follow-up Hdwy	3.5	4	3.3	3.5
Pot Cap-1 Maneuver	860	777	1020	863
Stage 1	965	855	-	952
Stage 2	948	846	-	963
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	854	776	1020	860
Mov Cap-2 Maneuver	854	776	-	860
Stage 1	964	855	-	951
Stage 2	941	845	-	961

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	8.9	0.1	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1564	-	-	930	935	1554	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	0.008	-	-	-
HCM Control Delay (s)	7.3	0	-	8.9	8.9	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

# Appendix D

## 2027 Background Operation Reports



Lanes, Volumes, Timings  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2027 Background AM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	42	161	139	12	30	21
Future Volume (vph)	42	161	139	12	30	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction		0.990		0.945		
Fit Protected		0.990		0.971		
Satd. Flow (prot)	0	1881	1881	0	1743	0
Fit Permitted		0.990		0.971		
Satd. Flow (perm)	0	1881	1881	0	1743	0
Link Speed (k/h)		80		80		
Link Distance (m)		427.8		363.5		2036.0
Travel Time (s)		19.3		16.4		91.6
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	51	194	167	14	36	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	245	181	0	61	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2027 Background AM

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	42	161	139	12	30	21
Future Vol, veh/h	42	161	139	12	30	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	51	194	167	14	36	25

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	181	0	470
Stage 1	-	-	174
Stage 2	-	-	296
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1407	-	875
Stage 1	-	-	861
Stage 2	-	-	759
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1407	-	533
Mov Cap-2 Maneuver	-	-	533
Stage 1	-	-	826
Stage 2	-	-	759

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1407	-	-	-	635
HCM Lane V/C Ratio	0.036	-	-	-	0.097
HCM Control Delay (s)	7.7	0	-	-	11.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2027 Background AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	3	6	1	2	2	8	1	46	2	6	49	1
Future Volume (vph)	3	6	1	2	2	8	1	46	2	6	49	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.913			0.994			0.998	
Flt Protected		0.985			0.991			0.999			0.995	
Satd. Flow (prot)	0	1853	0	0	1719	0	0	1887	0	0	1887	0
Flt Permitted		0.985			0.991			0.999			0.995	
Satd. Flow (perm)	0	1853	0	0	1719	0	0	1887	0	0	1887	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		2545.2			405.3			2036.0			221.1	
Travel Time (s)		114.5			18.2			91.6			9.9	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	8	1	3	3	11	1	61	3	8	65	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	17	0	0	65	0	0	74	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	15.9%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2027 Background AM

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	3	6	1	2	2	8	1	46	2	6	49	1
Future Vol, veh/h	3	6	1	2	2	8	1	46	2	6	49	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	8	1	3	3	11	1	61	3	8	65	1

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	154	148	66	151
Stage 1	82	82	-	65
Stage 2	72	66	-	86
Critical Hdwy	7.1	6.5	6.2	7.1
Critical Hdwy Stg 1	6.1	5.5	-	6.1
Critical Hdwy Stg 2	6.1	5.5	-	6.1
Follow-up Hdwy	3.5	4	3.3	3.5
Pot Cap-1 Maneuver	817	747	1003	821
Stage 1	931	831	-	951
Stage 2	943	844	-	927
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	802	743	1003	810
Mov Cap-2 Maneuver	802	743	-	810
Stage 1	930	827	-	950
Stage 2	929	843	-	912

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9	0.1	0.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1549	-	-	780	916	1551	-	-
HCM Lane V/C Ratio	0.001	-	-	0.017	0.017	0.005	-	-
HCM Control Delay (s)	7.3	0	-	9.7	9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Lanes, Volumes, Timings  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2027 Background PM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	35	121	160	26	17	32
Future Volume (vph)	35	121	160	26	17	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction		0.981		0.912		
Fit Protected		0.989		0.983		
Satd. Flow (prot)	0	1879	1864	0	1703	0
Fit Permitted		0.989		0.983		
Satd. Flow (perm)	0	1879	1864	0	1703	0
Link Speed (k/h)		80		80		
Link Distance (m)		427.8		363.5		2036.0
Travel Time (s)		19.3		16.4		91.6
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	37	129	170	28	18	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	166	198	0	52	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	31.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2027 Background PM

Intersection							
Int Delay, s/veh	2						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		↕	↕		↕		
Traffic Vol, veh/h	35	121	160	26	17	32	
Future Vol, veh/h	35	121	160	26	17	32	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	94	94	94	94	94	94	
Heavy Vehicles, %	0	0	0	0	0	0	
Mvmt Flow	37	129	170	28	18	34	

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	198	0	0	387	184
Stage 1	-	-	-	184	-
Stage 2	-	-	-	203	-
Critical Hdwy	4.1	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	3.5	3.3
Pot Cap-1 Maneuver	1387	-	-	620	864
Stage 1	-	-	-	852	-
Stage 2	-	-	-	836	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1387	-	-	602	864
Mov Cap-2 Maneuver	-	-	-	602	-
Stage 1	-	-	-	827	-
Stage 2	-	-	-	836	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1387	-	-	-	751
HCM Lane V/C Ratio	0.027	-	-	-	0.069
HCM Control Delay (s)	7.7	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2



Lanes, Volumes, Timings  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2027 Background PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	2	0	2	1	1	4	1	57	0	0	49	2
Future Volume (vph)	2	0	2	1	1	4	1	57	0	0	49	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932			0.904			0.995					
Flt Protected	0.976			0.993			0.999					
Satd. Flow (prot)	0	1728	0	0	1706	0	0	1898	0	0	1890	0
Flt Permitted	0.976			0.993			0.999					
Satd. Flow (perm)	0	1728	0	0	1706	0	0	1898	0	0	1890	0
Link Speed (k/h)	80			80			80			80		
Link Distance (m)	2545.2			405.3			2036.0			221.1		
Travel Time (s)	114.5			18.2			91.6			9.9		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	2	0	2	1	1	5	1	68	0	0	58	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	0	0	7	0	0	69	0	0	60	0
Sign Control	Stop		Stop		Free		Free					

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.8%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2027 Background PM

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	2	0	2	1	1	4	1	57	0	0	49	2
Future Vol, veh/h	2	0	2	1	1	4	1	57	0	0	49	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	2	0	2	1	1	5	1	68	0	0	58	2

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	132	129	59	130
Stage 1	59	59	-	70
Stage 2	73	70	-	60
Critical Hdwy	7.1	6.5	6.2	7.1
Critical Hdwy Stg 1	6.1	5.5	-	6.1
Critical Hdwy Stg 2	6.1	5.5	-	6.1
Follow-up Hdwy	3.5	4	3.3	3.5
Pot Cap-1 Maneuver	845	765	1012	847
Stage 1	958	850	-	945
Stage 2	942	841	-	957
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	839	764	1012	844
Mov Cap-2 Maneuver	839	764	-	844
Stage 1	957	850	-	944
Stage 2	935	840	-	955

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.9	8.9	0.1	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1556	-	-	917	924	1546	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	0.008	-	-	-
HCM Control Delay (s)	7.3	0	-	8.9	8.9	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

# Appendix E

## 2027 Total Operation Reports



Lanes, Volumes, Timings  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2027 Total AM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	48	161	139	18	36	27
Future Volume (vph)	48	161	139	18	36	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.984		0.941	
Fit Protected		0.989			0.972	
Satd. Flow (prot)	0	1879	1870	0	1738	0
Fit Permitted		0.989			0.972	
Satd. Flow (perm)	0	1879	1870	0	1738	0
Link Speed (k/h)		80	80		80	
Link Distance (m)		427.8	363.5		2036.0	
Travel Time (s)		19.3	16.4		91.6	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	58	194	167	22	43	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	252	189	0	76	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2027 Total AM

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	48	161	139	18	36	27
Future Vol, veh/h	48	161	139	18	36	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	58	194	167	22	43	33

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	189	0	488
Stage 1	-	-	178
Stage 2	-	-	310
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1397	-	543
Stage 1	-	-	858
Stage 2	-	-	748
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1397	-	517
Mov Cap-2 Maneuver	-	-	517
Stage 1	-	-	818
Stage 2	-	-	748

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1397	-	-	-	626
HCM Lane V/C Ratio	0.041	-	-	-	0.121
HCM Control Delay (s)	7.7	0	-	-	11.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Lanes, Volumes, Timings  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2027 Total AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	3	6	13	2	2	8	13	46	2	6	49	1
Future Volume (vph)	3	6	13	2	2	8	13	46	2	6	49	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.921			0.913			0.995			0.998	
Flt Protected		0.993			0.991			0.990			0.995	
Satd. Flow (prot)	0	1738	0	0	1719	0	0	1872	0	0	1887	0
Flt Permitted		0.993			0.991			0.990			0.995	
Satd. Flow (perm)	0	1738	0	0	1719	0	0	1872	0	0	1887	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		2545.2			405.3			2036.0			221.1	
Travel Time (s)		114.5			18.2			91.6			9.9	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	8	17	3	3	11	17	61	3	8	65	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	29	0	0	17	0	0	81	0	0	74	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	15.7%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2027 Total AM

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	3	6	13	2	2	8	13	46	2	6	49	1
Future Vol, veh/h	3	6	13	2	2	8	13	46	2	6	49	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	8	17	3	3	11	17	61	3	8	65	1

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	186	180	66	191
Stage 1	82	82	-	97
Stage 2	104	98	-	94
Critical Hdwy	7.1	6.5	6.2	7.1
Critical Hdwy Stg 1	6.1	5.5	-	6.1
Critical Hdwy Stg 2	6.1	5.5	-	6.1
Follow-up Hdwy	3.5	4	3.3	3.5
Pot Cap-1 Maneuver	779	717	1003	773
Stage 1	931	831	-	914
Stage 2	907	818	-	918
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	760	706	1003	744
Mov Cap-2 Maneuver	760	706	-	744
Stage 1	921	827	-	904
Stage 2	885	809	-	889

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	9.1	1.6	0.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1549	-	-	866	891	1551	-	-
HCM Lane V/C Ratio	0.011	-	-	0.034	0.018	0.005	-	-
HCM Control Delay (s)	7.3	0	-	9.3	9.1	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Lanes, Volumes, Timings  
103: Southgate Road 04 & Site Driveway

Southgate Part Lot 31 TIS  
2027 Total AM

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	0	0	12	12	0
Future Volume (vph)	0	0	0	12	12	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>	0.865					
Fit Protected				0.950		
Satd. Flow (prot)	0	1900	1644	0	1805	0
Fit Permitted				0.950		
Satd. Flow (perm)	0	1900	1644	0	1805	0
Link Speed (k/h)	80		80		50	
Link Distance (m)	310.8		2545.2		98.0	
Travel Time (s)	14.0		114.5		7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	0	0	13	13	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	13	0	13	0
Sign Control	Free		Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC  
103: Southgate Road 04 & Site Driveway

Southgate Part Lot 31 TIS  
2027 Total AM

Intersection						
Int Delay, s/veh	4.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	0	0	0	12	12	0
Future Vol, veh/h	0	0	0	12	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	13	13	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	13	0	7
Stage 1	-	-	7
Stage 2	-	-	0
Critical Hdwy	4.1	-	6.2
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.3
Pot Cap-1 Maneuver	1619	-	1081
Stage 1	-	-	1021
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1619	-	1081
Mov Cap-2 Maneuver	-	-	1019
Stage 1	-	-	1021
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.6
HCM LOS	A		

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1619	-	-	-	1019
HCM Lane V/C Ratio	-	-	-	-	0.013
HCM Control Delay (s)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lanes, Volumes, Timings  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2027 Total PM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	41	121	160	32	23	38
Future Volume (vph)	41	121	160	32	23	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction		0.977		0.916		
Fit Protected		0.987		0.982		
Satd. Flow (prot)	0	1875	1856	0	1709	0
Fit Permitted		0.987		0.982		
Satd. Flow (perm)	0	1875	1856	0	1709	0
Link Speed (k/h)		80		80		
Link Distance (m)		427.8		363.5		2036.0
Travel Time (s)		19.3		16.4		91.6
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	44	129	170	34	24	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	173	204	0	64	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM 6th TWSC  
101: Highway 89 & Grey Road 8

Southgate Part Lot 31 TIS  
2027 Total PM

Intersection						
Int Delay, s/veh	2.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	41	121	160	32	23	38
Future Vol, veh/h	41	121	160	32	23	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	44	129	170	34	24	40

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	204	0	404
Stage 1	-	-	187
Stage 2	-	-	217
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1380	-	606
Stage 1	-	-	850
Stage 2	-	-	824
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1380	-	585
Mov Cap-2 Maneuver	-	-	585
Stage 1	-	-	821
Stage 2	-	-	824

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1380	-	-	-	731
HCM Lane V/C Ratio	0.032	-	-	-	0.089
HCM Control Delay (s)	7.7	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2027 Total PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	2	0	14	1	1	4	13	57	0	0	49	2
Future Volume (vph)	2	0	14	1	1	4	13	57	0	0	49	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879			0.904						0.995	
Flt Protected		0.995			0.993			0.991				
Satd. Flow (prot)	0	1662	0	0	1706	0	0	1883	0	0	1890	0
Flt Permitted		0.995			0.993			0.991				
Satd. Flow (perm)	0	1662	0	0	1706	0	0	1883	0	0	1890	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		2545.2			405.3			2036.0			221.1	
Travel Time (s)		114.5			18.2			91.6			9.9	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	2	0	17	1	1	5	15	68	0	0	58	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	0	7	0	0	83	0	0	60	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.4%
ICU Level of Service A	
Analysis Period (min)	15

HCM 6th TWSC  
102: Grey Road 8 & Southgate Road 04

Southgate Part Lot 31 TIS  
2027 Total PM

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	2	0	14	1	1	4	13	57	0	0	49	2
Future Vol, veh/h	2	0	14	1	1	4	13	57	0	0	49	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	2	0	17	1	1	5	15	68	0	0	58	2

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	160	157	59	166
Stage 1	59	59	-	98
Stage 2	101	98	-	68
Critical Hdwy	7.1	6.5	6.2	7.1
Critical Hdwy Stg 1	6.1	5.5	-	6.1
Critical Hdwy Stg 2	6.1	5.5	-	6.1
Follow-up Hdwy	3.5	4	3.3	3.5
Pot Cap-1 Maneuver	810	739	1012	803
Stage 1	958	850	-	913
Stage 2	910	818	-	947
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	799	732	1012	784
Mov Cap-2 Maneuver	799	732	-	784
Stage 1	948	850	-	904
Stage 2	895	810	-	931

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	9	1.4	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1556	-	-	979	904	1546	-	-
HCM Lane V/C Ratio	0.01	-	-	0.019	0.008	-	-	-
HCM Control Delay (s)	7.3	0	-	8.8	9	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Lanes, Volumes, Timings  
103: Southgate Road 04 & Site Driveway

Southgate Part Lot 31 TIS  
2027 Total PM

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	0	0	12	12	0
Future Volume (vph)	0	0	0	12	12	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction	0.865					
Fit Protected				0.950		
Satd. Flow (prot)	0	1900	1644	0	1805	0
Fit Permitted				0.950		
Satd. Flow (perm)	0	1900	1644	0	1805	0
Link Speed (k/h)	80		80		50	
Link Distance (m)	310.8		2545.2		98.0	
Travel Time (s)	14.0		114.5		7.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	0	0	13	13	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	13	0	13	0
Sign Control	Free		Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	13.3%		ICU Level of Service A			
Analysis Period (min)	15					

HCM 6th TWSC  
103: Southgate Road 04 & Site Driveway

Southgate Part Lot 31 TIS  
2027 Total PM

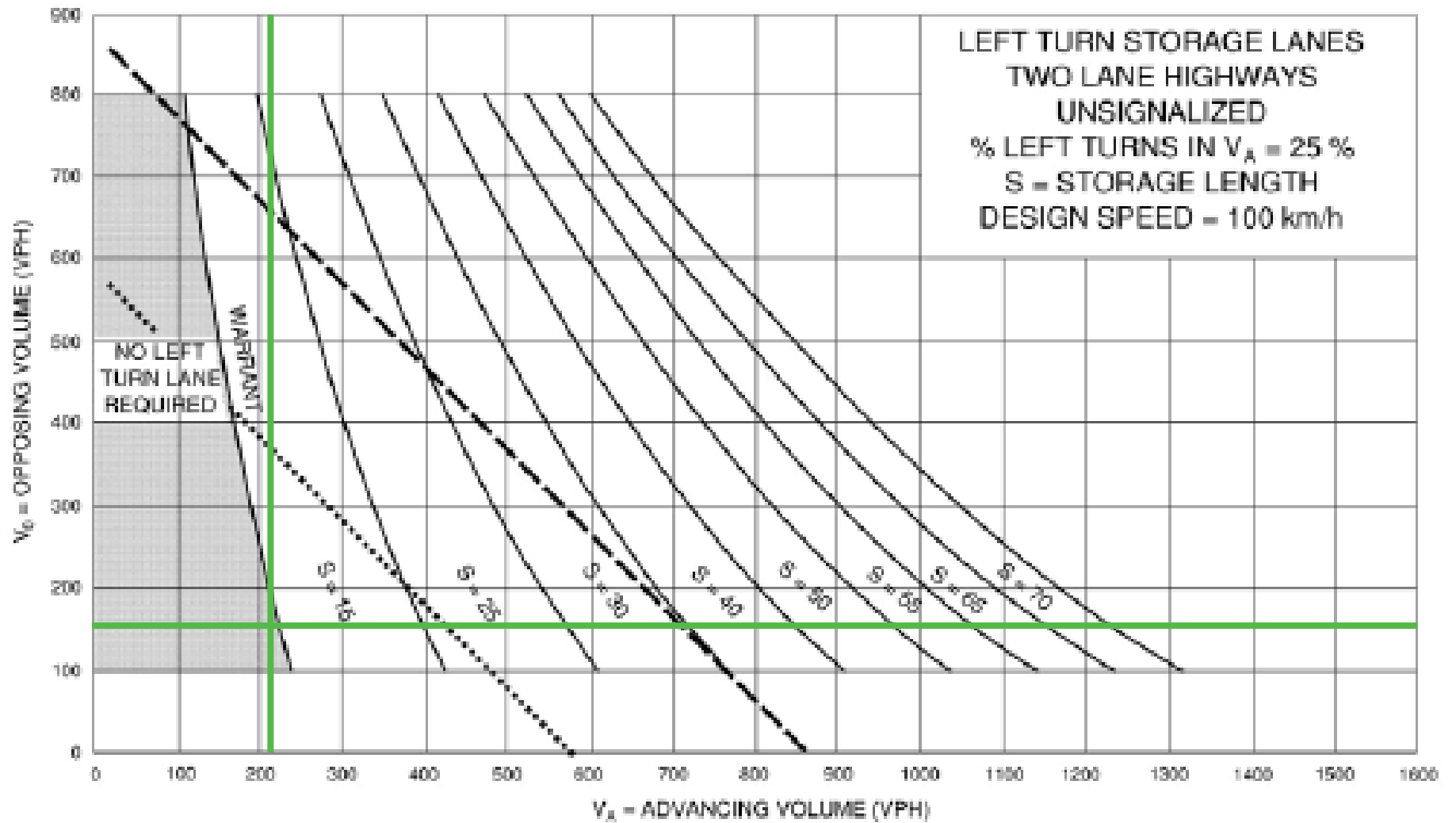
<b>Intersection</b>						
Int Delay, s/veh	4.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	0	0	0	12	12	0
Future Vol, veh/h	0	0	0	12	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	13	13	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	13	0	0	7	7	
Stage 1	-	-	-	7	-	
Stage 2	-	-	-	0	-	
Critical Hdwy	4.1	-	-	6.4	6.2	
Critical Hdwy Stg 1	-	-	-	5.4	-	
Critical Hdwy Stg 2	-	-	-	5.4	-	
Follow-up Hdwy	2.2	-	-	3.5	3.3	
Pot Cap-1 Maneuver	1619	-	-	1019	1081	
Stage 1	-	-	-	1021	-	
Stage 2	-	-	-	-	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	1619	-	-	1019	1081	
Mov Cap-2 Maneuver	-	-	-	1019	-	
Stage 1	-	-	-	1021	-	
Stage 2	-	-	-	-	-	
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	8.6			
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1619	-	-	-	1019	
HCM Lane V/C Ratio	-	-	-	-	0.013	
HCM Control Delay (s)	0	-	-	-	8.6	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

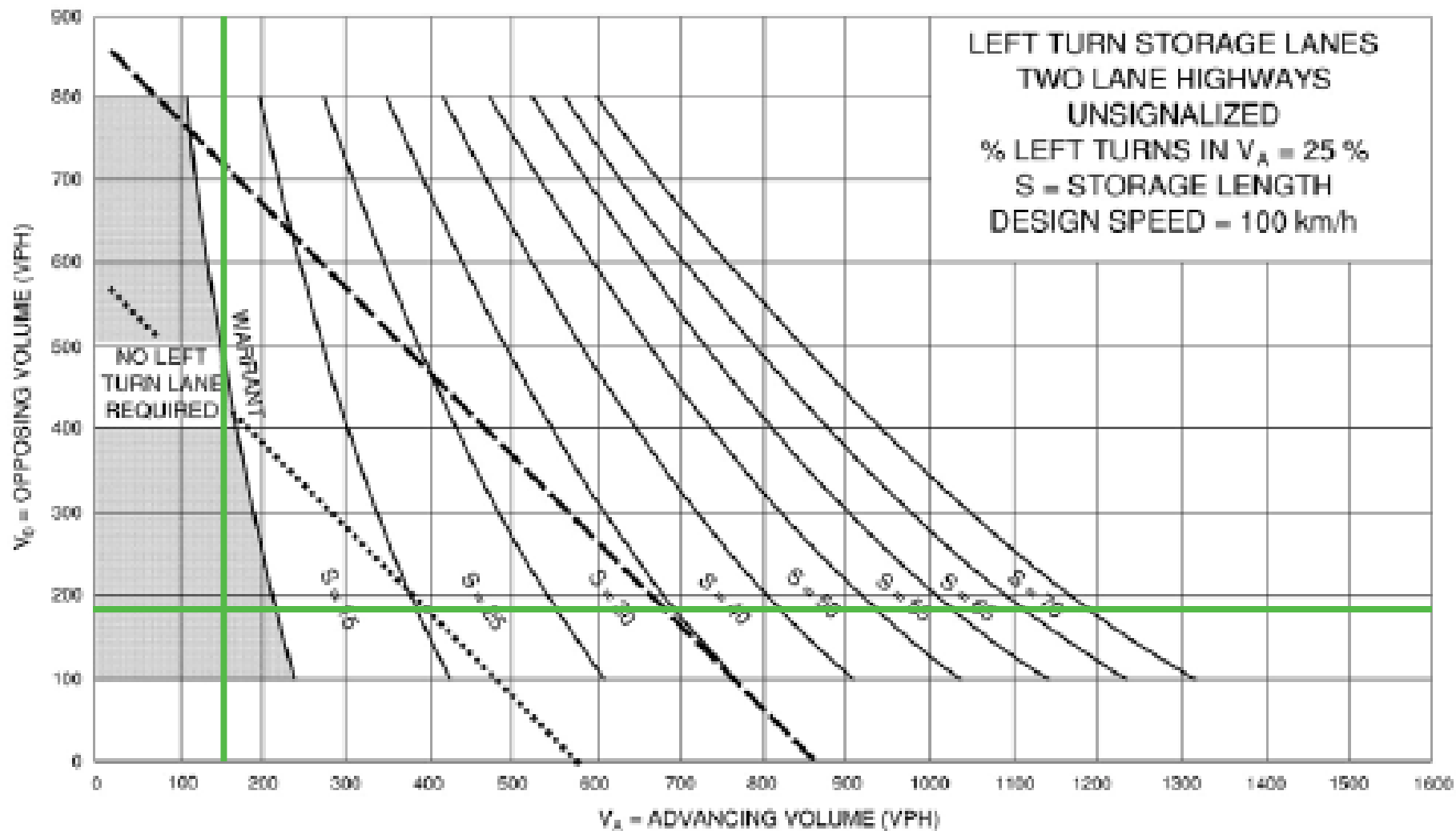


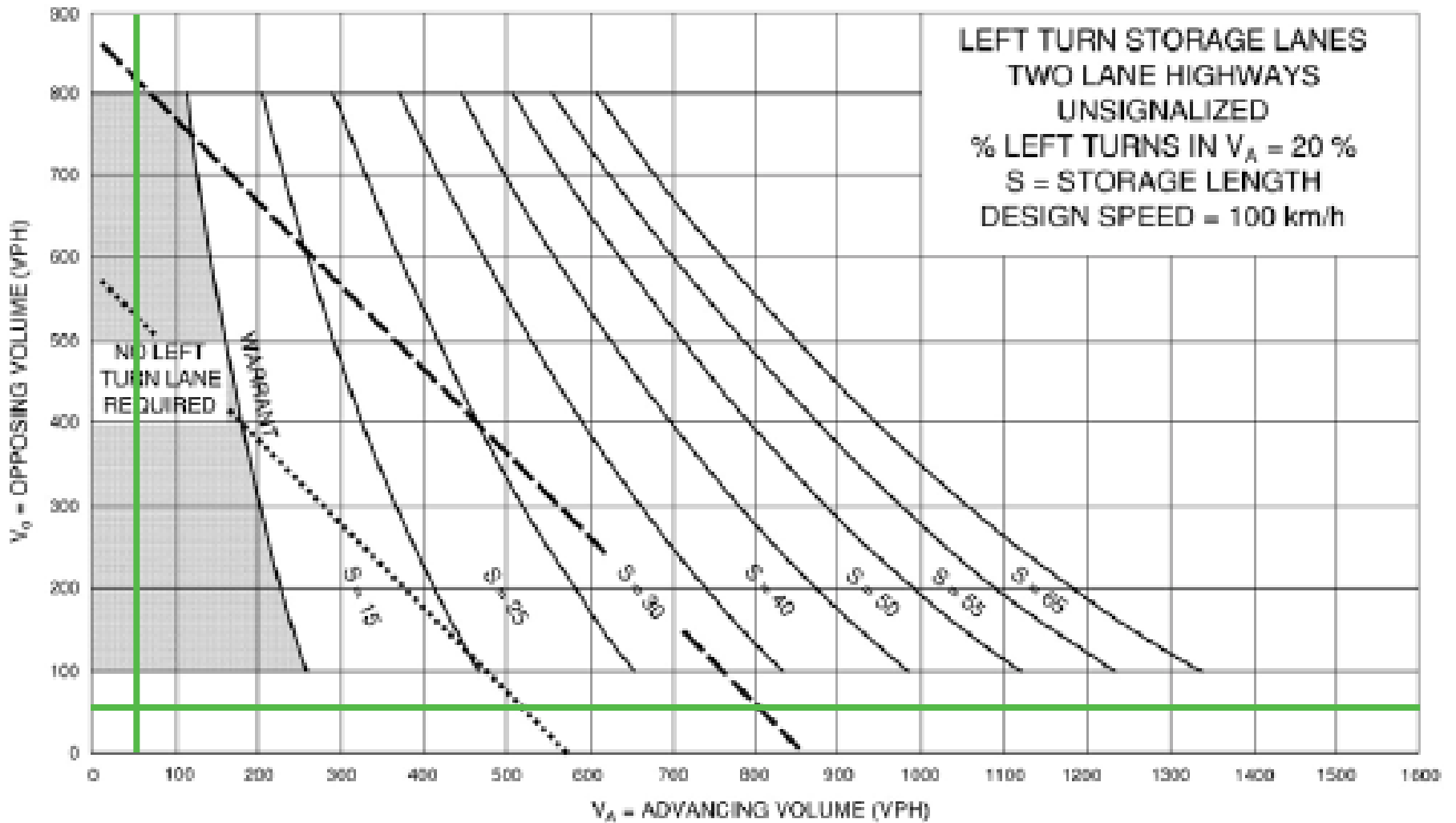
# Appendix F

## Left-Turn Lane Warrant Nomographs









## Appendix F

