



263 Concession Road 6 Traffic Impact Study, Niagara-on-the-Lake

Paradigm Transportation Solutions Limited

2024-12
240204



Project Summary

**Project Number:**

240204

Date and Version:

2024-10

1.0.0

Client:

Moksh Developments Ltd.

8383 Mississauga Road

Brampton, Ontario

Client Contact:

Parth Patel

263 Concession Road 6 Traffic Impact Study, Niagara-on-the-Lake

**Consultant Project Team**

Adam Makarewicz, CET, MITE

Greg Lue, M.A.Sc., P.Eng.

Greg Lue, P.Eng.

**Paradigm Transportation
Solutions Limited**

5A-150 Pinebush Road
Cambridge ON N1R 8J8

p: 519.896.3163

905.381.2229

416.479.9684

www.ptsl.com

Disclaimer

This document has been prepared for the titled project or named part thereof (the "project") and except for approval and commenting municipalities and agencies in their review and approval of this project, should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorization of Paradigm Transportation Solutions Limited being obtained. Paradigm Transportation Solutions Limited accepts no responsibility or liability for the consequence of this document being used for a purpose other than the project for which it was commissioned. Any person using or relying on the document for such other purpose agrees and will by such use or reliance be taken to confirm their agreement to indemnify Paradigm Transportation Solutions Limited for all loss or damage resulting there from. Paradigm Transportation Solutions Limited accepts no responsibility or liability for this document to any party other than the person by whom it was commissioned and the approval and commenting municipalities and agencies for the project.

To the extent that this report is based on information supplied by other parties, Paradigm Transportation Solutions Limited accepts no liability for any loss or damage suffered by the client, whether through contract or tort, stemming from any conclusions based on data supplied by parties other than Paradigm Transportation Solutions Limited and used by Paradigm Transportation Solutions Limited in preparing this report.

© 1998 Paradigm Transportation Solutions Limited. All rights reserved.

Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Traffic Impact Study (TIS) study for a proposed Agricultural Farm located at 263 Concession Road 6 in Niagara-on-the-Lake.

This study determines the impacts of the additional traffic generated by the subject site on the surrounding road network and the remedial measures necessary to accommodate future traffic satisfactorily.

Development Concept

The concept plan depicts severing the lot and developing the south end with four building pads with a combined Gross Floor Area (GFA) of 4,460 m² (48,000 sq.ft.) plus 1,394 m² (15,000 sq.ft.) of seasonal farming area. The existing single family residential use and the existing driveway serving that use will remain in its current location.

Of the total building area, about 186 m² (2,000 sq.ft.) is dedicated to fruit market land use, while 1,858 m² (20,000 sq.ft.) is dedicated to agricultural farm equipment storage. Approximately 2,415 m² (26,000 sq.ft.) GFA is proposed as an agricultural temperature-controlled storage facility and an agricultural farm office building.

Vehicle access to the new lot is proposed via a new driveway connection to Concession 6 Road and the existing driveway connection to York Road. The build-out date is assumed to be 2026.

Conclusions

The main findings and conclusions of this study are as follows:

- ▶ **Base Year Traffic Conditions:** No critical movements are identified.
- ▶ **Trip Generation:** The site's trip generation is estimated to be a total of 61 weekday AM peak hour trips, 64 weekday PM peak hour trips, and 58 Saturday peak hour trips.
- ▶ **Heavy Vehicle Traffic:** From a capacity and operational perspective, no geometric improvements are recommended to accommodate the projected site truck traffic at the area intersections.



- ▶ **Background Traffic Conditions:** No critical movements are forecasted.
- ▶ **Total Traffic Conditions:** All study area intersections are forecast to operate within similar service levels as documented under the background scenario. No critical movements are forecasted.

Overall, the addition of the site traffic is forecast to add less than five seconds of delay to intersection movements.

The site accesses are forecast to operate with delays in the LOS B range, with delays not exceeding 15 seconds during peak hours.

- ▶ **Access Configuration:** In a review of the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR) as well as the Niagara Region Access Management Guidelines (NRAMG), the existing access to York Road meets the minimum spacing requirements from the Concession 6 intersection.

If access is limited to Concession 6, the site is forecast to function adequately for traffic operations and site circulation. However, a two-access configuration reduces heavy vehicle maneuvering on site and allows for improved site circulation.

- ▶ **Remedial Measures:** No remedial measures are required.

Recommendations

Based on the findings of this study, the following is recommended:

- ▶ The Town recognizes the traffic findings above.
- ▶ The Town permit the proposed driveway to Concession 6 and existing driveway to York Road for improved site access and circulation.



Contents

1	Introduction	1
1.1	Overview	1
1.2	Study Area	1
2	Existing Conditions	3
2.1	Road Network	3
2.2	Pedestrian and Cycling Network.....	5
2.3	Transit Service.....	5
2.4	Traffic Volumes	5
2.5	Traffic Operations	7
3	Development Concept	10
3.1	Site Description	10
3.2	Trip Generation.....	13
3.3	Heavy Vehicle Circulation.....	19
4	Future Conditions	20
4.1	Forecast Traffic Volumes.....	20
4.2	Forecast Traffic Operations.....	25
4.2.1	Background Traffic Operations.....	25
4.2.2	Total Traffic Operations	25
5	Access Assessment	28
5.1.1	Unsignalized Intersection Spacing Guideline (NRAMG).....	28
5.1.2	Corner Clearance Intersection Spacing Guideline (TAC)	28
5.1.3	Single Access Operational Assessment.....	29
6	Remedial Measures.....	33
6.1	Assessment of Impacts	33
6.2	Auxiliary Turn Lane	33
6.2.1	Left-Turn Warrant.....	33
6.2.2	Right-Turn Warrant.....	33
7	Conclusions and Recommendations	35
7.1	Conclusions.....	35
7.2	Recommendations	36



Appendices

Appendix A	Terms of Reference
Appendix B	Traffic Data
Appendix C	Base Year Synchro Reports
Appendix D	Proxy Site Survey Data
Appendix E	Vehicle Swept Path Analysis
Appendix F	Future Background Synchro Reports
Appendix G	Future Total Synchro Reports
Appendix H	Future Total Synchro Reports – Single Access
Appendix I	Vehicle Swept Path Analysis – Single Access
Appendix J	Turn Lane Warrants

Figures

Figure 1.1:	Location of Subject Site	2
Figure 2.1:	Existing Lane Configuration and Traffic Control	4
Figure 2.2:	Existing Traffic Volumes	6
Figure 3.1A:	Overall Site Concept Plan	11
Figure 3.1B:	Detailed Site Concept Plan	12
Figure 3.2A:	Site-Generated Traffic Volumes – Weekday AM Peak Hour	16
Figure 3.2B:	Site Generated Traffic Volumes – Weekday PM Peak Hour	17
Figure 3.2C:	Site Generated Traffic Volumes – Saturday Peak Hour	18
Figure 4.1:	Future Background Traffic Volumes	21
Figure 4.2A:	Future Total Traffic Volumes – Weekday AM Peak Hour	22
Figure 4.2B:	Future Total Traffic Volumes – Weekday PM Peak Hour	23
Figure 4.2C:	Future Total Traffic Volumes – Saturday Peak Hour	24
Figure 5.1:	Site Generated Traffic – Single Access	30
Figure 5.2:	Total Traffic Volumes – Single Access	31

Tables

Table 2.1:	Existing Intersection Operations	9
Table 3.1:	Proxy Site Observed Trip Rates	13
Table 3.2:	Estimated Trip Generation	15
Table 3.3:	Estimated Trip Distribution	15
Table 4.1:	Future Background Traffic Operations	26
Table 4.2:	Future Total Traffic Operations	27
Table 5.1:	Future Total Traffic Operations – Single Access	32



1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Traffic Impact Study (TIS) for a proposed agricultural farm temperature-controlled storage facility and farm equipment storage facility located at 263 Concession Road 6 in the Town of Niagara-on-the-Lake. **Figure 1.1** illustrates the location of the subject site.

This study determines the impacts of the development traffic on the surrounding road network and identifies the recommended improvements to accommodate the site-generated traffic. The scope of the analysis includes:

- ▶ Determine and assess the current study area traffic conditions;
- ▶ Forecast the additional traffic generated by the proposed development;
- ▶ Analyze the impacts of the additional traffic on the study area's street network and
- ▶ Recommend any necessary remedial measures to mitigate the traffic impacts.

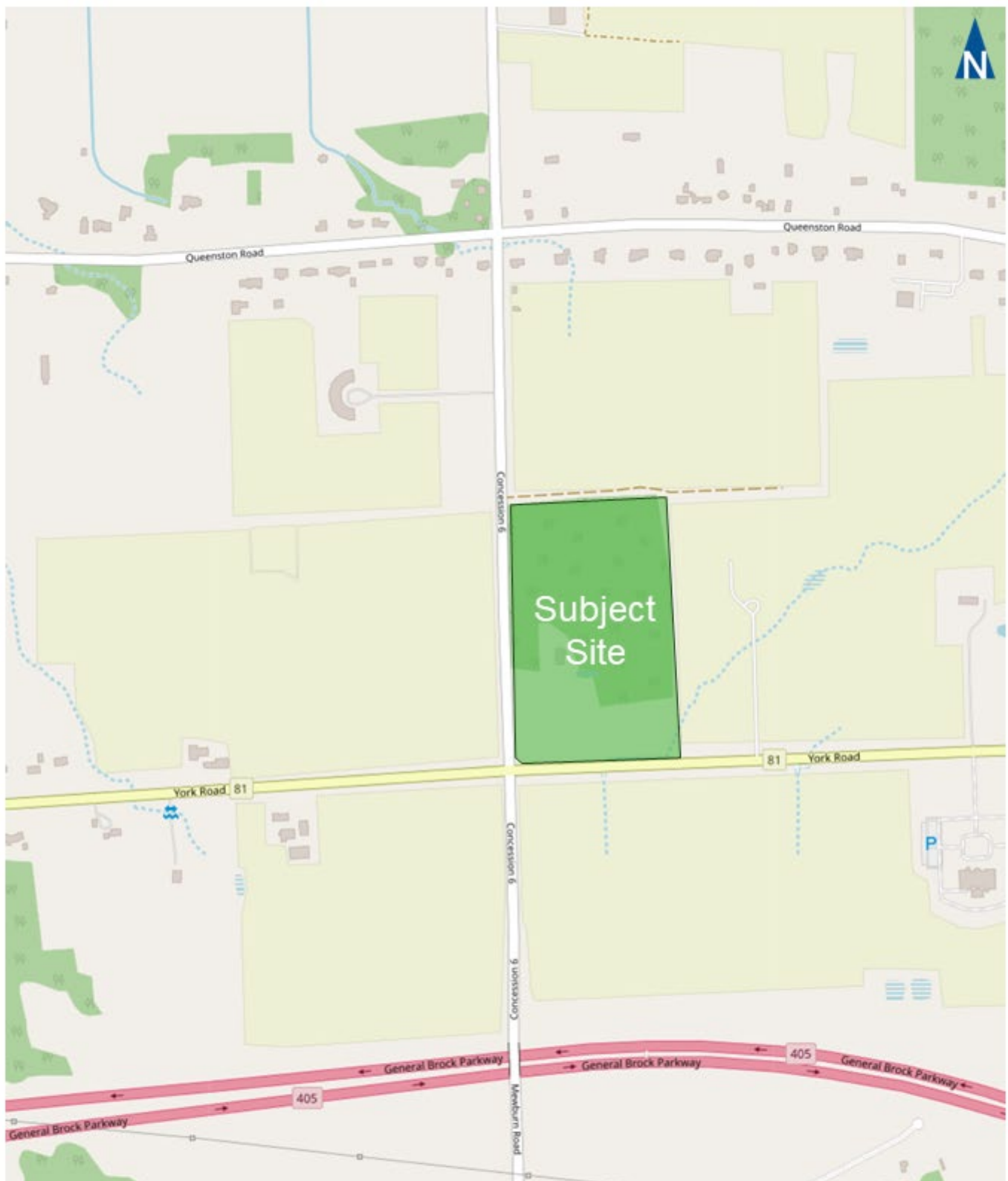
Appendix A contains the study's Terms of Reference provided to the Town of Niagara-on-the-Lake and the Region of Niagara in May 2024.

1.2 Study Area

This study examines the weekday AM and PM peak hours and Saturday peak hours for the following study area intersections:

- ▶ York Road at Concession 6 Road (unsignalized); and
- ▶ Proposed site driveways.





2 Existing Conditions

The section of the report provides an overview of the existing conditions of the roadways in the study area and other features of the transportation network, including transit and active transportation infrastructure.

2.1 Road Network

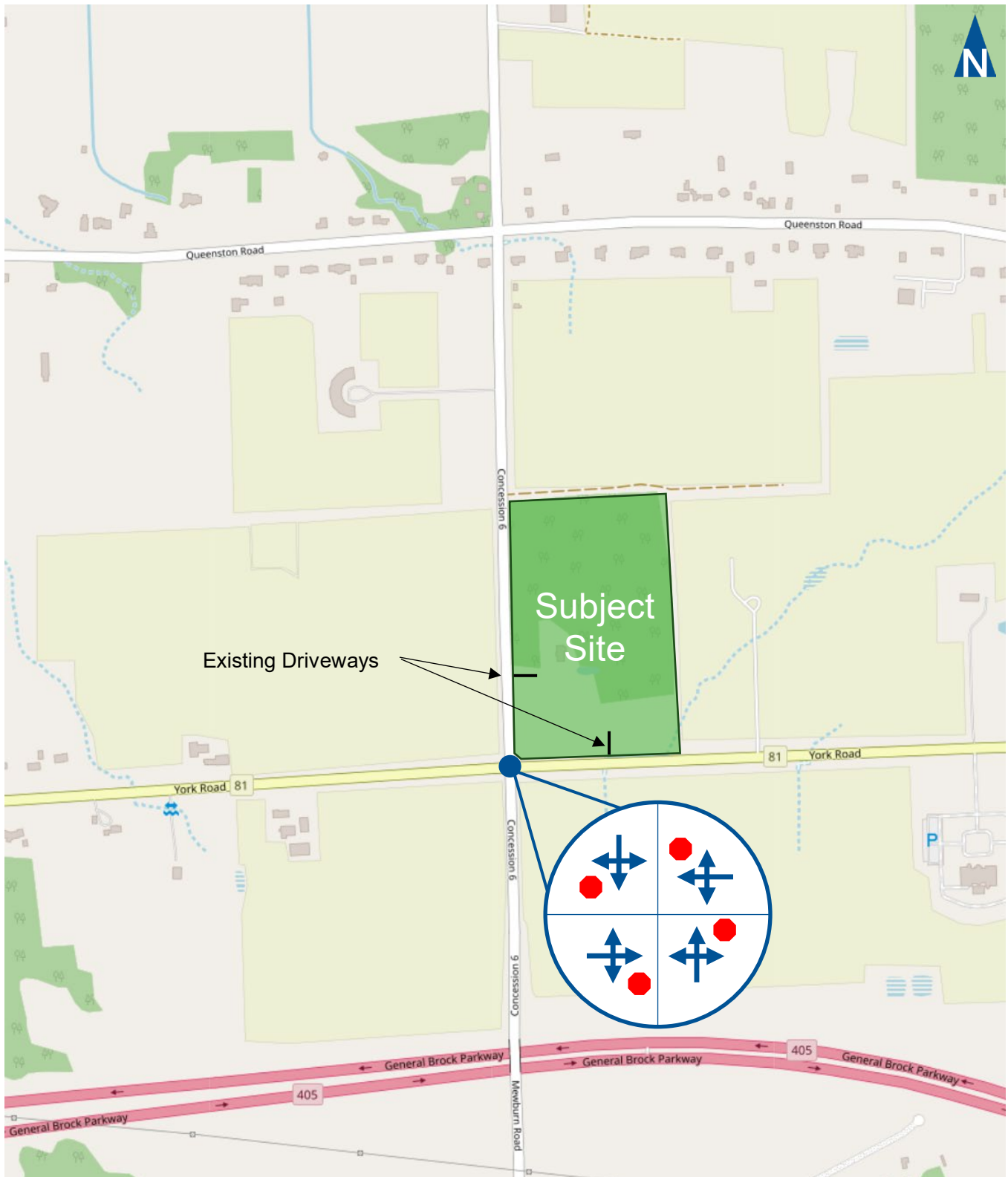
The roadways of interest within the study area include:

- ▶ **Concession Road 6** is a north-south local roadway¹ with a two-lane cross-section. The posted speed limit within the study area is 60 km/h. There are no sidewalks or dedicated cycling facilities in the study area.
- ▶ **York Road** is an east-west regional road with a two-lane cross-section. The posted speed limit within the study area is 80 km/h. There are no sidewalks or dedicated cycling facilities in the study area.

Figure 2.1 illustrates the lane configuration and traffic control at the study area intersections.

¹ Niagara Region Regional Road Map 2022





2.2 Pedestrian and Cycling Network

Pedestrian infrastructure typically consists of sidewalks, multi-use paths, and trails. However, there is no pedestrian infrastructure within the study area.

Cycling infrastructure typically consists of on-street and off-street facilities. On-street facilities include cycling lanes, signed cycling routes, and paved shoulders. Off-street facilities are multi-use or informal trails.

There are no dedicated cycling facilities within the study area.

2.3 Transit Service

The Town of Niagara-on-the-Lake is currently served by the Niagara Region Transit (NRT) OnDemand ridesharing. Residents can book a ride using the transit app or call the customer service number to select a pick-up point and destination. The NRT OnDemand service operates Monday to Saturday between 7:00 AM and 10:00 PM.

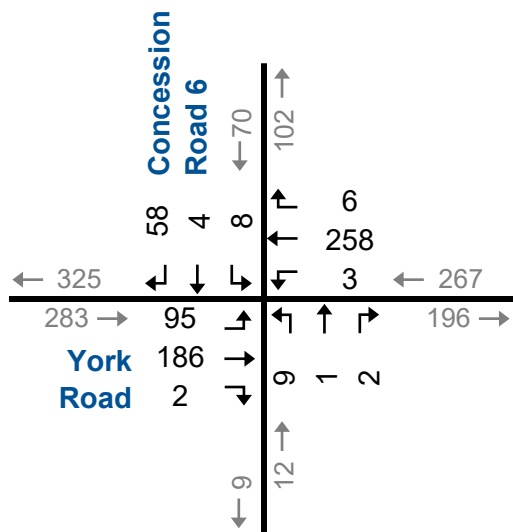
NRT also operates inter-regional routes that stop at the Niagara-on-the-Lake Niagara College campus.

2.4 Traffic Volumes

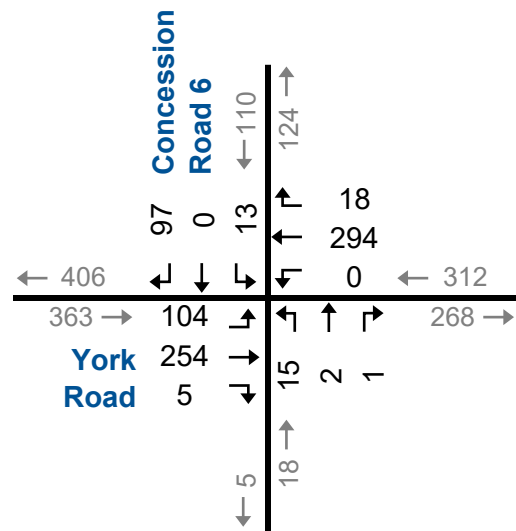
Turning Movement Counts (TMC) data at the study area intersections was collected in May 2024. **Appendix B** contains the existing count data. **Figure 2.2** illustrates the existing peak-hour traffic volumes.



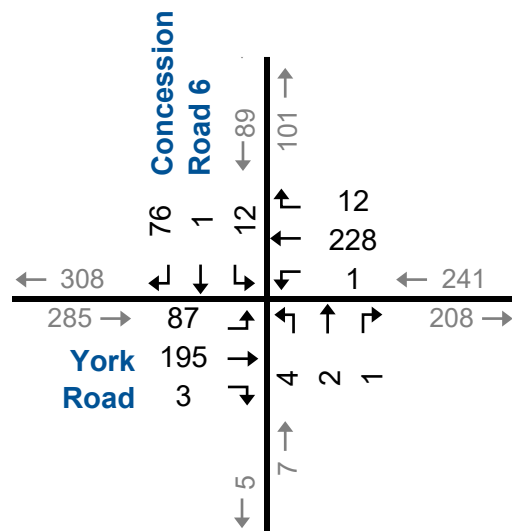
Weekday AM Peak Hour



Weekday PM Peak Hour



Saturday Peak Hour



2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying traffic flow efficiency 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 desiring to make a movement compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows. The highest possible rating is LOS A, where the average total delay is equal to or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (50 seconds at unsignalized intersections), the movement is considered to have a LOS F and remedial measures are usually implemented if feasible.

The operations of the study area intersections were evaluated under existing traffic volumes using Synchro 11 and HCM 2000 procedures. The intersection analysis considered the following measures of performance:

- ▶ The LOS for each turning movement. LOS is based on the average control delay per vehicle;
- ▶ The volume to capacity ratio (v/c) for each intersection; and
- ▶ 95th percentile queue length (metres) using Synchro.

Under Niagara Region's TIS Guidelines², the following criteria indicate critical conditions and signify that mitigation measures may need to be considered:

- ▶ At signalized intersections,
 - Movements increased to v/c 0.85 or above; and
 - Movements increased to a LOS "E" or worse.
- ▶ At unsignalized intersections,
 - LOS, based on average delay per vehicle, on individual movements is expected to operate at a LOS "D" or worse.
- ▶ At all intersections,
 - An exclusive turning movement in which the 95th percentile queue will exceed the available storage space.

² Niagara Region, *Transportation Impact Assessment Guidelines*, July 2023



- Exclusive left- and right-turn lanes that are inaccessible due to the length of queues in the adjacent through lanes.

Table 2.1 summarizes the existing level of service conditions. No critical movements are noted at the study area intersections.

Appendix C contains the detailed Synchro reports.



TABLE 2.1: EXISTING INTERSECTION OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Concession Road 6 & York Road	AWSC	LOS Delay V/C Q Ex Avail.	< < < < <	B 11 0.41 21 -	> > > > >	B 11	< < < < <	B 10 0.38 21 -	> > > > >	B 10	< < < < <	A 9 0.02 10 -	> > > > >	A 9	< < < < <	A 9 0.11 16 -	> > > > >	A 9	B 10
PM Peak Hour	1 - Concession Road 6 & York Road	AWSC	LOS Delay V/C Q Ex Avail.	< < < < <	B 13 0.52 22 -	> > > > >	B 13	< < < < <	B 12 0.45 22 -	> > > > >	B 12	< < < < <	A 10 0.03 14 -	> > > > >	A 10	< < < < <	A 9 0.17 15 -	> > > > >	A 9	B 12
Saturday Peak Hour	1 - Concession Road 6 & York Road	AWSC	LOS Delay V/C Q Ex Avail.	< < < < <	B 11 0.41 16 -	> > > > >	B 11	< < < < <	B 10 0.35 22 -	> > > > >	B 10	< < < < <	A 9 0.01 6 -	> > > > >	A 9	< < < < <	A 9 0.14 13 -	> > > > >	A 9	B 10

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex. - Existing Available Storage

Avail. - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

RBT - Roundabout

< - Shared Left-turn

> - Shared Right-turn



3 Development Concept

3.1 Site Description

The subject site currently contains a single-family residential use and agricultural use. The existing driveway to the single-family residential use is located approximately 155 m north (curb return to curb return) from the Concession 6 at York Road intersection. Another existing driveway to York Road is located 145 metres east (curb return to curb return) of the intersection of Concession 6 Road and York Road.

The concept plan depicts severing the lot and developing the south end with four building pads with a combined Gross Floor Area (GFA) of 4,460 m² (48,000 sq.ft.) plus 1,394 m² (15,000 sq.ft.) of seasonal farming area. The existing single family residential use and the existing driveway serving that use will remain in its current location.

Of the total building area, about 186 m² (2,000 sq.ft.) is dedicated to fruit market land use, while 1,858 m² (20,000 sq.ft.) is dedicated to agricultural farm equipment storage. Approximately 2,415 m² (26,000 sq.ft.) GFA is proposed as an agricultural temperature-controlled storage facility and an agricultural farm office building.

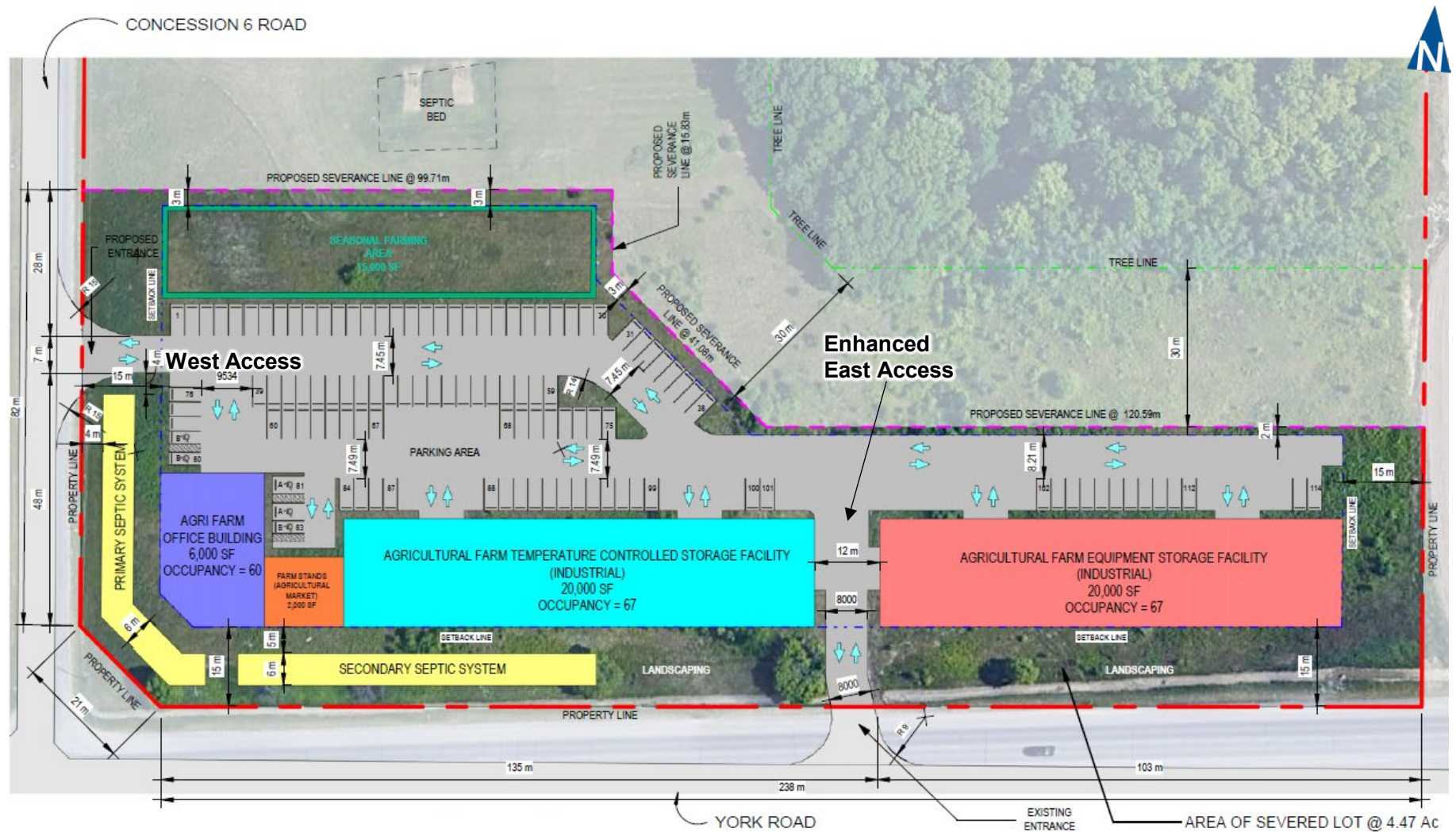
Vehicle access to the new lot is proposed via a new driveway connection to Concession 6 Road (West Access) and the existing driveway connection to York Road (East Access) which will be enhanced to support the proposed use.

The proposed driveways to Concession 6 Road and York Road are approximately 70 metres north and 145 metres east (curb return to curb return) of the intersection of Concession 6 Road and York Road, respectively. The proposed driveway locations provide adequate spacing from the upstream and downstream intersections.

The build-out date is assumed to be 2026.

Figure 3.1A illustrates the overall site concept plan and **Figure 3.1B** illustrates the detailed development concept plan.





NTS



Detailed Site Concept Plan

263 Concession 6, NOTL
24204

Figure 3.1B

3.2 Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation³ Methods were used to estimate the trip generation rates the trip generation for the agricultural temperature-controlled storage facility and an agricultural farm office building. For the purpose of the analysis, it has been assumed these land uses will operate similarly to a warehouse building which includes office space. As such, Land Use Code (LUC) 150—Warehouse has been utilized for the trip generation.

As ITE does not have a specific land use code for an agricultural market or agricultural farm equipment storage facility, a proxy survey was conducted at similar sites in Niagara-on-the-Lake:

- ▶ Agricultural Market – The Grove (1267 Niagara Stone Road, Niagara-on-the-Lake) – Approximately 1,100 m² (11,840 sq. ft) GFA
- ▶ Agriculture Supply Store – Lakeview Vineyard Equipment Inc. (40 Lakeshore Road, Niagara-on-the-Lake) – Approximately 1,100 m² (12,917 sq. ft) GFA

Traffic generated by the proxy sites was surveyed during weekday and Saturday peak hours in July 2024. Survey data can be found in **Appendix D. Table 3.1** summarizes the observed trip rates from the proxy sites. The following is noted concerning the observations:

- ▶ Agricultural Market generates 4.55 trips per 1,000 m² in the weekday AM peak hour, 32.73 trips per 1,000 m² in the weekday PM peak hour, and 80.00 trips per 1,000 m² in the Saturday peak hour.
- ▶ Agriculture Supply Store generates 15.00 trips per 1,000 m² in the weekday AM peak hour, 14.17 trips per 1,000 m² in the weekday PM peak hour, and 6.67 trips per 1,000 m² in the Saturday peak hour.

TABLE 3.1: PROXY SITE OBSERVED TRIP RATES

Proxy Site	Trip Rate per 1,000 m ²		
	AM	PM	Sat
Agricultural Market (1267 Niagara Stone Road, NOTL)	4.55	32.73	80.00
Agriculture Supply Store (40 Lakeshore Road, NOTL)	15.00	14.17	6.67

³ Institute of Transportation Engineers, *Trip Generation Manual*, 11th ed., (Washington DC: ITE, 2021).



The seasonal farming area is assumed to generate the majority of the produce for the agricultural market. In reality, the seasonal farming area produce will be the main generator for market trips and the agricultural market area trips just closely tied to the farming area trips. However, as conventional trip generation rates and surveys look at the floor space of the market area selling the produce as the source of agricultural market trip generation, for this assessment the floor area of the agricultural market is used as the unit for determining trips generated by this land use.

Table 3.2 summarizes the estimated site-generated trips for the development. The site's trip generation is estimated to be 61 weekday AM peak hour trips, 64 weekday PM peak hour trips, and 58 Saturday peak hour trips.

The trip distribution is estimated based on the existing traffic patterns observed in the study area. **Table 3.3** summarizes the site trip distribution. **Figure 3.2** illustrates the site-generated AM and PM peak-hour trip assignments.



TABLE 3.2: ESTIMATED TRIP GENERATION

LUC	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
	In	Out	Sum	In	Out	Sum	In	Out	Sum
Fruit Market - 186 m ² (2,000 sq.ft.)	1	0	1	3	4	7	8	7	15
Agriculture Supply Store - 1,858 m ² (20,000 sq.ft.)	12	16	28	10	17	27	7	6	13
ITE 150 - Warehouse - 2,415 m ² (26,000 sq.ft.)	25	7	32	8	22	30	8	22	30
Total	38	23	61	21	43	64	23	35	58

Fruit Market trip rate per 1,000m2 AM: 4.55 | PM: 32.73 | Sat: 80.00

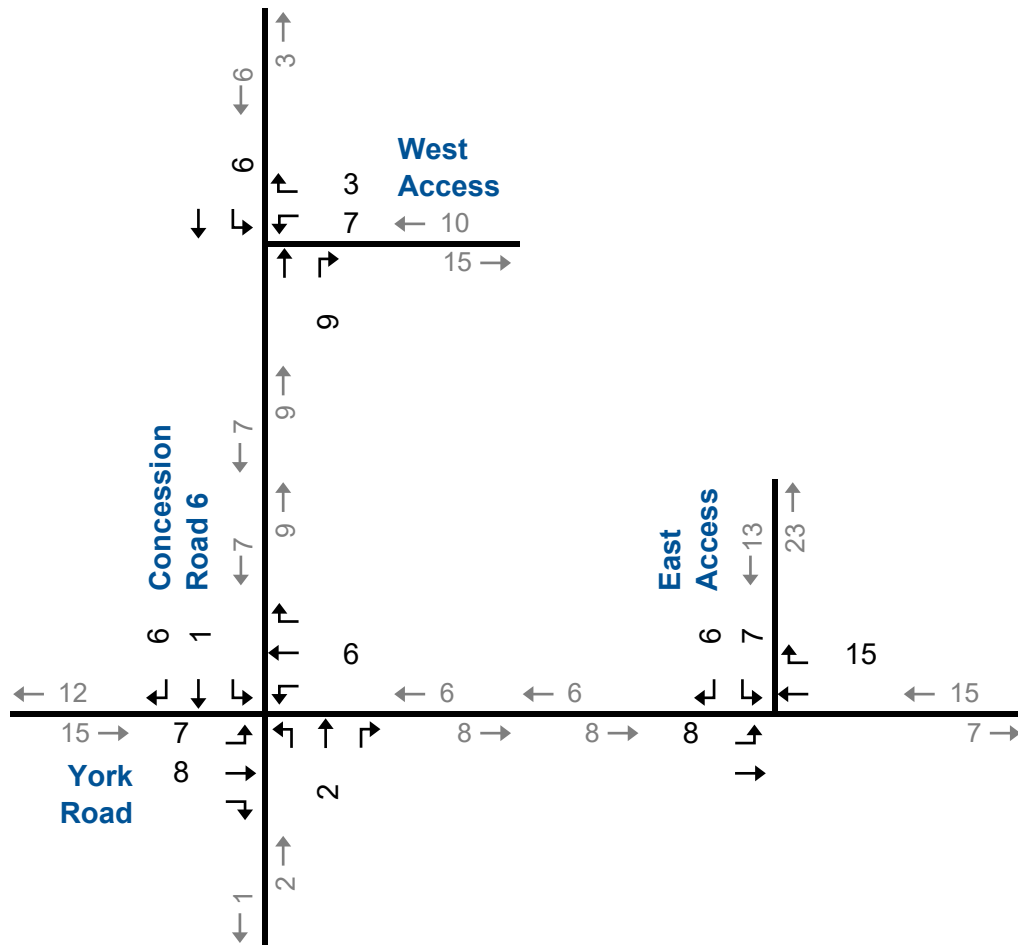
Agriculture Supply Store trip rate per 1,000m2 GFA AM: 15.00 | PM: 14.17 | Sat: 6.67

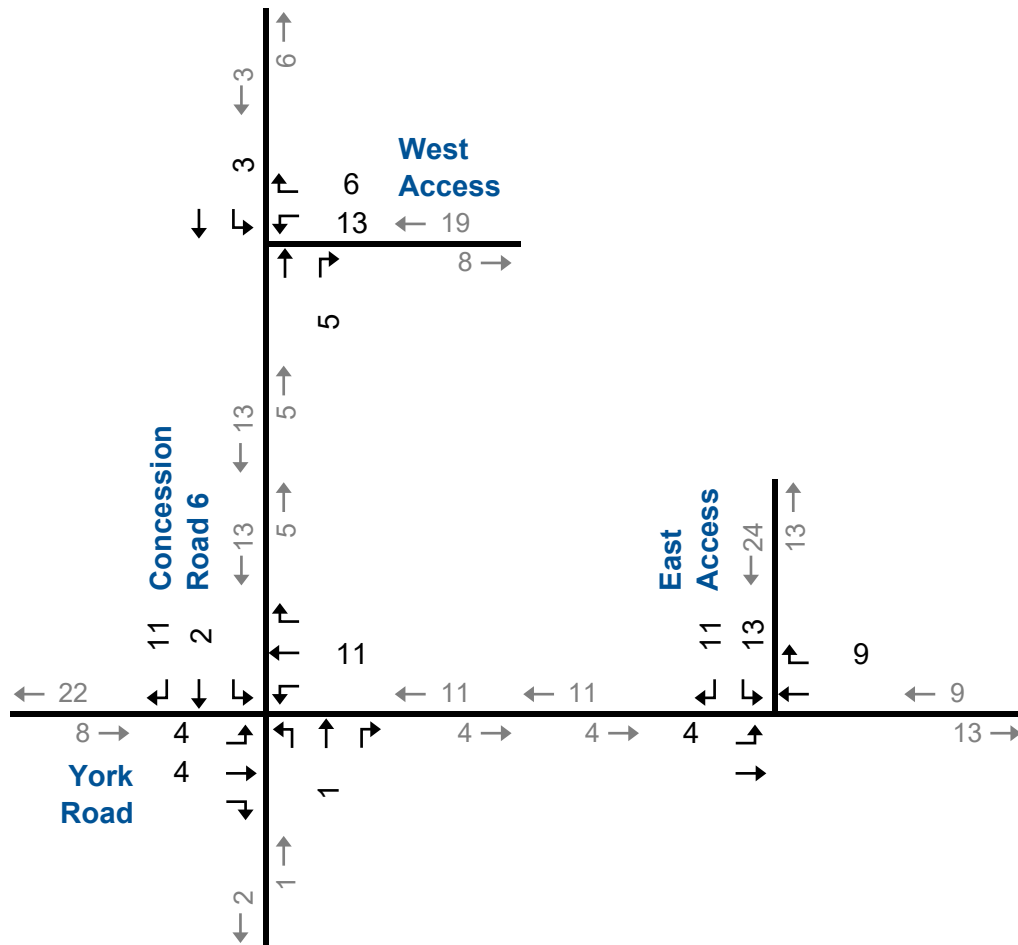
LUC 150 eqn per 1,000 sq. ft. GFA AM: $T = 0.12(X) + 23.62$ | PM: $T = 0.12(X) + 26.48$

TABLE 3.3: ESTIMATED TRIP DISTRIBUTION

From/To	In	Out
North via Concession Road 6	15%	15%
South via Concession Road 6	5%	5%
East via York Road	40%	30%
West via York Road	40%	50%
Total	100%	100%









263 Concession 6, NOTL
240204

Figure 3.2C

3.3 Heavy Vehicle Circulation

The heavy vehicle site circulation has been assessed using AutoTURN swept path analysis software and the following design vehicles:

- ▶ Transportation Association of Canada⁴ (TAC) Heavy Single Unit (HSU);
- ▶ TAC WB-20 Tractor Trailer
- ▶ Pick-up truck with trailer; and
- ▶ Fire Truck.

No conflicts with the on-site geometry are noted. The vehicle-swept path analysis is contained in **Appendix E**.

⁴ Transportation Association of Canada. Geometric Design Guide for Canadian Roads (2017).



4 Future Conditions

The assessment of future conditions in this section includes the following components:

- ▶ Background traffic forecast;
- ▶ Total traffic forecast;
- ▶ Level of service analysis for background traffic (pre-development) and
- ▶ Level of service analysis for total traffic (post-development).

This study assesses one horizon years of five years from the opening date (2031)

4.1 Forecast Traffic Volumes

A five-year horizon following full build-out/occupancy (2031) is assessed in this study. The future horizon traffic volumes are estimated to consist of the following:

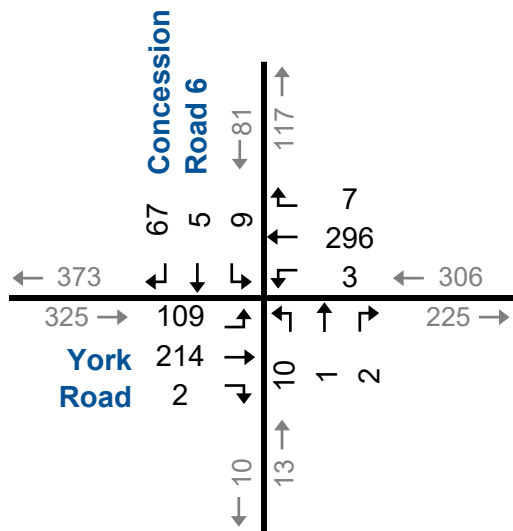
- ▶ Increased non-site traffic (generalized background traffic growth) is estimated to be 2.0% per annum, as confirmed by the Town, and
- ▶ Traffic generated by the subject site.

The Town identified no background developments to be included in the future horizon traffic volumes.

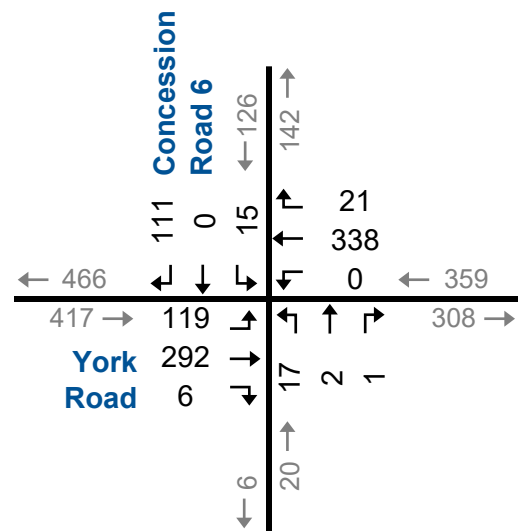
Figures 4.1 and **4.2** illustrate the future background and future total traffic volumes, respectively.



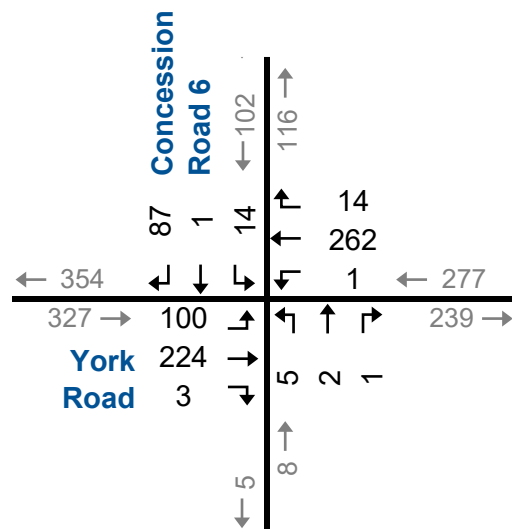
Weekday AM Peak Hour

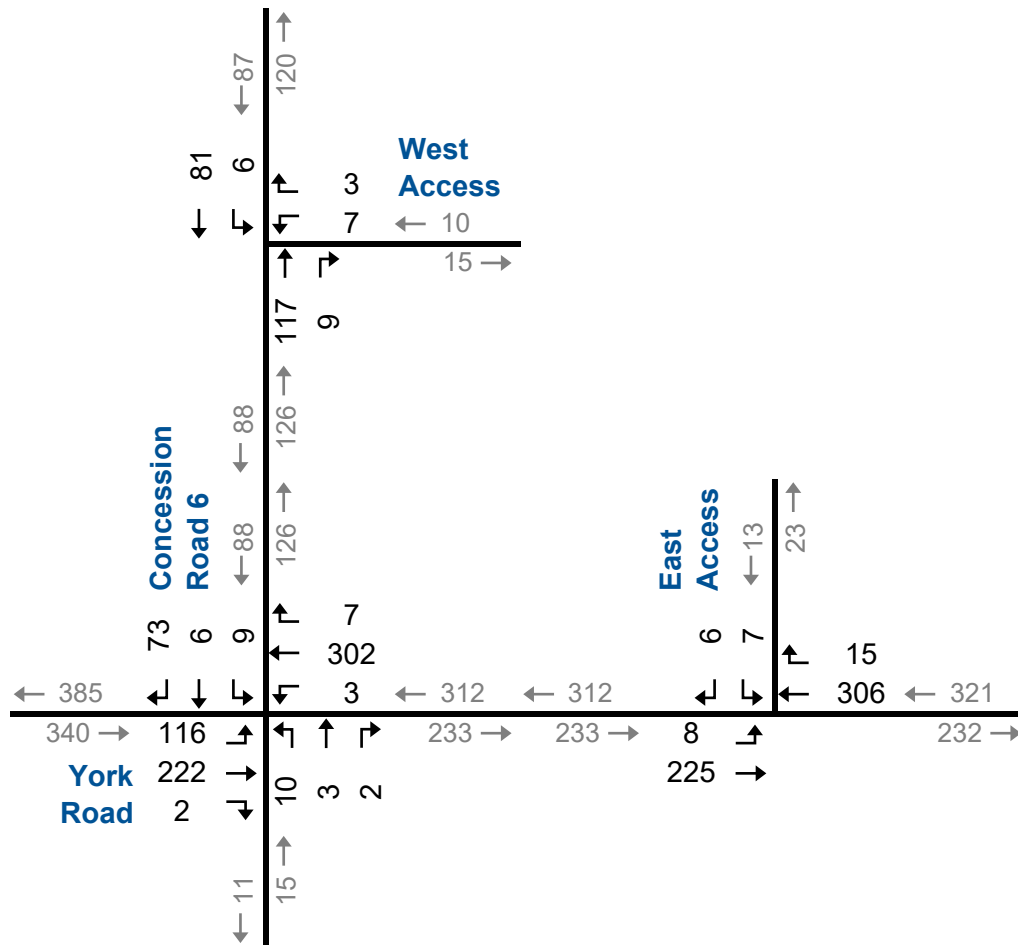


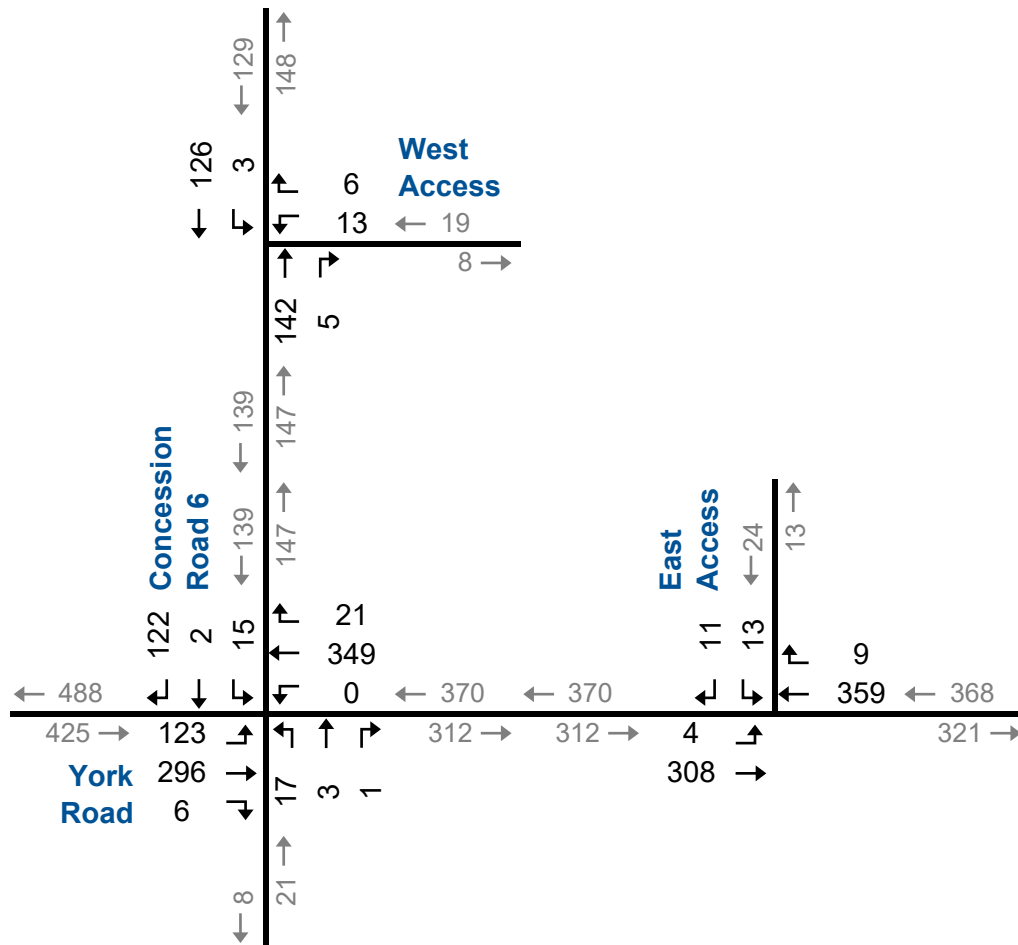
Weekday PM Peak Hour

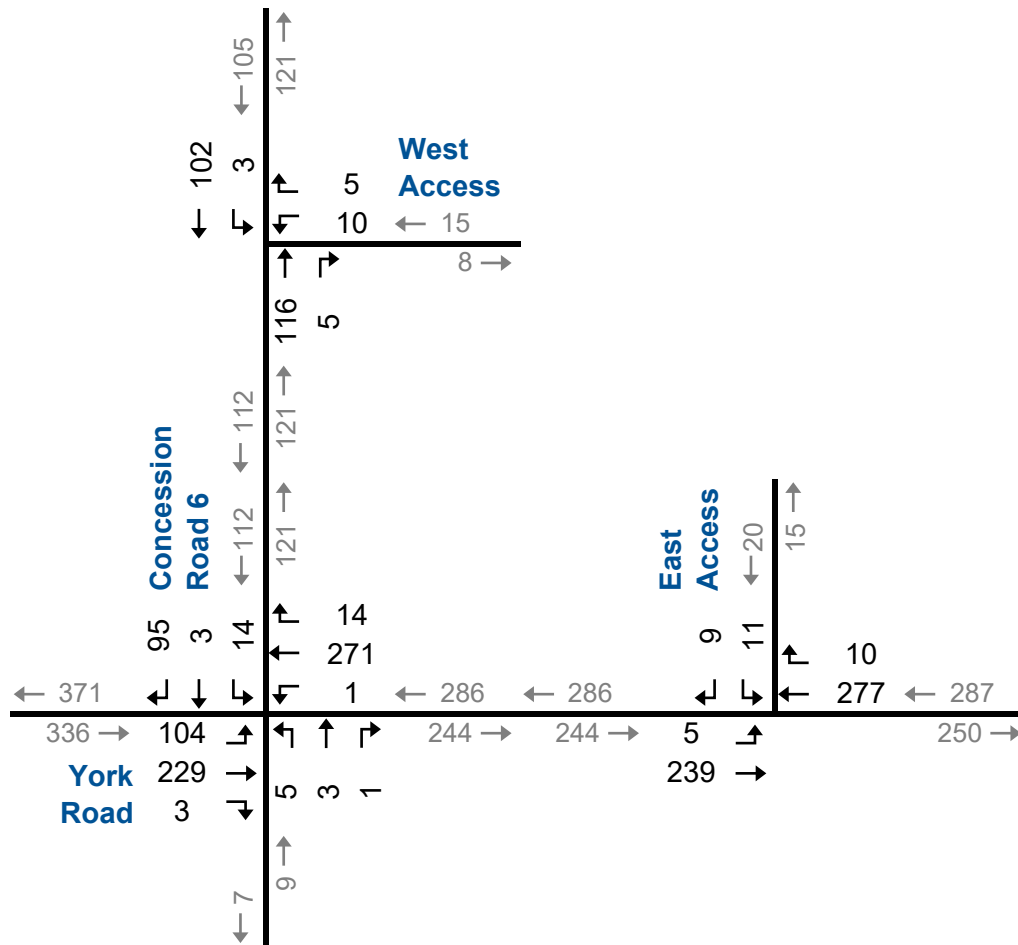


Saturday Peak Hour









4.2 Forecast Traffic Operations

4.2.1 Background Traffic Operations

The study area intersection operations analysis for background traffic conditions followed the same methodology used for the existing traffic conditions. **Table 4.1** details the level of service conditions. No critical movements are forecast. **Appendix F** contains the detailed Synchro reports.

4.2.2 Total Traffic Operations

The study area intersection operations analysis for total traffic conditions followed the same methodology used for the existing traffic conditions. **Table 4.2** details the level of service conditions. No critical movements are forecast. **Appendix G** contains the detailed Synchro reports.

Study area intersections are forecasted to operate at levels similar to the background scenario. Overall, the site traffic is forecast to add less than five seconds of delay to intersection movements.

The site accesses are forecast to operate with delays in the LOS B range, with delays not exceeding 15 seconds during peak hours.



TABLE 4.1: FUTURE BACKGROUND TRAFFIC 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	1 - Concession Road 6 & York Road	AWSC	LOS Delay V/C Q Ex Avail.	< < < < < <	B 12 0.48 25 -- --	> > > > > >	B 12	< < < < < <	B 12 0.45 23 -- --	> > > > > >	B 12	< < < < < <	A 9 0.02 11 -- --	> > > > > >	A 9	< < < < < <	A 9 0.13 19 -- --	> > > > > >	A 9	B 12
PM Peak Hour	1 - Concession Road 6 & York Road	AWSC	LOS Delay V/C Q Ex Avail.	< < < < < <	C 16 0.61 24 -- --	> > > > > >	C 16	< < < < < <	B 14 0.53 26 -- --	> > > > > >	B 14	< < < < < <	A 10 0.04 14 -- --	> > > > > >	A 10	< < < < < <	A 10 0.21 16 -- --	> > > > > >	A 10	B 14
Saturday Peak Hour	1 - Concession Road 6 & York Road	AWSC	LOS Delay V/C Q Ex Avail.	< < < < < <	B 12 0.49 18 -- --	> > > > > >	B 12	< < < < < <	B 11 0.42 21 -- --	> > > > > >	B 11	< < < < < <	A 9 0.01 7 -- --	> > > > > >	A 9	< < < < < <	A 9 0.16 13 -- --	> > > > > >	A 9	B 11

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex. - Existing Available Storage

Avail. - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

RBT - Roundabout

< - Shared Left-turn

> - Shared Right-turn



RBT - Roundabout
< - Shared Left-turn
> - Shared Right-turn

5 Access Assessment

In the pre-consultation comments received from Niagara Region, the region advised that it would not be in favour of granting access to York Road.

It is noted that the access to York Road is an existing access that will be enhanced to support the proposed land uses.

To assist in determining the appropriateness of the access locations, the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR)⁵ was reviewed, as well as the Niagara Region Access Management Guidelines (NRAMG)⁶.

5.1.1 Unsignalized Intersection Spacing Guideline (NRAMG)

The specific location of the existing driveway to York Road was reviewed against the Region's NRAMG guideline. Section 2.2.7 (Full Movement Entranceway Spacing) outlines that the minimum spacing requirements for full movement entranceways along regional roads vary based on the road typology.

Based on the current characteristics of York Road, it is assumed that this road would be classified as a Thoroughfare (Rural), given its rural cross-section, 2-4 travel lanes, and a posted speed limit between 60 – 80 kilometres per hour. The minimum spacing between full-movement entranceways along this type of road is noted to be 125 metres (curb return to curb return). The proposed driveway to York Road is 145 metres (curb return to curb return) east of the intersection of Concession 6 Road and York Road and 225 metres (curb return to curb return) west of the main entrance to AMO Winery.

The minimum spacing requirement for adjacent unsignalized intersections is met.

5.1.2 Corner Clearance Intersection Spacing Guideline (TAC)

Section 8.8.1 of the TAC guidelines outlines that corner clearance is the distance from an intersection to the nearest access upstream or downstream. Corner clearance is measured from the near curb of the cross roadway to the near edge of the access throat. It consists of three components: the curb return radius at the intersection, the length of the tangent, and the curb return radius or flare dimension at the

⁵ Geometric Design Guide for Canadian Roads, Transportation Association of Canada, 2017

⁶ Niagara Region, Access Management Guidelines, January 2023



driveway. Inadequate corner clearance between accesses and intersections along a major road, such as a major arterial, can create operational issues.

As York Road can be classified as an arterial roadway, the minimum corner clearance along this roadway to permit a full-movement driveway is noted to be 50 metres.

The driveway to York Road is 145 metres (curb return to curb return) east of the intersection of Concession 6 Road and York Road and meets minimum corner clearance guidelines.

5.1.3 Single Access Operational Assessment

To review this feasibility from an operational and site circulation perspective, an additional analysis has been considered to examine sole access to Concession 6 Road.

Figure 5.1 and **Figure 5.2** illustrate single access site traffic and total traffic, respectively. **Table 5.1** details the level of service conditions. No critical movements are forecast. **Appendix H** contains the detailed Synchro reports.

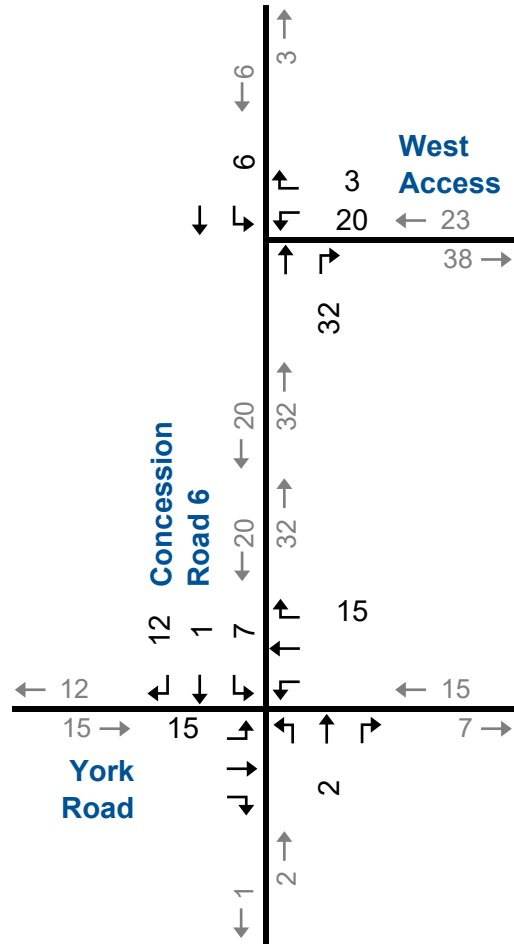
Study area intersections are forecasted to operate at levels similar to the Total scenario. Overall, the site traffic is forecast to add less than five seconds of delay to intersection movements.

The single site access is forecast to operate with delays in the LOS A range, with delays not exceeding 15 seconds during peak hours.

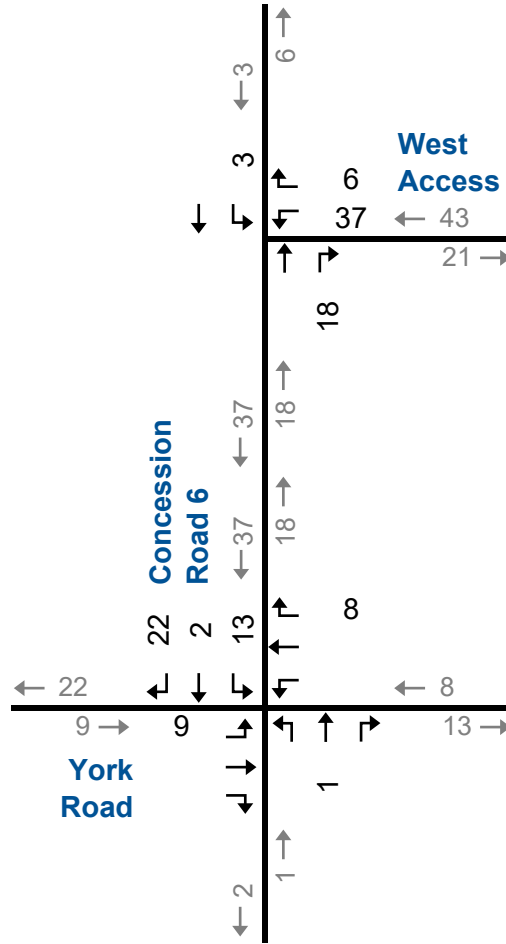
There are no conflicts for the heavy vehicle circulation with the single access. The vehicle-swept path analysis is contained in **Appendix I**.



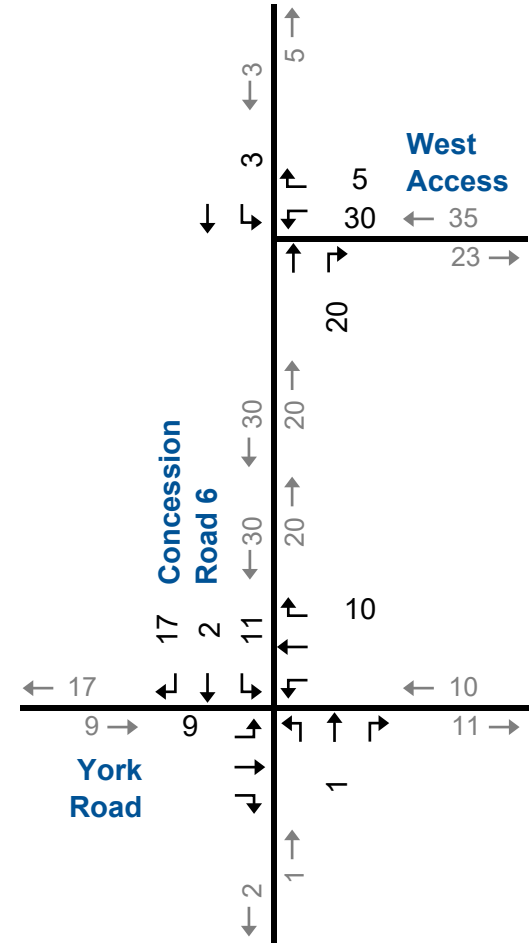
Weekday AM Peak Hour



Weekday PM Peak Hour

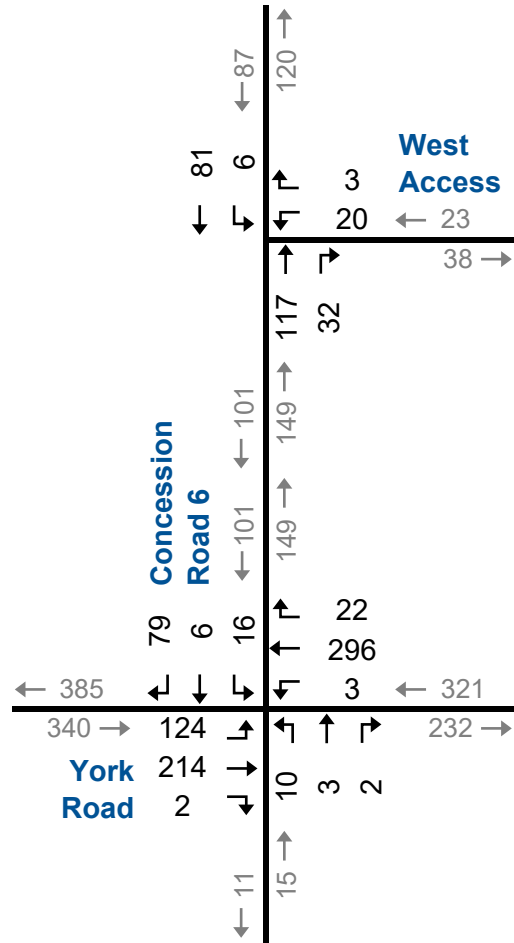


Saturday Peak Hour

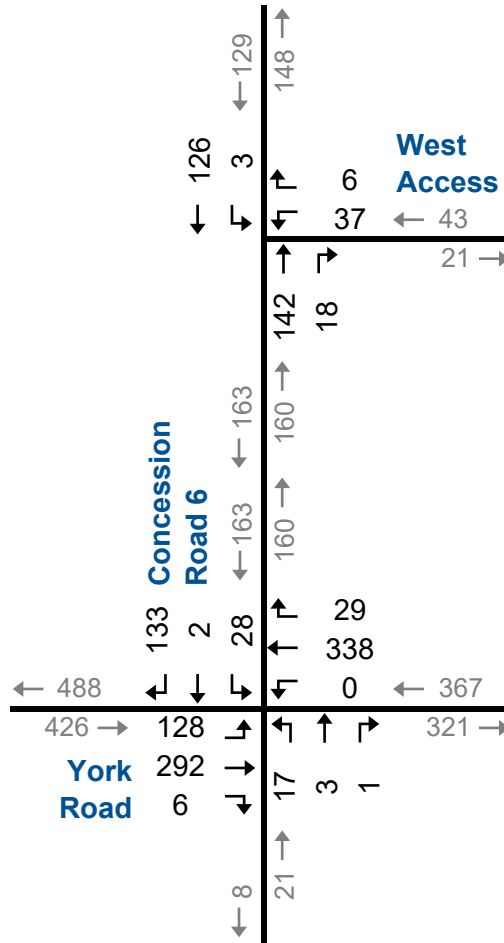


Site Generated Traffic – Single Access

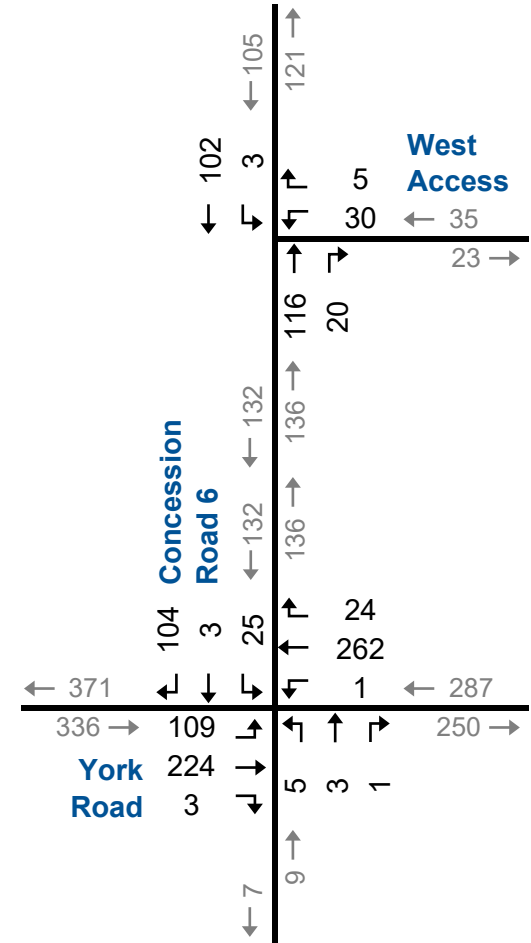
Weekday AM Peak Hour



Weekday PM Peak Hour



Saturday Peak Hour



Total Traffic Volumes – Single Access

TABLE 5.1: FUTURE TOTAL TRAFFIC OPERATIONS – SINGLE ACCESS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Concession Road 6 & York Road	AWSC	LOS Delay V/C Q Ex Avail.	< < < < <	B 13 0.52 24 -	> > > > >	B 13	< < < < <	B 12 0.48 25 -	> > > > >	B 12	< < < < <	A 9 0.03 12 -	> > > > >	A 9	< < < < <	A 10 0.17 20 -	> > > > >	A 10	B 12
	2 - Concession Road 6 & West Access (Single Access)	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.03 1 - -		> > > > >	A 10		A 0 0.10 0 - -	> > > > >	A 0	< < < < <	A 1 0.00 0 - -		A 1	A 1
PM Peak Hour	1 - Concession Road 6 & York Road	AWSC	LOS Delay V/C Q Ex Avail.	< < < < <	C 17 0.65 25 -	> > > > >	C 17	< < < < <	B 15 0.56 27 -	> > > > >	B 15	< < < < <	B 10 0.04 15 -	> > > > >	B 10	< < < < <	B 11 0.27 17 -	> > > > >	B 11	C 15
	2 - Concession Road 6 & West Access (Single Access)	TWSC	LOS Delay V/C Q Ex Avail.					B 11 0.07 2 - -		> > > > >	B 11		A 0 0.10 0 - -	> > > > >	A 0	< < < < <	A 0 0.00 0 - -		A 0	A 1
Saturday Peak Hour	1 - Concession Road 6 & York Road	AWSC	LOS Delay V/C Q Ex Avail.	< < < < <	B 13 0.52 20 -	> > > > >	B 13	< < < < <	B 12 0.45 21 -	> > > > >	B 12	< < < < <	A 9 0.02 8 -	> > > > >	A 9	< < < < <	A 10 0.22 13 -	> > > > >	A 10	B 12
	2 - Concession Road 6 & West Access (Single Access)	TWSC	LOS Delay V/C Q Ex Avail.					A 10 0.05 1 - -		> > > > >	A 10		A 0 0.09 0 - -	> > > > >	A 0	< < < < <	A 0 0.00 0 - -		A 0	A 1

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex. - Existing Available Storage

Avail. - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

RBT - Roundabout

< - Shared Left-turn

> - Shared Right-turn



6 Remedial Measures

This chapter contains an analysis to identify whether improvement measures are required within the study area.

6.1 Assessment of Impacts

The intersection of Concession Road 6 and York currently operates without significant delay during peak hours. With background traffic growth, similar levels of operation are expected.

The addition of site traffic is not forecasted to significantly impact delays, and operations are expected to continue without issue.

No remedial measures are required.

6.2 Auxiliary Turn Lane

6.2.1 Left-Turn Warrant

The Ministry of Transportation's Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads⁷ guides the assessment and/or need for auxiliary left-turn lanes at intersections.

The site accesses have been reviewed using these procedures to determine if the future traffic volumes warrant left-turn lanes to serve the site accesses. York Road has a posted speed limit of 80 km/h; as such, a design speed of 100 km/h (20 km/h above the speed limit) has been assessed. Concession Road 6 has a posted speed limit of 60 km/h; a design speed of 70 km/h (10 km/h above the speed limit) has been assessed.

Based on the volumes and percentage of left-turns, inbound left-turn lanes are not warranted for the west or east accesses.

Appendix J contains the left-turn lane warrant diagrams.

6.2.2 Right-Turn Warrant

A right-turn lane warrant analysis has been undertaken for the northbound approach at the Centre Driveway. A review of the TAC Geometric Design Guide for Canadian Roads, MTO supplement, and the National Cooperative Highway Research Program (NCHRP)

⁷ MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads, Appendix 9 for Chapter 9 Intersections, June 2017.



documentation⁸ shows that a right-turn lane or deceleration lane is not warranted for the East Driveway to York Road. **Appendix J** contains the warrant analysis.

The projected right-turn volumes are less than 35 vph and less than 15% of the through volume. The posted speed limit is 80 km/h and sightlines to the driveway extend beyond 250 m. Considering the proximity to the all-way stop-controlled intersection of Concession 6 and York Road, a right-turn lane or deceleration lane is not required.

⁸ National Cooperative Highway Research Program, "Synthesis on Right-Turn Deceleration Lanes on Urban and Suburban Arterials", August 2006



7 Conclusions and Recommendations

7.1 Conclusions

The main findings and conclusions of this study are as follows:

- ▶ **Base Year Traffic Conditions:** No critical movements are identified.
- ▶ **Trip Generation:** The site's trip generation is estimated to be a total of 61 weekday AM peak hour trips, 64 weekday PM peak hour trips, and 58 Saturday peak hour trips.
- ▶ **Heavy Vehicle Traffic:** From a capacity and operational perspective, no geometric improvements are recommended to accommodate the projected site truck traffic at the area intersections.
- ▶ **Background Traffic Conditions:** No critical movements are forecasted.
- ▶ **Total Traffic Conditions:** All study area intersections are forecast to operate within similar service levels as documented under the background scenario. No critical movements are forecasted.

Overall, the addition of the site traffic is forecast to add less than five seconds of delay to intersection movements.

The site accesses are forecast to operate with delays in the LOS B range, with delays not exceeding 15 seconds during peak hours.

- ▶ **Access Configuration:** In a review of the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR) as well as the Niagara Region Access Management Guidelines (NRAMG), the existing access to York Road meets the minimum spacing requirements from the Concession 6 intersection.

If access is limited to Concession 6, the site is forecast to function adequately for traffic operations and site circulation. However, a two-access configuration reduces heavy vehicle maneuvering on site and allows for improved site circulation.

- ▶ **Remedial Measures:** No remedial measures are required.



7.2 Recommendations

Based on the findings of this study, the following is recommended:

- ▶ The Town recognizes the traffic findings above.
- ▶ The Town permit the proposed driveway to Concession 6 and existing driveway to York Road for improved site access and circulation.



Appendix A

Terms of Reference



Greg Lue

From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: May 21, 2024 4:17 PM
To: Adam Makarewicz
Cc: Marci Weston
Subject: RE: Traffic Impact Study, TOR - 263 Concession Road 6, NOTL

Hi Adam

Thank you for reaching out to the Region for the terms of reference for this site. The Region did not require the TIS for this site and had noted that we did not support an entrance on York Road at the precon. For these reasons we did not have any comments on the terms of reference. If you require Regional traffic data please use this link to the Regional website:
<https://www.niagararegion.ca/living/roads/permits/traffic-data-requests.aspx>.

If you require anything further please let me know.



Susan M. Dunsmore, P.Eng.

ACTING DIRECTOR, INFRASTRUCTURE PLANNING
& DEVELOPMENT ENGINEERING

Niagara Region, 1815 Sir Isaac Brock Way, Thorold, ON, L2V
4T7

P : (905) 980 - 6000 ext. 3661

W : www.niagararegion.ca

E : susan.dunsmore@niagararegion.ca



From: Adam Makarewicz <amakarewicz@ptsl.com>
Sent: Friday, May 17, 2024 1:52 PM
To: Marci Weston <Marci.Weston@notl.com>; Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Subject: Traffic Impact Study, TOR - 263 Concession Road 6, NOTL

CAUTION EXTERNAL EMAIL: This email originated from outside of the Niagara Region email system. Use caution when clicking links or opening attachments unless you recognize the sender and know the content is safe.

Hi Marci and Susan,

We've been retained to complete a traffic impact study for a proposed development at 263 Concession Road 6 in the Town of Niagara-on-the-Lake. Would the following work plan be acceptable to the Town and Region to satisfy the traffic study requirements?

Context

The property currently consists of a single-family dwelling unit with access to Concession 6 Road located at 263 Concession 6 Road in the Town of Niagara-on-the-Lake. It is understood that the Applicant proposes serving the property to create a new lot supporting Agricultural Farm and Equipment uses. The current concept plan depicts four building pads with a combined Gross Floor Area (GFA) of 48,00 square feet. In addition, 32,200 square feet of seasonal farming activity are proposed. Vehicle access to the new lot is proposed via a new driveway connection to Concession 6 Road and a secondary driveway connection to York Road.

Scope of Work

- Study Area
 - York Road at Concession 6 Road
 - Proposed Development Driveways
- Peak Hours
 - Weekday AM
 - Weekday PM
 - Saturday
- Traffic Data
 - New traffic counts will be undertaken after Victoria Day Weekend
- Horizon Years
 - Existing Year (2024)
 - Build-Out Horizon
 - Five-Years after build-out Horizon
- Analysis
 - Synchro 11
 - HCM 2000
- Background Traffic
 - Generalized growth rate of 2% per annum.
- Site Traffic Estimates
 - We intend to complete a traffic survey at an existing fruit market and Agricultural Supply store within Niagara-on-the-Lake to observe trip generation characteristics and truck volumes to help formulate a site-specific trip generation rate.
 - Fruit Market – The Grove (1267 Niagara Stone Road, NOTL)
 - Agricultural Supply Store – Lakeview Vineyard Equipment Inc. (40 Lakeshore Road, NOTL)
 - Survey times will occur for a weekday (7AM-6PM) and Saturday (9AM-6PM).
- Site Traffic Distribution
 - Existing travel patterns

Thanks,

Adam J. Makarewicz

Senior Project Manager, Associate



5A-150 Pinebush Road, Cambridge ON, N1R 8J8
p: 905.381.2229 x303
e: amakarewicz@ptsl.com
w: www.ptsl.com

This e-mail and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this e-mail in error please notify the sender immediately. Please note that any views or opinions presented in this e-mail are solely those of the author and do not necessarily represent those of Paradigm Transportation Solutions Limited. Finally, the recipient should check this e-mail and any attachments for the presence of viruses. Paradigm Transportation Solutions Limited accepts no liability for any damage caused by any virus transmitted by this e-mail.

The Regional Municipality of Niagara Confidentiality Notice The information contained in this communication including any attachments may be confidential, is intended only for the use of the recipient(s) named above, and may be legally privileged. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, disclosure, or copying of this communication, or any of its contents, is strictly prohibited. If you have received this communication in error, please re-send this communication to the sender and permanently delete the original and any copy of it from your computer system. Thank you.

Appendix B

Traffic Data





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: York Road & Concession 6 Road
Site Code: 240204
Start Date: 05/23/2024
Page No: 1

Turning Movement Data

Start Time	York Road Eastbound						York Road Westbound						Concession 6 Road Northbound						Concession 6 Road 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	6	17	1	0	0	24	2	35	0	0	0	37	1	1	1	0	0	3	0	0	14	0	0	14	78
7:15 AM	13	28	1	0	0	42	0	42	1	0	0	43	0	0	0	0	0	0	2	0	14	0	0	16	101
7:30 AM	14	27	0	0	0	41	0	46	0	0	0	46	0	1	1	0	0	2	0	0	11	0	0	11	100
7:45 AM	22	51	0	0	0	73	0	56	1	0	0	57	2	0	0	0	0	2	2	2	16	0	0	20	152
Hourly Total	55	123	2	0	0	180	2	179	2	0	0	183	3	2	2	0	0	7	4	2	55	0	0	61	431
8:00 AM	16	41	0	0	0	57	1	64	1	0	0	66	1	3	1	0	0	5	3	1	17	0	0	21	149
8:15 AM	23	46	0	0	0	69	1	52	3	0	0	56	2	0	1	0	0	3	3	1	11	0	0	15	143
8:30 AM	26	40	0	0	0	66	0	67	2	0	0	69	1	1	1	0	0	3	2	1	19	0	0	22	160
8:45 AM	35	49	1	0	0	85	1	68	0	0	0	69	2	0	0	0	0	2	3	2	17	0	0	22	178
Hourly Total	100	176	1	0	0	277	3	251	6	0	0	260	6	4	3	0	0	13	11	5	64	0	0	80	630
9:00 AM	11	51	1	0	0	63	1	71	1	0	0	73	4	0	0	0	0	4	0	0	11	0	0	11	151
9:15 AM	22	34	1	0	0	57	0	50	0	0	0	50	2	0	0	0	0	2	0	0	13	0	0	13	122
9:30 AM	15	39	2	0	0	56	1	62	1	0	0	64	1	0	0	0	0	1	2	0	11	0	0	13	134
9:45 AM	27	43	2	0	0	72	0	54	2	0	0	56	2	0	0	0	0	2	5	0	15	0	0	20	150
Hourly Total	75	167	6	0	0	248	2	237	4	0	0	243	9	0	0	0	0	9	7	0	50	0	0	57	557
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	22	39	1	0	0	62	0	44	2	0	0	46	1	0	0	0	0	1	2	2	13	0	0	17	126
11:15 AM	14	57	2	0	0	73	0	51	0	0	0	51	0	1	0	0	0	1	2	0	17	0	0	19	144
11:30 AM	22	48	2	0	0	72	1	59	2	0	0	62	3	0	1	0	0	4	3	0	13	0	0	16	154
11:45 AM	17	46	4	0	0	67	1	48	0	0	0	49	0	1	0	0	0	1	2	0	11	0	0	13	130
Hourly Total	75	190	9	0	0	274	2	202	4	0	0	208	4	2	1	0	0	7	9	2	54	0	0	65	554
12:00 PM	21	46	3	0	0	70	0	56	2	0	0	58	1	0	0	0	0	1	3	0	13	0	0	16	145
12:15 PM	27	63	0	0	0	90	0	58	4	0	0	62	2	0	0	0	0	2	1	1	11	0	0	13	167
12:30 PM	22	38	1	0	0	61	1	69	1	0	0	71	3	0	0	0	0	3	1	0	14	0	0	15	150
12:45 PM	22	54	1	0	0	77	0	80	1	0	0	81	3	0	0	0	0	3	4	0	17	0	0	21	182
Hourly Total	92	201	5	0	0	298	1	263	8	0	0	272	9	0	0	0	0	9	9	1	55	0	0	65	644
1:00 PM	19	56	5	0	0	80	1	55	2	0	0	58	1	1	0	0	0	2	1	0	12	0	0	13	153
1:15 PM	21	50	1	0	0	72	3	48	0	0	0	51	4	0	0	0	0	4	4	0	13	0	0	17	144
1:30 PM	13	61	2	0	0	76	0	60	4	0	0	64	0	0	1	0	0	1	3	1	16	0	0	20	161
1:45 PM	13	34	1	0	0	48	1	59	0	0	0	60	3	1	2	0	0	6	3	0	3	0	0	6	120
Hourly Total	66	201	9	0	0	276	5	222	6	0	0	233	8	2	3	0	0	13	11	1	44	0	0	56	578
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	19	63	3	0	0	85	0	75	4	0	0	79	1	0	0	0	0	1	2	0	21	0	0	23	188
3:15 PM	22	54	2	0	0	78	0	91	3	0	0	94	1	0	0	0	0	1	3	0	23	0	0	26	199
3:30 PM	24	66	1	0	0	91	1	85	3	0	0	89	2	0	0	0	0	2	2	0	12	0	0	14	196

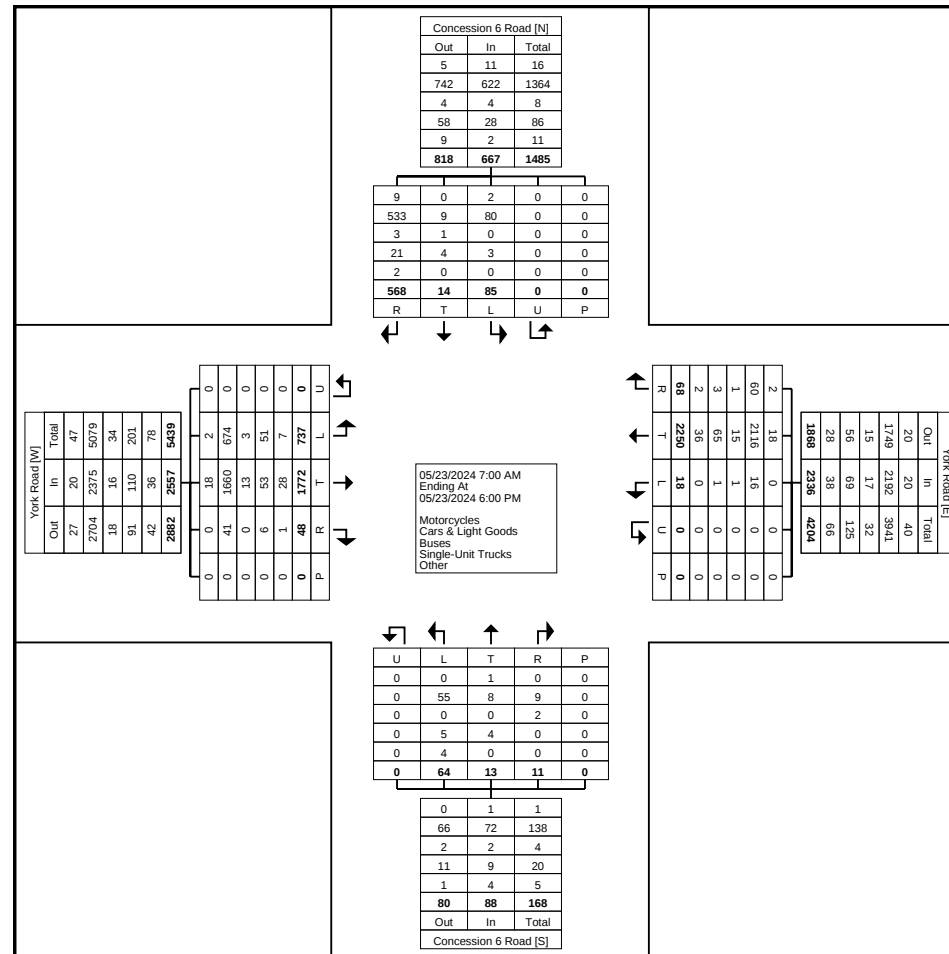
3:45 PM	26	63	0	0	0	89	0	65	1	0	0	66	1	0	0	0	0	1	3	2	15	0	0	20	176
Hourly Total	91	246	6	0	0	343	1	316	11	0	0	328	5	0	0	0	0	5	10	2	71	0	0	83	759
4:00 PM	18	66	1	0	0	85	0	77	6	0	0	83	3	2	0	0	0	5	4	0	23	0	0	27	200
4:15 PM	17	59	1	0	0	77	0	78	3	0	0	81	3	0	0	0	0	3	4	0	20	0	0	24	185
4:30 PM	35	56	2	0	0	93	0	71	5	0	0	76	8	0	1	0	0	9	2	0	23	0	0	25	203
4:45 PM	34	73	1	0	0	108	0	68	4	0	0	72	1	0	0	0	0	1	3	0	31	0	0	34	215
Hourly Total	104	254	5	0	0	363	0	294	18	0	0	312	15	2	1	0	0	18	13	0	97	0	0	110	803
5:00 PM	24	57	0	0	0	81	1	81	2	0	0	84	1	0	0	0	0	1	3	0	26	0	0	29	195
5:15 PM	19	37	2	0	0	58	0	73	3	0	0	76	1	0	0	0	0	1	2	0	21	0	0	23	158
5:30 PM	18	66	2	0	0	86	1	70	1	0	0	72	3	0	0	0	0	3	5	0	20	0	0	25	186
5:45 PM	18	54	1	0	0	73	0	62	3	0	0	65	0	1	1	0	0	2	1	1	11	0	0	13	153
Hourly Total	79	214	5	0	0	298	2	286	9	0	0	297	5	1	1	0	0	7	11	1	78	0	0	90	692
Grand Total	737	1772	48	0	0	2557	18	2250	68	0	0	2336	64	13	11	0	0	88	85	14	568	0	0	667	5648
Approach %	28.8	69.3	1.9	0.0	-	-	0.8	96.3	2.9	0.0	-	-	72.7	14.8	12.5	0.0	-	-	12.7	2.1	85.2	0.0	-	-	-
Total %	13.0	31.4	0.8	0.0	-	45.3	0.3	39.8	1.2	0.0	-	41.4	1.1	0.2	0.2	0.0	-	1.6	1.5	0.2	10.1	0.0	-	11.8	-
Motorcycles	2	18	0	0	-	20	0	18	2	0	-	20	0	1	0	0	-	1	2	0	9	0	-	11	52
% Motorcycles	0.3	1.0	0.0	-	-	0.8	0.0	0.8	2.9	-	-	0.9	0.0	7.7	0.0	-	-	1.1	2.4	0.0	1.6	-	-	1.6	0.9
Cars & Light Goods	674	1660	41	0	-	2375	16	2116	60	0	-	2192	55	8	9	0	-	72	80	9	533	0	-	622	5261
% Cars & Light Goods	91.5	93.7	85.4	-	-	92.9	88.9	94.0	88.2	-	-	93.8	85.9	61.5	81.8	-	-	81.8	94.1	64.3	93.8	-	-	93.3	93.1
Buses	3	13	0	0	-	16	1	15	1	0	-	17	0	0	2	0	-	2	0	1	3	0	-	4	39
% Buses	0.4	0.7	0.0	-	-	0.6	5.6	0.7	1.5	-	-	0.7	0.0	0.0	18.2	-	-	2.3	0.0	7.1	0.5	-	-	0.6	0.7
Single-Unit Trucks	51	53	6	0	-	110	1	65	3	0	-	69	5	4	0	0	-	9	3	4	21	0	-	28	216
% Single-Unit Trucks	6.9	3.0	12.5	-	-	4.3	5.6	2.9	4.4	-	-	3.0	7.8	30.8	0.0	-	-	10.2	3.5	28.6	3.7	-	-	4.2	3.8
Articulated Trucks	7	27	1	0	-	35	0	34	0	0	-	34	4	0	0	0	-	4	0	0	2	0	-	2	75
% Articulated Trucks	0.9	1.5	2.1	-	-	1.4	0.0	1.5	0.0	-	-	1.5	6.3	0.0	0.0	-	-	4.5	0.0	0.0	0.4	-	-	0.3	1.3
Bicycles on Road	0	1	0	0	-	1	0	2	2	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	5
% Bicycles on Road	0.0	0.1	0.0	-	-	0.0	0.0	0.1	2.9	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
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@pts1.com

Count Name: York Road & Concession 6 Road
Site Code: 240204
Start Date: 05/23/2024
Page No: 3



Turning Movement Data Plot

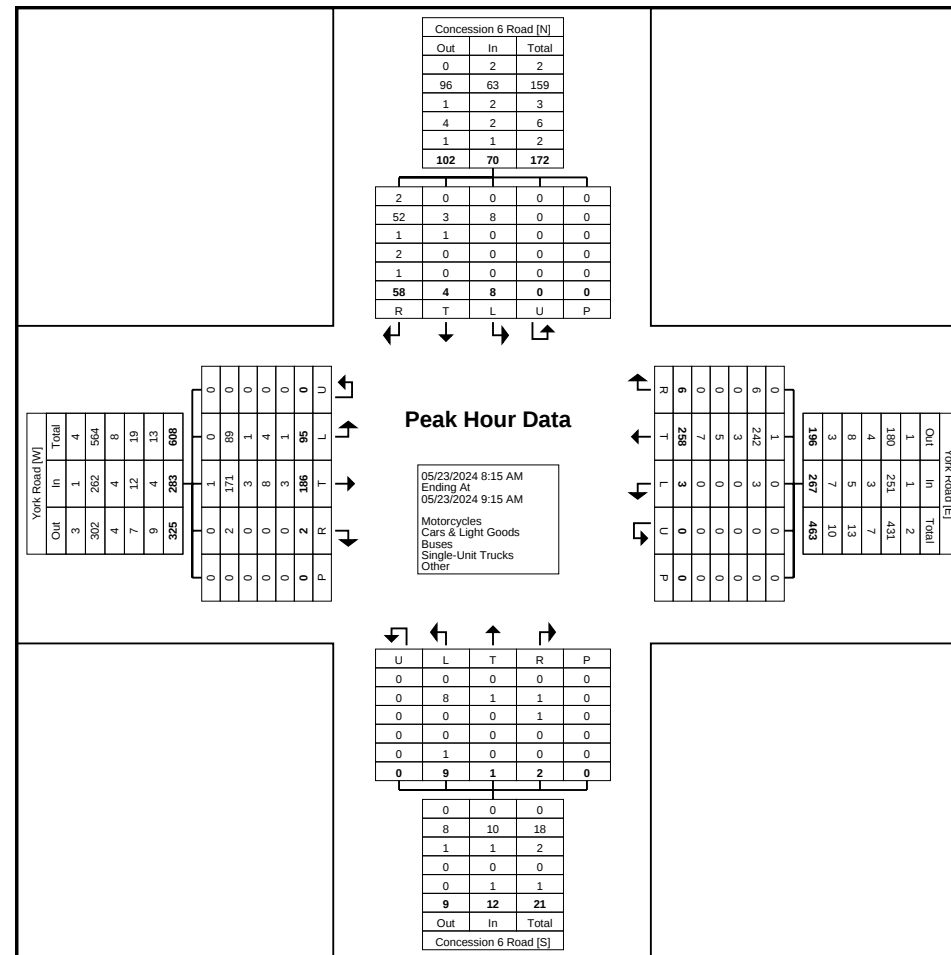
[illegible]



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: York Road & Concession 6 Road
Site Code: 240204
Start Date: 05/23/2024
Page No: 5



Turning Movement Peak Hour Data Plot (8:15 AM)

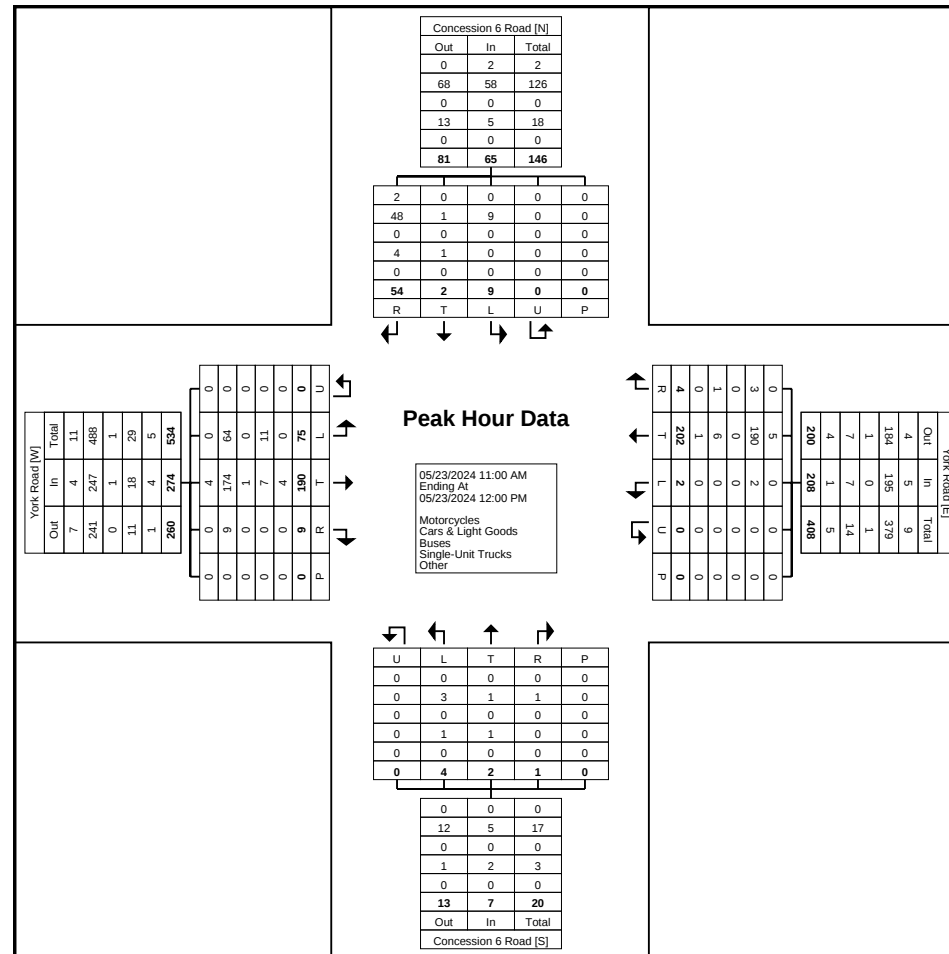
Start Time	York Road Eastbound						York Road Westbound						Concession 6 Road Northbound						Concession 6 Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	22	39	1	0	0	62	0	44	2	0	0	46	1	0	0	0	0	1	2	2	13	0	0	17	126
11:15 AM	14	57	2	0	0	73	0	51	0	0	0	51	0	1	0	0	0	1	2	0	17	0	0	19	144
11:30 AM	22	48	2	0	0	72	1	59	2	0	0	62	3	0	1	0	0	4	3	0	13	0	0	16	154
11:45 AM	17	46	4	0	0	67	1	48	0	0	0	49	0	1	0	0	0	1	2	0	11	0	0	13	130
Total	75	190	9	0	0	274	2	202	4	0	0	208	4	2	1	0	0	7	9	2	54	0	0	65	554
Approach %	27.4	69.3	3.3	0.0	-	-	1.0	97.1	1.9	0.0	-	-	57.1	28.6	14.3	0.0	-	-	13.8	3.1	83.1	0.0	-	-	-
Total %	13.5	34.3	1.6	0.0	-	49.5	0.4	36.5	0.7	0.0	-	37.5	0.7	0.4	0.2	0.0	-	1.3	1.6	0.4	9.7	0.0	-	11.7	-
PHF	0.852	0.833	0.563	0.000	-	0.938	0.500	0.856	0.500	0.000	-	0.839	0.333	0.500	0.250	0.000	-	0.438	0.750	0.250	0.794	0.000	-	0.855	0.899
Motorcycles	0	4	0	0	-	4	0	5	0	0	-	5	0	0	0	0	-	0	0	0	2	0	-	2	11
% Motorcycles	0.0	2.1	0.0	-	-	1.5	0.0	2.5	0.0	-	-	2.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	3.7	-	-	3.1	2.0
Cars & Light Goods	64	174	9	0	-	247	2	190	3	0	-	195	3	1	1	0	-	5	9	1	48	0	-	58	505
% Cars & Light Goods	85.3	91.6	100.0	-	-	90.1	100.0	94.1	75.0	-	-	93.8	75.0	50.0	100.0	-	-	71.4	100.0	50.0	88.9	-	-	89.2	91.2
Buses	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.5	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	11	7	0	0	-	18	0	6	1	0	-	7	1	1	0	0	-	2	0	1	4	0	-	5	32
% Single-Unit Trucks	14.7	3.7	0.0	-	-	6.6	0.0	3.0	25.0	-	-	3.4	25.0	50.0	0.0	-	-	28.6	0.0	50.0	7.4	-	-	7.7	5.8
Articulated Trucks	0	4	0	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	4
% Articulated Trucks	0.0	2.1	0.0	-	-	1.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.7
Bicycles on Road	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
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 cdowness@ptsI.com

Count Name: York Road & Concession 6 Road
Site Code: 240204
Start Date: 05/23/2024
Page No: 7



Turning Movement Peak Hour Data Plot (11:00 AM)

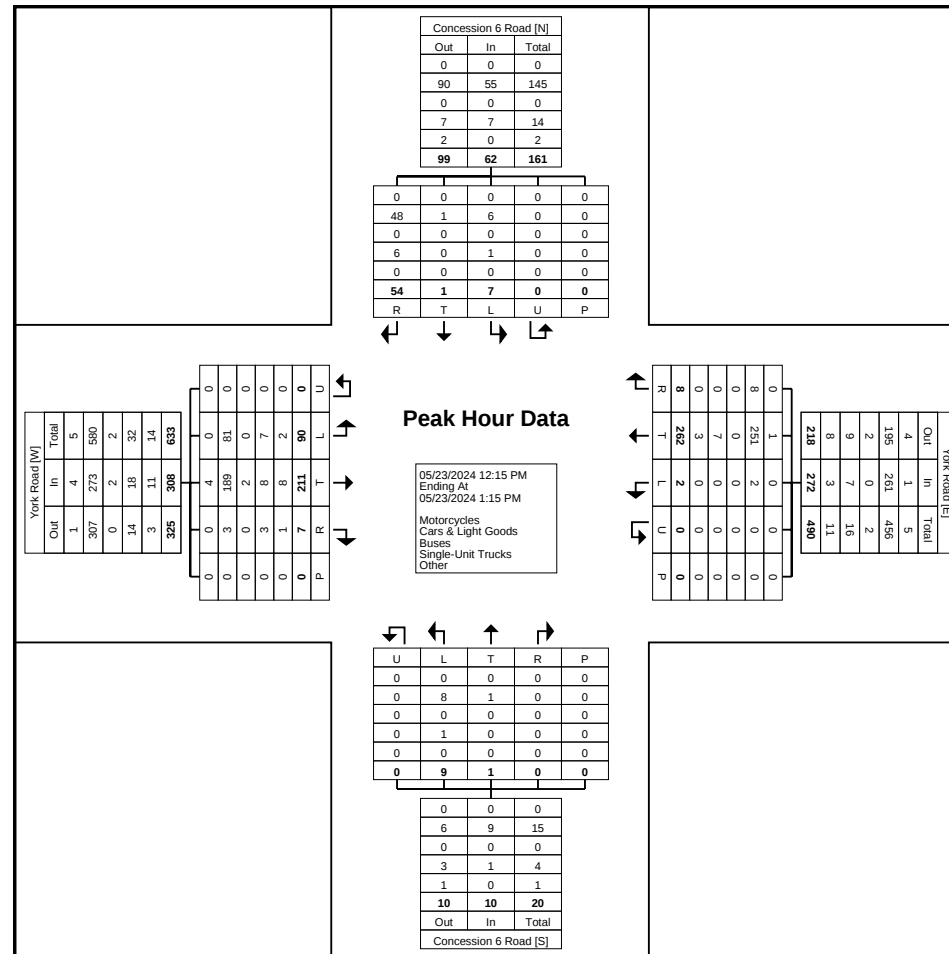
Start Time	York Road Eastbound						York Road Westbound						Concession 6 Road Northbound						Concession 6 Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	27	63	0	0	0	90	0	58	4	0	0	62	2	0	0	0	0	2	1	1	11	0	0	13	167
12:30 PM	22	38	1	0	0	61	1	69	1	0	0	71	3	0	0	0	0	3	1	0	14	0	0	15	150
12:45 PM	22	54	1	0	0	77	0	80	1	0	0	81	3	0	0	0	0	3	4	0	17	0	0	21	182
1:00 PM	19	56	5	0	0	80	1	55	2	0	0	58	1	1	0	0	0	2	1	0	12	0	0	13	153
Total	90	211	7	0	0	308	2	262	8	0	0	272	9	1	0	0	0	10	7	1	54	0	0	62	652
Approach %	29.2	68.5	2.3	0.0	-	-	0.7	96.3	2.9	0.0	-	-	90.0	10.0	0.0	0.0	-	-	11.3	1.6	87.1	0.0	-	-	-
Total %	13.8	32.4	1.1	0.0	-	47.2	0.3	40.2	1.2	0.0	-	41.7	1.4	0.2	0.0	0.0	-	1.5	1.1	0.2	8.3	0.0	-	9.5	-
PHF	0.833	0.837	0.350	0.000	-	0.856	0.500	0.819	0.500	0.000	-	0.840	0.750	0.250	0.000	0.000	-	0.833	0.438	0.250	0.794	0.000	-	0.738	0.896
Motorcycles	0	4	0	0	-	4	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	5
% Motorcycles	0.0	1.9	0.0	-	-	1.3	0.0	0.4	0.0	-	-	0.4	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.8
Cars & Light Goods	81	189	3	0	-	273	2	251	8	0	-	261	8	1	0	0	-	9	6	1	48	0	-	55	598
% Cars & Light Goods	90.0	89.6	42.9	-	-	88.6	100.0	95.8	100.0	-	-	96.0	88.9	100.0	-	-	-	90.0	85.7	100.0	88.9	-	-	88.7	91.7
Buses	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	2
% Buses	0.0	0.9	0.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3
Single-Unit Trucks	7	8	3	0	-	18	0	7	0	0	-	7	1	0	0	0	-	1	1	0	6	0	-	7	33
% Single-Unit Trucks	7.8	3.8	42.9	-	-	5.8	0.0	2.7	0.0	-	-	2.6	11.1	0.0	-	-	-	10.0	14.3	0.0	11.1	-	-	11.3	5.1
Articulated Trucks	2	8	1	0	-	11	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	14
% Articulated Trucks	2.2	3.8	14.3	-	-	3.6	0.0	1.1	0.0	-	-	1.1	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	2.1
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
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



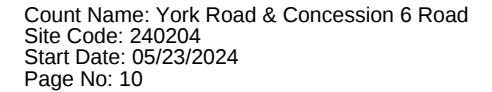
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: York Road & Concession 6 Road
Site Code: 240204
Start Date: 05/23/2024
Page No: 9



Turning Movement Peak Hour Data Plot (12:15 PM)



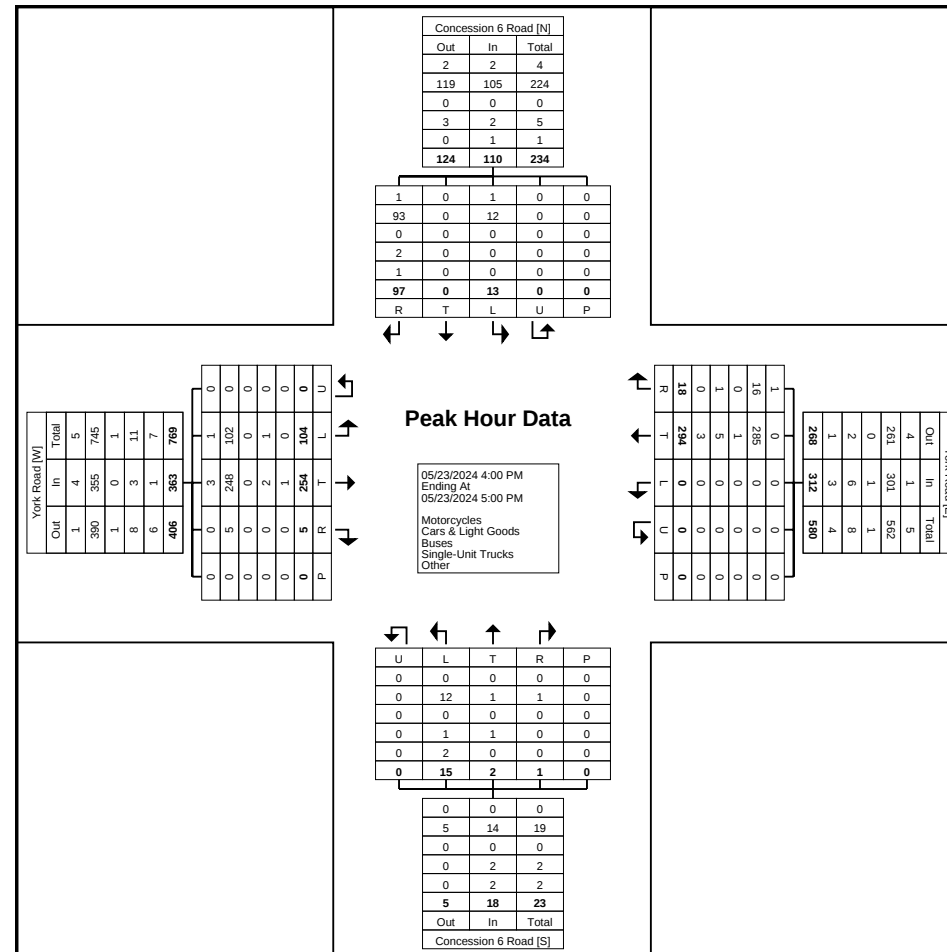
Start Time	York Road Eastbound						York Road Westbound						Concession 6 Road Northbound						Concession 6 Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	18	66	1	0	0	85	0	77	6	0	0	83	3	2	0	0	0	5	4	0	23	0	0	27	200
4:15 PM	17	59	1	0	0	77	0	78	3	0	0	81	3	0	0	0	0	3	4	0	20	0	0	24	185
4:30 PM	35	56	2	0	0	93	0	71	5	0	0	76	8	0	1	0	0	9	2	0	23	0	0	25	203
4:45 PM	34	73	1	0	0	108	0	68	4	0	0	72	1	0	0	0	0	1	3	0	31	0	0	34	215
Total	104	254	5	0	0	363	0	294	18	0	0	312	15	2	1	0	0	18	13	0	97	0	0	110	803
Approach %	28.7	70.0	1.4	0.0	-	-	0.0	94.2	5.8	0.0	-	-	83.3	11.1	5.6	0.0	-	-	11.8	0.0	88.2	0.0	-	-	-
Total %	13.0	31.6	0.6	0.0	-	45.2	0.0	36.6	2.2	0.0	-	38.9	1.9	0.2	0.1	0.0	-	2.2	1.6	0.0	12.1	0.0	-	13.7	-
PHF	0.743	0.870	0.625	0.000	-	0.840	0.000	0.942	0.750	0.000	-	0.940	0.469	0.250	0.250	0.000	-	0.500	0.813	0.000	0.782	0.000	-	0.809	0.934
Motorcycles	1	3	0	0	-	4	0	0	1	0	-	1	0	0	0	0	-	0	1	0	1	0	-	2	7
% Motorcycles	1.0	1.2	0.0	-	-	1.1	-	0.0	5.6	-	-	0.3	0.0	0.0	0.0	-	-	0.0	7.7	-	1.0	-	-	1.8	0.9
Cars & Light Goods	102	248	5	0	-	355	0	285	16	0	-	301	12	1	1	0	-	14	12	0	93	0	-	105	775
% Cars & Light Goods	98.1	97.6	100.0	-	-	97.8	-	96.9	88.9	-	-	96.5	80.0	50.0	100.0	-	-	77.8	92.3	-	95.9	-	-	95.5	96.5
Buses	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	-	0.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.1
Single-Unit Trucks	1	2	0	0	-	3	0	5	1	0	-	6	1	1	0	0	-	2	0	0	2	0	-	2	13
% Single-Unit Trucks	1.0	0.8	0.0	-	-	0.8	-	1.7	5.6	-	-	1.9	6.7	50.0	0.0	-	-	11.1	0.0	-	2.1	-	-	1.8	1.6
Articulated Trucks	0	1	0	0	-	1	0	3	0	0	-	3	2	0	0	0	-	2	0	0	1	0	-	1	7
% Articulated Trucks	0.0	0.4	0.0	-	-	0.3	-	1.0	0.0	-	-	1.0	13.3	0.0	0.0	-	-	11.1	0.0	-	1.0	-	-	0.9	0.9
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
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@ptsI.com

Count Name: York Road & Concession 6 Road
Site Code: 240204
Start Date: 05/23/2024
Page No: 11



Turning Movement Peak Hour Data Plot (4:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: York Road & Concession 6 Road -
Saturday
Site Code: 240204
Start Date: 05/25/2024
Page No: 1

Turning Movement Data

Start Time	York Road Eastbound						York Road Westbound						Concession 6 Road Northbound						Concession 6 Road 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	
10:00 AM	22	28	2	1	0	53	2	52	3	0	0	57	0	0	2	0	0	2	0	0	13	0	0	13	125
10:15 AM	26	35	2	0	0	63	2	44	3	0	0	49	0	2	0	0	0	2	2	0	16	0	0	18	132
10:30 AM	22	32	1	0	0	55	0	57	2	0	0	59	1	0	1	0	0	2	0	0	15	0	0	15	131
10:45 AM	23	56	2	0	0	81	1	53	3	0	0	57	2	0	0	0	0	2	4	0	14	0	0	18	158
Hourly Total	93	151	7	1	0	252	5	206	11	0	0	222	3	2	3	0	0	8	6	0	58	0	0	64	546
11:00 AM	17	37	0	0	0	54	1	62	1	0	0	64	0	1	0	0	0	1	3	0	19	0	0	22	141
11:15 AM	23	44	0	0	0	67	2	58	3	0	0	63	3	1	1	0	0	5	2	0	12	0	0	14	149
11:30 AM	28	41	1	0	0	70	0	49	3	0	0	52	0	0	1	0	0	1	1	0	15	0	0	16	139
11:45 AM	23	46	0	0	0	69	0	60	2	0	0	62	1	0	1	0	0	2	4	2	8	0	0	14	147
Hourly Total	91	168	1	0	0	260	3	229	9	0	0	241	4	2	3	0	0	9	10	2	54	0	0	66	576
12:00 PM	25	63	3	0	0	91	0	57	2	0	0	59	1	0	0	0	0	1	4	1	14	0	0	19	170
12:15 PM	12	54	3	0	0	69	0	56	4	0	0	60	0	0	0	0	0	0	3	1	10	0	0	14	143
12:30 PM	15	53	0	0	0	68	1	66	2	0	0	69	0	0	1	0	0	1	2	0	11	0	0	13	151
12:45 PM	29	39	0	0	0	68	0	53	4	0	0	57	1	0	1	0	0	2	2	0	9	0	0	11	138
Hourly Total	81	209	6	0	0	296	1	232	12	0	0	245	2	0	2	0	0	4	11	2	44	0	0	57	602
1:00 PM	18	44	3	0	0	65	0	58	7	1	0	66	1	0	2	0	0	3	6	0	11	0	0	17	151
1:15 PM	21	35	2	0	0	58	0	53	4	0	0	57	1	0	3	0	0	4	4	0	10	0	0	14	133
1:30 PM	20	42	1	0	0	63	0	60	6	0	0	66	0	0	0	0	0	0	2	0	10	0	0	12	141
1:45 PM	26	58	0	0	0	84	0	47	3	0	0	50	2	0	0	0	0	2	2	0	11	0	0	13	149
Hourly Total	85	179	6	0	0	270	0	218	20	1	0	239	4	0	5	0	0	9	14	0	42	0	0	56	574
2:00 PM	17	46	0	0	0	63	0	46	5	1	0	52	1	0	0	0	0	1	3	0	10	0	0	13	129
2:15 PM	19	41	0	0	0	60	0	62	3	0	0	65	2	1	0	0	0	3	4	0	15	0	0	19	147
2:30 PM	22	52	1	0	0	75	0	52	4	0	0	56	2	0	0	0	0	2	4	1	13	0	0	18	151
2:45 PM	12	49	3	1	0	65	0	65	3	0	0	68	4	0	0	0	0	4	5	0	17	0	0	22	159
Hourly Total	70	188	4	1	0	263	0	225	15	1	0	241	9	1	0	0	0	10	16	1	55	0	0	72	586
3:00 PM	17	45	2	0	0	64	0	50	3	0	0	53	1	0	1	0	0	2	2	0	24	0	0	26	145
3:15 PM	20	33	0	1	0	54	0	41	4	0	0	45	1	0	0	0	0	1	1	0	18	0	0	19	119
3:30 PM	20	43	2	0	0	65	1	57	5	0	0	63	1	0	3	0	0	4	3	1	9	0	0	13	145
3:45 PM	23	39	1	0	0	63	3	60	3	0	0	66	1	0	0	0	0	1	0	0	16	0	0	16	146
Hourly Total	80	160	5	1	0	246	4	208	15	0	0	227	4	0	4	0	0	8	6	1	67	0	0	74	555
4:00 PM	19	57	1	0	0	77	1	62	6	0	0	69	2	0	0	0	0	2	6	1	23	0	0	30	178
4:15 PM	18	49	1	0	0	68	0	58	1	0	0	59	0	0	1	0	0	1	1	0	19	0	0	20	148
4:30 PM	27	39	0	0	0	66	0	54	2	0	0	56	1	0	0	0	0	1	3	0	15	0	0	18	141
4:45 PM	23	50	1	0	0	74	0	54	3	0	0	57	1	2	0	0	0	3	2	0	19	0	0	21	155
Hourly Total	87	195	3	0	0	285	1	228	12	0	0	241	4	2	1	0	0	7	12	1	76	0	0	89	622

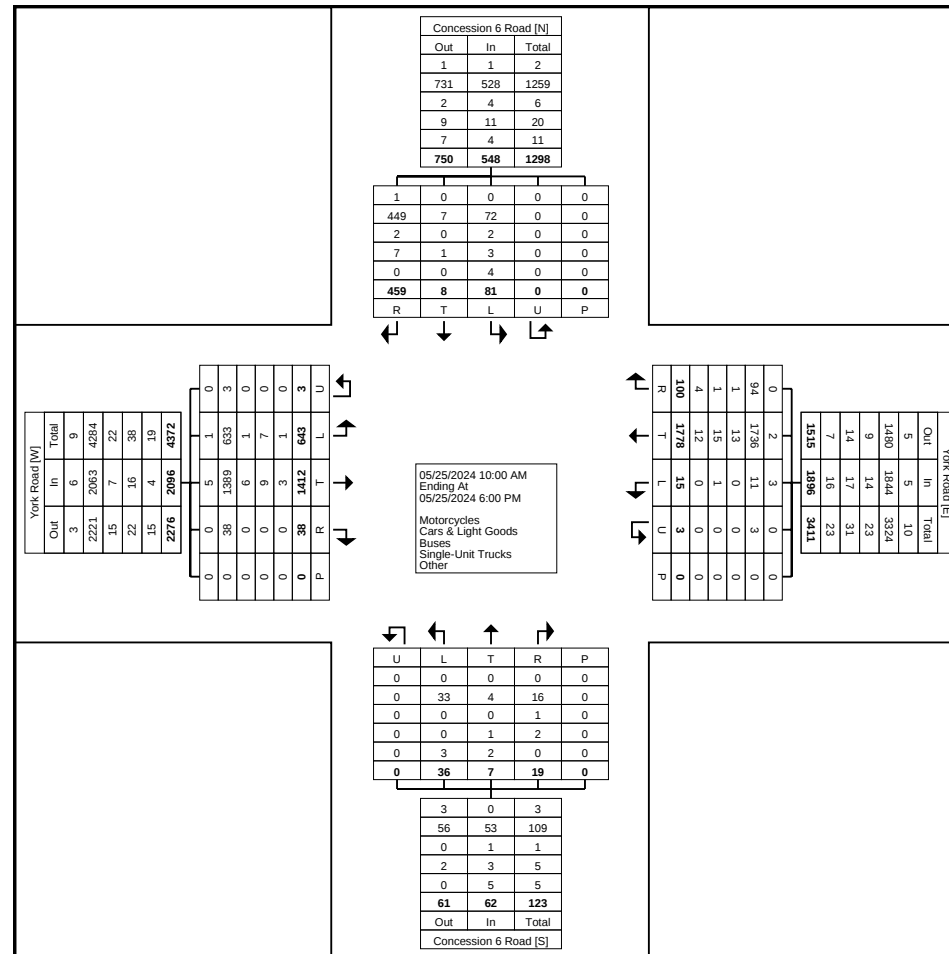
5:00 PM	18	43	1	0	0	62	0	65	3	0	0	68	0	0	0	0	0	0	1	0	19	0	0	20	150
5:15 PM	17	31	1	0	0	49	0	52	1	0	0	53	3	0	0	0	0	3	2	0	18	0	0	20	125
5:30 PM	11	39	1	0	0	51	1	64	0	0	0	65	2	0	0	0	0	2	2	1	14	0	0	17	135
5:45 PM	10	49	3	0	0	62	0	51	2	1	0	54	1	0	1	0	0	2	1	0	12	0	0	13	131
Hourly Total	56	162	6	0	0	224	1	232	6	1	0	240	6	0	1	0	0	7	6	1	63	0	0	70	541
Grand Total	643	1412	38	3	0	2096	15	1778	100	3	0	1896	36	7	19	0	0	62	81	8	459	0	0	548	4602
Approach %	30.7	67.4	1.8	0.1	-	-	0.8	93.8	5.3	0.2	-	-	58.1	11.3	30.6	0.0	-	-	14.8	1.5	83.8	0.0	-	-	-
Total %	14.0	30.7	0.8	0.1	-	45.5	0.3	38.6	2.2	0.1	-	41.2	0.8	0.2	0.4	0.0	-	1.3	1.8	0.2	10.0	0.0	-	11.9	-
Motorcycles	1	5	0	0	-	6	3	2	0	0	-	5	0	0	0	0	-	0	0	0	1	0	-	1	12
% Motorcycles	0.2	0.4	0.0	0.0	-	0.3	20.0	0.1	0.0	0.0	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.2	-	-	0.2	0.3
Cars & Light Goods	633	1389	38	3	-	2063	11	1736	94	3	-	1844	33	4	16	0	-	53	72	7	449	0	-	528	4488
% Cars & Light Goods	98.4	98.4	100.0	100.0	-	98.4	73.3	97.6	94.0	100.0	-	97.3	91.7	57.1	84.2	-	-	85.5	88.9	87.5	97.8	-	-	96.4	97.5
Buses	1	6	0	0	-	7	0	13	1	0	-	14	0	0	1	0	-	1	2	0	2	0	-	4	26
% Buses	0.2	0.4	0.0	0.0	-	0.3	0.0	0.7	1.0	0.0	-	0.7	0.0	0.0	5.3	-	-	1.6	2.5	0.0	0.4	-	-	0.7	0.6
Single-Unit Trucks	7	9	0	0	-	16	1	15	1	0	-	17	0	1	2	0	-	3	3	1	7	0	-	11	47
% Single-Unit Trucks	1.1	0.6	0.0	0.0	-	0.8	6.7	0.8	1.0	0.0	-	0.9	0.0	14.3	10.5	-	-	4.8	3.7	12.5	1.5	-	-	2.0	1.0
Articulated Trucks	1	3	0	0	-	4	0	11	0	0	-	11	0	0	0	0	-	0	0	0	0	0	-	0	15
% Articulated Trucks	0.2	0.2	0.0	0.0	-	0.2	0.0	0.6	0.0	0.0	-	0.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	0	1	4	0	-	5	3	2	0	0	-	5	4	0	0	0	-	4	14
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	4.0	0.0	-	0.3	8.3	28.6	0.0	-	-	8.1	4.9	0.0	0.0	-	-	0.7	0.3
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@pts1.com

Count Name: York Road & Concession 6 Road -
Saturday
Site Code: 240204
Start Date: 05/25/2024
Page No: 3



Turning Movement Data Plot

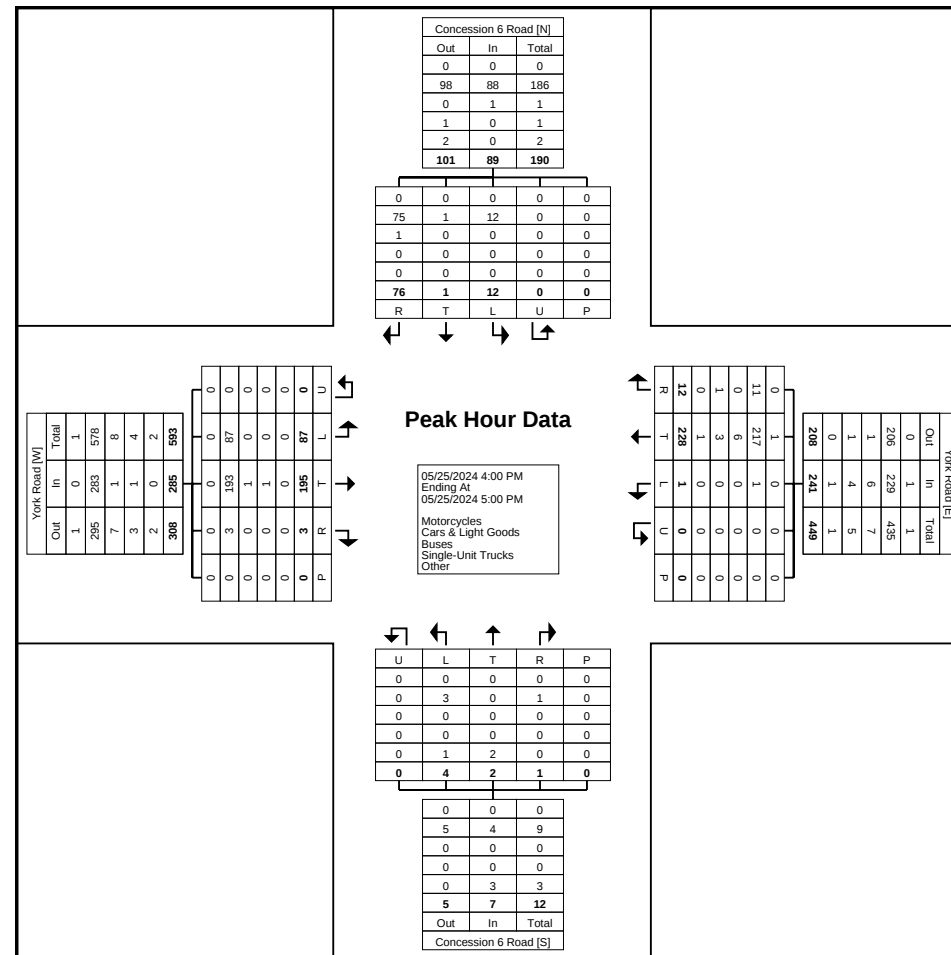
Start Time	York Road Eastbound						York Road Westbound						Concession 6 Road Northbound						Concession 6 Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	19	57	1	0	0	77	1	62	6	0	0	69	2	0	0	0	0	2	6	1	23	0	0	30	178
4:15 PM	18	49	1	0	0	68	0	58	1	0	0	59	0	0	1	0	0	1	1	0	19	0	0	20	148
4:30 PM	27	39	0	0	0	66	0	54	2	0	0	56	1	0	0	0	0	1	3	0	15	0	0	18	141
4:45 PM	23	50	1	0	0	74	0	54	3	0	0	57	1	2	0	0	0	3	2	0	19	0	0	21	155
Total	87	195	3	0	0	285	1	228	12	0	0	241	4	2	1	0	0	7	12	1	76	0	0	89	622
Approach %	30.5	68.4	1.1	0.0	-	-	0.4	94.6	5.0	0.0	-	-	57.1	28.6	14.3	0.0	-	-	13.5	1.1	85.4	0.0	-	-	-
Total %	14.0	31.4	0.5	0.0	-	45.8	0.2	36.7	1.9	0.0	-	38.7	0.6	0.3	0.2	0.0	-	1.1	1.9	0.2	12.2	0.0	-	14.3	-
PHF	0.806	0.855	0.750	0.000	-	0.925	0.250	0.919	0.500	0.000	-	0.873	0.500	0.250	0.250	0.000	-	0.583	0.500	0.250	0.826	0.000	-	0.742	0.874
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Cars & Light Goods	87	193	3	0	-	283	1	217	11	0	-	229	3	0	1	0	-	4	12	1	75	0	-	88	604
% Cars & Light Goods	100.0	99.0	100.0	-	-	99.3	100.0	95.2	91.7	-	-	95.0	75.0	0.0	100.0	-	-	57.1	100.0	100.0	98.7	-	-	98.9	97.1
Buses	0	1	0	0	-	1	0	6	0	0	-	6	0	0	0	0	-	0	0	0	1	0	-	1	8
% Buses	0.0	0.5	0.0	-	-	0.4	0.0	2.6	0.0	-	-	2.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.3	-	-	1.1	1.3
Single-Unit Trucks	0	1	0	0	-	1	0	3	1	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	5
% Single-Unit Trucks	0.0	0.5	0.0	-	-	0.4	0.0	1.3	8.3	-	-	1.7	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.8
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	1	2	0	0	-	3	0	0	0	0	-	0	3
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	25.0	100.0	0.0	-	-	42.9	0.0	0.0	0.0	-	-	0.0	0.5
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@ptsll.com

Count Name: York Road & Concession 6 Road -
Saturday
Site Code: 240204
Start Date: 05/25/2024
Page No: 5



Turning Movement Peak Hour Data Plot (4:00 PM)

Appendix C

Base Year Synchro Reports



Lanes, Volumes, Timings
1: Concession Road 6 & York Road

Base
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	95	186	2	3	258	6	9	1	2	8	4	58
Future Volume (vph)	95	186	2	3	258	6	9	1	2	8	4	58
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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	0.999			0.997			0.979			0.887		
Flt Protected	0.983						0.963			0.994		
Satd. Flow (prot)	0	1366	0	0	1410	0	0	1204	0	0	1221	0
Flt Permitted	0.983						0.963			0.994		
Satd. Flow (perm)	0	1366	0	0	1410	0	0	1204	0	0	1221	0
Link Speed (k/h)	80			80			60			60		
Link Distance (m)	399.7			159.9			252.6			81.7		
Travel Time (s)	18.0			7.2			15.2			4.9		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	6%	7%	0%	0%	5%	0%	11%	0%	50%	0%	25%	7%
Adj. Flow (vph)	107	209	2	3	290	7	10	1	2	9	4	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	318	0	0	300	0	0	13	0	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop			Stop			Stop			Stop		

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 52.8%
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
1: Concession Road 6 & York Road

Base
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	95	186	2	3	258	6	9	1	2	8	4	58
Future Volume (vph)	95	186	2	3	258	6	9	1	2	8	4	58
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	107	209	2	3	290	7	10	1	2	9	4	65
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	318	300	13	78								
Volume Left (vph)	107	3	10	9								
Volume Right (vph)	2	7	2	65								
Hadj (s)	0.18	0.07	0.34	-0.36								
Departure Headway (s)	4.7	4.6	5.8	5.0								
Degree Utilization, x	0.41	0.38	0.02	0.11								
Capacity (veh/h)	753	759	535	638								
Control Delay (s)	10.9	10.4	8.9	8.6								
Approach Delay (s)	10.9	10.4	8.9	8.6								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay		10.4										
Level of Service		B										
Intersection Capacity Utilization		52.8%		ICU Level of Service					A			
Analysis Period (min)		15										

Queuing and Blocking Report

Base
AM Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	22.7	23.5	13.2	20.8
Average Queue (m)	13.7	13.6	2.7	9.2
95th Queue (m)	21.0	21.1	9.9	16.0
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Lanes, Volumes, Timings 1: Concession Road 6 & York Road

Base
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group												
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	104	254	5	0	294	18	15	2	1	13	0	97
Future Volume (vph)	104	254	5	0	294	18	15	2	1	13	0	97
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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		0.998			0.992			0.993			0.881	
Flt Protected		0.986						0.960			0.994	
Satd. Flow (prot)	0	1445	0	0	1426	0	0	1158	0	0	1265	0
Flt Permitted		0.986						0.960			0.994	
Satd. Flow (perm)	0	1445	0	0	1426	0	0	1158	0	0	1265	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		399.7			159.9			252.6			81.7	
Travel Time (s)		18.0			7.2			15.2			4.9	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	0%	0%	3%	6%	20%	50%	0%	0%	0%	3%
Adj. Flow (vph)	112	273	5	0	316	19	16	2	1	14	0	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	390	0	0	335	0	0	19	0	0	118	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 64.4%

ICU Level of Service C

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 1: Concession Road 6 & York Road

Base
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	104	254	5	0	294	18	15	2	1	13	0	97
Future Volume (vph)	104	254	5	0	294	18	15	2	1	13	0	97
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	112	273	5	0	316	19	16	2	1	14	0	104
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	390	335	19	118								
Volume Left (vph)	112	0	16	14								
Volume Right (vph)	5	19	1	104								
Hadj (s)	0.07	0.02	0.51	-0.46								
Departure Headway (s)	4.8	4.8	6.4	5.2								
Degree Utilization, x	0.52	0.45	0.03	0.17								
Capacity (veh/h)	727	725	477	609								
Control Delay (s)	12.7	11.6	9.6	9.3								
Approach Delay (s)	12.7	11.6	9.6	9.3								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay				11.7								
Level of Service				B								
Intersection Capacity Utilization				64.4%	ICU Level of Service			C				
Analysis Period (min)				15								

Queuing and Blocking Report

Base
PM Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	27.5	25.5	18.3	20.0
Average Queue (m)	14.2	13.6	4.4	9.2
95th Queue (m)	22.1	22.0	13.7	14.6
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Lanes, Volumes, Timings

1: Concession Road 6 & York Road

Base

Sat Peak Hour

	↖	→	↘	↙	←	↖	↙	↗	↘	↖	↘	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	87	195	3	1	228	12	4	2	1	12	1	76
Future Volume (vph)	87	195	3	1	228	12	4	2	1	12	1	76
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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	0.999				0.993			0.983			0.885	
Flt Protected		0.985						0.970			0.993	
Satd. Flow (prot)	0	1449	0	0	1413	0	0	1414	0	0	1292	0
Flt Permitted		0.985						0.970			0.993	
Satd. Flow (perm)	0	1449	0	0	1413	0	0	1414	0	0	1292	0
Link Speed (k/h)	80				80			60			60	
Link Distance (m)	399.7				159.9			252.6			81.7	
Travel Time (s)	18.0				7.2			15.2			4.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	1%	0%	0%	4%	8%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	100	224	3	1	262	14	5	2	1	14	1	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	327	0	0	277	0	0	8	0	0	102	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 52.8%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

1: Concession Road 6 & York Road

Base

Sat Peak Hour

	↖	→	↘	↙	←	↖	↙	↗	↘	↖	↘	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	87	195	3	1	228	12	4	2	1	12	1	76
Future Volume (vph)	87	195	3	1	228	12	4	2	1	12	1	76
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	100	224	3	1	262	14	5	2	1	14	1	87
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	327	277	8	102								
Volume Left (vph)	100	1	5	14								
Volume Right (vph)	3	14	1	87								
Hadj (s)	0.07	0.04	0.05	-0.47								
Departure Headway (s)	4.6	4.6	5.5	4.8								
Degree Utilization, x	0.41	0.35	0.01	0.14								
Capacity (veh/h)	767	754	559	663								
Control Delay (s)	10.8	10.1	8.6	8.6								
Approach Delay (s)	10.8	10.1	8.6	8.6								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay		10.2										
Level of Service		B										
Intersection Capacity Utilization		52.8%			ICU Level of Service					A		
Analysis Period (min)		15										

Queuing and Blocking Report

Base
Sat Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	17.8	25.7	8.6	15.8
Average Queue (m)	11.1	13.3	1.2	7.9
95th Queue (m)	16.4	21.8	6.0	12.9
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Appendix D

Proxy Site Survey Data



Study Name 1267 Niagara Stone Road

Start Date 07/11/2024

Start Time 7:00 AM

Site Code 240204

Weekday

Start Time	15 min		Hour Sum	
	Inbound	Outbound	Inbound	Outbound
7:00 AM	0	0		
7:15 AM	0	0		
7:30 AM	0	0		
7:45 AM	0	0	0	0
8:00 AM	0	0	0	0
8:15 AM	0	0	0	0
8:30 AM	0	0	0	0
8:45 AM	2	0	2	0
9:00 AM	0	0	2	0
9:15 AM	1	0	3	0
9:30 AM	1	1	4	1
9:45 AM	4	0	6	1
10:00 AM	2	4	8	5
10:15 AM	4	4	11	9
10:30 AM	3	3	13	11
10:45 AM	4	2	13	13
11:00 AM	1	4	12	13
11:15 AM	5	2	13	11
11:30 AM	8	10	18	18
11:45 AM	3	4	17	20
12:00 PM	6	4	22	20
12:15 PM	4	5	21	23
12:30 PM	4	6	17	19
12:45 PM	2	3	16	18
1:00 PM	6	1	16	15
1:15 PM	5	5	17	15
1:30 PM	1	4	14	13
1:45 PM	4	1	16	11
2:00 PM	3	5	13	15
2:15 PM	4	6	12	16
2:30 PM	4	2	15	14
2:45 PM	4	6	15	19
3:00 PM	3	3	15	17
3:15 PM	4	4	15	15
3:30 PM	5	6	16	19
3:45 PM	2	3	14	16
4:00 PM	3	4	14	17
4:15 PM	2	3	12	16
4:30 PM	5	5	12	15
4:45 PM	6	5	16	17
5:00 PM	4	6	17	19
5:15 PM	4	2	19	18
5:30 PM	1	4	15	17
5:45 PM	3	2	12	14

Peak Hour of Adjacent Road

Peak Hour of Adjacent Road

Study Name 1267 Niagara Stone Road - Saturday

Start Date 07/13/2024

Start Time 9:00 AM

Site Code 240204

Saturday

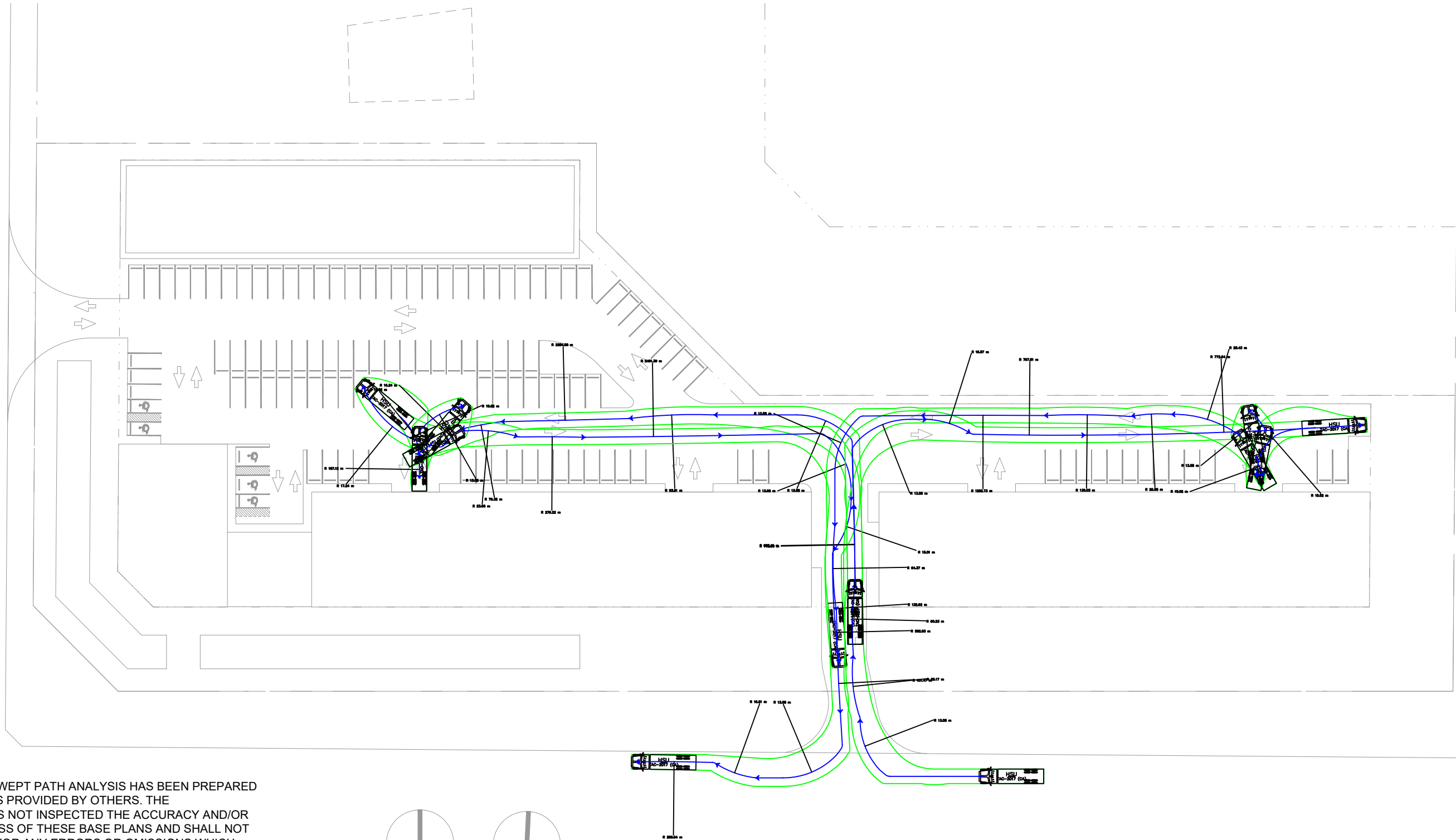
Start Time	15 min		Hour Sum	
	Inbound	Outbound	Inbound	Outbound
9:00 AM	1	0		
9:15 AM	2	2		
9:30 AM	1	1		
9:45 AM	2	0	6	3
10:00 AM	5	4	10	7
10:15 AM	4	4	12	9
10:30 AM	1	2	12	10
10:45 AM	4	3	14	13
11:00 AM	7	6	16	15
11:15 AM	4	9	16	20
11:30 AM	7	5	22	23
11:45 AM	8	8	26	28
12:00 PM	6	8	25	30
12:15 PM	6	5	27	26
12:30 PM	11	5	31	26
12:45 PM	13	5	36	23
1:00 PM	4	12	34	27
1:15 PM	9	5	37	27
1:30 PM	6	10	32	32
1:45 PM	11	8	30	35
2:00 PM	13	5	39	28
2:15 PM	12	10	42	33
2:30 PM	10	10	46	33
2:45 PM	5	9	40	34
3:00 PM	9	6	36	35
3:15 PM	13	10	37	35
3:30 PM	12	15	39	40
3:45 PM	9	6	43	37
4:00 PM	11	12	45	43
4:15 PM	12	10	44	43
4:30 PM	6	14	38	42
4:45 PM	6	3	35	39
5:00 PM	11	12	35	39
5:15 PM	6	6	29	35
5:30 PM	7	6	30	27
5:45 PM	6	5	30	29

Peak Hour of Generator

Appendix E

Vehicle Swept Path Analysis

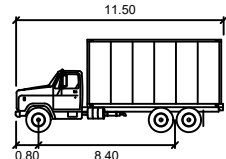




THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

NO.	DATE	INITIAL	REVISION DETAIL
3	2024-09-19	LC	UPDATED SITE PLAN
2	2024-09-10	LC	UPDATED SITE PLAN
1	2024-09-09	LC	UPDATED SITE PLAN

DESIGN VEHICLE:



HSU

meters
Width : 2.60
Track : 2.60
Lock to Lock Time : 6.0
Steering Angle : 40.0

AUTOTURN ASSESSMENT
263 CONCESSION ROAD 6
NIAGARA-ON-THE-LAKE, ON



PROJECT NO.: 240204

DATE: SEPTEMBER 2024

SCALE: 1:750

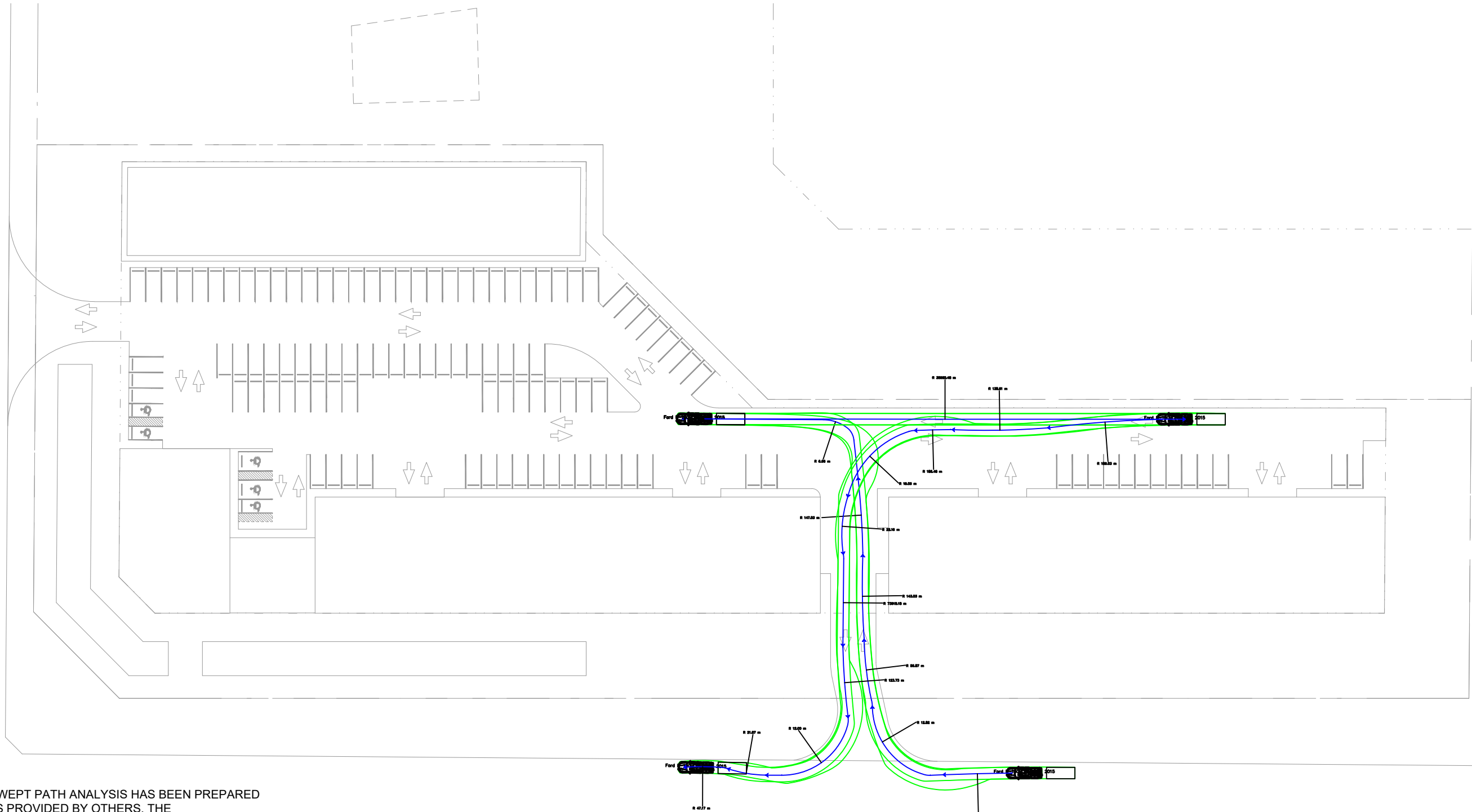
DRAWING NO.:

DRAWN: LC

DESIGN: LC

CHECK: GL

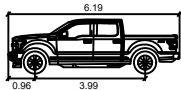
01



THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

NO.	DATE	INITIAL	REVISION DETAIL
3	2024-09-19	LC	UPDATED SITE PLAN
2	2024-09-10	LC	UPDATED SITE PLAN
1	2024-09-09	LC	UPDATED SITE PLAN

DESIGN VEHICLE:



Ford F-150 Crew Cab 2015
Width : 2.03 meters
Track : 1.98
Lock to Lock Time : 6.0
Steering Angle : 35.0

AUTOTURN ASSESSMENT
263 CONCESSION ROAD 6
NIAGARA-ON-THE-LAKE, ON



PROJECT NO.: 240204

DATE: SEPTEMBER 2024

SCALE: 1:750

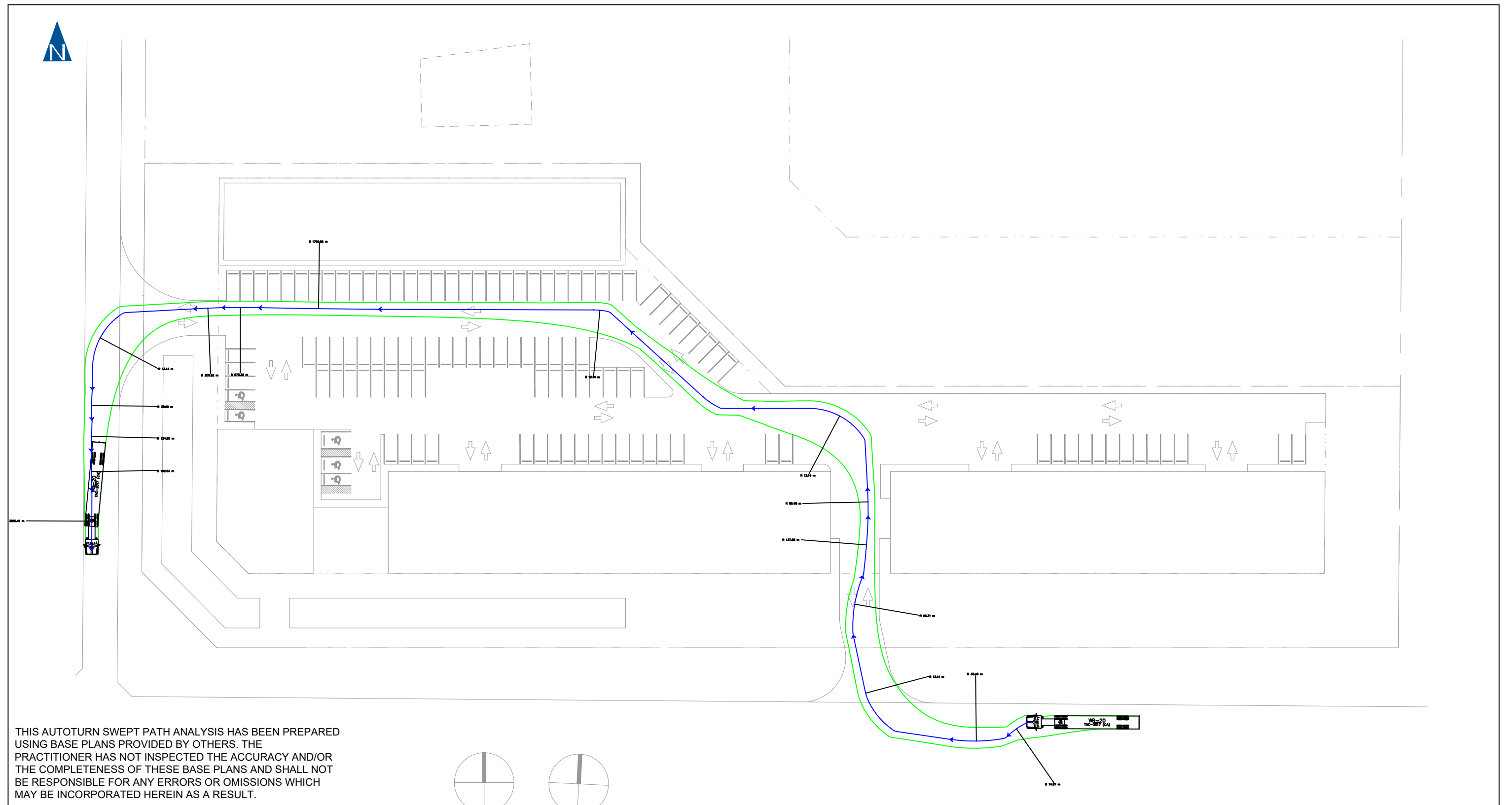
DRAWING NO.:

DRAWN: LC

DESIGN: LC

CHECK: GL

02

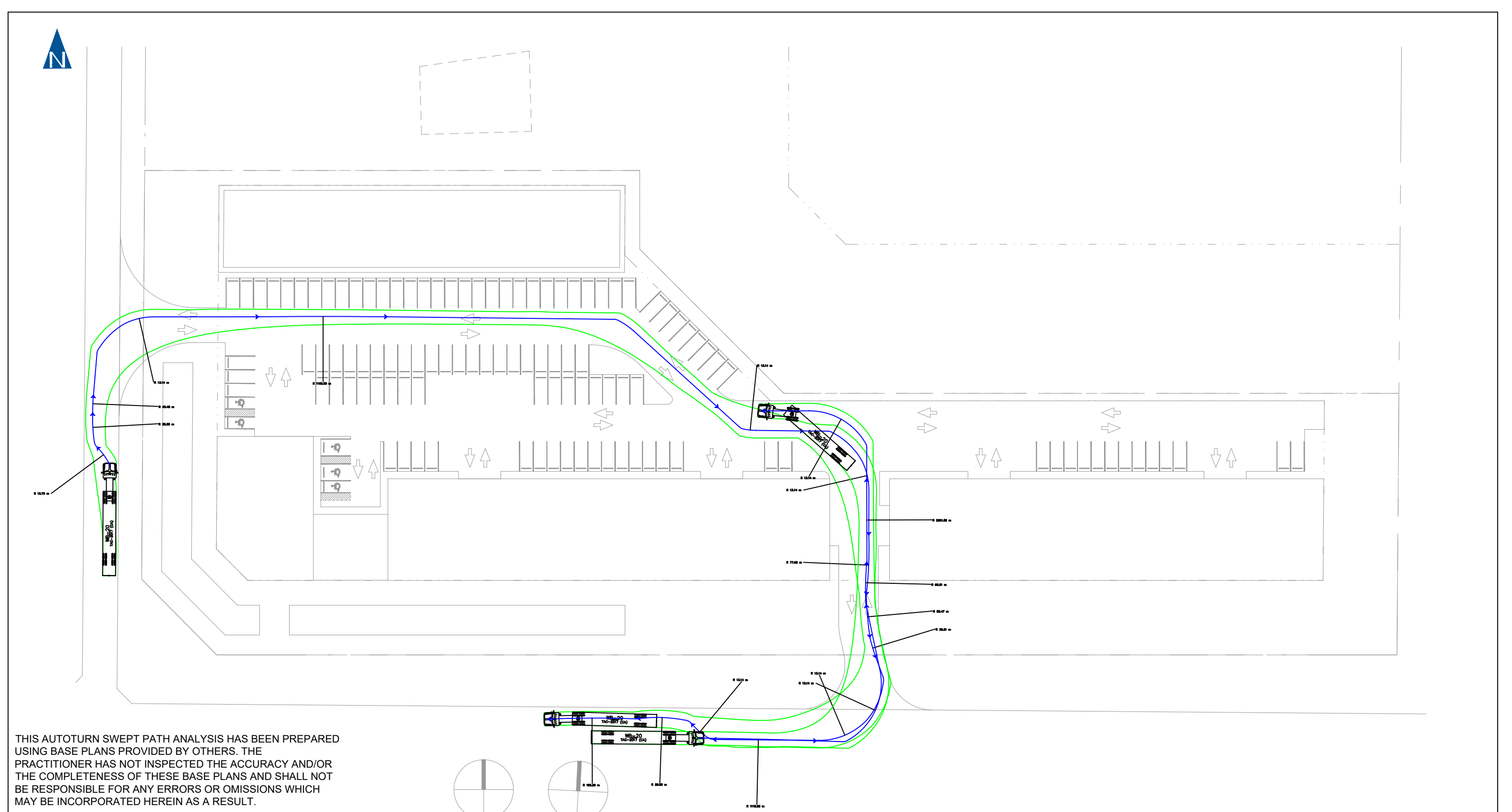


DESIGN VEHICLE:

WB-20

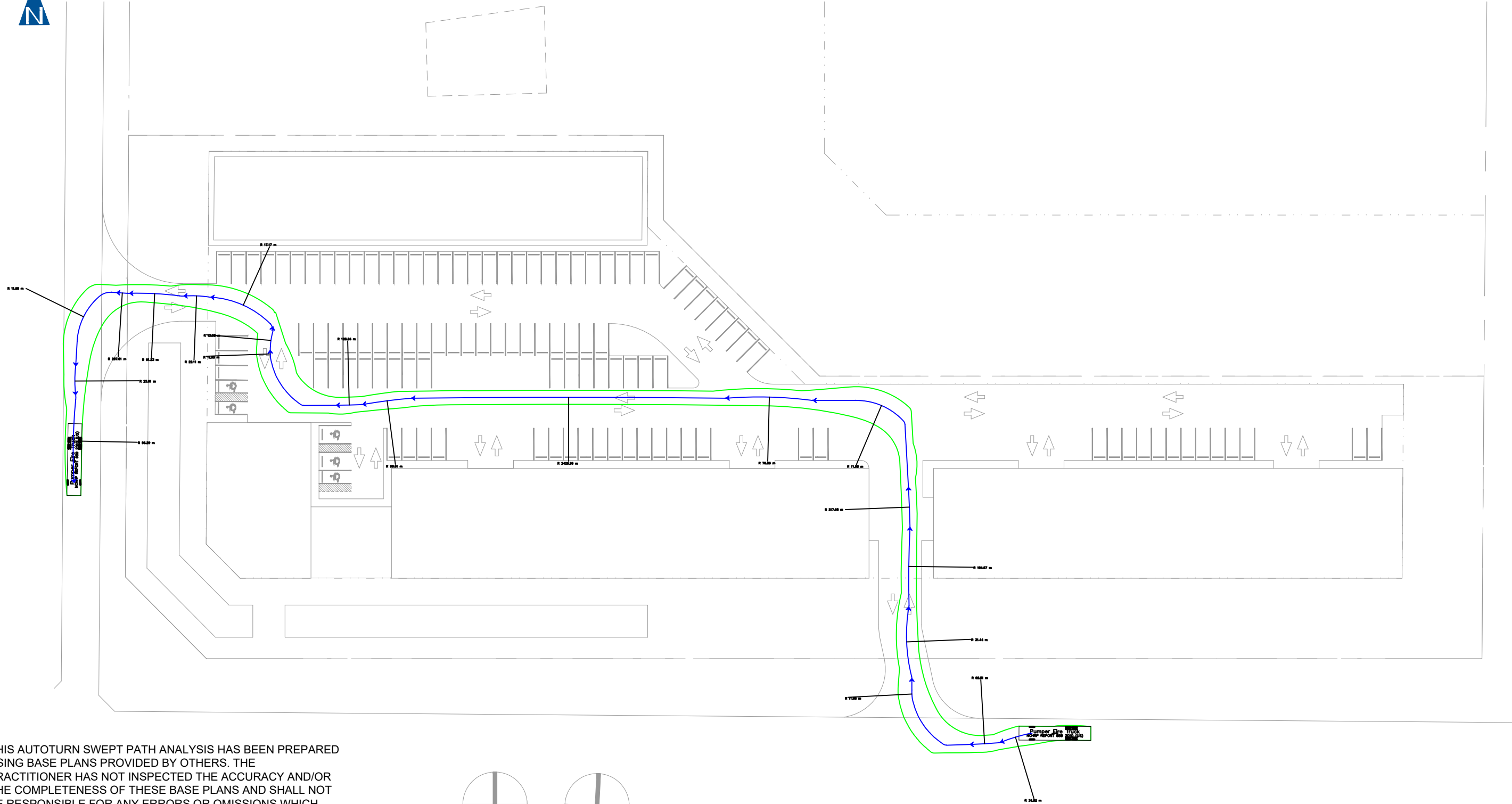
meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.0
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		



3	2024-09-19	LC	UPDATED SITE PLAN
2	2024-09-10	LC	UPDATED SITE PLAN
1	2024-09-09	LC	UPDATED SITE PLAN
NO.	DATE	INITIAL	REVISION DETAIL

04

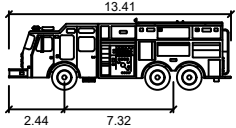


THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.



NO.	DATE	INITIAL	REVISION DETAIL
3	2024-09-19	LC	UPDATED SITE PLAN
2	2024-09-10	LC	UPDATED SITE PLAN
1	2024-09-09	LC	UPDATED SITE PLAN

DESIGN VEHICLE:



Pumper Fire Truck

Width	: 2.59
Track	: 2.59
Lock to Lock Time	: 6.0
Steering Angle	: 37.8

AUTOTURN ASSESSMENT
263 CONCESSION ROAD 6
NIAGARA-ON-THE-LAKE, ON



PROJECT NO.: 240204

DATE: SEPTEMBER 2024

SCALE: 1:750

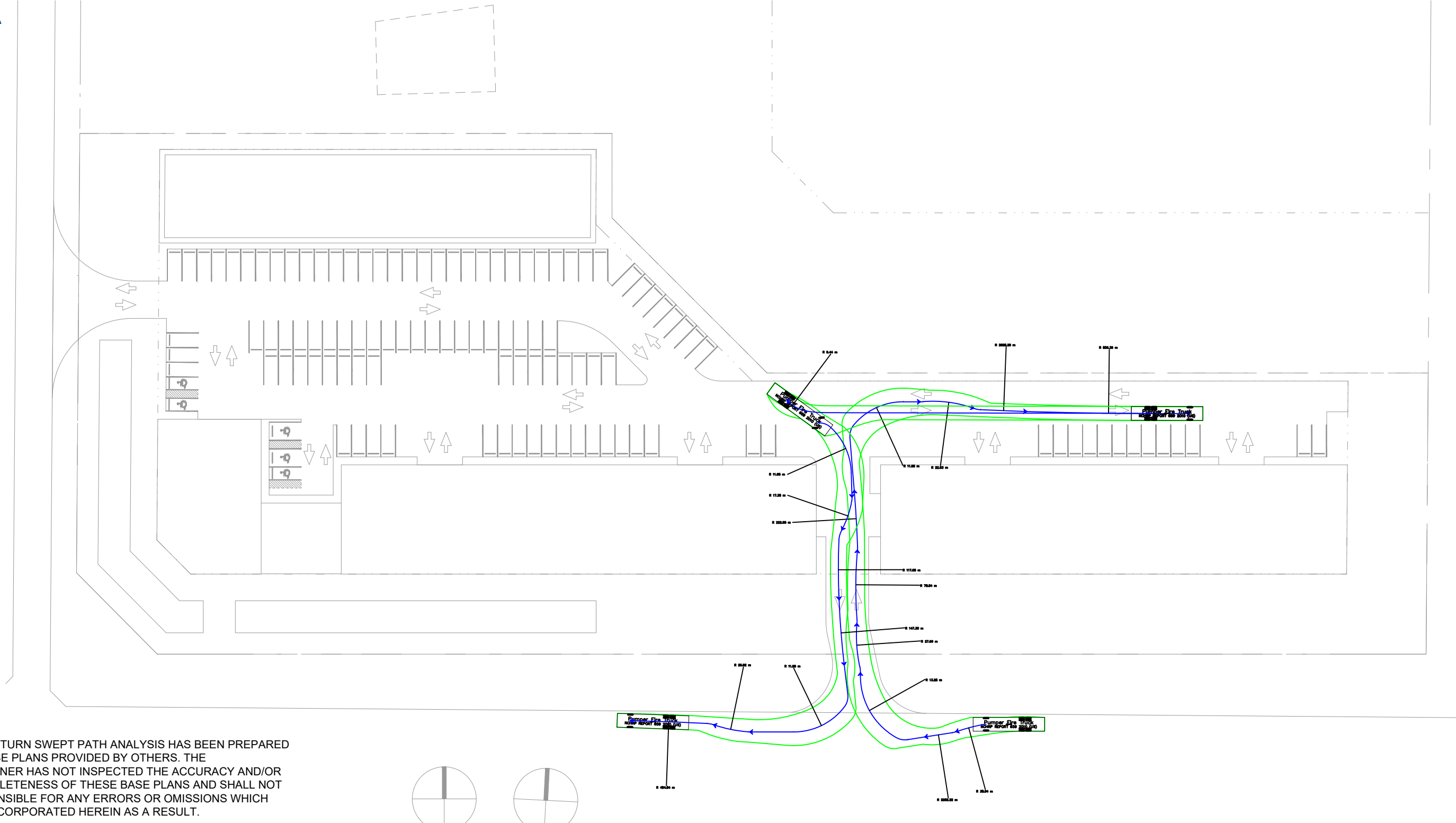
DRAWING NO.:

DRAWN: LC

DESIGN: LC

CHECK: GL

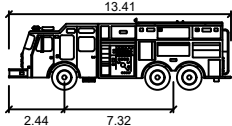
05



THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

NO.	DATE	INITIAL	REVISION DETAIL
3	2024-09-19	LC	UPDATED SITE PLAN
2	2024-09-10	LC	UPDATED SITE PLAN
1	2024-09-09	LC	UPDATED SITE PLAN

DESIGN VEHICLE:



Pumper Fire Truck

Width	: 2.59
Track	: 2.59
Lock to Lock Time	: 6.0
Steering Angle	: 37.8

AUTOTURN ASSESSMENT 263 CONCESSION ROAD 6 NIAGARA-ON-THE-LAKE, ON



PROJECT NO.: 240204

DATE: SEPTEMBER 2024

SCALE: 1:750

DRAWING NO.:

DRAWN: LC

DESIGN: LC

CHECK: GL

06

Appendix F

Future Background Synchro Reports



Lanes, Volumes, Timings
1: Concession Road 6 & York Road

Future Background
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	109	214	2	3	296	7	10	1	2	9	5	67
Future Volume (vph)	109	214	2	3	296	7	10	1	2	9	5	67
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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	0.999				0.997			0.981			0.889	
Flt Protected		0.984						0.962			0.995	
Satd. Flow (prot)	0	1367	0	0	1410	0	0	1209	0	0	1221	0
Flt Permitted		0.984						0.962			0.995	
Satd. Flow (perm)	0	1367	0	0	1410	0	0	1209	0	0	1221	0
Link Speed (k/h)	80				80			60			60	
Link Distance (m)	399.7				159.9			252.6			81.7	
Travel Time (s)	18.0				7.2			15.2			4.9	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	6%	7%	0%	0%	5%	0%	11%	0%	50%	0%	25%	7%
Adj. Flow (vph)	122	240	2	3	333	8	11	1	2	10	6	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	364	0	0	344	0	0	14	0	0	91	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 59.1%
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
1: Concession Road 6 & York Road

Future Background
AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	109	214	2	3	296	7	10	1	2	9	5	67
Future Volume (vph)	109	214	2	3	296	7	10	1	2	9	5	67
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	122	240	2	3	333	8	11	1	2	10	6	75
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	364	344	14	91								
Volume Left (vph)	122	3	11	10								
Volume Right (vph)	2	8	2	75								
Hadj (s)	0.18	0.07	0.34	-0.35								
Departure Headway (s)	4.8	4.7	6.1	5.2								
Degree Utilization, x	0.48	0.45	0.02	0.13								
Capacity (veh/h)	725	741	502	603								
Control Delay (s)	12.1	11.5	9.2	9.0								
Approach Delay (s)	12.1	11.5	9.2	9.0								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay		11.5										
Level of Service		B										
Intersection Capacity Utilization		59.1%			ICU Level of Service					B		
Analysis Period (min)		15										

Queuing and Blocking Report

Future Background
AM Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	32.6	26.9	14.3	24.1
Average Queue (m)	15.2	14.7	3.1	10.2
95th Queue (m)	24.8	22.9	10.9	18.6
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Lanes, Volumes, Timings

1: Concession Road 6 & York Road

Future Background
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group												
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	119	292	6	0	338	21	17	2	1	15	0	111
Future Volume (vph)	119	292	6	0	338	21	17	2	1	15	0	111
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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		0.998			0.992			0.994			0.881	
Frt Protected		0.986						0.959			0.994	
Satd. Flow (prot)	0	1445	0	0	1426	0	0	1160	0	0	1265	0
Frt Permitted		0.986						0.959			0.994	
Satd. Flow (perm)	0	1445	0	0	1426	0	0	1160	0	0	1265	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		399.7			159.9			252.6			81.7	
Travel Time (s)		18.0			7.2			15.2			4.9	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	0%	0%	3%	6%	20%	50%	0%	0%	0%	3%
Adj. Flow (vph)	128	314	6	0	363	23	18	2	1	16	0	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	448	0	0	386	0	0	21	0	0	135	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 72.5%

ICU Level of Service C

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 1: Concession Road 6 & York Road

Future Background
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	119	292	6	0	338	21	17	2	1	15	0	111
Future Volume (vph)	119	292	6	0	338	21	17	2	1	15	0	111
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	128	314	6	0	363	23	18	2	1	16	0	119
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	448	386	21	135								
Volume Left (vph)	128	0	18	16								
Volume Right (vph)	6	23	1	119								
Hadj (s)	0.07	0.02	0.52	-0.46								
Departure Headway (s)	4.9	5.0	6.8	5.5								
Degree Utilization, x	0.61	0.53	0.04	0.21								
Capacity (veh/h)	705	702	438	572								
Control Delay (s)	15.5	13.5	10.0	9.9								
Approach Delay (s)	15.5	13.5	10.0	9.9								
Approach LOS	C	B	B	A								
Intersection Summary												
Delay			13.8									
Level of Service			B									
Intersection Capacity Utilization			72.5%	ICU Level of Service					C			
Analysis Period (min)			15									

Queuing and Blocking Report

Future Background
PM Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	28.7	30.7	17.4	20.6
Average Queue (m)	15.4	15.8	5.0	9.9
95th Queue (m)	24.0	25.5	13.7	15.7
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Lanes, Volumes, Timings

1: Concession Road 6 & York Road

Future Background

Sat Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	100	224	3	1	262	14	5	2	1	14	1	87
Future Volume (vph)	100	224	3	1	262	14	5	2	1	14	1	87
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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	0.999			0.993			0.985			0.885		
Flt Protected	0.985						0.968			0.993		
Satd. Flow (prot)	0	1449	0	0	1413	0	0	1414	0	0	1292	0
Flt Permitted	0.985						0.968			0.993		
Satd. Flow (perm)	0	1449	0	0	1413	0	0	1414	0	0	1292	0
Link Speed (k/h)	80			80			60			60		
Link Distance (m)	399.7			159.9			252.6			81.7		
Travel Time (s)	18.0			7.2			15.2			4.9		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	1%	0%	0%	4%	8%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	115	257	3	1	301	16	6	2	1	16	1	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	375	0	0	318	0	0	9	0	0	117	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop			Stop			Stop			Stop		

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 59.1%

ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

1: Concession Road 6 & York Road

Future Background

Sat Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	100	224	3	1	262	14	5	2	1	14	1	87
Future Volume (vph)	100	224	3	1	262	14	5	2	1	14	1	87
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	115	257	3	1	301	16	6	2	1	16	1	100
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	375	318	9	117								
Volume Left (vph)	115	1	6	16								
Volume Right (vph)	3	16	1	100								
Hadj (s)	0.07	0.04	0.07	-0.47								
Departure Headway (s)	4.7	4.7	5.8	5.0								
Degree Utilization, x	0.49	0.42	0.01	0.16								
Capacity (veh/h)	738	734	520	629								
Control Delay (s)	12.1	11.0	8.9	9.0								
Approach Delay (s)	12.1	11.0	8.9	9.0								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay		11.2										
Level of Service		B										
Intersection Capacity Utilization		59.1%		ICU Level of Service					B			
Analysis Period (min)		15										

Intersection: 1: Concession Road 6 & York Road				
Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	20.5	25.0	8.7	15.8
Average Queue (m)	12.0	13.2	1.8	8.6
95th Queue (m)	18.2	21.2	7.3	12.9
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Appendix G

Future Total Synchro Reports



Lanes, Volumes, Timings

1: Concession Road 6 & York Road

Future Total

AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↖	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	116	222	2	3	302	7	10	3	2	9	6	73
Future Volume (vph)	116	222	2	3	302	7	10	3	2	9	6	73
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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	0.999				0.997			0.983			0.888	
Flt Protected		0.983						0.967			0.995	
Satd. Flow (prot)	0	1366	0	0	1410	0	0	1239	0	0	1218	0
Flt Permitted		0.983						0.967			0.995	
Satd. Flow (perm)	0	1366	0	0	1410	0	0	1239	0	0	1218	0
Link Speed (k/h)	80				80			60			60	
Link Distance (m)	399.7				159.9			252.6			81.7	
Travel Time (s)	18.0				7.2			15.2			4.9	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	6%	7%	0%	0%	5%	0%	11%	0%	50%	0%	25%	7%
Adj. Flow (vph)	130	249	2	3	339	8	11	3	2	10	7	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	381	0	0	350	0	0	16	0	0	99	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 61.2%

ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

1: Concession Road 6 & York Road

Future Total

AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↖	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	116	222	2	3	302	7	10	3	2	9	6	73
Future Volume (vph)	116	222	2	3	302	7	10	3	2	9	6	73
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	130	249	2	3	339	8	11	3	2	10	7	82
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	381	350	16	99								
Volume Left (vph)	130	3	11	10								
Volume Right (vph)	2	8	2	82								
Hadj (s)	0.18	0.07	0.30	-0.35								
Departure Headway (s)	4.8	4.8	6.1	5.3								
Degree Utilization, x	0.51	0.46	0.03	0.15								
Capacity (veh/h)	718	731	495	594								
Control Delay (s)	12.8	11.8	9.3	9.2								
Approach Delay (s)	12.8	11.8	9.3	9.2								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay		11.9										
Level of Service		B										
Intersection Capacity Utilization		61.2%		ICU Level of Service					B			
Analysis Period (min)		15										

Lanes, Volumes, Timings
2: Concession Road 6 & West Access

Future Total
AM Peak Hour

	↖	↗	↖	↗	↖	↗
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (vph)	7	3	117	9	6	81
Future Volume (vph)	7	3	117	9	6	81
Ideal Flow (vphpl)	1483	1483	1388	1388	1228	1228
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.963		0.990			
Flt Protected	0.965				0.996	
Satd. Flow (prot)	1351	0	1347	0	0	1199
Flt Permitted	0.965				0.996	
Satd. Flow (perm)	1351	0	1347	0	0	1199
Link Speed (k/h)	50		60		60	
Link Distance (m)	104.8		81.7		308.7	
Travel Time (s)	7.5		4.9		18.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	3	127	10	7	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	0	137	0	0	95
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.37	1.37	1.48	1.48	1.71	1.71
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.2%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
2: Concession Road 6 & West Access

Future Total
AM Peak Hour

	↖	↗	↖	↗	↖	↗
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	7	3	117	9	6	81
Future Volume (Veh/h)	7	3	117	9	6	81
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	3	127	10	7	88
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	132			137	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	234	132			137	
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	100			100	
cM capacity (veh/h)	751	917			1447	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	11	137	95
Volume Left	8	0	7
Volume Right	3	10	0
cSH	790	1700	1447
Volume to Capacity	0.01	0.08	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	9.6	0.0	0.6
Lane LOS	A		A
Approach Delay (s)	9.6	0.0	0.6
Approach LOS	A		

Intersection Summary

Average Delay	0.7		
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
3: York Road & East Access

Future Total
AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group						
Lane Configurations		↗	↘		↖	↗
Traffic Volume (vph)	8	225	306	15	7	6
Future Volume (vph)	8	225	306	15	7	6
Ideal Flow (vphpl)	1228	1228	1388	1388	1483	1483
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.994		0.937	
Flt Protected		0.998			0.974	
Satd. Flow (prot)	0	1202	1353	0	1327	0
Flt Permitted		0.998			0.974	
Satd. Flow (perm)	0	1202	1353	0	1327	0
Link Speed (k/h)		80	80		50	
Link Distance (m)		159.9	377.0		70.4	
Travel Time (s)		7.2	17.0		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	245	333	16	8	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	254	349	0	15	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.71	1.71	1.48	1.48	1.37	1.37
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 38.3%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
3: York Road & East Access

Future Total
AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↗	↘		↖	↗
Traffic Volume (veh/h)	8	225	306	15	7	6
Future Volume (Veh/h)	8	225	306	15	7	6
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)	9	245	333	16	8	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	349				604	341
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349				604	341
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				98	99
cM capacity (veh/h)	1210				458	701
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	254	349	15			
Volume Left	9	0	8			
Volume Right	0	16	7			
cSH	1210	1700	547			
Volume to Capacity	0.01	0.21	0.03			
Queue Length 95th (m)	0.2	0.0	0.7			
Control Delay (s)	0.4	0.0	11.8			
Lane LOS	A		B			
Approach Delay (s)	0.4	0.0	11.8			
Approach LOS			B			
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		38.3%		ICU Level of Service		A
Analysis Period (min)		15				

Queuing and Blocking Report

Future Total
AM Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	30.3	28.2	18.3	22.6
Average Queue (m)	16.4	14.5	4.2	10.5
95th Queue (m)	25.6	23.7	13.2	17.7
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Concession Road 6 & West Access

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	9.2	9.9
Average Queue (m)	2.1	0.5
95th Queue (m)	8.3	4.1
Link Distance (m)	96.1	301.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: York Road & East Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	8.7	10.2
Average Queue (m)	0.6	3.4
95th Queue (m)	4.0	10.6
Link Distance (m)	144.2	61.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

Lanes, Volumes, Timings

1: Concession Road 6 & York Road

Future Total
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group												
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	123	296	6	0	349	21	17	3	1	15	2	122
Future Volume (vph)	123	296	6	0	349	21	17	3	1	15	2	122
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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		0.998			0.992			0.994			0.881	
Flt Protected		0.986						0.961			0.995	
Satd. Flow (prot)	0	1445	0	0	1426	0	0	1150	0	0	1267	0
Flt Permitted		0.986						0.961			0.995	
Satd. Flow (perm)	0	1445	0	0	1426	0	0	1150	0	0	1267	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		399.7			159.9			252.6			81.7	
Travel Time (s)		18.0			7.2			15.2			4.9	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	0%	0%	3%	6%	20%	50%	0%	0%	0%	3%
Adj. Flow (vph)	132	318	6	0	375	23	18	3	1	16	2	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	456	0	0	398	0	0	22	0	0	149	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 74.8% ICU Level of Service D

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
1: Concession Road 6 & York Road

Future Total
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	123	296	6	0	349	21	17	3	1	15	2	122
Future Volume (vph)	123	296	6	0	349	21	17	3	1	15	2	122
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	132	318	6	0	375	23	18	3	1	16	2	131
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	456	398	22	149								
Volume Left (vph)	132	0	18	16								
Volume Right (vph)	6	23	1	131								
Hadj (s)	0.07	0.02	0.53	-0.46								
Departure Headway (s)	5.0	5.0	6.9	5.6								
Degree Utilization, x	0.64	0.56	0.04	0.23								
Capacity (veh/h)	694	689	424	566								
Control Delay (s)	16.3	14.2	10.2	10.2								
Approach Delay (s)	16.3	14.2	10.2	10.2								
Approach LOS	C	B	B	B								
Intersection Summary												
Delay				14.5								
Level of Service				B								
Intersection Capacity Utilization				74.8%	ICU Level of Service			D				
Analysis Period (min)				15								

Lanes, Volumes, Timings

2: Concession Road 6 & West Access

Future Total
PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	13	6	142	5	3	126
Future Volume (vph)	13	6	142	5	3	126
Ideal Flow (vphpl)	1483	1483	1388	1388	1228	1228
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.955		0.996			
Flt Protected	0.968					0.999
Satd. Flow (prot)	1344	0	1355	0	0	1203
Flt Permitted	0.968					0.999
Satd. Flow (perm)	1344	0	1355	0	0	1203
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		81.7			308.7
Travel Time (s)	7.5		4.9			18.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	7	154	5	3	137
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	0	159	0	0	140
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.37	1.37	1.48	1.48	1.71	1.71
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 24.0%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis

2: Concession Road 6 & West Access

Future Total
PM Peak Hour

	↖	↗	↖	↗	↖	↗
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		W		W	W
Traffic Volume (veh/h)	13	6	142	5	3	126
Future Volume (Veh/h)	13	6	142	5	3	126
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	7	154	5	3	137
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	300	156			159	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	300	156			159	
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	99			100	
cM capacity (veh/h)	690	889			1420	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	21	159	140			
Volume Left	14	0	3			
Volume Right	7	5	0			
cSH	746	1700	1420			
Volume to Capacity	0.03	0.09	0.00			
Queue Length 95th (m)	0.7	0.0	0.1			
Control Delay (s)	10.0	0.0	0.2			
Lane LOS	A		A			
Approach Delay (s)	10.0	0.0	0.2			
Approach LOS	A					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization		24.0%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings

3: York Road & East Access

Future Total
PM Peak Hour

	↖	→	←	↖	↗	↖
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		W	W		W	W
Traffic Volume (vph)	4	308	359	9	13	11
Future Volume (vph)	4	308	359	9	13	11
Ideal Flow (vphpl)	1228	1228	1388	1388	1483	1483
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997		0.938	
Flt Protected		0.999			0.974	
Satd. Flow (prot)	0	1203	1357	0	1328	0
Flt Permitted		0.999			0.974	
Satd. Flow (perm)	0	1203	1357	0	1328	0
Link Speed (k/h)		80	80		50	
Link Distance (m)		159.9	377.0		70.4	
Travel Time (s)		7.2	17.0		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	335	390	10	14	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	339	400	0	26	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.71	1.71	1.48	1.48	1.37	1.37
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 40.0%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis 3: York Road & East Access

Future Total
PM Peak Hour

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	308	359	9	13	11
Future Volume (Veh/h)	4	308	359	9	13	11
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)	4	335	390	10	14	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	400				738	395
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	400				738	395
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	98
cM capacity (veh/h)	1159				384	654
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	339	400	26			
Volume Left	4	0	14			
Volume Right	0	10	12			
cSH	1159	1700	474			
Volume to Capacity	0.00	0.24	0.05			
Queue Length 95th (m)	0.1	0.0	1.4			
Control Delay (s)	0.1	0.0	13.0			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	13.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			40.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Queuing and Blocking Report

Future Total
PM Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	33.0	37.9	20.9	21.4
Average Queue (m)	16.1	16.4	5.4	10.6
95th Queue (m)	26.1	28.3	15.7	16.8
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Concession Road 6 & West Access

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	9.2	1.7
Average Queue (m)	3.7	0.1
95th Queue (m)	10.9	1.2
Link Distance (m)	96.1	301.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: York Road & East Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	3.4	10.3
Average Queue (m)	0.1	4.9
95th Queue (m)	1.7	12.2
Link Distance (m)	144.2	61.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

Lanes, Volumes, Timings

1: Concession Road 6 & York Road

Future Total

Sat Peak Hour

	↖	→	↘	↙	←	↖	↙	↗	↘	↖	↘	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	104	229	3	1	271	14	5	3	1	14	3	95
Future Volume (vph)	104	229	3	1	271	14	5	3	1	14	3	95
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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	0.999				0.993			0.986			0.885	
Flt Protected		0.985						0.971			0.994	
Satd. Flow (prot)	0	1449	0	0	1413	0	0	1420	0	0	1294	0
Flt Permitted		0.985						0.971			0.994	
Satd. Flow (perm)	0	1449	0	0	1413	0	0	1420	0	0	1294	0
Link Speed (k/h)	80				80			60			60	
Link Distance (m)	399.7				159.9			252.6			81.7	
Travel Time (s)	18.0				7.2			15.2			4.9	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	1%	0%	0%	4%	8%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	120	263	3	1	311	16	6	3	1	16	3	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	386	0	0	328	0	0	10	0	0	128	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 61.2%

ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

1: Concession Road 6 & York Road

Future Total

Sat Peak Hour

	↖	→	↘	↙	←	↖	↙	↗	↘	↖	↘	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control	Stop				Stop			Stop			Stop	
Traffic Volume (vph)	104	229	3	1	271	14	5	3	1	14	3	95
Future Volume (vph)	104	229	3	1	271	14	5	3	1	14	3	95
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	120	263	3	1	311	16	6	3	1	16	3	109
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	386	328	10	128								
Volume Left (vph)	120	1	6	16								
Volume Right (vph)	3	16	1	109								
Hadj (s)	0.07	0.04	0.06	-0.47								
Departure Headway (s)	4.8	4.8	5.9	5.1								
Degree Utilization, x	0.51	0.44	0.02	0.18								
Capacity (veh/h)	729	724	509	621								
Control Delay (s)	12.6	11.4	9.0	9.3								
Approach Delay (s)	12.6	11.4	9.0	9.3								
Approach LOS	B	B	A	A								

Intersection Summary

Delay 11.6

Level of Service B

Intersection Capacity Utilization 61.2%

ICU Level of Service B

Analysis Period (min) 15

Lanes, Volumes, Timings
2: Concession Road 6 & West Access

Future Total
Sat Peak Hour

	←	↖	↑	↗	→	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		S	T
Traffic Volume (vph)	10	5	116	5	3	102
Future Volume (vph)	10	5	116	5	3	102
Ideal Flow (vphpl)	1483	1483	1388	1388	1228	1228
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.958		0.995			
Flt Protected	0.967				0.999	
Satd. Flow (prot)	1347	0	1354	0	0	1203
Flt Permitted	0.967				0.999	
Satd. Flow (perm)	1347	0	1354	0	0	1203
Link Speed (k/h)	50		60		60	
Link Distance (m)	104.8		81.7		308.7	
Travel Time (s)	7.5		4.9		18.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	5	126	5	3	111
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	131	0	0	114
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.37	1.37	1.48	1.48	1.71	1.71
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 22.0%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
2: Concession Road 6 & West Access

Future Total
Sat Peak Hour

	←	↖	↑	↗	→	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		S	T
Traffic Volume (veh/h)	10	5	116	5	3	102
Future Volume (Veh/h)	10	5	116	5	3	102
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	5	126	5	3	111
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	246	128			131	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	246	128			131	
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	99			100	
cM capacity (veh/h)	741	921			1454	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	16	131	114
Volume Left	11	0	3
Volume Right	5	5	0
cSH	790	1700	1454
Volume to Capacity	0.02	0.08	0.00
Queue Length 95th (m)	0.5	0.0	0.0
Control Delay (s)	9.7	0.0	0.2
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	0.2
Approach LOS	A		

Intersection Summary

Average Delay	0.7		
Intersection Capacity Utilization	22.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
3: York Road & East Access

Future Total
Sat Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group						
Lane Configurations		↗	↖		↘	↙
Traffic Volume (vph)	5	239	277	10	11	9
Future Volume (vph)	5	239	277	10	11	9
Ideal Flow (vphpl)	1228	1228	1388	1388	1483	1483
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.995		0.939	
Flt Protected		0.999			0.973	
Satd. Flow (prot)	0	1203	1354	0	1328	0
Flt Permitted		0.999			0.973	
Satd. Flow (perm)	0	1203	1354	0	1328	0
Link Speed (k/h)		80	80		50	
Link Distance (m)		159.9	377.0		70.4	
Travel Time (s)		7.2	17.0		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	260	301	11	12	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	265	312	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.71	1.71	1.48	1.48	1.37	1.37
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 35.7%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
3: York Road & East Access

Future Total
Sat Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement						
Lane Configurations		↗	↖		↘	↙
Traffic Volume (veh/h)	5	239	277	10	11	9
Future Volume (Veh/h)	5	239	277	10	11	9
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)	5	260	301	11	12	10
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	312				576	306
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	312				576	306
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				97	99
cM capacity (veh/h)	1248				477	733
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	265	312	22			
Volume Left	5	0	12			
Volume Right	0	11	10			
cSH	1248	1700	567			
Volume to Capacity	0.00	0.18	0.04			
Queue Length 95th (m)	0.1	0.0	1.0			
Control Delay (s)	0.2	0.0	11.6			
Lane LOS	A		B			
Approach Delay (s)	0.2	0.0	11.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization		35.7%		ICU Level of Service		A
Analysis Period (min)		15				

Queuing and Blocking Report

Future Total
Sat Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	20.7	28.6	9.0	17.7
Average Queue (m)	13.0	13.5	2.7	9.3
95th Queue (m)	19.4	21.9	9.0	14.5
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Concession Road 6 & West Access

Movement	WB
Directions Served	LR
Maximum Queue (m)	9.2
Average Queue (m)	2.7
95th Queue (m)	9.4
Link Distance (m)	96.1
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: York Road & East Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	3.4	9.1
Average Queue (m)	0.2	3.7
95th Queue (m)	2.1	10.8
Link Distance (m)	144.2	61.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

Appendix H

Future Total Synchro Reports – Single Access



Lanes, Volumes, Timings

1: Concession Road 6 & York Road

Future Total Sensitivity - 1 Access

AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	124	214	2	3	296	22	10	3	2	16	6	79
Future Volume (vph)	124	214	2	3	296	22	10	3	2	16	6	79
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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	0.999				0.991			0.983			0.895	
Flt Protected		0.982						0.967			0.992	
Satd. Flow (prot)	0	1365	0	0	1405	0	0	1239	0	0	1231	0
Flt Permitted		0.982						0.967			0.992	
Satd. Flow (perm)	0	1365	0	0	1405	0	0	1239	0	0	1231	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		399.7			159.9			252.6			81.7	
Travel Time (s)		18.0			7.2			15.2			4.9	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	6%	7%	0%	0%	5%	0%	11%	0%	50%	0%	25%	7%
Adj. Flow (vph)	139	240	2	3	333	25	11	3	2	18	7	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	381	0	0	361	0	0	16	0	0	114	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 62.9%

ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

1: Concession Road 6 & York Road

Future Total Sensitivity - 1 Access

AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	124	214	2	3	296	22	10	3	2	16	6	79
Future Volume (vph)	124	214	2	3	296	22	10	3	2	16	6	79
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	139	240	2	3	333	25	11	3	2	18	7	89
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	381	361	16	114								
Volume Left (vph)	139	3	11	18								
Volume Right (vph)	2	25	2	89								
Hadj (s)	0.18	0.04	0.30	-0.32								
Departure Headway (s)	4.9	4.8	6.2	5.4								
Degree Utilization, x	0.52	0.48	0.03	0.17								
Capacity (veh/h)	707	726	486	588								
Control Delay (s)	13.1	12.1	9.4	9.5								
Approach Delay (s)	13.1	12.1	9.4	9.5								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay		12.2										
Level of Service		B										
Intersection Capacity Utilization		62.9%			ICU Level of Service					B		
Analysis Period (min)		15										

Lanes, Volumes, Timings

2: Concession Road 6 & West Access

Future Total Sensitivity - 1 Access

AM Peak Hour

	←	↖	↑	↗	→	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	T	T
Traffic Volume (vph)	20	3	117	32	6	81
Future Volume (vph)	20	3	117	32	6	81
Ideal Flow (vphpl)	1483	1483	1388	1388	1228	1228
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.984		0.971			
Flt Protected	0.958				0.996	
Satd. Flow (prot)	1371	0	1321	0	0	1199
Flt Permitted	0.958				0.996	
Satd. Flow (perm)	1371	0	1321	0	0	1199
Link Speed (k/h)	50		60		60	
Link Distance (m)	104.8		81.7		308.7	
Travel Time (s)	7.5		4.9		18.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	3	127	35	7	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	162	0	0	95
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.37	1.37	1.48	1.48	1.71	1.71
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.2%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis

2: Concession Road 6 & West Access

Future Total Sensitivity - 1 Access

AM Peak Hour

	←	↖	↑	↗	→	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	T	T
Traffic Volume (veh/h)	20	3	117	32	6	81
Future Volume (Veh/h)	20	3	117	32	6	81
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	3	127	35	7	88
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	246	144			162	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	246	144			162	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	738	903			1417	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	25	162	95
Volume Left	22	0	7
Volume Right	3	35	0
cSH	755	1700	1417
Volume to Capacity	0.03	0.10	0.00
Queue Length 95th (m)	0.8	0.0	0.1
Control Delay (s)	9.9	0.0	0.6
Lane LOS	A		A
Approach Delay (s)	9.9	0.0	0.6
Approach LOS	A		

Intersection Summary

Average Delay	1.1		
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

Queuing and Blocking Report

Future Total Sensitivity - 1 Access
AM Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	28.1	30.7	16.2	23.1
Average Queue (m)	15.4	15.2	3.8	10.8
95th Queue (m)	24.2	25.2	12.0	19.9
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Concession Road 6 & West Access

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	11.9	1.5
Average Queue (m)	4.7	0.0
95th Queue (m)	12.3	1.1
Link Distance (m)	96.1	301.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Lanes, Volumes, Timings

1: Concession Road 6 & York Road

Future Total Sensitivity - 1 Access
PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group												
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	128	292	6	0	338	29	17	3	1	28	2	133
Future Volume (vph)	128	292	6	0	338	29	17	3	1	28	2	133
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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		0.998			0.989			0.994			0.890	
Flt Protected		0.985						0.961			0.992	
Satd. Flow (prot)	0	1444	0	0	1421	0	0	1150	0	0	1278	0
Flt Permitted		0.985						0.961			0.992	
Satd. Flow (perm)	0	1444	0	0	1421	0	0	1150	0	0	1278	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		399.7			159.9			252.6			81.7	
Travel Time (s)		18.0			7.2			15.2			4.9	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	0%	0%	3%	6%	20%	50%	0%	0%	0%	3%
Adj. Flow (vph)	138	314	6	0	363	31	18	3	1	30	2	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	458	0	0	394	0	0	22	0	0	175	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
1: Concession Road 6 & York Road

Future Total Sensitivity - 1 Access
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	128	292	6	0	338	29	17	3	1	28	2	133
Future Volume (vph)	128	292	6	0	338	29	17	3	1	28	2	133
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	138	314	6	0	363	31	18	3	1	30	2	143
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	458	394	22	175								
Volume Left (vph)	138	0	18	30								
Volume Right (vph)	6	31	1	143								
Hadj (s)	0.07	0.01	0.53	-0.41								
Departure Headway (s)	5.1	5.1	7.0	5.7								
Degree Utilization, x	0.65	0.56	0.04	0.27								
Capacity (veh/h)	679	674	420	562								
Control Delay (s)	17.2	14.6	10.3	10.8								
Approach Delay (s)	17.2	14.6	10.3	10.8								
Approach LOS	C	B	B	B								
Intersection Summary												
Delay			15.0									
Level of Service			B									
Intersection Capacity Utilization			76.3%		ICU Level of Service				D			
Analysis Period (min)			15									

Lanes, Volumes, Timings

2: Concession Road 6 & West Access

Future Total Sensitivity - 1 Access
PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Volume (vph)	37	6	142	18	3	126
Future Volume (vph)	37	6	142	18	3	126
Ideal Flow (vphpl)	1483	1483	1388	1388	1228	1228
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.980		0.984			
Flt Protected	0.959					0.999
Satd. Flow (prot)	1366	0	1339	0	0	1203
Flt Permitted	0.959					0.999
Satd. Flow (perm)	1366	0	1339	0	0	1203
Link Speed (k/h)	50		60			60
Link Distance (m)	104.8		81.7			308.7
Travel Time (s)	7.5		4.9			18.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	7	154	20	3	137
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	0	174	0	0	140
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.37	1.37	1.48	1.48	1.71	1.71
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 24.0%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis 2: Concession Road 6 & West Access

Future Total Sensitivity - 1 Access
PM Peak Hour

	↖	↗	↖	↗	↖	↗
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	T	R
Traffic Volume (veh/h)	37	6	142	18	3	126
Future Volume (Veh/h)	37	6	142	18	3	126
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	40	7	154	20	3	137
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	307	164			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	307	164			174	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	99			100	
cM capacity (veh/h)	684	881			1403	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	47	174	140			
Volume Left	40	0	3			
Volume Right	7	20	0			
cSH	707	1700	1403			
Volume to Capacity	0.07	0.10	0.00			
Queue Length 95th (m)	1.7	0.0	0.1			
Control Delay (s)	10.5	0.0	0.2			
Lane LOS	B		A			
Approach Delay (s)	10.5	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			24.0%	ICU Level of Service		A
Analysis Period (min)			15			

Queuing and Blocking Report

Future Total Sensitivity - 1 Access
PM Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	29.4	34.0	19.0	20.5
Average Queue (m)	16.2	16.1	5.0	11.0
95th Queue (m)	25.4	26.8	14.7	17.0
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Concession Road 6 & West Access

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	15.8	5.0
Average Queue (m)	7.1	0.2
95th Queue (m)	14.3	2.6
Link Distance (m)	96.1	301.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Lanes, Volumes, Timings

1: Concession Road 6 & York Road

Future Total Sensitivity - 1 Access

Sat Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	109	224	3	1	262	24	5	3	1	25	3	104
Future Volume (vph)	109	224	3	1	262	24	5	3	1	25	3	104
Ideal Flow (vphpl)	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483	1483
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	0.999			0.989			0.986			0.893		
Flt Protected	0.984						0.971			0.991		
Satd. Flow (prot)	0	1448	0	0	1406	0	0	1420	0	0	1302	0
Flt Permitted	0.984						0.971			0.991		
Satd. Flow (perm)	0	1448	0	0	1406	0	0	1420	0	0	1302	0
Link Speed (k/h)	80			80			60			60		
Link Distance (m)	399.7			159.9			252.6			81.7		
Travel Time (s)	18.0			7.2			15.2			4.9		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	1%	0%	0%	4%	8%	0%	0%	0%	0%	0%	1%
Adj. Flow (vph)	125	257	3	1	301	28	6	3	1	29	3	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	385	0	0	330	0	0	10	0	0	152	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop			Stop			Stop			Stop		

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 63.0%

ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

1: Concession Road 6 & York Road

Future Total Sensitivity - 1 Access

Sat Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	109	224	3	1	262	24	5	3	1	25	3	104
Future Volume (vph)	109	224	3	1	262	24	5	3	1	25	3	104
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	125	257	3	1	301	28	6	3	1	29	3	120
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	385	330	10	152								
Volume Left (vph)	125	1	6	29								
Volume Right (vph)	3	28	1	120								
Hadj (s)	0.07	0.02	0.06	-0.42								
Departure Headway (s)	4.8	4.9	6.0	5.2								
Degree Utilization, x	0.52	0.45	0.02	0.22								
Capacity (veh/h)	715	712	499	616								
Control Delay (s)	12.9	11.7	9.1	9.7								
Approach Delay (s)	12.9	11.7	9.1	9.7								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay		11.9										
Level of Service		B										
Intersection Capacity Utilization		63.0%		ICU Level of Service					B			
Analysis Period (min)		15										

Lanes, Volumes, Timings

2: Concession Road 6 & West Access

Future Total Sensitivity - 1 Access

Sat Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (vph)	30	5	116	20	3	102
Future Volume (vph)	30	5	116	20	3	102
Ideal Flow (vphpl)	1483	1483	1388	1388	1228	1228
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.982		0.980			
Flt Protected	0.958				0.999	
Satd. Flow (prot)	1368	0	1334	0	0	1203
Flt Permitted	0.958				0.999	
Satd. Flow (perm)	1368	0	1334	0	0	1203
Link Speed (k/h)	50		60		60	
Link Distance (m)	104.8		81.7		308.7	
Travel Time (s)	7.5		4.9		18.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	5	126	22	3	111
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	148	0	0	114
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.37	1.37	1.48	1.48	1.71	1.71
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.0%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis

2: Concession Road 6 & West Access

Future Total Sensitivity - 1 Access

Sat Peak Hour

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	30	5	116	20	3	102
Future Volume (Veh/h)	30	5	116	20	3	102
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	5	126	22	3	111
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	254	137			148	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	254	137			148	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	99			100	
cM capacity (veh/h)	733	911			1434	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	38	148	114
Volume Left	33	0	3
Volume Right	5	22	0
cSH	752	1700	1434
Volume to Capacity	0.05	0.09	0.00
Queue Length 95th (m)	1.3	0.0	0.1
Control Delay (s)	10.0	0.0	0.2
Lane LOS	B		A
Approach Delay (s)	10.0	0.0	0.2
Approach LOS	B		

Intersection Summary

Average Delay	1.4
Intersection Capacity Utilization	22.0%
Analysis Period (min)	15
ICU Level of Service	A

Queuing and Blocking Report

Future Total Sensitivity - 1 Access
Sat Peak Hour

Intersection: 1: Concession Road 6 & York Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	24.5	24.3	8.8	14.8
Average Queue (m)	12.7	13.6	2.2	9.5
95th Queue (m)	20.1	21.1	8.2	13.0
Link Distance (m)	391.0	144.2	243.9	62.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Concession Road 6 & West Access

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	15.6	3.3
Average Queue (m)	6.9	0.2
95th Queue (m)	14.4	2.1
Link Distance (m)	96.1	301.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

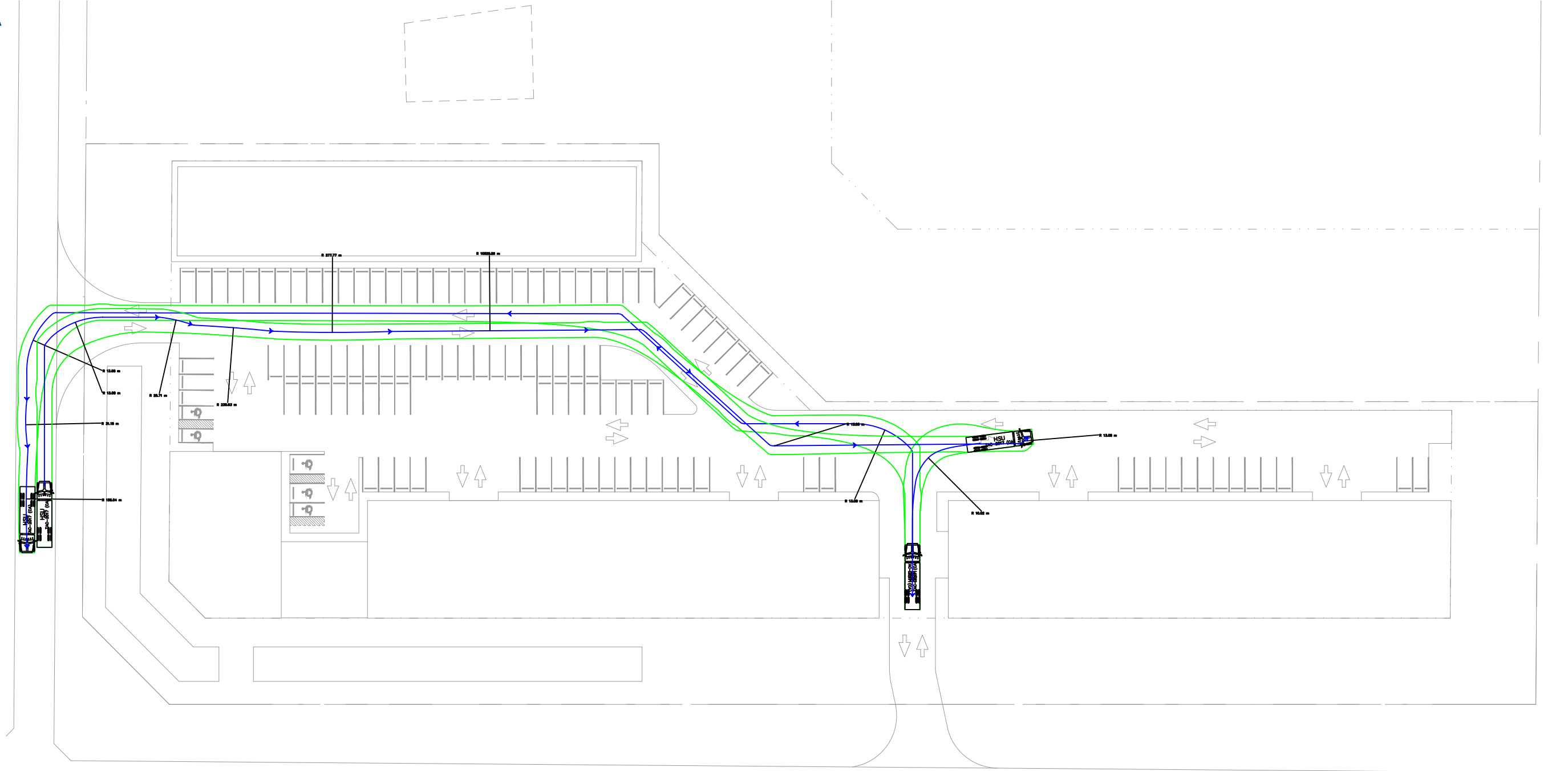
Zone Summary

Zone wide Queuing Penalty: 0

Appendix I

Vehicle Swept Path Analysis - Single Access





DESIGN VEHICLE:

Diagram of a truck with dimensions:

- Overall length: 11.50
- Wheelbase: 8.40
- Front overhang: 0.80

HSU

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

AUTOTURN ASSESSMENT
263 CONCESSION ROAD 6
NIAGARA-ON-THE-LAKE, ON



PROJECT NO.: 240204	DATE: SEPTEMBER 2024	SCALE: 1:750	DRAWING NO.: 07
DRAWN: LC	DESIGN: LC	CHECK: GL	

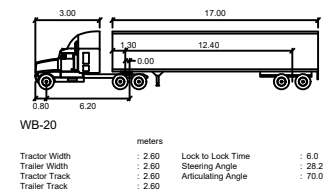


THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.



3	2024-09-19	LC	UPDATED SITE PLAN
2	2024-09-10	LC	UPDATED SITE PLAN
1	2024-09-09	LC	UPDATED SITE PLAN
NO.	DATE	INITIAL	REVISION DETAIL

DESIGN VEHICLE:



AUTOTURN ASSESSMENT
263 CONCESSION ROAD 6
NIAGARA-ON-THE-LAKE, ON



PROJECT NO.: 240204

DATE: SEPTEMBER 2024

SCALE: 1:750

DRAWING NO.:

DRAWN: LC

DESIGN: LC

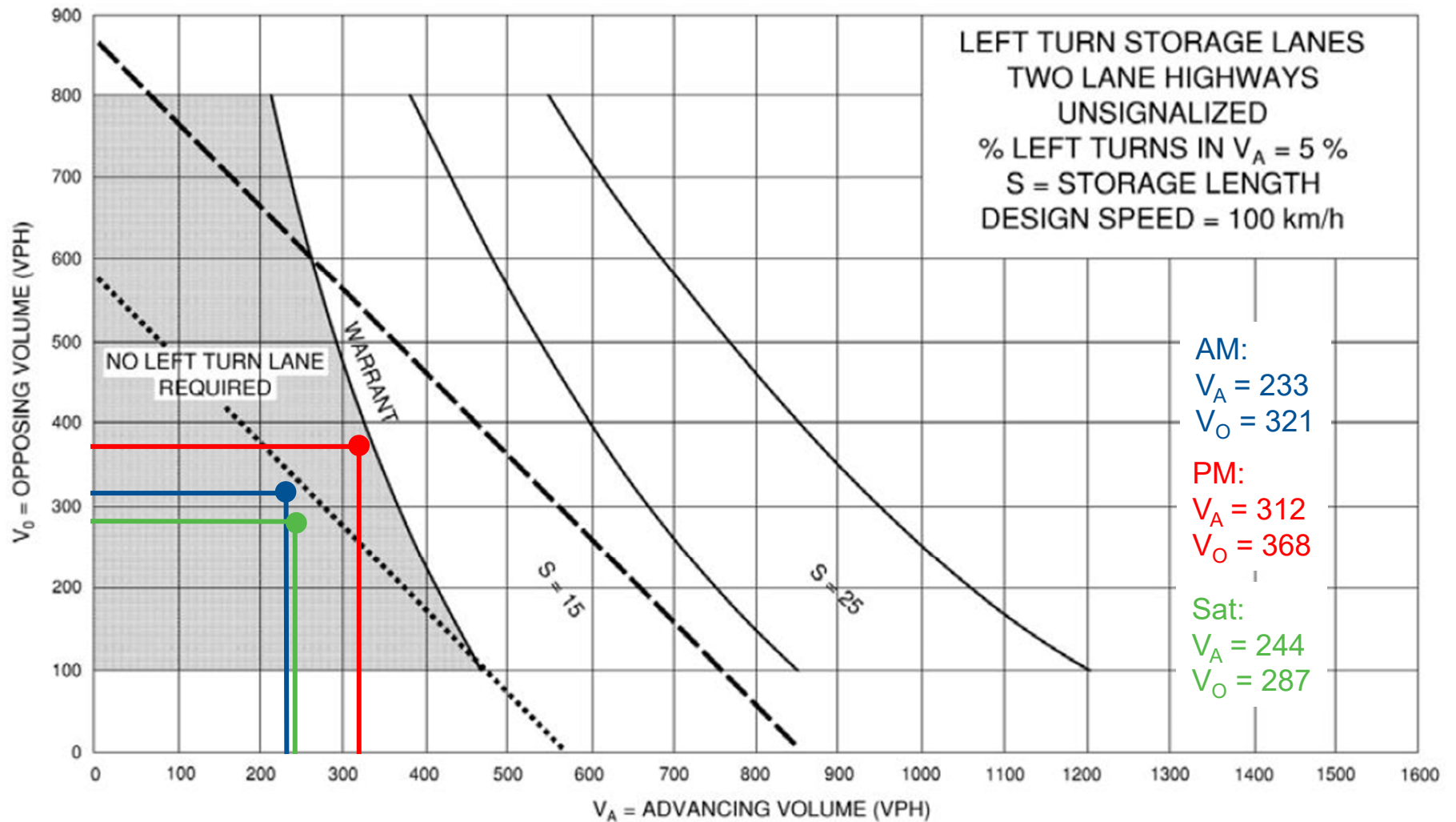
CHECK: GL

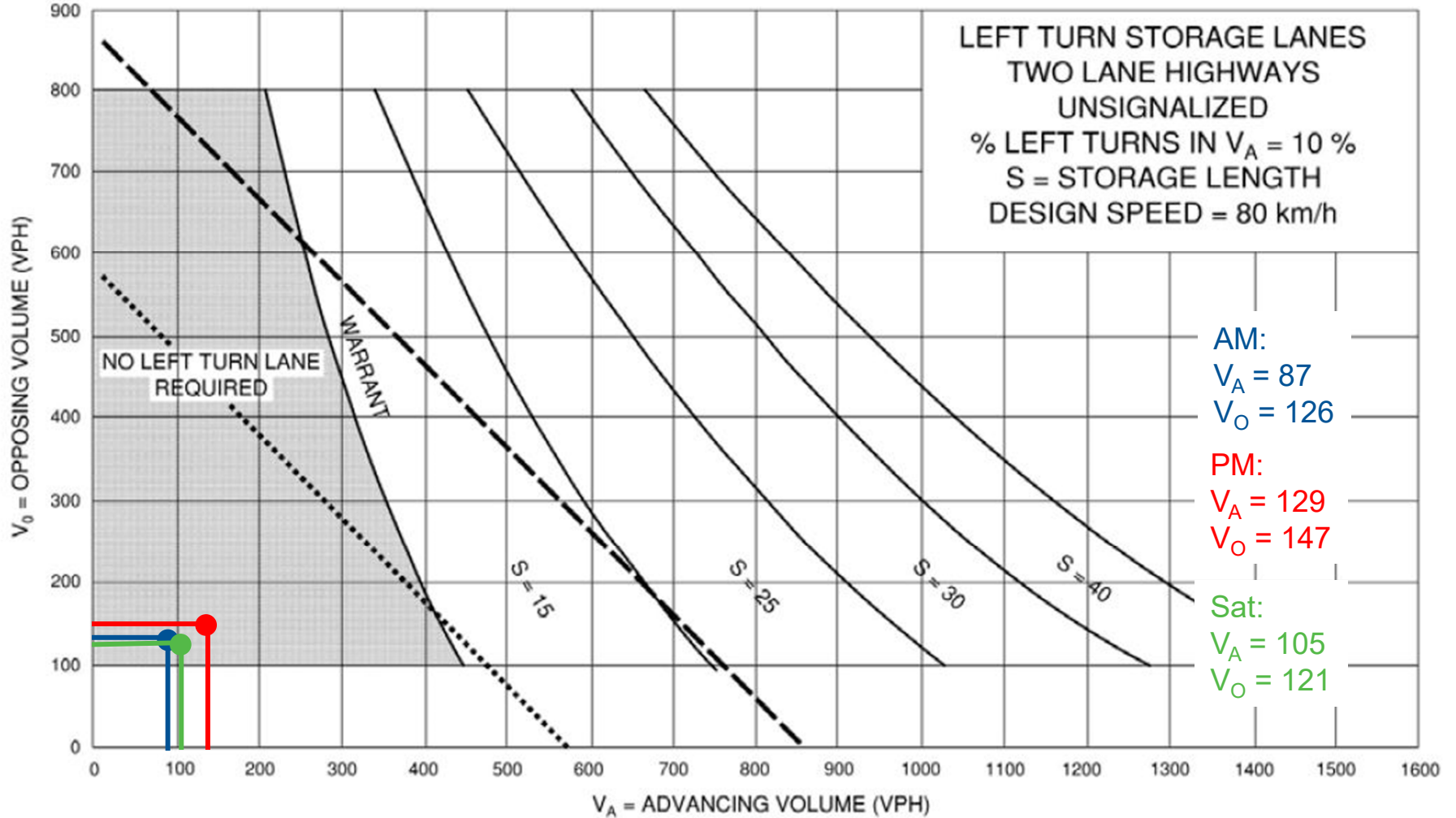
09

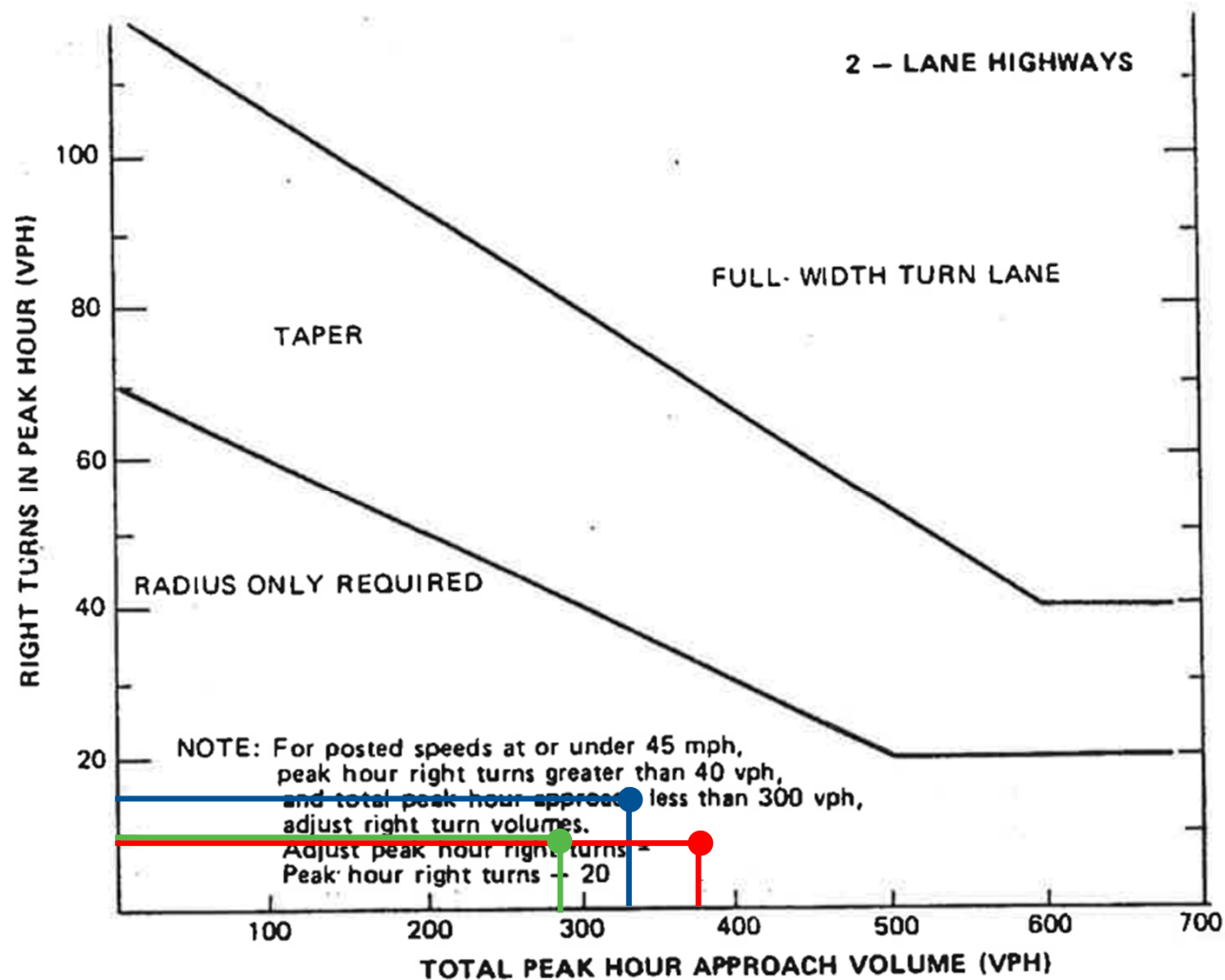
Appendix J

Turn Lane Warrants









AM:
 $V_A = 321$
 $V_R = 15$

PM:
 $V_A = 368$
 $V_R = 9$

Sat:
 $V_A = 287$
 $V_R = 10$

Source: National Cooperative Highway Research Program, "Synthesis on Right-Turn Deceleration Lanes on Urban and Suburban Arterials", August 2006 – Table 21



East Site Driveway Westbound Right-Turn Lane Warrant

