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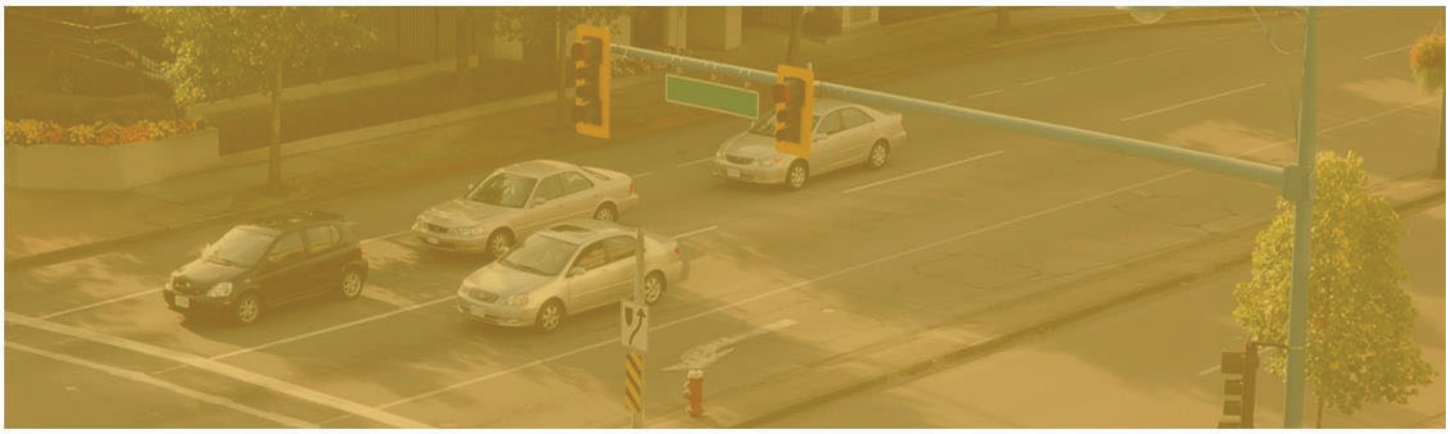

983 Yonge Street

TRANSPORTATION IMPACT STUDY

Little Lake Communities Inc.

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Issue	Date	Description
1	August 26, 2024	Final Report

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1 Introduction

Tatham Engineering Limited was retained by Little Lake Communities Inc. to prepare a Transportation Impact Study in support of the Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) applications to the Town of Midland in support of a proposed residential development to be located at 983 Yonge Street in the Town of Midland. The location of the development is illustrated in Figure 1.

1.1 REPORT OBJECTIVE

The objective of this report is to present the findings of the transportation impact study and address the requirements of the Town with the respect to the potential impacts of the proposed development on the area road network. In particular, the following will be discussed:

- the operations of the study area road system prior to the proposed development;
- the growth in the traffic volumes not otherwise attributed to the development (i.e. from overall growth in the area and/or other developments);
- the number of new trips the proposed development is likely to generate;
- the operations of the study area road system upon the completion of the proposed development; and,
- the resulting impacts and need for mitigating measures (if required) to ensure acceptable overall road operations, including during the construction of the proposed development.

A Terms of Reference was submitted for review and subsequently approved by the Town (as provided in Appendix A).

1.2 REPORT STRUCTURE

The report is structured as follows:

- Chapter 1: introduction and study purpose;
- Chapter 2: existing conditions, detailing the road system and corresponding traffic operations;
- Chapter 3: future conditions, prior to the completion of the proposed development (referred to as future background conditions), and the expected growth in traffic levels and the resulting operating conditions;
- Chapter 4: proposed development and associated details including land use, access, traffic volumes and parking;
- Chapter 5: future conditions, with completion of the proposed development (referred to as future total conditions); and
- Chapter 6: summary of the report and key findings.

2 Existing Conditions

This chapter will describe the road network, traffic volumes and operations for the existing conditions.

2.1 ROAD NETWORK

The road network to be addressed by this study consists of Yonge Street and following intersections:

- Yonge Street with County Road 93 and County Road 25 (Balm Beach Road);
- Yonge Street with Keller Drive/Simcoe Boulevard; and
- Yonge Street with Russ Howard Drive.

Aerial mapping and photographs of the road system are provided in Figure 2.

2.1.1 Roads

County Road 93

As per the Town of Midland *Official Plan*[1], County Road 93 is under the jurisdiction of the County of Simcoe. The road is oriented north-south and its cross-sections varies from rural to urban (4 lanes north and south of the built-up area of Midland, 6 lanes at the intersection with Balm Beach Road/Yonge Street including exclusive turn lanes). The posted speed limit varies from 60 km/h in the built-up area of Midland to 80 km/h outside of Midland.

County Road 25 (Balm Beach Road)

As per the Town's *Official Plan*, County Road 25 (known locally as Balm Beach Road) is also under the jurisdiction of the County. The road is oriented east-west and its cross-section is mostly rural with one lane per direction and changes to a 4 lane cross-section right before its intersection with County Road 93. The speed limit on County Road 25 is 60 km/h immediately west of County Road 93, increasing to 80 km/h approximately 900 metres to the west.

Yonge Street

As per the Town's *Official Plan*, Yonge Street is an arterial road under the jurisdiction of the Town. The road is oriented east-west and has a 3-lane (1 lane per direction with a centre turn lane) urban cross-section (curb and gutter, sidewalk on the north side) with bike lanes on both sides

[1] *Official Plan for the Town of Midland*. Town of Midland. November 2019.

of the road. The posted speed limit is 50 km/h. As a major travel corridor within the Town, Yonge Street has a significant number of fronting properties (residential, commercial and institutional) with direct driveway accesss.

Keller Drive, Simcoe Boulevard & Russ Howard Drive

As per the Town's *Official Plan*, Keller Drive, Simcoe Boulevard and Russ Howard Drive are all local roads under the jurisdiction of the Town. Upon approach to Yonge Street, each is oriented north-south and has an urban cross-section with one lane per direction. Simcoe Boulevard has a sidewalk on the east side and a centre landscape median island of approximately 35 metres immediately north of Yonge Street. As local Town roads, each has a speed limit of 50 km/h (albeit unposted).

2.1.2 Intersections

County Road 93 & Yonge Street/County Road 25

The intersection of Yonge Street/County Road 25 with County Road 93 is a 4-leg signalized intersection having the following configuration:

- north approach – a left turn lane, two through lanes and a right turn lane;
- south approach – a left turn lane, two through lanes and a channelized right turn lane;
- east approach – a left lane, a through lane and a channelized right turn lane; and
- west approach – a left lane and a shared through-right lane.

In conjunction with the traffic signal control, there are full pedestrian measures on each leg (eg. pedestrian signals, crosswalks and sidewalks).

Yonge Street & Keller Drive/Simcoe Boulevard

The intersection of Yonge Street with Keller Drive/Simcoe Boulevard is a 4-leg signalized intersection having the following configuration:

- east approach – a left turn lane and a shared through-right lane;
- west approach – a left turn lane and a shared through-right lane;
- north approach - a shared left-through-right lane; and
- south approach - a shared left-through-right lane.

As previously noted, the north approach has a centre median, separating the inbound and outbound lanes.

There are pedestrian crossings and pedestrian signals on each of the 4 intersection legs, with connections to the sidewalks on Yonge Street and Simcoe Boulevard.

Yonge Street & Russ Howard Drive

The intersection of Yonge Street with Russ Howard Drive is a 3-leg intersection with stop control on the minor road (Russ Howard Drive) and the following lane configuration:

- east approach - a left turn lane (via the centre turn lane) and a through lane;
- west approach - a left turn lane (via the centre turn lane) and a shared through-right turn lane; and
- south approach - a shared left-right turn lane.

In conjunction with the stop control on Russ Howard Drive, there is a pedestrian crossing thus giving pedestrians the right-of-way. There are no pedestrian crossings of Yonge Street given that the associated vehicle movements are uncontrolled.

2.2 TRAFFIC VOLUMES

Traffic Counts

To determine the existing traffic volumes traffic counts were conducted on Tuesday June 25, 2024 (7:00 to 10:00 and 15:00 to 18:00) at the intersections of County Road 93 with Yonge Street/County Road 25 and Yonge Street with Simcoe Boulevard/Keller Drive. The counts were supplemented with additional counts conducted on Tuesday July 16, 2024 at the intersection of Yonge Street with Russ Howard Drive (8:45-9:45 and 15:30-16-30 reflective of peak hours of the road network as realized from the June 2024 counts).

The observed peak hour traffic volumes are illustrated in Figure 3, whereas detailed count sheets provided in Appendix B.

2.3 TRAFFIC OPERATIONS

The assessment of existing conditions provides the baseline from which the future traffic operations (both without and with the subject development) can be assessed. As the capacity, and hence operations of a road system, is effectively dictated by its intersections, the assessment has focused on the operations of the noted key intersections based on the following:

- the 2024 peak hour traffic volumes;
- the existing intersection configurations and controls; and

- procedures outlined in the *2000 Highway Capacity Manual*[2] (using Synchro v.11 software).

For each intersection, the analysis considers:

- the average delay (measured in seconds);
- level of service (LOS); and
- volume to capacity (v/c) for each movement if signalized, or for critical movements only if unsignalized.

With respect to the noted metrics:

- level of service (LOS) - level of service A corresponds to the best operating condition with minimal delays whereas level of service F corresponds to poor operations resulting from high intersection delays (level of service definitions are provided in Appendix C); and
- volume to capacity (v/c) - a v/c ratio of less than 1.0 indicates the intersection movement/approach is operating at less than capacity while v/c of 1.0 indicates capacity has been reached.

A summary of the analysis provided in Table 1; whereas detailed operations worksheets are included in Appendix D.

2.4 NEED FOR IMPROVEMENTS

Based on the existing volumes, intersection configuration and control, all of the intersections provide good overall levels of service (LOS C or better) with average delays. As such, no intersection improvements are required to support the existing conditions.

[2] *Highway Capacity Manual*. Transportation Research Board, Washington DC, 2000.

Table 1: Intersection Operations – 2024 Conditions

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
County Road 93 & County Road 25 /Yonge Street	EB L	signal	22	C	0.37	24	C	0.51
	EB TR	signal	23	C	0.38	23	C	0.40
	WB L	signal	34	D	0.63	35	C	0.40
	WB T	signal	34	D	0.61	43	D	0.73
	WB R	signal	31	C	0.10	32	C	0.15
	NB L	signal	15	B	0.25	19	B	0.23
	NB T	signal	21	C	0.40	28	C	0.49
	NB R	signal	19	B	0.07	22	C	0.05
	SB L	signal	12	B	0.42	20	B	0.68
	SB T	signal	20	C	0.46	24	C	0.51
	SB R	signal	17	B	0.07	20	B	0.11
	overall	signal	23	C	0.50	26	C	0.70
Yonge Street & Simcoe Boulevard /Keller Drive	EB L	signal	10	B	0.02	10	B	0.01
	EB TR	signal	15	B	0.61	18	B	0.73
	WB L	signal	10	B	0.01	11	B	0.06
	WB TR	signal	14	B	0.51	17	B	0.69
	NB LTR	signal	15	B	0.11	14	B	0.06
	SB LTR	signal	14	B	0.03	14	B	0.01
	overall	signal	14	B	0.39	17	B	0.43
Yonge Street & Russ Howard Drive	WB L	free	8	A	0.00	9	A	0.01
	NB LR	stop	11	B	0.03	12	B	0.02

L - left T - through R - right LTR - left-through-right LT - left-through TR - through-right LR - left-right

3 Future Background Conditions

This chapter will describe the road network and background traffic volumes expected for the years 2027, 2032 and 2037. The 2027 horizon year has been adopted to reflect full build-out of the proposed development, whereas the 2032 and 2037 horizons will address the longer-term impacts (5 and 10 years beyond build-out).

3.1 ROAD NETWORK

It is noted that the *Official Plan for the Town of Midland* [3] and the Town's *Multi-Modal Transportation Master Plan*[4] identifies improvements to the existing bike lane configuration along Yonge Street, including the section across the frontage of the site, however, the lane configuration will not change (3 lane cross-section will be maintained), and the future operations will not be affected. As such, the road network as described in Section 2.1 has been maintained through the analyses of the future horizons.

3.2 TRAFFIC VOLUMES

Future background traffic volumes expected for the 2027, 2032 and 2037 horizon years have been determined based on the existing traffic volumes, historical and projected growth, and additional increases in volumes due to other developments (if any) within the immediate area (apart from the subject development).

3.2.1 Background Growth

Population

Based on census data from 2011, 2016 and 2021, the population of the Town of Midland increased from 16,572 to 16,864 to 17,817 people translating to an annual growth of 0.4% from 2011 to 2016, 1.1% per annum from 2016 to 2021, and 0.7% per annum from 2011 to 2021.

As per the Town's *Transportation Master Plan*, the Town is projected to reach a population of 22,500 persons by 2031 and 26,881 by 2041. In considering the 2016 population of 16,864 (as per the *Transportation Master Plan* which is slightly higher than census data), this translates to a growth rate of approximately 2.2% per annum through 2031 and 2.4% per annum through 2041.

[3] *Official Plan for the Town of Midland*. Town of Midland. November 2019.
[4] *Multi-Modal Transportation Master Plan*. Town of Midland. November 2019.

The County of Simcoe's *Growth Forecast and Land Needs Assessment*[5] projects that the population of the Town of Midland will increase to 24,290 persons by 2051. In considering the 2021 census population, the noted population projection translates to an annual growth rate of 1.0%. It is noted that the population projection for the Town of Midland in the *Growth Forecast and Land Needs* Assessment is consistent with the County of Simcoe's *Transportation Master Plan*[6] projections (24,290 persons by 2051).

3.2.2 Background Developments

Consideration has also been given to other planned developments in close proximity of the site. The Town's mapping was reviewed and after further consultation with the Town's staff it was concluded that there are no planned developments within the Town that would have any material impact on the area road network. As such, background developments were not considered in this study.

3.2.3 Background Volumes

Based on the above, a growth of 1.5% per annum has been applied to the 2024 volumes on County Road 93, County Road 25 and the through volumes on Yonge Street (which is considered conservative as the Town's *Transportation Master Plan* assumes 1.0%). No annual growth has been assumed for Simcoe Boulevard, Keller Drive nor Ross Howard Drive given their local nature.

The resulting future background traffic volumes are presented in Figure 4 to Figure 6.

3.3 TRAFFIC OPERATIONS

The area road intersections were again analyzed for each horizon year given the projected background volumes. Results of the operational analyses are summarized in Table 2 through Table 4, with detailed worksheets provided in Appendix E.

As indicated, the key intersections will continue to provide good overall operations (LOS C or better) through the 2037 horizon.

3.4 NEED FOR IMPROVEMENTS

Based on the future background traffic operations, no intersection improvements are required to support the future background conditions.

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[5] *Growth Forecasts and Land Needs Assessment.* Prepared by Hemson for the County of Simcoe. March 31, 2022.

[6] *Transportation Master Plan. Phase III: Strategies and Policies to Support the Recommended Network.* County of Simcoe. September 2023 (Draft Report).

Table 2: Intersection Operations – 2027 Background

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
County Road 93 & County Road 25 /Yonge Street	EB L	signal	21	C	0.38	22	C	0.51
	EB TR	signal	22	C	0.38	21	C	0.40
	WB L	signal	40	D	0.64	33	C	0.41
	WB T	signal	36	D	0.62	40	D	0.73
	WB R	signal	30	C	0.11	30	C	0.15
	NB L	signal	16	B	0.30	18	B	0.27
	NB T	signal	22	C	0.41	25	C	0.48
	NB R	signal	18	B	0.08	20	B	0.06
	SB L	signal	14	B	0.48	35	C	0.84
	SB T	signal	21	C	0.48	25	C	0.56
	SB R	signal	17	B	0.08	20	B	0.11
	overall	signal	23	C	0.52	27	C	0.78
Yonge Street & Simcoe Boulevard /Keller Drive	EB L	signal	10	B	0.02	10	B	0.01
	EB TR	signal	15	B	0.64	19	B	0.76
	WB L	signal	10	B	0.01	11	B	0.07
	WB TR	signal	14	B	0.53	18	B	0.72
	NB LTR	signal	15	B	0.11	14	B	0.06
	SB LTR	signal	14	B	0.03	14	B	0.01
	overall	signal	15	B	0.40	18	B	0.44
Yonge Street & Russ Howard Drive	WB L	free	8	A	0.00	9	A	0.01
	NB LR	stop	11	B	0.03	13	B	0.02

L - left T - through R - right LTR - left-through-right LT - left-through TR - through-right LR - left-right

Table 3: Intersection Operations – 2032 Background

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
County Road 93 & County Road 25 /Yonge Street	EB L	signal	21	C	0.41	22	C	0.55
	EB TR	signal	22	C	0.40	21	C	0.42
	WB L	signal	41	D	0.67	33	C	0.43
	WB T	signal	36	D	0.63	41	D	0.75
	WB R	signal	30	C	0.12	30	C	0.17
	NB L	signal	17	B	0.34	19	B	0.33
	NB T	signal	23	C	0.45	26	C	0.52
	NB R	signal	19	B	0.08	21	C	0.06
	SB L	signal	15	B	0.54	66	E	0.98
	SB T	signal	23	C	0.52	27	C	0.61
	SB R	signal	18	B	0.08	21	C	0.12
	overall	signal	24	C	0.58	31	C	0.87
Yonge Street & Simcoe Boulevard /Keller Drive	EB L	signal	10	B	0.02	10	B	0.02
	EB TR	signal	17	B	0.68	22	C	0.82
	WB L	signal	10	B	0.02	11	B	0.09
	WB TR	signal	15	B	0.57	20	B	0.77
	NB LTR	signal	15	B	0.11	14	B	0.06
	SB LTR	signal	14	B	0.03	14	B	0.01
	overall	signal	16	B	0.43	20	C	0.48
Yonge Street & Russ Howard Drive	WB L	free	9	A	0.00	9	A	0.01
	NB LR	stop	11	B	0.03	13	B	0.02

L - left T - through R - right LTR - left-through-right LT - left-through TR - through-right LR - left-right

Table 4: Intersection Operations – 2037 Background

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
County Road 93 & County Road 25 /Yonge Street	EB L	signal	22	C	0.44	30	C	0.66
	EB TR	signal	22	C	0.42	26	C	0.46
	WB L	signal	43	D	0.70	37	D	0.45
	WB T	signal	37	D	0.65	48	D	0.78
	WB R	signal	30	C	0.13	34	C	0.18
	NB L	signal	18	B	0.40	26	C	0.36
	NB T	signal	25	C	0.49	38	D	0.67
	NB R	signal	20	C	0.09	28	C	0.07
	SB L	signal	18	B	0.62	37	D	0.87
	SB T	signal	24	C	0.57	27	C	0.59
	SB R	signal	18	B	0.09	21	C	0.13
	overall	signal	25	C	0.64	33	C	0.85
Yonge Street & Simcoe Boulevard /Keller Drive	EB L	signal	10	B	0.02	10	B	0.02
	EB TR	signal	18	B	0.73	26	C	0.88
	WB L	signal	10	B	0.02	11	B	0.12
	WB TR	signal	15	B	0.61	23	C	0.83
	NB LTR	signal	15	B	0.11	14	B	0.06
	SB LTR	signal	14	B	0.03	14	B	0.01
	overall	signal	17	B	0.45	24	C	0.51
Yonge Street & Russ Howard Drive	WB L	free	9	A	0.00	10	A	0.01
	NB LR	stop	12	B	0.03	14	B	0.02

L - left T - through R - right LTR - left-through-right LT - left-through TR - through-right LR - left-right

4 Proposed Development

This section will provide additional details with respect to the proposed residential development, including its location, the projected site generated traffic volumes and the assignment of such to the adjacent road network.

4.1 LOCATION

The subject site is located at 983 Yonge Street in the Town of Midland (as per Figure 1).

4.2 LAND USE

The proposed development will consist of the following:

- 8 detached dwelling units;
- 14 semi-detached dwelling units;
- 29 townhouse units; and
- 86 apartment units within two 3-storey apartment buildings consisting of 43 units each.

The site plan is provided in Figure 7.

4.3 PARKING

4.3.1 Requirement

As per the Town of Midland's *Zoning By-law*, detached, semi-detached and townhouse dwelling units are required to provide 1.0 parking space per unit, whereas apartment dwelling units are required to provide 1.5 parking spaces per unit, of which 25% shall be for visitor parking.

In considering the proposed two 43-unit apartment buildings, each is required to provide 65 parking spaces (43 units x 1.5 spaces/unit = 65 spaces), of which 17 must be designated as visitor parking (65 spaces x 25% = 17 spaces).

4.3.2 Supply

Each detached, semi-detached and townhouse dwelling unit will be provided with a garage and driveway thus satisfying the 1.0 space per unit requirement.

As per the site plan, the two apartment buildings will provide 67 and 66 parking spaces respectively, thus satisfying the overall parking supply requirement. Although not indicated on the site plan, it is expected that visitor parking will be provided in accordance with the Town's requirements.

4.4 ACCESS

4.4.1 Location

The site will be served by a new municipal road connection (Street A) to Yonge Street and through an extension of Russ Howard Drive. The new Street A intersection with Yonge Street will be stop controlled, with a single inbound and a single outbound lane (i.e. shared left-right lane).

It is understood that Street A will be designed to the Town standard STD-R1 (8 metre) which also satisfies the requirement of the Building Code regarding the fire route.

4.4.2 Intersection Spacing

As per the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads*[7]:

> *The spacing of intersections along a road in both an urban and rural setting has a great effect on the operation, level of service, and vehicular capacity of the roadway. Ideally, intersection spacing along a road should be selected based on function, traffic volume, and the relative presence of various road user modes (e.g., vehicles, cyclists, pedestrians).*

The minimum spacing for an arterial road (County Road 93) is 200 metres and 60 metres for a local road (Keller Drive/Simcoe Boulevard).

The proposed access location will provide a spacing of 75 metres to Keller Drive/Simcoe Boulevard to the east and spacing of approximately 350 metres to County Road 93 to the west. As such, the resulting spacing to the adjacent intersections satisfy the TAC guidelines.

4.4.3 Corner Clearance

Corner clearance is the minimum suggested distance between a proposed access and an adjacent intersection or driveway. The distance is typically measured from the near curb of the adjacent street/access to the near edge of the proposed access. Inadequate corner clearance can result in interrupted traffic flow, poor access operations and safety concerns. Appropriate corner clearance is of particular concern at intersections where stop or signal control is present (i.e. stop control and traffic signals may create queues that encroach on the operations of the adjacent driveway).

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[7] *Geometric Design Guide for Canadian Roads, Chapter 9.* Transportation Association of Canada. June 2017.

The corner clearance distance consists of three measurements: the corner curb radius of the adjacent intersection or access, a tangent section and the radius of the proposed access. The tangent section provides separation between the end of the adjacent intersection corner radius and the end of the proposed access radius. For a residential access, TAC guidelines recommend a minimum tangent length of 2.0 metres from the nearest intersection and 1.0 metre from the nearest adjacent access.

With respect to separation from the adjacent driveways, a minimum of 1.0 metre tangent will be provided between the site access and the two residential access points to east and west.

4.4.4 Sight Lines

Sight lines at the new Street A intersection have been reviewed considering both minimum stopping sight distance and intersection sight distance, as per the TAC design guidelines, as detailed below.

- The minimum stopping sight distance provides sufficient distance for an approaching motorist to observe a stationary hazard in the road and bring their vehicle to a complete stop prior to the hazard.
- Intersection sight distance allows a vehicle to enter a main road from a side street and attain the appropriate operating speed without significantly impacting the operating speed of an approaching vehicle.

The minimum stopping sight and intersection sight distance requirements are provided in Table 5 for design speed of 60 km/h. The available sight lines were determined from site reconnaissance and are also provided in Table 5.

Table 5: Sight Line Assessment

LOCATION	DESIGN SPEED	STOPPING SIGHT DISTANCE	INTERSECTION SIGHT DISTANCE		AVAILABLE SIGHT LINES TO/FROM	
			Left Turn	Right Turn	East	West
Street A & Yonge Street	60 km/h	85m	130m	110m	>150m	>150m

The available sight distances along Yonge Street at Street A are in excess of 150 metres to/from the east and west and thus satisfy TAC sight lines requirements (no improvements to address sight line constraints are required).

4.5 SITE TRAFFIC

4.5.1 Trip Generation

The number of vehicle trips to be generated by the proposed development for the weekday AM and PM peak hours has been determined based on type of use, development size and trip generation rates as per the *ITE Trip Generation Manual, 11th Edition*. Based on the proposed development, the following ITE land uses have been considered:

- *single family detached* (ITE land use code 210);
- *single family attached* (215), applicable to the semi-detached and townhouse units; and
- *multifamily housing - low-rise* (ITE code 220), applicable to the apartment units.

The associated trip rates and trip estimates are provided in Table 6 and Table 7.

As indicated, the proposed development is expected to generate 61 trips during the AM peak hour and 77 trips during the PM peak hour.

Table 6: Trip Generation Rates

LAND USE	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
single family detached (ITE 210)	units	0.18	0.52	0.70	0.59	0.35	0.94
single family attached (ITE 215)	units	0.15	0.33	0.48	0.32	0.25	0.57
multifamily housing - low-rise (ITE 220)	units	0.10	0.30	0.40	0.32	0.19	0.51

Table 7: Trip Estimates – 983 Yonge Street

LAND USE	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
detached units	8 units	2	4	6	5	3	8
semi-detached & townhouse units	43 units	7	14	21	14	11	25
apartment units	86 units	8	26	34	28	16	44
Total	**137 units**	**17**	**44**	**61**	**47**	**30**	**77**

4.5.2 Trip Distribution & Assignment

Trip Distribution

The distribution of trips has been based on trip data provided in the Town's *Transportation Master Plan* which in turn is based on the 2016 *Transportation Tomorrow Survey* (TTS). The TTS is a comprehensive travel survey conducted in the Greater Golden Horseshoe Area once every five years. The following distribution was established:

- to/from locations within Midland – 45%;
- to/from the north of Midland – 20%;
- to/from the south of Midland – 15%;
- to/from the east of Midland – 5%; and
- to/from the west of Midland – 15%.

As indicated, 45% of the trips remain wholly within Midland whereas 55% originate from, or are destined to, areas outside of the Town.

Trip Assignment

The trips that remain within Midland were distributed based on additional TTS trip data for the traffic zone within which the development is located. When considering the distribution of trips that remain within the Town, the following assignment has been applied:

- to/from the north via County Road 93 – 30%;
- to/from the south via County Road 93 – 20%;
- to/from the east via Yonge Street – 30%; and
- to/from the west via Yonge Street/County Road 25 – 20%.

The assignment of the trips generated by the development to the area road network is illustrated in Figure 8. It is noted that all site traffic was distributed through the new road connection to Yonge Street thereby maximizing the volumes through the respective intersection. This is considered a conservative approach recognizing that a portion of traffic accessing/exiting the site will use the new road connection to Russ Howard Drive.

5 Future Total Conditions

This chapter will address the resulting impacts of the proposed residential development on the adjacent road system. The areas to be addressed are:

- operations at the key intersections and the site access; and
- potential improvements to the study area network, if necessary.

5.1 TRAFFIC VOLUMES

To assess the impacts of the increased traffic volumes resulting from the proposed development, the site generated traffic was combined with the 2027, 2032 and 2037 background traffic volumes. The resulting total traffic volumes are presented in Figure 9 to Figure 11.

5.2 TRAFFIC OPERATIONS

The operations of the subject intersections were again investigated considering the total traffic volumes for each horizon year. In addition, the new intersection of Street A with Yonge Street site access operations have also been reviewed. The site access configuration has considered a single shared left-right outbound lane operating under stop control and a single receiving lane. The results of the operational review are provided in Table 8 through Table 10, whereas detailed worksheets are provided in Appendix F.

As indicated, the study area intersections will continue to provide good overall operations (LOS C or better) through the 2037 horizon. The new Street A intersection with Yonge Street (the site access) will also provide acceptable operations under the assumed intersection configuration.

5.3 NEED FOR IMPROVEMENTS

5.3.1 Traffic Operations

Based on the anticipated traffic operations at the key intersections, no additional improvements are required to accommodate the future total conditions from a traffic operations perspective.

Table 8: Intersection Operations – 2027 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
County Road 93 & County Road 25 /Yonge Street	EB L	signal	21	C	0.38	22	C	0.51
	EB TR	signal	22	C	0.39	22	C	0.41
	WB L	signal	41	D	0.67	33	C	0.43
	WB T	signal	36	D	0.62	41	D	0.74
	WB R	signal	30	C	0.12	30	C	0.16
	NB L	signal	16	B	0.29	18	B	0.27
	NB T	signal	22	C	0.41	25	C	0.48
	NB R	signal	19	B	0.08	20	C	0.06
	SB L	signal	15	B	0.49	41	D	0.88
	SB T	signal	22	C	0.49	25	C	0.56
	SB R	signal	18	B	0.08	20	B	0.11
	overall	signal	23	C	0.54	28	C	0.81
Yonge Street & Simcoe Boulevard /Keller Drive	EB L	signal	10	B	0.02	10	B	0.01
	EB TR	signal	16	B	0.66	20	B	0.77
	WB L	signal	10	B	0.02	11	B	0.07
	WB TR	signal	14	B	0.54	18	B	0.73
	NB LTR	signal	15	B	0.11	14	B	0.06
	SB LTR	signal	14	B	0.03	14	B	0.01
	overall	signal	15	B	0.41	19	B	0.45
Yonge Street & Russ Howard Drive	WB L	free	8	A	0.00	9	A	0.01
	NB LR	stop	11	B	0.03	13	B	0.02
Yonge Street & Site Access	WB L	stop	8	A	0.00	9	A	0.02
	NB LT	free	13	B	0.09	14	B	0.08

L - left T - through R - right LTR - left-through-right LT - left-through TR - through-right LR - left-right

Table 9: Intersection Operations – 2032 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
County Road 93 & County Road 25 /Yonge Street	EB L	signal	21	C	0.41	25	C	0.58
	EB TR	signal	22	C	0.40	24	C	0.44
	WB L	signal	43	D	0.69	35	D	0.45
	WB T	signal	36	D	0.63	44	D	0.75
	WB R	signal	29	C	0.13	32	C	0.17
	NB L	signal	18	B	0.35	22	C	0.31
	NB T	signal	24	C	0.46	32	C	0.58
	NB R	signal	20	B	0.09	25	C	0.07
	SB L	signal	16	B	0.57	37	D	0.88
	SB T	signal	23	C	0.53	26	C	0.57
	SB R	signal	18	B	0.08	20	C	0.12
	overall	signal	24	C	0.60	30	C	0.83
Yonge Street & Simcoe Boulevard /Keller Drive	EB L	signal	10	B	0.02	10	B	0.02
	EB TR	signal	17	B	0.70	22	C	0.83
	WB L	signal	10	B	0.02	11	B	0.09
	WB TR	signal	15	B	0.58	21	C	0.79
	NB LTR	signal	15	B	0.11	14	B	0.06
	SB LTR	signal	14	B	0.03	14	B	0.01
	overall	signal	16	B	0.44	21	C	0.48
Yonge Street & Russ Howard Drive	WB L	free	9	A	0.00	9	A	0.01
	NB LR	stop	11	B	0.03	13	B	0.02
Yonge Street & Site Access	WB L	stop	9	A	0.00	10	A	0.02
	NB LT	free	13	B	0.10	15	C	0.08

L - left T - through R - right LTR - left-through-right LT - left-through TR - through-right LR - left-right

Table 10: Intersection Operations – 2037 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
County Road 93 & County Road 25 /Yonge Street	EB L	signal	21	C	0.43	30	C	0.67
	EB TR	signal	22	C	0.42	26	C	0.47
	WB L	signal	44	D	0.71	38	D	0.47
	WB T	signal	36	D	0.64	48	D	0.78
	WB R	signal	29	C	0.13	34	C	0.18
	NB L	signal	19	B	0.41	27	C	0.37
	NB T	signal	25	C	0.50	38	D	0.68
	NB R	signal	21	C	0.09	29	C	0.07
	SB L	signal	19	B	0.65	43	D	0.91
	SB T	signal	25	C	0.58	28	C	0.59
	SB R	signal	19	B	0.09	21	C	0.13
	overall	signal	26	C	0.66	34	C	0.87
Yonge Street & Simcoe Boulevard /Keller Drive	EB L	signal	10	B	0.02	10	B	0.02
	EB TR	signal	19	B	0.75	28	C	0.89
	WB L	signal	10	B	0.02	11	B	0.12
	WB TR	signal	15	B	0.62	24	C	0.85
	NB LTR	signal	15	B	0.11	14	B	0.06
	SB LTR	signal	14	B	0.03	14	B	0.01
	overall	signal	17	B	0.47	25	C	0.52
Yonge Street & Russ Howard Drive	WB L	free	9	A	0.00	10	A	0.01
	NB LR	stop	12	B	0.03	14	B	0.02
Yonge Street & Site Access	WB L	stop	9	A	0.01	10	B	0.02
	NB LT	free	13	B	0.10	16	C	0.09

L - left T - through R - right LTR - left-through-right LT - left-through TR - through-right LR - left-right

5.3.2 Turn Lane Requirements

Despite the otherwise good operations provided at the intersection of Yonge Street with Street A under the future total conditions (2027, 2032 and 2037), the need for exclusive turn lanes on Yonge Street has been reviewed in consideration of MTO warrants.

Left Turn Lane

The existing centre turn lane on Yong Street will accommodate left turns into the site and thus there is no further requirement to support the development.

Right Turn Lane

MTO guidelines suggest that exclusive right turn lanes be considered where right turn volumes exceed 60 vehicles per hour and impede the operations of through traffic. Based on the right turn volumes (32 vehicles per hour or less through to the 2037 horizon year), an exclusive right turn lane on Yonge Street is not warranted to serve the site.

6 Summary

Proposed Development

The study has addressed the transportation impacts associated with the proposed residential development to be located at 983 Yonge Street in the Town of Midland. Upon completion, the 137-unit development is expected to generate an additional 61 trips during AM peak hour and 77 trips during PM peak hour.

Transportation Impacts

The key intersections were reviewed under both existing and future conditions (background and total), whereas the operations of the site access on Yonge Street was reviewed under future total conditions. The results of the operational analyses indicate that the study area intersection and site access will provide good operations through 2037. Thus, no improvements are required to accommodate the subject development.

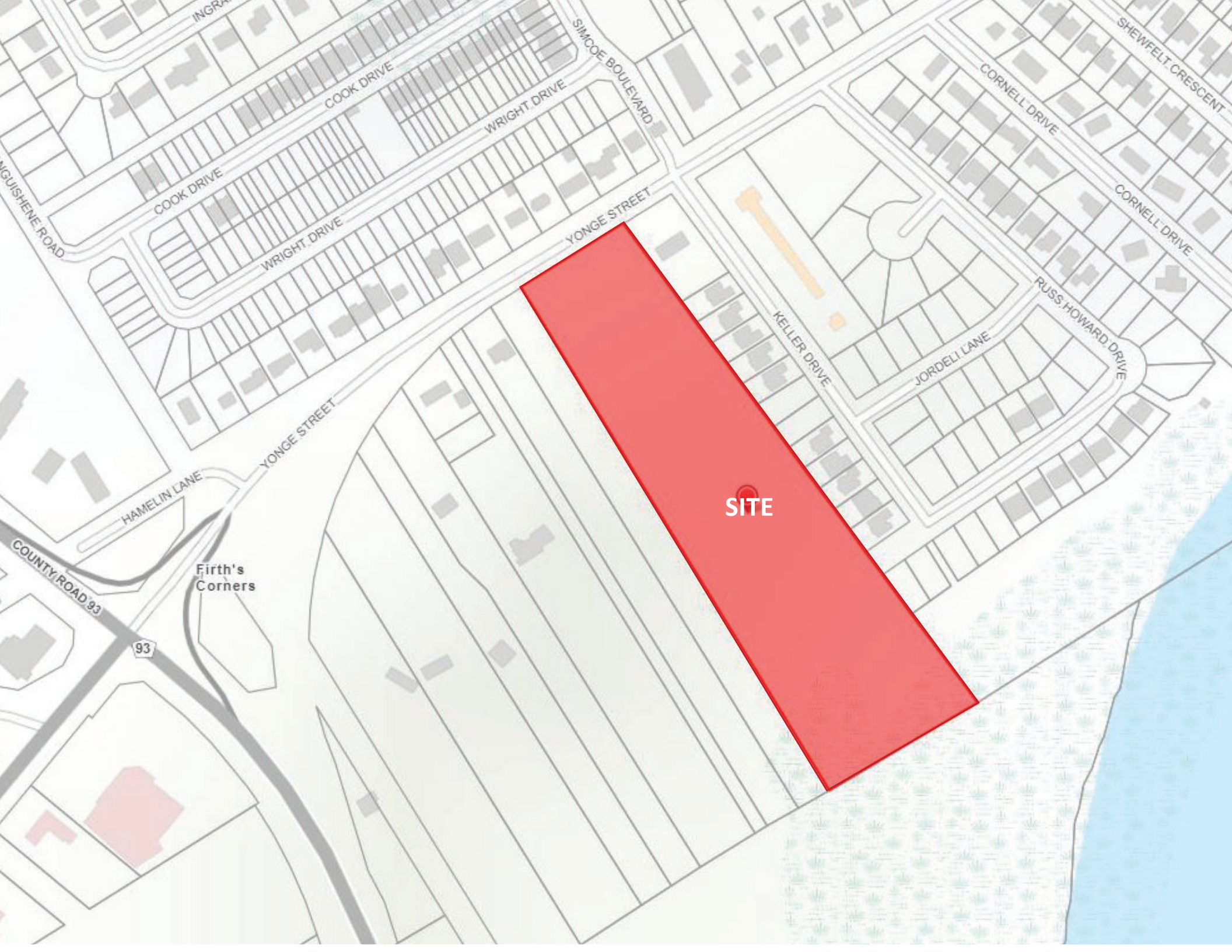
Overall, the subject site is not expected to have any material impact on the operations of the adjacent road network.

Sight Line Assessment

The available sight lines along Yonge Street at the new Street A intersection were reviewed in consideration of TAC sight and intersection distance requirements. In all instances, and in consideration of the design speed of 60 km/h, the available sight lines were determined to be adequate.

Turn Lane Requirements

The need for exclusive turn lanes was reviewed at the Street A intersection in the context of MTO warrants. A left turn lane will be accommodated via the centre turn lane on Yonge Street; a right turn lane is not required.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SHEWFELT CRESCENT
KELLER DRIVE
JORDELI LANE
RUSS HOWARD DRIVE
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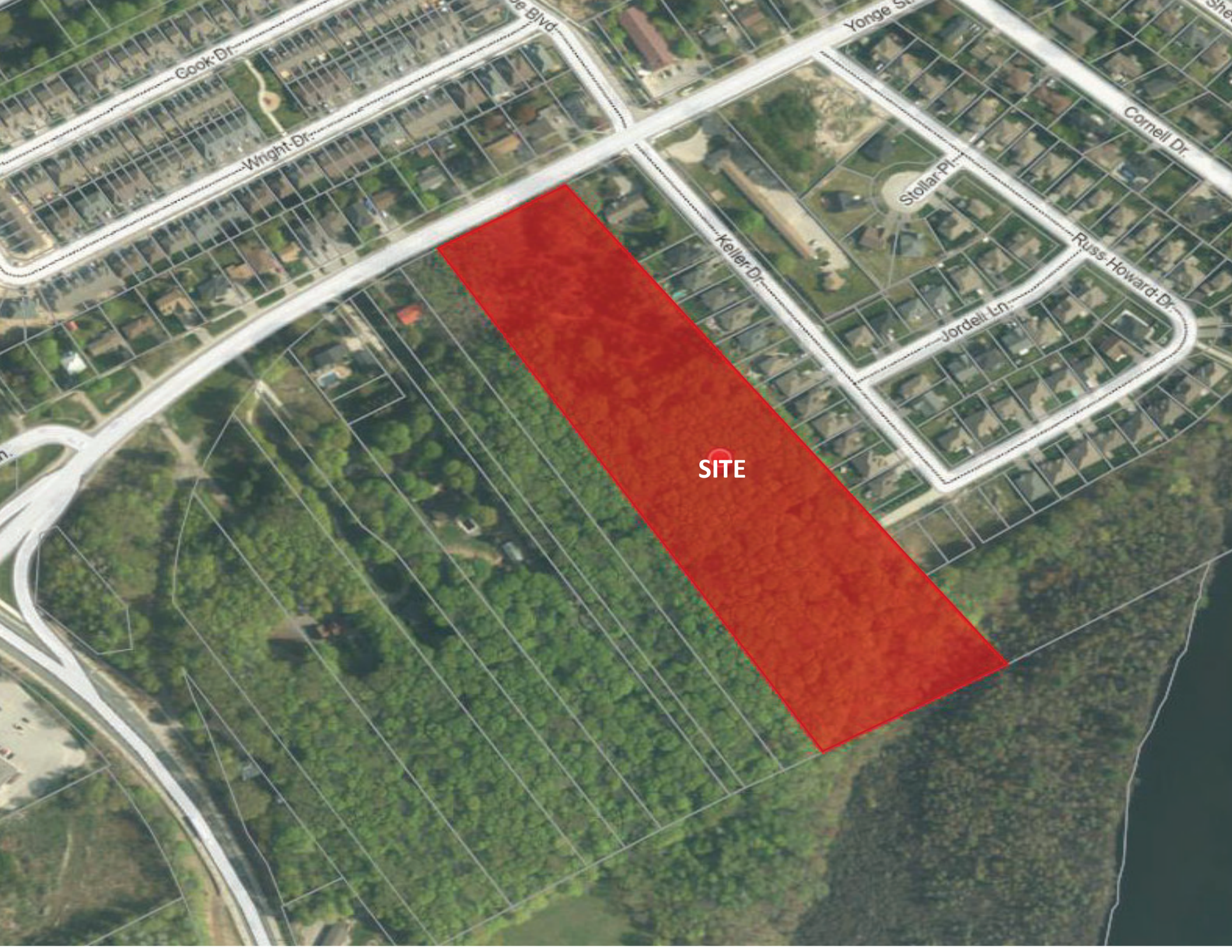
93
Firth's Corners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Yonge Street
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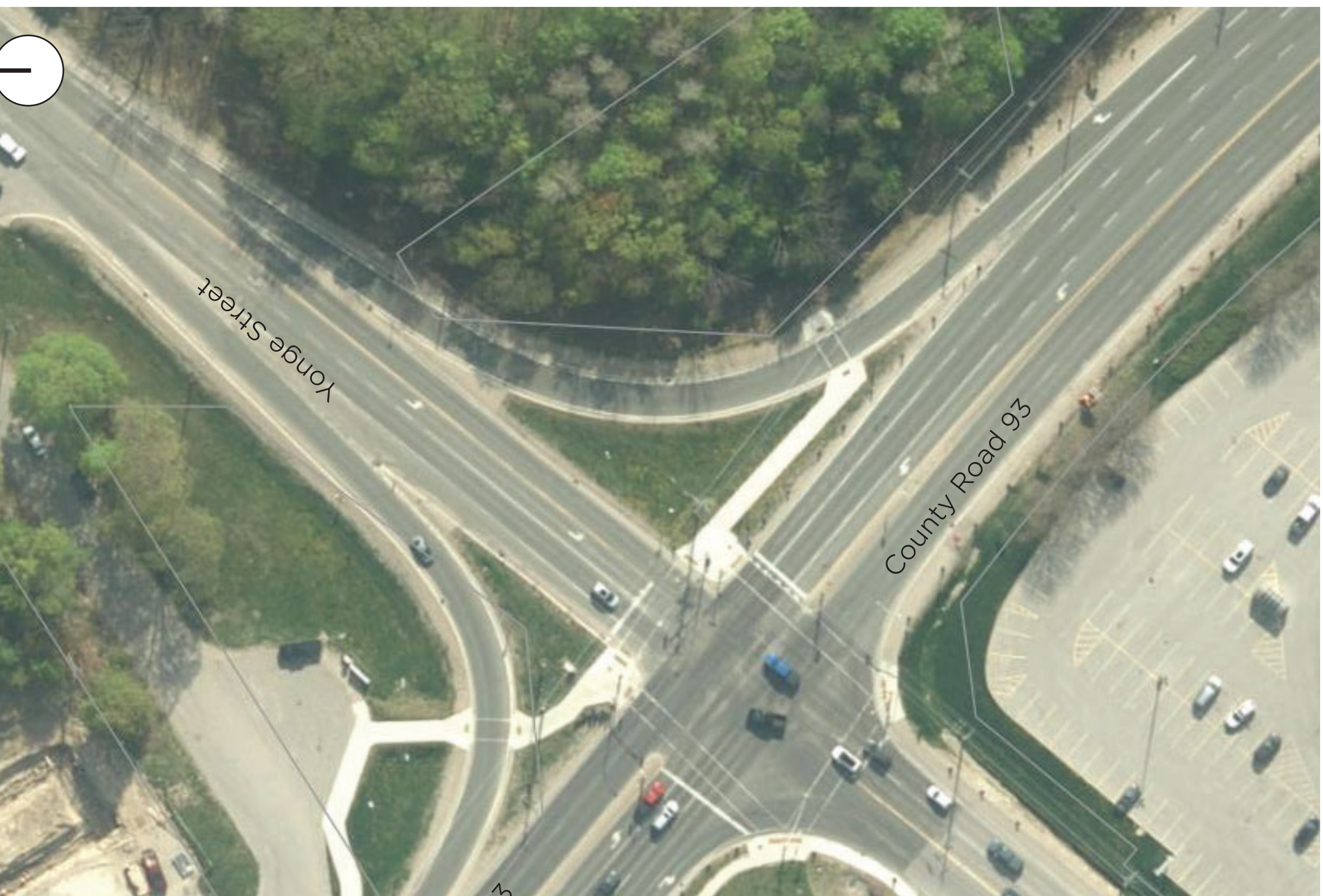
Simcoe Blvd

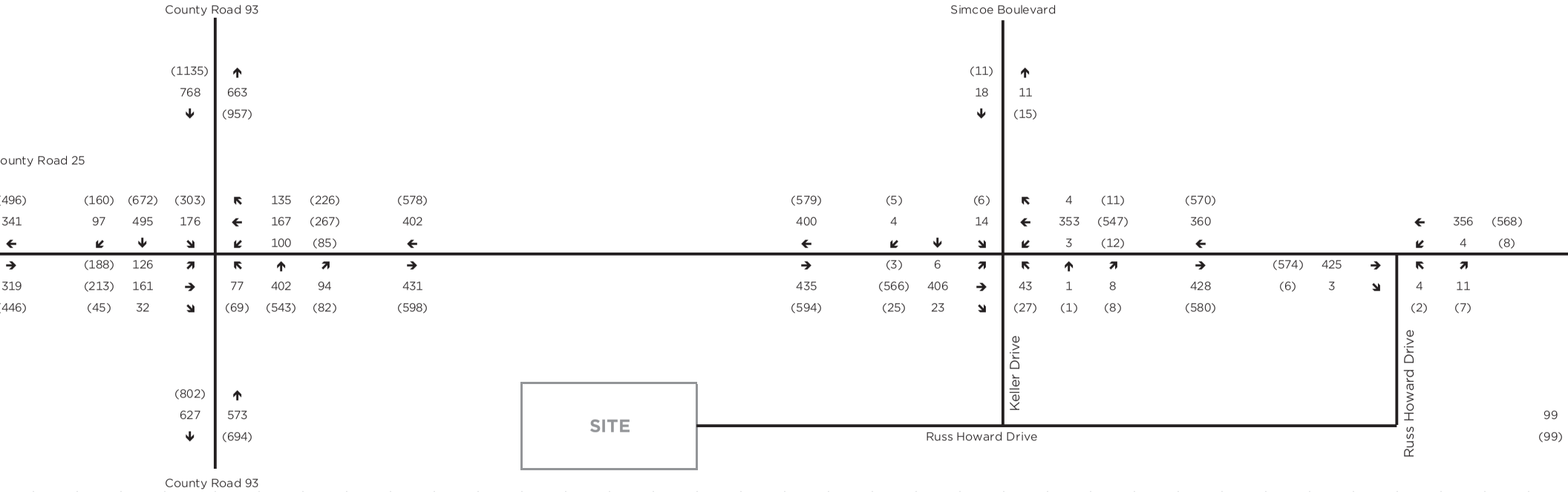

Yonge Street
County Road 93

Yonge Street from site access

Looking west along Yonge Street from site access

Yonge Street towards site access

Looking east along Yonge Street towards site access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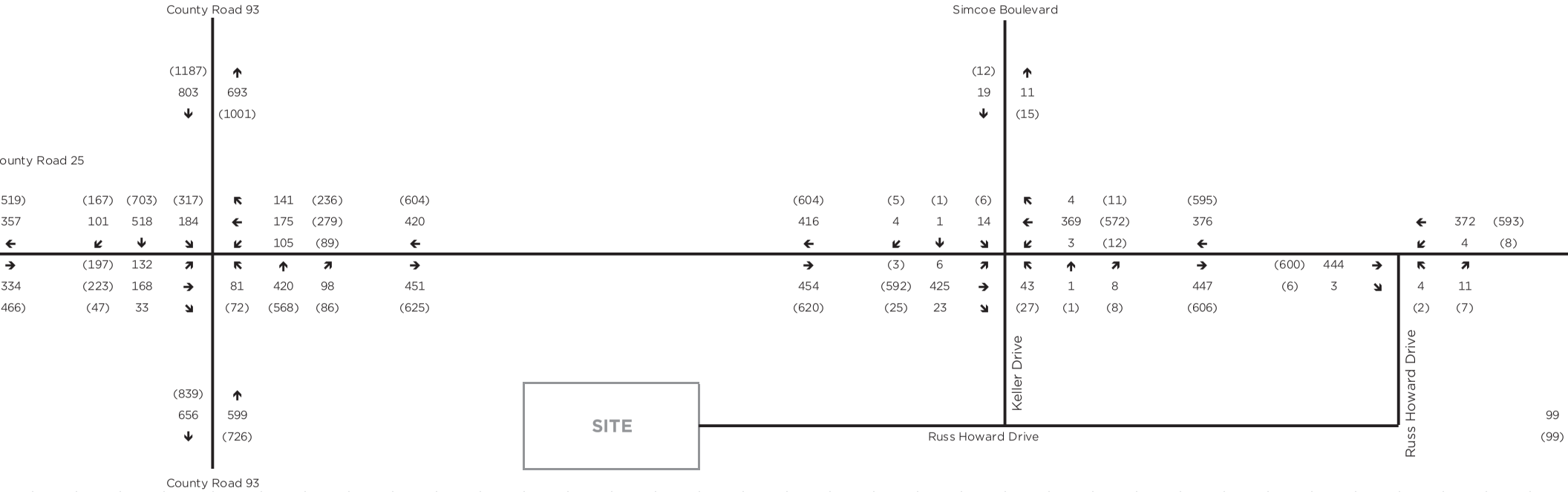
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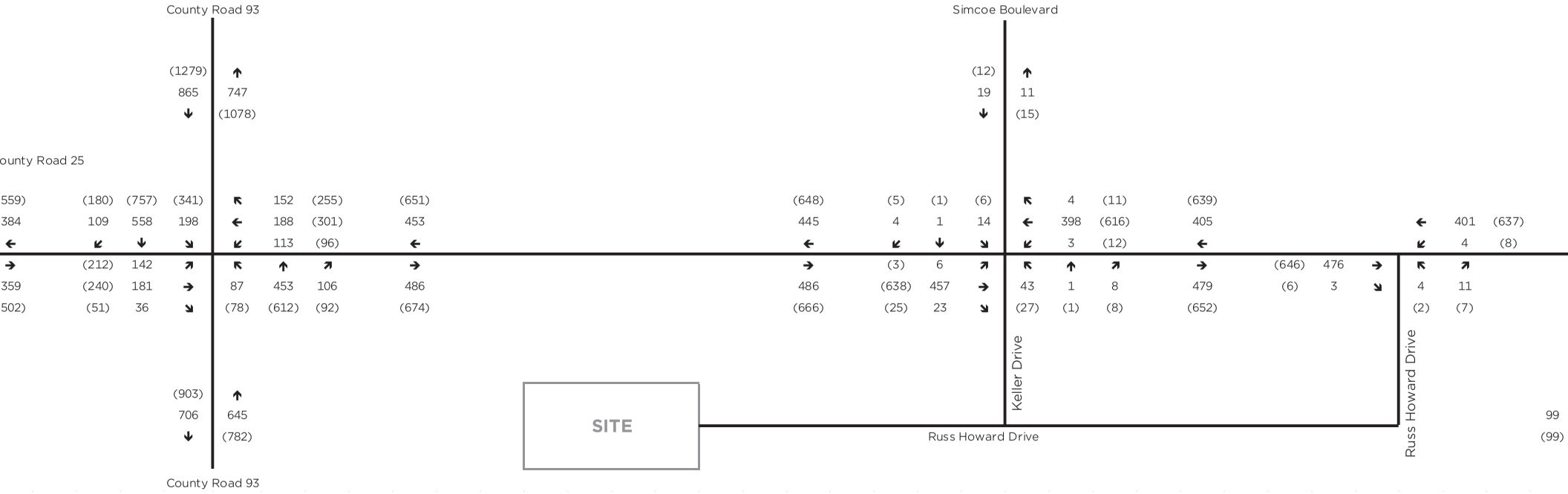
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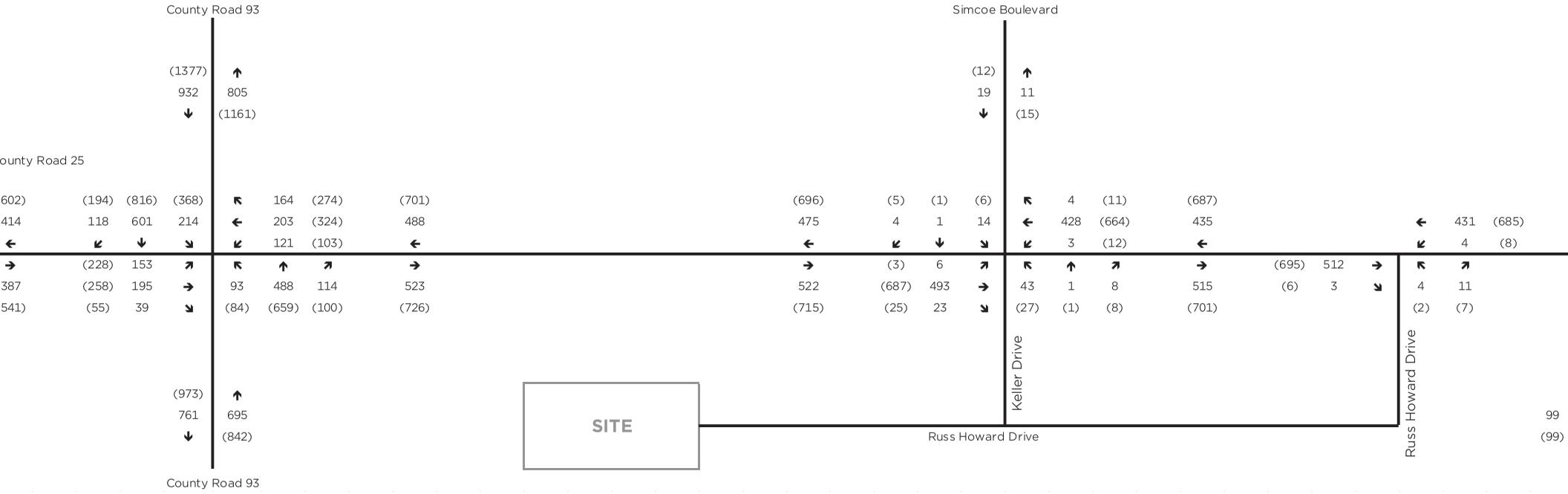
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KELLER DRIVE
RUSS HOWARD DR.
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67 PARKING SPACES
BLOCK 2
APT 43 UNITS
4347.76 m² (0.435 ha)
66 PARKING SPACES
BLOCK 3
STH 5 UNITS
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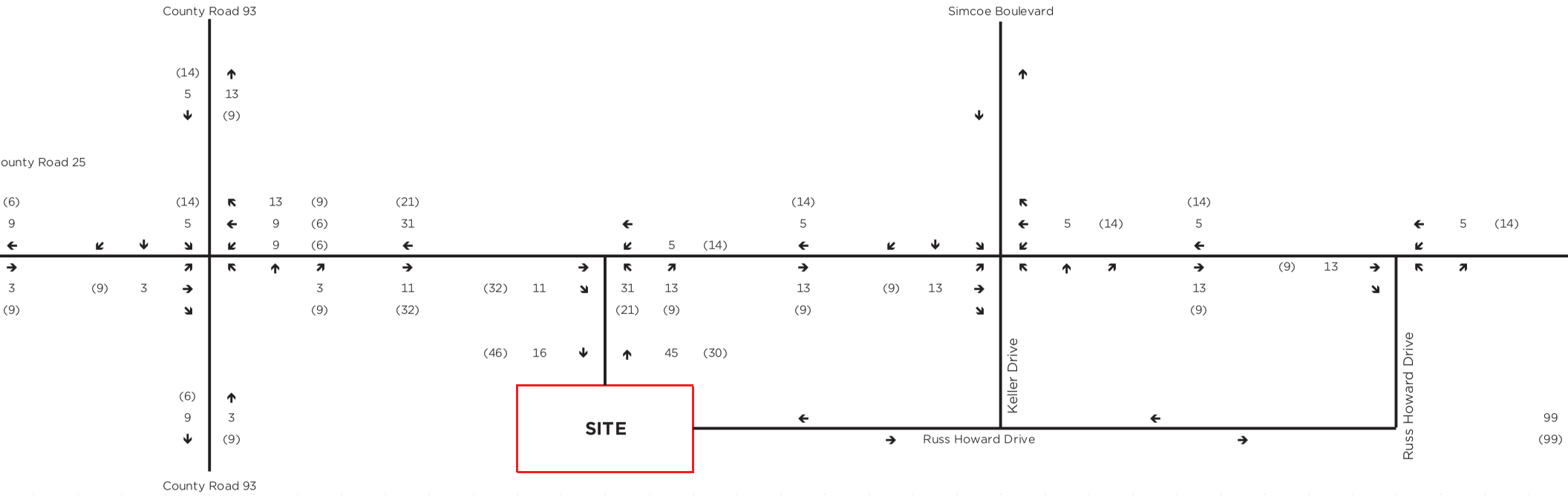
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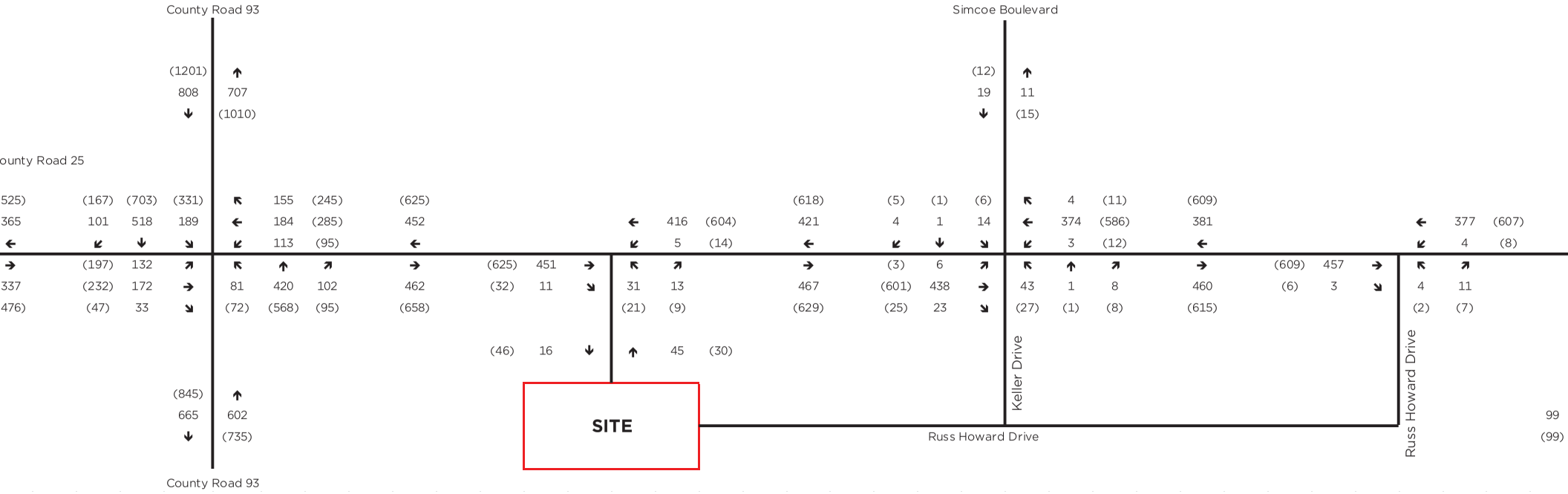
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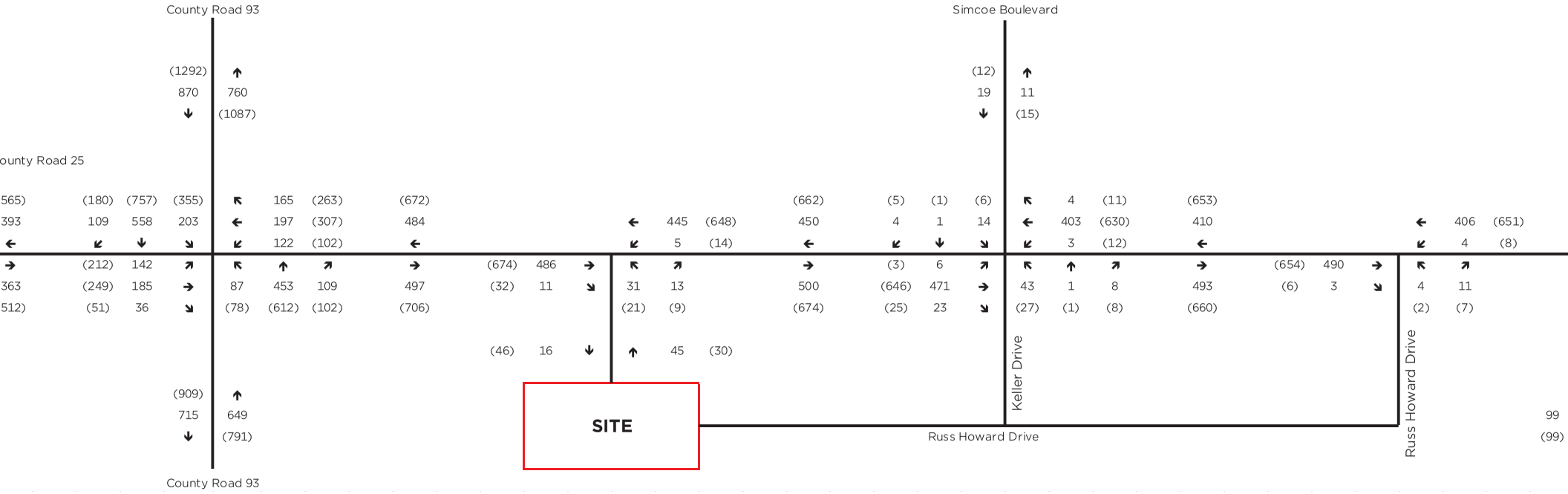
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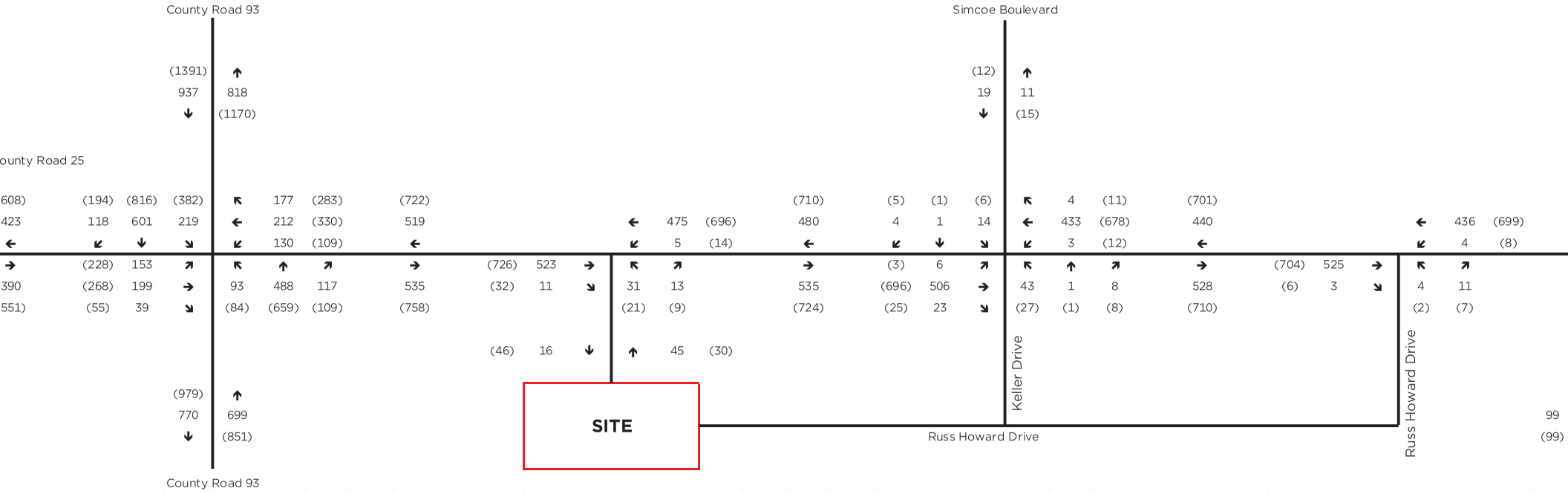
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County Road 93

Appendix A:
Terms of Reference

RE: 983 Yonge Street - TOR

Mitch Sobil <msobil@midland.ca>
Tue 7/2/2024 8:56 AM
To:Karolina Kukielka <kkukielka@tathameng.com>;Steve Farquharson <sfarquharson@midland.ca>
Cc:Tomasz Wierzba <twierzba@midland.ca>;Bailee Yasher <byasher@midland.ca>;Chris Underwood <cunderwood@tathameng.com>

Hi Karolina,

There are no major developments in the near vicinity that would have a major impact on this development from a traffic perspective. If you provide the appropriate growth rate at the horizons proposed that should be sufficient.

Thanks,

Mitch Sobil, P.Eng
Manager of Engineering
P: 705-526-4275 ext 2213
E: msobil@midland.ca

E-service
Click here to report an issue.

Town of Midland
575 Dominion Avenue,
Midland, Ontario L4R 1R2
www.midland.ca

From: Karolina Kukielka <kkukielka@tathameng.com>
Sent: Monday, June 24, 2024 9:19 AM
To: Mitch Sobil <msobil@midland.ca>; Steve Farquharson <sfarquharson@midland.ca>
Cc: Tomasz Wierzba <twierzba@midland.ca>; Bailee Yasher <byasher@midland.ca>; Chris Underwood <cunderwood@tathameng.com>
Subject: RE: 983 Yonge Street - TOR

Thank you Mitch,

Can you please confirm what background developments should be considered?

Kind Regards,

Karolina

Karolina Kukielka C.E.T., EIT, rcsi
Engineering Intern

kkukielka@tathameng.com **T** 705-733-9037 x2238
645 Veterans Drive, Unit D, Barrie, Ontario L4N 9H8

*We have moved! We look forward to welcoming you at our new Barrie location

tathameng.com

From: Mitch Sobil <msobil@midland.ca>
Sent: Sunday, June 23, 2024 10:06 PM
To: Karolina Kukielka <kkukielka@tathameng.com>; Steve Farquharson <sfarquharson@midland.ca>
Cc: Tomasz Wierzba <twierzba@midland.ca>; Bailee Yasher <byasher@midland.ca>
Subject: RE: 983 Yonge Street - TOR

Hi Karolina,

Apologies on the delay on reviewing the TOR for the traffic study.

Overall, the TOR you have provided is acceptable with the following additions.

1. Please also include the Russ Howard Dr and Yonge St intersection in your review.
2. Please ensure that the growth rates used are in alignment with the Town and County Growth projections for Midland.

If you have any questions as you proceed with the study, do not hesitate to reach out.

Thanks,

Mitch Sobil, P.Eng
Manager of Engineering
P: 705-526-4275 ext 2213
E: msobil@midland.ca

e-service
Click here to report an issue.

Town of Midland
575 Dominion Avenue,
Midland, Ontario L4R 1R2
www.midland.ca

From: Karolina Kukielka <kkukielka@tathameng.com>
Sent: Thursday, June 20, 2024 8:46 AM
To: Steve Farquharson <sfarquharson@midland.ca>
Cc: Mitch Sobil <msobil@midland.ca>
Subject: RE: 983 Yonge Street - TOR

Good morning Mitch,

I would like to check on the status of your review of my TOR.

Kind Regards,

Karolina

Karolina Kukielka C.E.T., EIT, rcsi
Engineering Intern

kkukielka@tathameng.com **T** 705-733-9037 x2238
41 King Street, Unit 4, Barrie, Ontario L4N 6B5

tathameng.com

From: Steve Farquharson <sfarquharson@midland.ca>
Sent: Monday, June 17, 2024 9:20 AM
To: Karolina Kukielka <kkukielka@tathameng.com>
Cc: Mitch Sobil <msobil@midland.ca>
Subject: RE: 983 Yonge Street - TOR

Good Morning Karolina,
Mitch Sobel is the Manager of Engineering Services. I have copied him on this email

Regards,

Steven Farquharson, BURPL, MCIP, RPP
Executive Director, Community and Growth
P: 705-526-4275 ext 2214
E:sfarquharson@midland.ca

Town of Midland
575 Dominion Avenue,
Midland, Ontario L4R 1R2
www.midland.ca

From: Karolina Kukielka <kkukielka@tathameng.com>
Sent: Monday, June 17, 2024 9:18 AM
To: Steve Farquharson <sfarquharson@midland.ca>
Subject: RE: 983 Yonge Street - TOR

Good morning Steve,

Could you please provide me with the contact information for thethe Manager of Engineering so I could follow-up with them regarding TOR?

Kind Regards,

From: Steve Farquharson <sfarquharson@midland.ca>
Sent: Monday, June 10, 2024 11:17 AM
To: Karolina Kukielka <kkukielka@tathameng.com>
Subject: RE: 983 Yonge Street - TOR

Good Morning Karolina,
I have forwarded this off to the Manager of Engineering as he would be the one that would review and comment on these terms of reference.

Regards,

Steven Farquharson, BURPL, MCIP, RPP
Executive Director, Community and Growth
P: 705-526-4275 ext 2214
E:sfarquharson@midland.ca

e-service
Click here to report an issue.

Town of Midland
575 Dominion Avenue,
Midland, Ontario L4R 1R2
www.midland.ca

From: Karolina Kukielka <kkukielka@tathameng.com>
Sent: Monday, June 10, 2024 9:30 AM
To: Steve Farquharson <sfarquharson@midland.ca>
Subject: RE: 983 Yonge Street - TOR

Good morning Steve,

I wanted to follow-up on my previous email. I would appreciate your feedback on the TOR.

Kind regards,

Karolina

Karolina Kukielka C.E.T., EIT, rcsi
Engineering Intern

kkukielka@tathameng.com **T** 705-733-9037 x2238
41 King Street, Unit 4, Barrie, Ontario L4N 6B5

tathameng.com

From: Karolina Kukielka
Sent: Wednesday, June 5, 2024 3:51 PM
To: sfarquharson@midland.ca
Subject: 983 Yonge Street - TOR

Good afternoon Steve,

Tatham Engineering Limited was retained to prepare a Traffic Impact Study in support of proposed residential development to be located at 983 Yonge Street in the Town of Midland. The development will consist of:

- 11 detached dwelling units;
- 11 semi-detached dwelling units;
- 29 townhouse units; and
- 2, 3-storey apartment buildings consisting of 43-units each (86-units total).

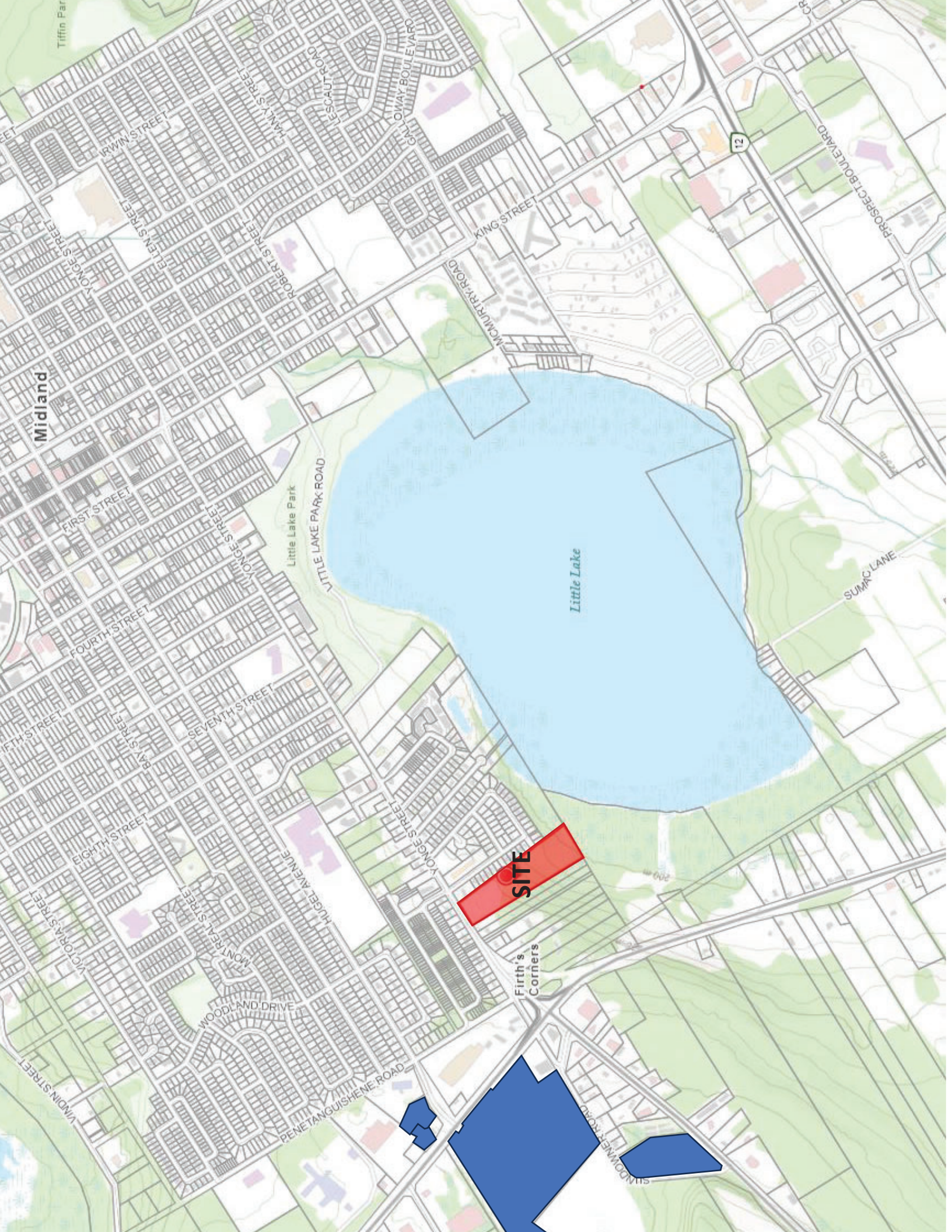
Our proposed scope is listed below:

1. The proposed study area is to include the following intersections:
   - County Road 93 & County Road 25/Yonge Street; and
   - Yonge Street & Keller Drive/Simcoe Boulevard.
2. Existing traffic volumes will be established based on new counts conducted at the study area intersections.
3. The operations assessment will consider weekday AM and PM peak hour volumes.
4. Projections will be developed for 2024 (existing), 2029 (year of build-out), 2034 and 2039 (5- and 10-year horizons beyond full build-out).
5. Using projected growth for the area, we will identify future background traffic volumes for the study area road network. Consideration will also be given to other planned developments in the area, I have included a map illustrating the location of the proposed site in relation to the current development projects as per Town of Midland's website.Please confirm what (if any) background developments should be included and please provide details for the ones selected.
6. Determine the number of trips to be generated by the proposed development during the relevant peak hour periods and assign such to the road network based on TTS survey data and existing traffic patterns. Trip estimates will be based on trip rates published in the*ITE Trip Generation Manual, 11th Edition* for land-uses reflective of those proposed.
7. Review the existing, background and total operations of the study area intersections and the site access point using Synchro traffic software.
8. Provide an assessment of the available sight lines at the proposed site access to Yonge Street.

9. Following the traffic analyses, identify any road network improvements/mitigating measures required to support the development and identify the timing of such.
10. Document the above into a Transportation Impact Study for submission to the Town/County for review and approval.

Please review the above Terms of Reference and provide any necessary feedback.

Kind Regards,


Midland
Little Lake
Little Lake Park
LITTLE LAKE PARK ROAD
KING STREET
MCMURTRY ROAD
PROSPECT BOULEVARD
12
IRWIN STREET
HANLY STREET
LESCAUT ROAD
GALLOWAY BOULEVARD
ELEN STREET
ROBERT STREET
YONGE STREET
FIRST STREET
FOURTH STREET
SEVENTH STREET
EIGHTH STREET
VICTORIA STREET
MONTREAL STREET
HUGEL AVENUE
WOODLAND DRIVE
PENETANGUISHENE ROAD
SUMAC LANE
SUNDOWNER ROAD
Firth's Corners
SITE

Appendix B:
Traffic Counts

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Project #24-295 - Tatham Engineering Ltd

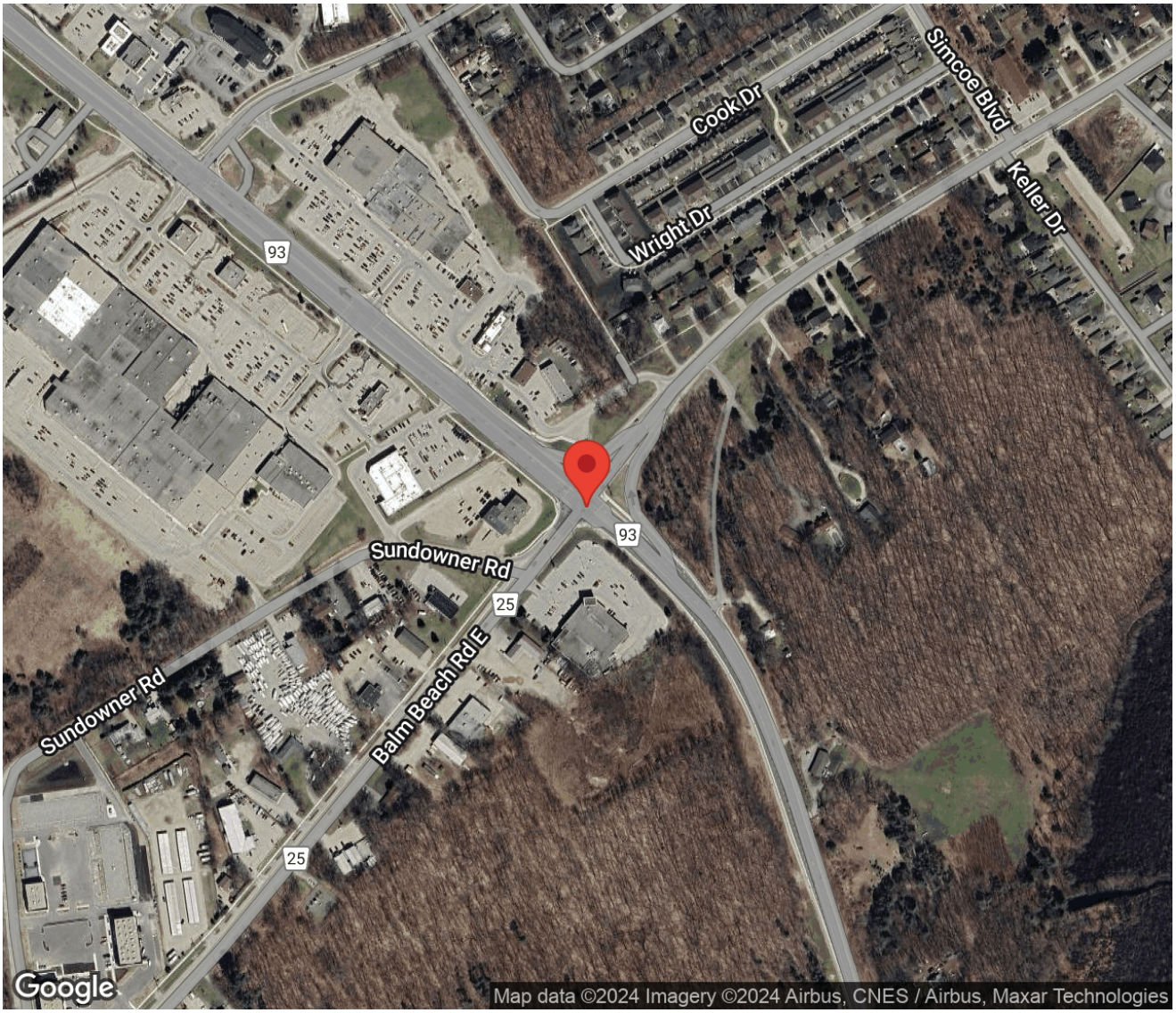
Intersection Count Report

Intersection:	CR 93 & CR 25 - Yonge St
Municipality:	Midland
Count Date:	Tuesday, Jun 25, 2024
Site Code:	2429500001
Count Categories:	Cars, Trucks, Bicycles, Pedestrians
Count Period:	07:00-10:00, 15:00-18:00
Weather:	Clear
Comments:	

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Map

Intersection:	CR 93 & CR 25 - Yonge St
Site Code:	2429500001
Municipality:	Midland
Count Date:	Jun 25, 2024



Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Summary

Intersection:	CR 93 & CR 25 - Yonge St
Site Code:	2429500001
Municipality:	Midland
Count Date:	Jun 25, 2024

CR 25 - Traffic Summary

	North Approach Totals						South Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	103	402	64	0	569	0	43	338	58	0	439	2	1008
08:00 - 09:00	127	480	119	0	726	0	64	409	89	0	562	1	1288
09:00 - 10:00	174	480	100	0	754	0	72	377	98	0	547	0	1301
BREAK													
15:00 - 16:00	266	684	131	0	1081	2	52	549	78	0	679	0	1760
16:00 - 17:00	310	637	158	0	1105	0	67	561	102	0	730	0	1835
17:00 - 18:00	281	426	88	0	795	7	43	531	81	0	655	0	1450
GRAND TOTAL	**1261**	**3109**	**660**	**0**	**5030**	**9**	**341**	**2765**	**506**	**0**	**3612**	**3**	**8642**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Summary

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Municipality: Midland
Count Date: Jun 25, 2024

Yonge St - Traffic Summary

	East Approach Totals						West Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	115	72	66	0	253	0	107	112	25	0	244	0	497
08:00 - 09:00	97	176	88	0	361	1	162	154	31	0	347	0	708
09:00 - 10:00	91	163	131	0	385	0	97	132	31	0	260	0	645
BREAK													
15:00 - 16:00	96	251	201	0	548	1	159	167	54	0	380	0	928
16:00 - 17:00	72	294	182	0	548	0	179	207	32	0	418	0	966
17:00 - 18:00	98	179	183	0	460	0	113	161	27	0	301	0	761
GRAND TOTAL	**569**	**1135**	**851**	**0**	**2555**	**2**	**817**	**933**	**200**	**0**	**1950**	**0**	**4505**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Municipality: Midland
Count Date: Jun 25, 2024

North Approach - CR 25

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
07:00	5	81	16	0	102	0	1	0	0	1	0	0	0	0	0	0
07:15	23	76	19	0	118	1	2	0	0	3	0	0	0	0	0	0
07:30	41	106	13	0	160	2	2	1	0	5	0	0	0	0	0	0
07:45	31	132	14	0	177	0	2	1	0	3	0	0	0	0	0	0
08:00	19	117	24	0	160	1	5	1	0	7	0	1	0	0	1	0
08:15	29	103	21	0	153	0	6	1	0	7	0	0	1	0	1	0
08:30	27	106	38	0	171	1	7	1	0	9	0	0	0	0	0	0
08:45	47	124	31	0	202	3	11	1	0	15	0	0	0	0	0	0
09:00	38	123	17	0	178	2	12	0	0	14	0	0	0	0	0	0
09:15	46	96	29	0	171	0	12	1	0	13	0	0	0	0	0	0
09:30	40	111	18	0	169	0	6	0	0	6	0	0	0	0	0	0
09:45	47	109	32	0	188	1	10	3	0	14	0	1	0	0	1	0
SUBTOTAL	393	1284	272	0	1949	11	76	10	0	97	0	2	1	0	3	0

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Municipality: Midland
Count Date: Jun 25, 2024

North Approach - CR 25

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
15:00	54	149	28	0	231	0	5	1	0	6	0	0	0	0	0	1
15:15	61	161	28	0	250	1	1	3	0	5	4	0	0	0	4	0
15:30	83	198	32	0	313	0	3	0	0	3	0	0	0	0	0	0
15:45	63	164	35	0	262	0	3	4	0	7	0	0	0	0	0	1
16:00	74	164	48	0	286	0	5	0	0	5	0	0	0	0	0	0
16:15	83	131	41	0	255	0	4	0	0	4	0	0	0	0	0	0
16:30	81	162	36	0	279	0	4	0	0	4	0	0	0	0	0	0
16:45	72	165	33	0	270	0	2	0	0	2	0	0	0	0	0	0
17:00	87	139	32	0	258	0	3	0	0	3	0	0	0	0	0	3
17:15	67	100	28	0	195	0	1	0	0	1	0	0	0	0	0	0
17:30	68	104	19	0	191	0	3	0	0	3	0	0	0	0	0	4
17:45	59	75	9	0	143	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	852	1712	369	0	2933	1	35	8	0	44	4	0	0	0	4	9
GRAND TOTAL	1245	2996	641	0	4882	12	111	18	0	141	4	2	1	0	7	9

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Municipality: Midland
Count Date: Jun 25, 2024

South Approach - CR 93

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
07:00	8	42	6	0	56	1	7	0	0	8	0	0	0	0	0	2
07:15	7	50	16	0	73	0	5	1	0	6	0	0	0	0	0	0
07:30	11	97	21	0	129	2	7	0	0	9	0	0	0	0	0	0
07:45	14	124	14	0	152	0	6	0	0	6	0	0	0	0	0	0
08:00	14	86	22	0	122	5	12	1	0	18	0	0	0	0	0	0
08:15	7	95	19	0	121	1	11	1	0	13	0	2	0	0	2	0
08:30	8	79	21	0	108	4	3	0	0	7	0	0	0	0	0	1
08:45	22	110	22	0	154	3	11	3	0	17	0	0	0	0	0	0
09:00	13	65	23	0	101	4	6	0	0	10	0	0	0	0	0	0
09:15	18	103	28	0	149	1	7	3	0	11	0	0	0	0	0	0
09:30	15	95	14	0	124	1	5	1	0	7	0	0	0	0	0	0
09:45	19	89	26	0	134	1	7	3	0	11	0	0	0	0	0	0
SUBTOTAL	156	1035	232	0	1423	23	87	13	0	123	0	2	0	0	2	3

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Municipality: Midland
Count Date: Jun 25, 2024

South Approach - CR 93

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	
15:00	10	133	14	0	157	0	3	0	0	3	0	0	0	0	0	0
15:15	17	132	25	0	174	0	5	0	0	5	0	0	0	0	0	0
15:30	6	123	13	0	142	0	5	0	0	5	0	0	0	0	0	0
15:45	17	145	25	0	187	2	3	1	0	6	0	0	0	0	0	0
16:00	27	133	21	0	181	1	6	0	0	7	0	0	0	0	0	0
16:15	15	128	22	0	165	1	0	0	0	1	0	0	0	0	0	0
16:30	18	152	21	0	191	0	5	0	0	5	0	0	0	0	0	0
16:45	5	137	37	0	179	0	0	1	0	1	0	0	0	0	0	0
17:00	10	141	26	0	177	0	3	0	0	3	0	0	0	0	0	0
17:15	7	138	26	0	171	0	1	0	0	1	0	0	0	0	0	0
17:30	14	122	11	0	147	0	0	0	0	0	0	0	0	0	0	0
17:45	12	126	18	0	156	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	158	1610	259	0	2027	4	31	2	0	37	0	0	0	0	0	0
GRAND TOTAL	**314**	**2645**	**491**	**0**	**3450**	**27**	**118**	**15**	**0**	**160**	**0**	**2**	**0**	**0**	**2**	**3**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Municipality: Midland
Count Date: Jun 25, 2024

East Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
07:00	16	7	18	0	41	0	0	1	0	1	0	0	0	0	0	0
07:15	26	10	12	0	48	1	0	1	0	2	0	0	0	0	0	0
07:30	38	11	13	0	62	0	3	0	0	3	0	0	0	0	0	0
07:45	33	39	20	0	92	1	2	1	0	4	0	0	0	0	0	0
08:00	22	49	16	0	87	0	2	1	0	3	0	0	0	0	0	0
08:15	20	31	24	0	75	0	0	3	0	3	0	0	0	0	0	1
08:30	22	44	14	0	80	1	1	2	0	4	0	0	0	0	0	0
08:45	29	46	28	0	103	3	1	0	0	4	0	2	0	0	2	0
09:00	15	28	40	0	83	2	0	2	0	4	0	0	0	0	0	0
09:15	20	46	28	0	94	1	0	1	0	2	0	0	0	0	0	0
09:30	28	43	35	0	106	2	1	1	0	4	0	0	0	0	0	0
09:45	22	44	23	0	89	1	0	1	0	2	0	1	0	0	1	0
SUBTOTAL	291	398	271	0	960	12	10	14	0	36	0	3	0	0	3	1

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Municipality: Midland
Count Date: Jun 25, 2024

East Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
15:00	20	52	44	0	116	3	2	0	0	5	0	0	0	0	0	0
15:15	20	59	47	0	126	0	2	2	0	4	0	0	0	0	0	0
15:30	22	88	60	0	170	0	2	0	0	2	0	0	0	0	0	0
15:45	28	44	48	0	120	3	0	0	0	3	0	2	0	0	2	1
16:00	16	61	61	0	138	1	1	1	0	3	0	3	0	0	3	0
16:15	15	66	55	0	136	0	0	1	0	1	0	0	0	0	0	0
16:30	23	81	27	0	131	0	0	0	0	0	0	0	0	0	0	0
16:45	17	82	37	0	136	0	0	0	0	0	0	0	0	0	0	0
17:00	27	36	52	0	115	1	1	0	0	2	0	0	0	0	0	0
17:15	17	63	55	0	135	1	1	1	0	3	0	0	0	0	0	0
17:30	33	49	33	0	115	0	1	0	0	1	0	0	0	0	0	0
17:45	19	27	41	0	87	0	0	1	0	1	0	1	0	0	1	0
SUBTOTAL	257	708	560	0	1525	9	10	6	0	25	0	6	0	0	6	1
GRAND TOTAL	**548**	**1106**	**831**	**0**	**2485**	**21**	**20**	**20**	**0**	**61**	**0**	**9**	**0**	**0**	**9**	**2**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Municipality: Midland
Count Date: Jun 25, 2024

West Approach - CR 25

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
07:00	14	21	5	0	40	1	2	0	0	3	0	0	0	0	0	0
07:15	12	7	7	0	26	0	0	0	0	0	0	0	0	0	0	0
07:30	31	29	6	0	66	1	2	0	0	3	0	0	0	0	0	0
07:45	46	50	6	0	102	1	1	1	0	3	1	0	0	0	1	0
08:00	38	25	5	0	68	0	0	1	0	1	0	0	0	0	0	0
08:15	35	31	9	0	75	2	1	1	0	4	0	0	0	0	0	0
08:30	31	33	9	0	73	1	1	0	0	2	0	0	0	0	0	0
08:45	55	63	5	0	123	0	0	1	0	1	0	0	0	0	0	0
09:00	25	34	8	0	67	0	1	1	0	2	0	0	0	0	0	0
09:15	20	21	1	0	42	1	0	2	0	3	0	0	0	0	0	0
09:30	25	42	13	0	80	0	0	1	0	1	0	0	0	0	0	0
09:45	26	34	5	0	65	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	358	390	79	0	827	7	8	8	0	23	1	0	0	0	1	0

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Municipality: Midland
Count Date: Jun 25, 2024

West Approach - CR 25

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
15:00	34	32	10	0	76	1	1	0	0	2	0	0	0	0	0	0
15:15	38	32	12	0	82	0	0	1	0	1	0	0	0	0	0	0
15:30	41	49	12	0	102	0	0	2	0	2	0	0	0	0	0	0
15:45	44	52	17	0	113	1	1	0	0	2	0	0	0	0	0	0
16:00	62	51	8	0	121	1	1	0	0	2	0	0	0	0	0	0
16:15	39	58	6	0	103	0	1	0	0	1	0	0	0	0	0	0
16:30	32	37	9	0	78	0	0	1	0	1	0	0	0	0	0	0
16:45	44	59	7	0	110	1	0	1	0	2	0	0	0	0	0	0
17:00	30	35	9	0	74	0	0	0	0	0	0	0	0	0	0	0
17:15	27	53	9	0	89	0	0	0	0	0	0	0	0	0	0	0
17:30	24	35	2	0	61	0	0	0	0	0	0	0	0	0	0	0
17:45	32	38	7	0	77	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	447	531	108	0	1086	4	4	5	0	13	0	0	0	0	0	0
GRAND TOTAL	805	921	187	0	1913	11	12	13	0	36	1	0	0	0	1	0

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Diagram

Specified Period		One Hour Peak	
From:	07:00:00	From:	08:45:00
To:	10:00:00	To:	09:45:00

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Count Date: Jun 25, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: CR 25 runs N/S

North Approach

	Out	In	Total
Cars	720	629	1349
Trucks	48	34	82
Bicycles	0	0	0
	768	**663**	**1431**

CR 25

Bicycles	0	0	0	0
Trucks	2	41	5	0
Cars	95	454	171	0
Totals	**97**	**495**	**176**	**0**

East Approach

	Out	In	Total
Cars	386	418	804
Trucks	14	13	27
Bicycles	2	0	2
	402	**431**	**833**

CR 25

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	1	125	**126**
0	1	160	**161**
0	5	27	**32**

Peds: 0

N
W E
S

Peds: 0

Peds: 0

Yonge St

Totals	Cars	Trucks	Bicycles
0	0	0	0
135	131	4	0
167	163	2	2
100	92	8	0

West Approach

	Out	In	Total
Cars	312	326	638
Trucks	7	13	20
Bicycles	0	2	2
	319	**341**	**660**

Totals	**77**	**402**	**94**	**0**
Cars	68	373	87	0
Trucks	9	29	7	0
Bicycles	0	0	0	0

CR 93

South Approach

	Out	In	Total
Cars	528	573	1101
Trucks	45	54	99
Bicycles	0	0	0
	573	**627**	**1200**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Count Date: Jun 25, 2024
Period: 07:00 - 10:00

Peak Hour Data (08:45 - 09:45)

Start Time	North Approach CR 25						South Approach CR 93						East Approach Yonge St						West Approach CR 25						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
08:45	50	135	32	0	0	217	25	121	25	0	0	171	32	49	28	0	0	109	55	63	6	0	0	124	621
09:00	40	135	17	0	0	192	17	71	23	0	0	111	17	28	42	0	0	87	25	35	9	0	0	69	459
09:15	46	108	30	0	0	184	19	110	31	0	0	160	21	46	29	0	0	96	21	21	3	0	0	45	485
09:30	40	117	18	0	0	175	16	100	15	0	0	131	30	44	36	0	0	110	25	42	14	0	0	81	497
Grand Total	**176**	**495**	**97**	**0**	**0**	**768**	**77**	**402**	**94**	**0**	**0**	**573**	**100**	**167**	**135**	**0**	**0**	**402**	**126**	**161**	**32**	**0**	**0**	**319**	**2062**
Approach %	22.9	64.5	12.6	0		-	13.4	70.2	16.4	0		-	24.9	41.5	33.6	0		-	39.5	50.5	10	0		-	
Totals %	8.5	24	4.7	0		37.2	3.7	19.5	4.6	0		27.8	4.8	8.1	6.5	0		19.5	6.1	7.8	1.6	0		15.5	
PHF	**0.88**	**0.92**	**0.76**	**0**		**0.88**	**0.77**	**0.83**	**0.76**	**0**		**0.84**	**0.78**	**0.85**	**0.8**	**0**		**0.91**	**0.57**	**0.64**	**0.57**	**0**		**0.64**	**0.83**
Cars	171	454	95	0		720	68	373	87	0		528	92	163	131	0		386	125	160	27	0		312	1946
% Cars	97.2	91.7	97.9	0		93.8	88.3	92.8	92.6	0		92.1	92	97.6	97	0		96	99.2	99.4	84.4	0		97.8	94.4
Trucks	5	41	2	0		48	9	29	7	0		45	8	2	4	0		14	1	1	5	0		7	114
% Trucks	2.8	8.3	2.1	0		6.3	11.7	7.2	7.4	0		7.9	8	1.2	3	0		3.5	0.8	0.6	15.6	0		2.2	5.5
Bicycles	0	0	0	0		0	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	2
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	1.2	0	0		0.5	0	0	0	0		0	0.1
Peds					0	-					0	-					0	-					0	-	0
% Peds					0	-					0	-					0	-					0	-	

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Diagram

Specified Period		One Hour Peak	
From:	15:00:00	From:	15:30:00
To:	18:00:00	To:	16:30:00

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Count Date: Jun 25, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: CR 25 runs N/S

North Approach

	Out	In	Total
Cars	1116	939	2055
Trucks	19	18	37
Bicycles	0	0	0
	1135	**957**	**2092**

CR 25

Bicycles	0	0	0	0
Trucks	4	15	0	0
Cars	156	657	303	0
Totals	**160**	**672**	**303**	**0**

East Approach

	Out	In	Total
Cars	564	594	1158
Trucks	9	4	13
Bicycles	5	0	5
	578	**598**	**1176**

CR 25

Bicycles	Trucks	Cars	Totals	
0	0	0	**0**	
0	2	186	**188**	
0	3	210	**213**	
0	2	43	**45**	

Peds: 1

Peds: 0

Peds: 1

Peds: 0

Yonge St

Totals	Cars	Trucks	Bicycles
0	0	0	0
226	224	2	0
267	259	3	5
85	81	4	0

West Approach

	Out	In	Total
Cars	439	480	919
Trucks	7	11	18
Bicycles	0	5	5
	446	**496**	**942**

Totals	**69**	**543**	**82**	**0**
Cars	65	529	81	0
Trucks	4	14	1	0
Bicycles	0	0	0	0

CR 93

South Approach

	Out	In	Total
Cars	675	781	1456
Trucks	19	21	40
Bicycles	0	0	0
	694	**802**	**1496**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection: CR 93 & CR 25 - Yonge St
Site Code: 2429500001
Count Date: Jun 25, 2024
Period: 15:00 - 18:00

Peak Hour Data (15:30 - 16:30)

Start Time	North Approach CR 25						South Approach CR 93						East Approach Yonge St						West Approach CR 25						Total Vehicles
	↰	↑	↱	↶	Peds	Total	↰	↑	↱	↶	Peds	Total	↰	↑	↱	↶	Peds	Total	↰	↑	↱	↶	Peds	Total	
15:30	83	201	32	0	0	316	6	128	13	0	0	147	22	90	60	0	0	172	41	49	14	0	0	104	739
15:45	63	167	39	0	1	269	19	148	26	0	0	193	31	46	48	0	1	125	45	53	17	0	0	115	702
16:00	74	169	48	0	0	291	28	139	21	0	0	188	17	65	62	0	0	144	63	52	8	0	0	123	746
16:15	83	135	41	0	0	259	16	128	22	0	0	166	15	66	56	0	0	137	39	59	6	0	0	104	666
Grand Total	**303**	**672**	**160**	**0**	**1**	**1135**	**69**	**543**	**82**	**0**	**0**	**694**	**85**	**267**	**226**	**0**	**1**	**578**	**188**	**213**	**45**	**0**	**0**	**446**	**2853**
Approach %	26.7	59.2	14.1	0		-	9.9	78.2	11.8	0		-	14.7	46.2	39.1	0		-	42.2	47.8	10.1	0		-	
Totals %	10.6	23.6	5.6	0		39.8	2.4	19	2.9	0		24.3	3	9.4	7.9	0		20.3	6.6	7.5	1.6	0		15.6	
PHF	**0.91**	**0.84**	**0.83**	**0**		**0.9**	**0.62**	**0.92**	**0.79**	**0**		**0.9**	**0.69**	**0.74**	**0.91**	**0**		**0.84**	**0.75**	**0.9**	**0.66**	**0**		**0.91**	**0.96**
Cars	303	657	156	0		1116	65	529	81	0		675	81	259	224	0		564	186	210	43	0		439	2794
% Cars	100	97.8	97.5	0		98.3	94.2	97.4	98.8	0		97.3	95.3	97	99.1	0		97.6	98.9	98.6	95.6	0		98.4	97.9
Trucks	0	15	4	0		19	4	14	1	0		19	4	3	2	0		9	2	3	2	0		7	54
% Trucks	0	2.2	2.5	0		1.7	5.8	2.6	1.2	0		2.7	4.7	1.1	0.9	0		1.6	1.1	1.4	4.4	0		1.6	1.9
Bicycles	0	0	0	0		0	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	5
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	1.9	0	0		0.9	0	0	0	0		0	0.2
Peds					1	-					0	-					1	-					0	-	2
% Peds					50	-					0	-					50	-					0	-	

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Project #24-295 - Tatham Engineering Ltd

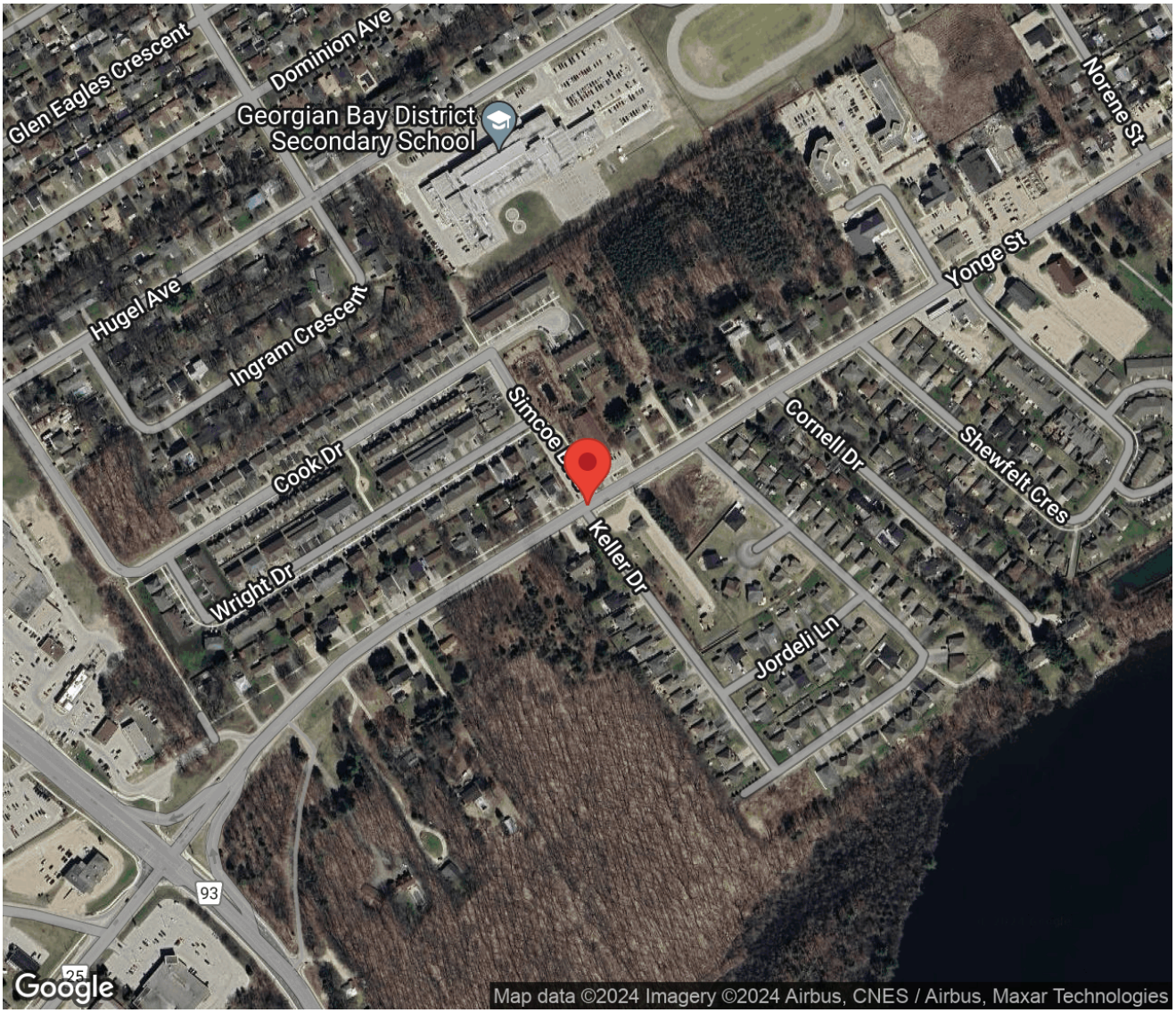
Intersection Count Report

Intersection:	Yonge St & Keller Dr - Simcoe Blvd
Municipality:	Midland
Count Date:	Tuesday, Jun 25, 2024
Site Code:	2429500002
Count Categories:	Cars, Trucks, Bicycles, Pedestrians
Count Period:	07:00-10:00, 15:00-18:00
Weather:	Clear
Comments:	

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Map

Intersection:	Yonge St & Keller Dr - Simcoe Blvd
Site Code:	2429500002
Municipality:	Midland
Count Date:	Jun 25, 2024



Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Summary

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

Simcoe Blvd - Traffic Summary

	North Approach Totals						South Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	7	1	4	0	12	0	21	1	5	0	27	6	39
08:00 - 09:00	11	1	4	0	16	4	36	1	15	0	52	12	68
09:00 - 10:00	10	0	8	0	18	3	41	1	7	0	49	17	67
BREAK													
15:00 - 16:00	12	1	2	0	15	2	24	1	2	0	27	6	42
16:00 - 17:00	6	0	4	0	10	2	36	1	9	0	46	5	56
17:00 - 18:00	6	1	1	0	8	10	32	2	9	0	43	5	51
GRAND TOTAL	**52**	**4**	**23**	**0**	**79**	**21**	**190**	**7**	**47**	**0**	**244**	**51**	**323**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Summary

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

Yonge St - Traffic Summary

	East Approach Totals						West Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	2	226	2	0	230	0	0	262	6	0	268	7	498
08:00 - 09:00	6	329	2	0	337	2	4	347	23	0	374	2	711
09:00 - 10:00	4	330	7	0	341	2	2	379	21	0	402	3	743
BREAK													
15:00 - 16:00	10	528	15	0	553	0	5	480	26	0	511	0	1064
16:00 - 17:00	11	510	12	0	533	0	2	582	26	0	610	0	1143
17:00 - 18:00	19	429	11	0	459	1	2	497	25	0	524	6	983
GRAND TOTAL	**52**	**2352**	**49**	**0**	**2453**	**5**	**15**	**2547**	**127**	**0**	**2689**	**18**	**5142**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

North Approach - Simcoe Blvd

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
07:00	5	0	2	0	7	0	0	0	0	0	0	0	0	0	0	0
07:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:30	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0
08:00	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
08:15	4	0	1	0	5	0	0	0	0	0	0	0	0	0	0	0
08:30	1	1	1	0	3	0	0	0	0	0	0	0	0	0	0	3
08:45	5	0	1	0	6	0	0	0	0	0	0	0	0	0	0	1
09:00	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
09:15	6	0	2	0	8	0	0	0	0	0	0	0	0	0	0	0
09:30	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
09:45	1	0	5	0	6	0	0	0	0	0	0	0	0	0	0	3
SUBTOTAL	28	2	16	0	46	0	0	0	0	0	0	0	0	0	0	7

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

North Approach - Simcoe Blvd

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	
15:00	5	1	0	0	6	0	0	0	0	0	0	0	1	0	1	0
15:15	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
15:45	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	2
16:00	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0
16:15	2	0	2	0	4	0	0	0	0	0	0	0	0	0	0	2
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
17:00	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4
17:15	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5
17:30	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
17:45	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	1
SUBTOTAL	24	2	6	0	32	0	0	0	0	0	0	0	1	0	1	14
GRAND TOTAL	**52**	**4**	**22**	**0**	**78**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**21**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

South Approach - Keller Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↩	Total	↰	↑	↱	↩	Total	↰	↑	↱	↩	Total	
07:00	8	0	1	0	9	0	0	0	0	0	0	0	0	0	0	0
07:15	4	1	1	0	6	0	0	0	0	0	0	0	0	0	0	2
07:30	2	0	2	0	4	0	0	0	0	0	0	0	0	0	0	3
07:45	7	0	1	0	8	0	0	0	0	0	0	0	0	0	0	1
08:00	4	1	5	0	10	0	0	0	0	0	0	0	0	0	0	1
08:15	8	0	6	0	14	0	0	0	0	0	0	0	0	0	0	2
08:30	9	0	3	0	12	0	0	0	0	0	0	0	0	0	0	8
08:45	15	0	1	0	16	0	0	0	0	0	0	0	0	0	0	1
09:00	16	0	4	0	20	2	0	1	0	3	0	0	0	0	0	8
09:15	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	2
09:30	3	1	2	0	6	0	0	0	0	0	0	0	0	0	0	5
09:45	12	0	0	0	12	0	0	0	0	0	1	0	0	0	1	2
SUBTOTAL	95	3	26	0	124	2	0	1	0	3	1	0	0	0	1	35

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

South Approach - Keller Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	5	0	1	0	6	1	0	0	0	1	0	0	0	0	0	4
15:15	9	1	0	0	10	0	0	0	0	0	0	0	0	0	0	1
15:30	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
15:45	5	0	1	0	6	0	0	0	0	0	0	0	0	0	0	1
16:00	5	0	3	0	8	0	0	0	0	0	2	0	0	0	2	2
16:15	11	1	4	0	16	0	0	0	0	0	0	0	0	0	0	2
16:30	9	0	0	0	9	0	0	0	0	0	0	0	0	0	0	1
16:45	9	0	2	0	11	0	0	0	0	0	0	0	0	0	0	0
17:00	10	0	3	0	13	0	0	0	0	0	0	0	0	0	0	0
17:15	10	1	2	0	13	0	0	0	0	0	1	0	0	0	1	0
17:30	7	0	3	0	10	0	0	0	0	0	0	0	0	0	0	4
17:45	4	1	1	0	6	0	0	0	0	0	0	0	0	0	0	1
SUBTOTAL	88	4	20	0	112	1	0	0	0	1	3	0	0	0	3	16
GRAND TOTAL	183	7	46	0	236	3	0	1	0	4	4	0	0	0	4	51

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

East Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
07:00	0	31	0	0	31	0	1	0	0	1	0	0	0	0	0	0
07:15	1	44	1	0	46	0	1	0	0	1	0	0	0	0	0	0
07:30	0	59	0	0	59	0	4	0	0	4	0	0	0	0	0	0
07:45	1	82	1	0	84	0	4	0	0	4	0	0	0	0	0	0
08:00	0	80	0	0	80	0	2	0	0	2	0	0	0	0	0	0
08:15	1	68	1	0	70	0	3	0	0	3	0	0	0	0	0	0
08:30	4	73	0	0	77	0	4	1	0	5	0	0	0	0	0	1
08:45	1	91	0	0	92	0	6	0	0	6	0	2	0	0	2	1
09:00	1	64	3	0	68	0	1	0	0	1	0	0	0	0	0	0
09:15	0	84	0	0	84	0	1	0	0	1	0	0	0	0	0	0
09:30	1	99	1	0	101	0	4	0	0	4	0	1	0	0	1	0
09:45	2	73	3	0	78	0	3	0	0	3	0	0	0	0	0	2
SUBTOTAL	12	848	10	0	870	0	34	1	0	35	0	3	0	0	3	4

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

East Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	
15:00	3	111	3	0	117	0	2	0	0	2	0	0	0	0	0	0
15:15	0	120	6	0	126	0	4	0	0	4	0	0	0	0	0	0
15:30	3	164	1	0	168	0	2	0	0	2	0	0	0	0	0	0
15:45	4	120	5	0	129	0	3	0	0	3	0	2	0	0	2	0
16:00	1	128	3	0	132	0	2	0	0	2	0	1	0	0	1	0
16:15	4	124	2	0	130	0	1	0	0	1	0	0	0	0	0	0
16:30	1	124	5	0	130	0	1	0	0	1	0	0	0	0	0	0
16:45	4	129	2	0	135	1	0	0	0	1	0	0	0	0	0	0
17:00	6	109	1	0	116	0	2	0	0	2	0	0	0	0	0	0
17:15	6	122	1	0	129	0	3	0	0	3	0	0	0	0	0	0
17:30	4	107	6	0	117	0	2	0	0	2	0	0	0	0	0	0
17:45	3	83	3	0	89	0	0	0	0	0	0	1	0	0	1	1
SUBTOTAL	39	1441	38	0	1518	1	22	0	0	23	0	4	0	0	4	1
GRAND TOTAL	**51**	**2289**	**48**	**0**	**2388**	**1**	**56**	**1**	**0**	**58**	**0**	**7**	**0**	**0**	**7**	**5**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

West Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
07:00	0	32	1	0	33	0	2	0	0	2	0	0	0	0	0	1
07:15	0	44	0	0	44	0	2	0	0	2	0	0	0	0	0	0
07:30	0	85	4	0	89	0	1	0	0	1	0	1	0	0	1	2
07:45	0	91	1	0	92	0	4	0	0	4	0	0	0	0	0	4
08:00	0	60	7	0	67	0	2	0	0	2	0	0	0	0	0	1
08:15	0	73	5	0	78	0	3	0	0	3	0	0	0	0	0	0
08:30	0	77	5	0	82	0	2	0	0	2	0	0	0	0	0	1
08:45	4	125	5	0	134	0	5	1	0	6	0	0	0	0	0	0
09:00	0	83	13	0	96	0	1	0	0	1	0	0	0	0	0	2
09:15	2	89	4	0	95	0	2	0	0	2	0	1	0	0	1	0
09:30	0	97	0	0	97	0	3	0	0	3	0	0	0	0	0	1
09:45	0	101	4	0	105	0	2	0	0	2	0	0	0	0	0	0
SUBTOTAL	6	957	49	0	1012	0	29	1	0	30	0	2	0	0	2	12

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Municipality: Midland
Count Date: Jun 25, 2024

West Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
15:00	2	92	8	0	102	0	0	0	0	0	0	0	0	0	0	0
15:15	2	108	4	0	114	0	3	0	0	3	0	3	0	0	3	0
15:30	0	134	10	0	144	0	0	0	0	0	0	0	0	0	0	0
15:45	1	138	4	0	143	0	2	0	0	2	0	0	0	0	0	0
16:00	2	133	6	0	141	0	0	0	0	0	0	0	0	0	0	0
16:15	0	157	5	0	162	0	2	0	0	2	0	0	0	0	0	0
16:30	0	132	8	0	140	0	0	0	0	0	0	0	0	0	0	0
16:45	0	157	7	0	164	0	1	0	0	1	0	0	0	0	0	0
17:00	0	139	11	0	150	0	1	0	0	1	0	0	0	0	0	4
17:15	1	137	7	0	145	0	0	0	0	0	0	1	0	0	1	2
17:30	0	106	4	0	110	0	1	0	0	1	0	0	0	0	0	0
17:45	1	112	3	0	116	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	9	1545	77	0	1631	0	10	0	0	10	0	4	0	0	4	6
GRAND TOTAL	**15**	**2502**	**126**	**0**	**2643**	**0**	**39**	**1**	**0**	**40**	**0**	**6**	**0**	**0**	**6**	**18**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Diagram

Specified Period		One Hour Peak	
From:	07:00:00	From:	08:45:00
To:	10:00:00	To:	09:45:00

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Count Date: Jun 25, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Yonge St runs E/W

North Approach

	Out	In	Total
Cars	18	11	29
Trucks	0	0	0
Bicycles	0	0	0
	18	**11**	**29**

Simcoe Blvd

Bicycles	0	0	0	0
Trucks	0	0	0	0
Cars	4	0	14	0
Totals	**4**	**0**	**14**	**0**

East Approach

	Out	In	Total
Cars	345	415	760
Trucks	12	12	24
Bicycles	3	1	4
	360	**428**	**788**

Peds: 1

Yonge St

Bicycles	Trucks	Cars	Totals	
0	0	0	**0**	
0	0	6	**6**	
1	11	394	**406**	
0	1	22	**23**	

Peds: 3

Peds: 1

Yonge St

Totals	Cars	Trucks	Bicycles
0	0	0	0
4	4	0	0
353	338	12	3
3	3	0	0

Peds: 16

West Approach

	Out	In	Total
Cars	422	383	805
Trucks	12	14	26
Bicycles	1	3	4
	435	**400**	**835**

Totals	**43**	**1**	**8**	**0**
Cars	41	1	7	0
Trucks	2	0	1	0
Bicycles	0	0	0	0

Keller Dr

South Approach

	Out	In	Total
Cars	49	25	74
Trucks	3	1	4
Bicycles	0	0	0
	52	**26**	**78**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Count Date: Jun 25, 2024
Period: 07:00 - 10:00

Peak Hour Data (08:45 - 09:45)

Start Time	North Approach Simcoe Blvd						South Approach Keller Dr						East Approach Yonge St						West Approach Yonge St						Total Vehicles
	↰	↑	↱	↶	Peds	Total	↰	↑	↱	↶	Peds	Total	↰	↑	↱	↶	Peds	Total	↰	↑	↱	↶	Peds	Total	
08:45	5	0	1	0	1	6	15	0	1	0	1	16	1	99	0	0	1	100	4	130	6	0	0	140	262
09:00	0	0	1	0	0	1	18	0	5	0	8	23	1	65	3	0	0	69	0	84	13	0	2	97	190
09:15	6	0	2	0	0	8	7	0	0	0	2	7	0	85	0	0	0	85	2	92	4	0	0	98	198
09:30	3	0	0	0	0	3	3	1	2	0	5	6	1	104	1	0	0	106	0	100	0	0	1	100	215
Grand Total	**14**	**0**	**4**	**0**	**1**	**18**	**43**	**1**	**8**	**0**	**16**	**52**	**3**	**353**	**4**	**0**	**1**	**360**	**6**	**406**	**23**	**0**	**3**	**435**	**865**
Approach %	77.8	0	22.2	0		-	82.7	1.9	15.4	0		-	0.8	98.1	1.1	0		-	1.4	93.3	5.3	0		-	
Totals %	1.6	0	0.5	0		2.1	5	0.1	0.9	0		6	0.3	40.8	0.5	0		41.6	0.7	46.9	2.7	0		50.3	
PHF	**0.58**	**0**	**0.5**	**0**		**0.56**	**0.6**	**0.25**	**0.4**	**0**		**0.57**	**0.75**	**0.85**	**0.33**	**0**		**0.85**	**0.38**	**0.78**	**0.44**	**0**		**0.78**	**0.83**
Cars	14	0	4	0		18	41	1	7	0		49	3	338	4	0		345	6	394	22	0		422	834
% Cars	100	0	100	0		100	95.3	100	87.5	0		94.2	100	95.8	100	0		95.8	100	97	95.7	0		97	96.4
Trucks	0	0	0	0		0	2	0	1	0		3	0	12	0	0		12	0	11	1	0		12	27
% Trucks	0	0	0	0		0	4.7	0	12.5	0		5.8	0	3.4	0	0		3.3	0	2.7	4.3	0		2.8	3.1
Bicycles	0	0	0	0		0	0	0	0	0		0	0	3	0	0		3	0	1	0	0		1	4
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	0.8	0	0		0.8	0	0.2	0	0		0.2	0.5
Peds					1	-					16	-					1	-					3	-	21
% Peds					4.8	-					76.2	-					4.8	-					14.3	-	

Peak Hour Diagram

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Count Date: Jun 25, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Yonge St runs E/W

North Approach

	Out	In	Total
Cars	11	15	26
Trucks	0	0	0
Bicycles	0	0	0
	11	**15**	**26**

Simcoe Blvd

Bicycles	0	0	0	0
Trucks	0	0	0	0
Cars	5	0	6	0
Totals	**5**	**0**	**6**	**0**

East Approach

	Out	In	Total
Cars	559	576	1135
Trucks	8	4	12
Bicycles	3	0	3
	570	**580**	**1150**

Peds: 4

Yonge St

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	0	3	**3**
0	4	562	**566**
0	0	25	**25**

Peds: 0

Peds: 0

Yonge St

	Totals	Cars	Trucks	Bicycles
	0	0	0	0
	11	11	0	0
	547	536	8	3
	12	12	0	0

Peds: 5

West Approach

	Out	In	Total
Cars	590	566	1156
Trucks	4	8	12
Bicycles	0	5	5
	594	**579**	**1173**

Keller Dr

Totals	**27**	**1**	**8**	**0**
Cars	25	1	8	0
Trucks	0	0	0	0
Bicycles	2	0	0	0

South Approach

	Out	In	Total
Cars	34	37	71
Trucks	0	0	0
Bicycles	2	0	2
	36	**37**	**73**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection: Yonge St & Keller Dr - Simcoe Blvd
Site Code: 2429500002
Count Date: Jun 25, 2024
Period: 15:00 - 18:00

Peak Hour Data (15:30 - 16:30)

Start Time	North Approach Simcoe Blvd						South Approach Keller Dr						East Approach Yonge St						West Approach Yonge St						Total Vehicles
	↰	↑	↱	↶	Peds	Total	↰	↑	↱	↶	Peds	Total	↰	↑	↱	↶	Peds	Total	↰	↑	↱	↶	Peds	Total	
15:30	0	0	1	0	0	1	4	0	0	0	0	4	3	166	1	0	0	170	0	134	10	0	0	144	319
15:45	4	0	0	0	2	4	5	0	1	0	1	6	4	125	5	0	0	134	1	140	4	0	0	145	289
16:00	0	0	2	0	0	2	7	0	3	0	2	10	1	131	3	0	0	135	2	133	6	0	0	141	288
16:15	2	0	2	0	2	4	11	1	4	0	2	16	4	125	2	0	0	131	0	159	5	0	0	164	315
Grand Total	**6**	**0**	**5**	**0**	**4**	**11**	**27**	**1**	**8**	**0**	**5**	**36**	**12**	**547**	**11**	**0**	**0**	**570**	**3**	**566**	**25**	**0**	**0**	**594**	**1211**
Approach %	54.5	0	45.5	0		-	75	2.8	22.2	0		-	2.1	96	1.9	0		-	0.5	95.3	4.2	0		-	
Totals %	0.5	0	0.4	0		0.9	2.2	0.1	0.7	0		3	1	45.2	0.9	0		47.1	0.2	46.7	2.1	0		49.1	
PHF	**0.38**	**0**	**0.63**	**0**		**0.69**	**0.61**	**0.25**	**0.5**	**0**		**0.56**	**0.75**	**0.82**	**0.55**	**0**		**0.84**	**0.38**	**0.89**	**0.63**	**0**		**0.91**	**0.95**
Cars	6	0	5	0		11	25	1	8	0		34	12	536	11	0		559	3	562	25	0		590	1194
% Cars	100	0	100	0		100	92.6	100	100	0		94.4	100	98	100	0		98.1	100	99.3	100	0		99.3	98.6
Trucks	0	0	0	0		0	0	0	0	0		0	0	8	0	0		8	0	4	0	0		4	12
% Trucks	0	0	0	0		0	0	0	0	0		0	0	1.5	0	0		1.4	0	0.7	0	0		0.7	1
Bicycles	0	0	0	0		0	2	0	0	0		2	0	3	0	0		3	0	0	0	0		0	5
% Bicycles	0	0	0	0		0	7.4	0	0	0		5.6	0	0.5	0	0		0.5	0	0	0	0		0	0.4
Peds					4	-					5	-					0	-					0	-	9
% Peds					44.4	-					55.6	-					0	-					0	-	

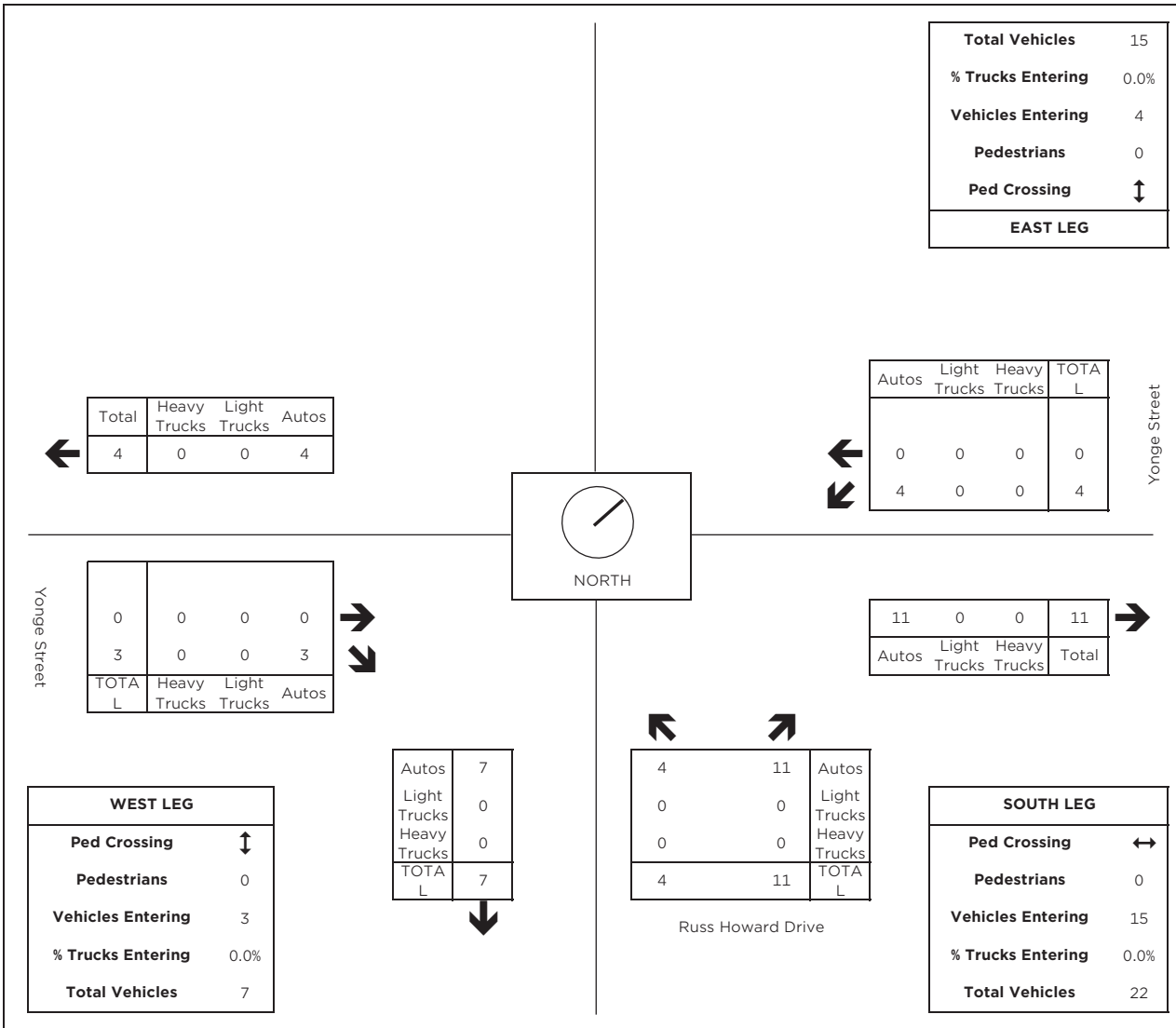
TATHAM ENGINEERING

INTERSECTION COUNT
AM PEAK HOUR

GENERAL INFORMATION

Surveyor Name	Jack Beaumont	Jurisdiction/Date	Town of Midland	16 July 2024
Weather Conditions	Clear	Major Street	Yonge Street	E-W
Project Name	983 Yonge Street	Minor Street	Russ Howard Drive	N-S
Project Number	324829	Intersection Control	stop control on minor street	

Additional Comments



EAST LEG	
Total Vehicles	15
% Trucks Entering	0.0%
Vehicles Entering	4
Pedestrians	0
Ped Crossing	↕

Total	Heavy Trucks	Light Trucks	Autos
4	0	0	4

Autos	Light Trucks	Heavy Trucks	TOTAL
0	0	0	0
4	0	0	4

0	0	0	0
3	0	0	3
TOTAL	Heavy Trucks	Light Trucks	Autos

11	0	0	11
Autos	Light Trucks	Heavy Trucks	Total

Autos	7
Light Trucks	0
Heavy Trucks	0
TOTAL	7

4	11	
0	0	Light Trucks
0	0	Heavy Trucks
4	11	TOTAL

WEST LEG	
Ped Crossing	↕
Pedestrians	0
Vehicles Entering	3
% Trucks Entering	0.0%
Total Vehicles	7

SOUTH LEG	
Ped Crossing	↔
Pedestrians	0
Vehicles Entering	15
% Trucks Entering	0.0%
Total Vehicles	22

8:45 to **9:45**

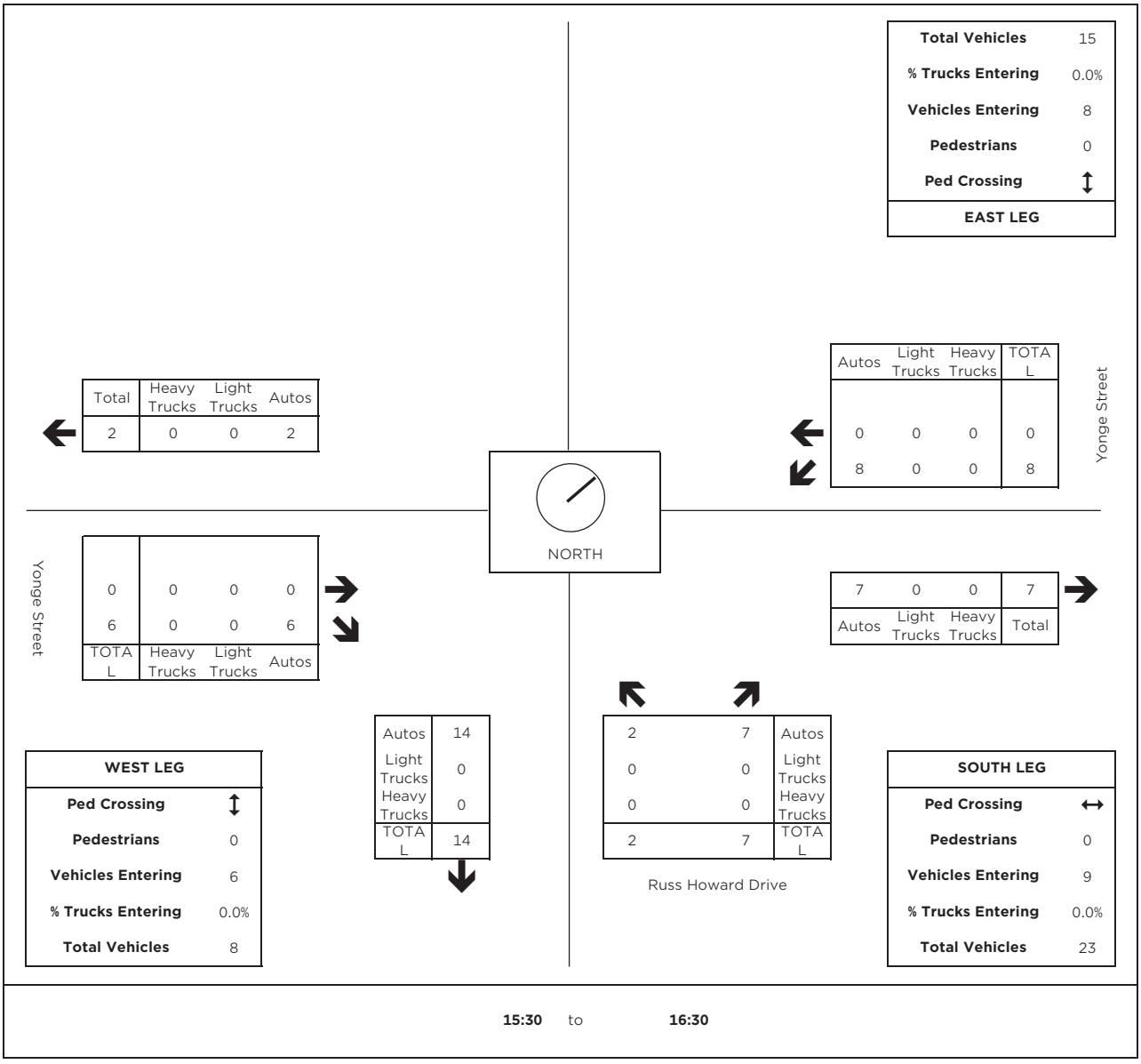
TATHAM ENGINEERING

INTERSECTION COUNT
PM PEAK HOUR

GENERAL INFORMATION

Surveyor Name	Jack Beaumont	Jurisdiction/Date	Town of Midland	16 July 2024
Weather Conditions	Clear	Major Street	Yonge Street	E-W
Project Name	983 Yonge Street	Minor Street	Russ Howard Drive	N-S
Project Number	324829	Intersection Control	stop control on minor street	

Additional Comments



EAST LEG	
Total Vehicles	15
% Trucks Entering	0.0%
Vehicles Entering	8
Pedestrians	0
Ped Crossing	↕

Total	Heavy Trucks	Light Trucks	Autos
2	0	0	2

Autos	Light Trucks	Heavy Trucks	TOTAL
0	0	0	0
8	0	0	8

0	0	0	0
6	0	0	6
TOTAL	Heavy Trucks	Light Trucks	Autos

7	0	0	7
Autos	Light Trucks	Heavy Trucks	Total

Autos	14
Light Trucks	0
Heavy Trucks	0
TOTAL	14

2	7	Autos
0	0	Light Trucks
0	0	Heavy Trucks
2	7	TOTAL

WEST LEG	
Ped Crossing	↕
Pedestrians	0
Vehicles Entering	6
% Trucks Entering	0.0%
Total Vehicles	8

SOUTH LEG	
Ped Crossing	↔
Pedestrians	0
Vehicles Entering	9
% Trucks Entering	0.0%
Total Vehicles	23

15:30 to **16:30**

Appendix C:
LOS Definitions

TATHAM ENGINEERING

Level of Service – Unsignalized Intersections

Level of Service (LOS) for unsignalized intersections is defined in terms of control delay for each critical lane. Control delay includes initial deceleration, queue move-up time, stopped delay and final acceleration delay, and is a function of the service rate or capacity of the approach and degree of saturation.

The following table describes in detail the characteristics of each level of service, with A being the best and F being the worst.

LOS	EXPECTED DELAY TO STREET TRAFFIC	DELAY (sec/veh)
A	Little or no delays	$0 < d \leq 10$
B	Short traffic delays	$10 < d \leq 15$
C	Average traffic delays	$15 < d \leq 25$
D	Long traffic delays	$25 < d \leq 35$
E	Very long traffic delays	$35 < d \leq 50$
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	$50 < d$

source: 2010 Highway Capacity Manual

TATHAM ENGINEERING

Level of Service – Signalized Intersections

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is made up of a number of factors that relate to control, geometrics, traffic and incidents. Only the portion of total delay attributed to the control facility is quantified. This control delay includes initial deceleration, queue move-up time, stopped delay and final acceleration delay.

The following table describes in detail the characteristics of each level of service, with A being the best and F being the worst.

LOS	EXPECTED DELAY TO STREET TRAFFIC	DELAY (sec/veh)
A	This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all at this LOS. Short cycle lengths may also contribute to low delay.	$0 < d \leq 10$
B	This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop at this level than at LOS A, causing longer average delays.	$10 < d \leq 20$
C	These higher delays may result from fair progression, longer cycle length, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	$20 < d \leq 35$
D	At this level, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures become noticeable.	$35 < d \leq 55$
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	$55 < d \leq 80$
F	At this level, oversaturation occurs when arrival flow rates exceed the design capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such high delay levels. LOS F is considered to be unacceptable to most drivers.	$80 < d$

source: 2010 Highway Capacity Manual

Appendix D:
Traffic Operations - Existing

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	161	32	100	167	135	77	402	94	176	495	97
Future Volume (vph)	126	161	32	100	167	135	77	402	94	176	495	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	7.0		7.0	7.0	7.0	4.5	7.0	7.0	3.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	1795		1690	1883	1585	1630	3411	1526	1772	3380	1601
Flt Permitted	0.48	1.00		0.61	1.00	1.00	0.40	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	909	1795		1091	1883	1585	681	3411	1526	765	3380	1601
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	152	194	39	120	201	163	93	484	113	212	596	117
RTOR Reduction (vph)	0	8	0	0	0	134	0	0	73	0	0	72
Lane Group Flow (vph)	152	225	0	120	201	29	93	484	40	212	596	45
Heavy Vehicles (%)	2%	2%	16%	8%	2%	3%	12%	7%	7%	3%	8%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	29.1	29.1		15.5	15.5	15.5	38.2	31.4	31.4	44.3	33.7	33.7
Effective Green, g (s)	29.1	29.1		15.5	15.5	15.5	38.2	31.4	31.4	44.3	33.7	33.7
Actuated g/C Ratio	0.33	0.33		0.18	0.18	0.18	0.43	0.36	0.36	0.50	0.38	0.38
Clearance Time (s)	2.0	7.0		7.0	7.0	7.0	4.5	7.0	7.0	3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	416	592		191	331	278	368	1215	543	505	1292	612
v/s Ratio Prot	0.05	c0.13			0.11		0.02	0.14		c0.05	c0.18	
v/s Ratio Perm	0.07			c0.11		0.02	0.09		0.03	0.16		0.03
v/c Ratio	0.37	0.38		0.63	0.61	0.10	0.25	0.40	0.07	0.42	0.46	0.07
Uniform Delay, d1	21.7	22.6		33.6	33.5	30.5	15.0	21.3	18.7	12.5	20.4	17.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.4		6.3	3.1	0.2	0.4	1.0	0.3	0.6	1.2	0.2
Delay (s)	22.2	23.0		40.0	36.6	30.6	15.4	22.2	19.0	13.1	21.6	17.5
Level of Service	C	C		D	D	C	B	C	B	B	C	B
Approach Delay (s)		22.7			35.4			20.8			19.1	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	88.1	Sum of lost time (s)	20.5
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	406	23	3	353	4	43	1	8	14	1	4
Future Volume (vph)	6	406	23	3	353	4	43	1	8	14	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.96	
Satd. Flow (prot)	1789	1849		1789	1862			1700			1763	
Flt Permitted	0.42	1.00		0.34	1.00			0.79			0.85	
Satd. Flow (perm)	790	1849		634	1862			1406			1553	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	489	28	4	425	5	52	1	10	17	1	5
RTOR Reduction (vph)	0	3	0	0	1	0	0	6	0	0	3	0
Lane Group Flow (vph)	7	514	0	4	429	0	0	57	0	0	20	0
Heavy Vehicles (%)	2%	3%	4%	2%	3%	2%	5%	2%	13%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.0	31.0		31.0	31.0			25.0			25.0	
Effective Green, g (s)	31.0	31.0		31.0	31.0			25.0			25.0	
Actuated g/C Ratio	0.46	0.46		0.46	0.46			0.37			0.37	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	0.2	0.2		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	360	842		289	848			516			570	
v/s Ratio Prot		c0.28			0.23							
v/s Ratio Perm	0.01			0.01				c0.04			0.01	
v/c Ratio	0.02	0.61		0.01	0.51			0.11			0.03	
Uniform Delay, d1	10.2	13.9		10.1	13.1			14.2			13.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.9		0.0	0.5			0.4			0.1	
Delay (s)	10.2	14.9		10.1	13.6			14.6			13.9	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		14.8			13.5			14.6			13.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	425	3	4	356	4	11
Future Volume (Veh/h)	425	3	4	356	4	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)	462	3	4	387	4	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	123					
pX, platoon unblocked			0.80		0.80	0.80
vC, conflicting volume			465		858	464
vC1, stage 1 conf vol					464	
vC2, stage 2 conf vol					395	
vCu, unblocked vol			210		701	209
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	98
cM capacity (veh/h)			1092		542	668

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	465	4	387	16
Volume Left	0	4	0	4
Volume Right	3	0	0	12
cSH	1700	1092	1700	631
Volume to Capacity	0.27	0.00	0.23	0.03
Queue Length 95th (m)	0.0	0.1	0.0	0.6
Control Delay (s)	0.0	8.3	0.0	10.9
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		10.9
Approach LOS				B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfryu												
LheC0h srV v PlgRc(	/ 11	8/)	26	16	830	883	35	62)	18	) k)	308	/ 3k
9i pihPsrV v PlgRc(	/ 11	8/)	26	16	830	883	35	62)	18	) k)	308	/ 3k
FfPeV9V d lgRcRV	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk
LrpeVBruppfv Plu(	8vk	0vk		0vk	0vk	0vk	2v6	0vk	0vk	) vk	0vk	0vk
BeyP. pfW9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	kv56	/ vkk	/ vkk	kv56	/ vkk
9hp	/ vkk	kv50		/ vkk	/ vkk	kv16	/ vkk	/ vkk	kv16	/ vkk	/ vkk	kv16
9\bAhrpPnpPl	kv56	/ vkk		kv56	/ vkk	/ vkk	kv56	/ vkk	/ vkk	kv56	/ vkk	/ vkk
4epl w9V d IRhrp(	/ 015	/ 181		/ 0) 1	/ 11)	/ 3k/	/ 088	) 622	/ 3k/	/ 015	) 605	/ 616
9\bAPhv fppPl	kvy2	/ vkk		kv65	/ vkk	/ vkk	kvy6	/ vkk	/ vkk	kvy)	/ vkk	/ vkk
4epl w9V d IRPhv (	326	/ 181		/ k13	/ 11)	/ 3k/	3) 2	) 622	/ 3k/	3/ 2	) 605	/ 616
APealctri hGenprh-A, 9	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53
HIjw9V d lgRc(	/ 53	888	20	15	801	8) 6	08	633	16	) / 3	0kk	/ 30
oLOo oPl inpfry lgRc(	k	1	k	k	k	/ 10	k	k	60	k	k	/ k)
BeyP GhriR9V d lgRc(	/ 53	83/	k	15	801	21	08	633	81	) / 3	0kk	32
, PegSsPcfnVPul%(	8%	8%	2%	6%	8%	8%	3%	) %	8%	8%	8%	) %
Li hy LSRP	Rv +Rp	WH		APhv	WH	APhv	Rv +Rp	WH	APhv	Rv +Rp	WH	APhv
AhrpPnpPl AceuPu	0	2			1		6	8		/	3	
APhv fppPl AceuPu	2			1		1	8		8	3		3
Hnpi epPl GhPPy- G lu(	) 2v8	) 2v8		/ 5v6	/ 5v6	/ 5v6	) 0v8	) / vy	) / vy	20v6	) 3v0	) 3v0
mC0PnpfgP GhPPy- t lu(	) 2v8	) 2v8		/ 5v6	/ 5v6	/ 5v6	) 0v8	) / vy	) / vy	20v6	) 3v0	) 3v0
Hnpi epPl t 7N oepfr	kvy3	kvy3		kv8k	kv8k	kv8k	kvy5	kvy)	kvy)	kv25	kvy1	kvy1
NVPeheynP Lfv Plu(	8vk	0vk		0vk	0vk	0vk	2v6	0vk	0vk	) vk	0vk	0vk
sPcfnVP mxpPyufry lu(	) vk	) vk		) vk	) vk	) vk	) vk	/ vk	/ vk	) vk	/ vk	/ vk
BeyP GhR NeR lgRc(	) 11	361		88k	) 18	) 82	) / 5	/ / 62	68/	232	/) 33	3k6
g7u oepfr Ahrp	nkvk0	kv/ 2			nkv/ 6		kvk/	kv/ 3		nkvk5	kv8k	
g7u oepfr APhv	kv/ /			kvk1		kvk)	kvk0		kvk8	nkv82		kvk2
g7h oepfr	kv6/	kv2k		kv2k	kv0)	kv/ 6	kv8)	kv25	kvk6	kv81	kv6/	kv/ /
. yfC hv DPvéS- I /	88v8	8) vk		)) vy	) 6v1	) / v6	/ 1v8	83vk	88v8	/ 6v8	88v1	/ 5v/
Ahrt hPuufry 9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk
FynhPv PypeVDPvéS- I 8	/ vk	kv2		/ v8	3v1	kv8	kv2	/ v6	kv8	2v/	/ v2	kv2
DPvéSlu(	8) v8	8) v2		) 2v6	28v8	) / v0	/ 5vk	80v6	88v2	/ 5v0	82v8	/ 5v6
BPgPVr C4 PhgfnP	N	N		N	D	N	E	N	N	E	N	E
HRRhrenc DPvéSlu(		8) v6			) 0v/			83v/			88vy	
HRRhrenc BO4		N			D			N			N	

FypPhuPnpfry 4i v v ehS					
, NM 8kkk Nrypfr VDPvéS	83v2	, NM 8kkk BPgPVr C4 PhgfnP		N	
, NM 8kkk srV v P pr NeRenfpShepfr	kv0k				
Hnpi epPl NSnVP BPyt pc lu(	53v/	4i v r CVfuppfv Plu(		8kv6	
FypPhuPnpfry NeRenfpS. pfWzepfr y	12v5%	RN. BPgPVr C4 PhgfnP		m	
HyeV8ufu APhfr l lv fy(	/ 6				
n NhfpfneVBeyP Ghri R					

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfr yu												
LheC0h sr Vv PlgRc(	)	633	86	/ 8	620	/ /	80	/	1	3	/	6
9i pihPsr Vv PlgRc(	)	633	86	/ 8	620	/ /	80	/	1	3	/	6
FfPeV9Vd lgRcRV/	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk
Lr peVBr uppfv Plu(	3vk	3vk		3vk	3vk			3vk			3vk	
BeyP. pfW9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
9hp	/ vkk	kv55		/ vkk	/ vkk			kv50			kv52	
9V0AhrpPnpPl	kv56	/ vkk		kv56	/ vkk			kv53			kv51	
4epl w9Vd lRhr p(	/ 015	/ 108		/ 015	/ 101			/ 038			/ 0) 2	
9V0APhv fppPl	kv80	/ vkk		kv82	/ vkk			kv12			kv58	
4epl w9Vd lRPhv (	6/ 8	/ 108		266	/ 101			/ 622			/ 32k	
APealdr i hGenpr h- A, 9	kv56	kv56	kv56	kv56	kv56	kv56	kv56	kv56	kv56	kv56	kv56	kv56
HI jw9Vd lgRc(	)	653	83	/)	603	/ 8	81	/	1	3	/	6
oLOo oPl i npfr y lgRc(	k	8	k	k	/	k	k	6	k	k	)	k
BeyP GhrriR9Vd lgRc(	)	38k	k	/)	610	k	k	) 8	k	k	5	k
Li hy LSRP	APhv	WH		APhv	WH		APhv	WH		APhv	WH	
AhrpPnpPl AceuPu		2			1			8			3	
APhv fppPl AceuPu	2			1			8			3		
Hnpi epPl GhPPy- G lu(	) / vk	) / vk		) / vk	) / vk			86vk			86vk	
mC0PnpfgP GhPPy- t lu(	) / vk	) / vk		) / vk	) / vk			86vk			86vk	
Hnpi epPl t 7N o epfr	kv23	kv23		kv23	kv23			kvy0			kvy0	
NVPeheynP Lfv Plu(	3vk	3vk		3vk	3vk			3vk			3vk	
s Pcfn\P mxpPyufr y lu(	kv8	kv8		) vk	) vk			kv8			kv8	
BeyP GhR NeR lgRc(	8))	16)		8k0	163			630			3k8	
g7u o epfr Ahr p		nkvy)			kvy/							
g7u o epfr APhv	kvk/			kvk)				nkvk8			kvk/	
g7h o epfr	kvk/	kv0)		kvk3	kv35			kvk3			kvk/	
. yfC hv DPVeS- I /	/ kv/	/ 6v/		/ kv2	/ 2v3			/) v5			/) v0	
Ahr t hPuufr y 9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
FynhPv PypeVDPVeS- I 8	kvk	8v3		kv/	8vy			kv8			kvk	
DPVeSlu(	/ kv/	/ 0v0		/ kv6	/ 3v5			/ 2v/			/) v0	
BPgPVr C4 PhgfnP	E	E		E	E			E			E	
HRRRr enc DPVeSlu(		/ 0v0			/ 3v1			/ 2v/			/) v0	
HRRRr enc BO4		E			E			E			E	

FypPhuPnpfr y 4i v v ehS			
, NM 8kkk Nr ydr VDPVeS	/ 0v/	, NM 8kkk BPgPVr C4 PhgfnP	E
, NM 8kkk sr Vv P pr NeRenfpS hepfr	kv2)		
Hnpi epPl NSnVP BPyt pc lu(	31vk	4i v r CVuppfv Plu(	/ 8vk
FypPhuPnpfr y NeRenfpS. pfWzepfr y	38v/ %	fN. BPgPVr C4 PhgfnP	E
HyeV8ufu APhfr l lv fy(	/ 6		

n NhfpfneVBeyP Ghr i R

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ct i hepdr yu						
LheCCh s r Vv P lgPc7c(	602	3	1	631	8	0
9i pi hP s r Vv P ls Pc7c(	602	3	1	631	8	0
4 ft y Nr ydr V	9hPP			9hPP	4 pr R	
Ghel P	k%			k%	k%	
APea , ri h9enpr h	kv68	kv68	kv68	kv68	kv68	kv68
, ri hNS CVd hepP lgRc(	382	0	5	3/ 0	8	1
APl Puphfeyu						
BeyP T fl pc lv (						
T eVafyt 4 RPPl lv 7u(						
APhmPypE Vr naet P						
o ft cppi hy CVeHP lgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey upr het P gPc(	8			8		
. RuphPev uft yeVlv (	/ 8)					
RX- RVepr r y i yb Vr naPl			kv08		kv08	kv08
gN- nr y CVhpfyt gr Vv P			3) /		/ 838	381
gN/ - upet P / nr y Cgr V					381	
gN8- upet P 8 nr y Cgr V					3) 6	
gNi - i yb Vr naPl gr V			815		/ / 35	812
pN- ufyt VP lu(			2vv		3v2	3v8
pN- 8 upet P lu(					6v2	
p9 lu(			8v8		) v6	) vy
Rk qi Pi P CPP %			55		55	55
nM neRenfpS lgPc7c(			5/)		) 51	628

DffPhpdr y- BeyP #	mE /	T E /	T E 8	WE /
s r Vv P Lr peV	3) /	5	3/ 0	/ k
s r Vv P BPQp	k	5	k	8
s r Vv P o ft cp	0	k	k	1
n4 ,	/ 0kk	5/)	/ 0kk	6k6
s r Vv P pr NeRenfpS	kvy0	kvk/	kvy3	kvk8
Qi Pi P BPyt pc 56pc lv (	kvk	kv8	kvk	kv6
Nr ydr VDPVeSlu(	kvk	5vk	kvk	/ 8vy
BeyP BO4		H		E
HRRhr enc DPVeSlu(	kvk	kvv		/ 8vy
HRRhr enc BO4				E

FypPhuPhpdr y 4i v v ehS							
HgPhet P DPVeS			kv8				
FypPhuPhpdr y NeRenfpS . pVzepdr y			2kv3%		fN.	BPgPVr C4 PhgfnP	H
HyeVSufu APhfr l lv fy(			/ 6				

Appendix E:
Traffic Operations – Background

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	138	66	105	175	141	81	420	98	184	518	101
Future Volume (vph)	162	138	66	105	175	141	81	420	98	184	518	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	7.0		7.0	7.0	7.0	4.5	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	1793		1390	1886	1585	1360	6411	1523	1772	6680	1301
Flt Permitted	0.47	1.00		0.31	1.00	1.00	0.68	1.00	1.00	0.40	1.00	1.00
Satd. Flow (perm)	888	1793		1082	1886	1585	350	6411	1523	748	6680	1301
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	159	202	40	127	211	170	98	503	118	222	324	122
RTOR Reduction (vph)	0	9	0	0	0	169	0	0	75	0	0	75
Lane Group Flow (vph)	159	266	0	127	211	61	98	503	46	222	324	47
Heavy Vehicles (%)	2%	2%	13%	8%	2%	6%	12%	7%	7%	6%	8%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	3	
Permitted Phases	4			8		8	2		2	3		3
Actuated Green, G (s)	29.4	29.4		15.8	15.8	15.8	63.5	61.4	61.4	42.2	66.5	66.5
Effective Green, g (s)	29.4	29.4		15.8	15.8	15.8	63.5	61.4	61.4	42.2	66.5	66.5
Actuated g/C Ratio	0.64	0.64		0.18	0.18	0.18	0.42	0.63	0.63	0.49	0.69	0.69
Clearance Time (s)	2.0	7.0		7.0	7.0	7.0	4.5	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0		6.0	6.0	6.0	6.0	1.0	1.0	6.0	1.0	1.0
Lane Grp Cap (vph)	422	310		197	646	289	662	1268	556	437	1609	320
v/s Ratio Prot	0.05	c0.16			0.11		0.02	0.15		c0.05	c0.18	
v/s Ratio Perm	0.08			c0.12		0.02	0.11		0.06	0.18		0.06
v/c Ratio	0.68	0.68		0.34	0.32	0.11	0.60	0.41	0.08	0.48	0.48	0.08
Uniform Delay, d1	20.8	21.7		62.7	62.3	29.5	15.4	20.3	18.1	16.1	19.9	13.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.4		7.0	6.6	0.2	0.5	1.0	0.6	0.8	1.2	0.2
Delay (s)	21.4	22.1		69.8	65.8	29.3	15.9	21.3	18.6	16.9	21.2	17.0
Level of Service	C	C		D	D	C	B	C	B	B	C	B
Approach Delay (s)		21.8			64.7			20.6			19.0	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	20.5
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	425	26	6	639	4	46	1	8	14	1	4
Future Volume (vph)	3	425	26	6	639	4	46	1	8	14	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.93			0.93	
Satd. Flow (prot)	1789	1850		1789	1832			1700			1736	
Flt Permitted	0.40	1.00		0.62	1.00			0.79			0.85	
Satd. Flow (perm)	754	1850		594	1832			1403			1556	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	7	512	28	4	445	5	52	1	10	17	1	5
RTOR Reduction (vph)	0	6	0	0	1	0	0	3	0	0	6	0
Lane Group Flow (vph)	7	567	0	4	449	0	0	57	0	0	20	0
Heavy Vehicles (%)	2%	6%	4%	2%	6%	2%	5%	2%	16%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			3	
Permitted Phases	4			8			2			3		
Actuated Green, G (s)	61.0	61.0		61.0	61.0			25.0			25.0	
Effective Green, g (s)	61.0	61.0		61.0	61.0			25.0			25.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.67			0.67	
Clearance Time (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Vehicle Extension (s)	0.2	0.2		6.0	6.0			0.2			0.2	
Lane Grp Cap (vph)	646	846		270	848			513			570	
v/s Ratio Prot		c0.29			0.24							
v/s Ratio Perm	0.01			0.01				c0.04			0.01	
v/c Ratio	0.02	0.34		0.01	0.56			0.11			0.06	
Uniform Delay, d1	10.2	14.2		10.1	16.6			14.2			16.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	1.2		0.0	0.3			0.4			0.1	
Delay (s)	10.2	15.4		10.2	16.9			14.3			16.9	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		15.6			16.9			14.3			16.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	38.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	444	6	4	672	4	11
Future Volume (Veh/h)	444	6	4	672	4	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)	486	6	4	404	4	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	126					
pX, platoon unblocked			0.79		0.79	0.79
vC, conflicting volume			483		893	484
vC1, stage 1 conf vol					484	
vC2, stage 2 conf vol					412	
vCu, unblocked vol			216		764	211
tC, single (s)			4.1		3.4	3.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		6.5	6.6
p0 queue free %			100		99	98
cM capacity (veh/h)			1039		527	356

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	483	4	404	13
Volume Left	0	4	0	4
Volume Right	6	0	0	12
cSH	1700	1039	1700	313
Volume to Capacity	0.29	0.00	0.24	0.06
Queue Length 95th (m)	0.0	0.1	0.0	0.3
Control Delay (s)	0.0	8.4	0.0	11.0
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		11.0
Approach LOS				B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	66.3%	ICU Level of Service	A
Analysis Period (min)	15		

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP NryCti hepfryu												
LheCCh s rVv PlgRc(	/) 0	886	20	1)	80)	863	08	531	13	6/ 0	0k6	/ 30
9i pihPs rVv PlgRc(	/) 0	886	20	1)	80)	863	08	531	13	6/ 0	0k6	/ 30
FfPeV9Vd lgRcRV(	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk
LrpeVBruppfv Plu(	8vk	0vk		0vk	0vk	0vk	2v5	0vk	0vk	6vk	0vk	0vk
BeyP. pfW9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	kvy5	/ vkk	/ vkk	kvy5	/ vkk
9hp	/ vkk	kvy0		/ vkk	/ vkk	kvt5	/ vkk	/ vkk	kvt5	/ vkk	/ vkk	kvt5
9\bAhrpPnpPl	kvy5	/ vkk		kvy5	/ vkk	/ vkk	kvy5	/ vkk	/ vkk	kvy5	/ vkk	/ vkk
4epl w9Vd IRhrp(	/ 01)	/ 181		/ 061	/ 116	/ 3k/	/ 088	6522	/ 3k/	/ 01)	650)	/ 515
9\bAPhv fppPl	kv62	/ vkk		kv5)	/ vkk	/ vkk	kv8)	/ vkk	/ vkk	kv62	/ vkk	/ vkk
4epl w9Vd IRPhv (	361	/ 181		/ k02	/ 116	/ 3k/	586	6522	/ 3k/	32k	650)	/ 515
APealctr ih@enprh-A, 9	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3
HIjw9Vd lgRc(	8k5	868	2)	) 6	8) /	823	05	5) 8	) k	66k	068	/ 02
oLOo oPl inpfry lgRc(	k	)	k	k	k	/) 2	k	k	51	k	k	/ / k
BeyP GhriR9Vd lgRc(	8k5	808	k	) 6	8) /	58	05	5) 8	68	66k	068	32
, PegSs PcfnWPul %(	8%	8%	2%	5%	8%	8%	3%	6%	8%	8%	8%	6%
Li hy LSRP	Rv +Rp	WH		APhv	WH	APhv	Rv +Rp	WH	APhv	Rv +Rp	WH	APhv
AhrpPnpPl AceuPu	0	2			1		5	8		/	3	
APhv fppPl AceuPu	2			1		1	8		8	3		3
Hnpi epPl GhPPy- G lu(	62v8	62v8		/) v5	/) v5	/) v5	60v2	68v6	68v6	2/ vy	66vt	66vt
mCCPnpfgP GhPPy- t lu(	62v8	62v8		/) v5	/) v5	/) v5	60v2	68v6	68v6	2/ vy	66vt	66vt
Hnpi epPl t 7N oepfr	kv61	kv61		kv8/	kv8/	kv8/	kv2/	kv65	kv65	kv23	kv60	kv60
NWPeheynP Lfv Plu(	8vk	0vk		0vk	0vk	0vk	2v5	0vk	0vk	6vk	0vk	0vk
sPcfnWP mxpPyufry lu(	6vk	6vk		6vk	6vk	6vk	6vk	/ vk	/ vk	6vk	/ vk	/ vk
BeyP GhR NeR lgRc(	2k6	310		880	6))	66)	80)	/ 822	538	6) 8	/ 6/ 2	518
g7u oepfr Ahrp	nkvk0	kv/ 5			nkv/ 5		kvk/	kv/ 0		nkvk0	kv8k	
g7u oepfr APhv	kv/ 8			kvk)		kvk6	kvk)		kvk8	nkv6/		kvk2
g7h oepfr	kv5/	kv2k		kv2/	kv06	kv/ 5	kv80	kv21	kvk3	kvt2	kv53	kv/
. yfCh v DPvéS- I /	8kvt	8/ vk		6/ v6	66vt	8) v5	/ 0v6	86v6	/) vt	/) v5	86vv	/) v8
Ahrt hPuufry 9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk
FynhPv PypeVDPvéS- I 8	/ vk	kv2		/ v8	3v8	kv8	kv5	/ v6	kv8	/ 5vk	/ v0	kv2
DPvéSlu(	8/ vt	8/ v2		68v5	2kv6	8) v0	/ 0vt	82v3	8kvk	62v5	82vy	/) v3
BPgPVr C4 PhgfnP	N	N		N	D	N	E	N	E	N	N	E
HRRhr enc DPvéSlu(		8/ v3			65vk			86v6			83v0	
HRRhr enc BO4		N			D			N			N	

FypPhuPnpfry 4i v v ehS						
, NM 8kkk Nr ypr VDPvéS	83vt	, NM 8kkk BPgPVr C4 PhgfnP		N		
, NM 8kkk s rVv P pr NeRenfpShepfr	kv01					
Hnpi epPl NSnWP BPyt pc lu(	) 8vk	4i v r CVruppfv Plu(		8kv5		
FypPhuPnpfry NeRenfpS. pfWzepfr y	13v5%	RN. BPgPVr C4 PhgfnP		m		
Hye\Sufu APhfr l lv fy(	/ 5					
n NhfpfneVBeyP Ghri R						

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfr yu												
LheC0h sr Vv PlgRc(	6	5) 8	85	/ 8	508	/ /	80	/	1	3	/	5
9i pihPs r Vv PlgRc(	6	5) 8	85	/ 8	508	/ /	80	/	1	3	/	5
FfPeV9Vd lgRcRV/	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk
Lr peVBr uppfv Plu(	3vk	3vk		3vk	3vk			3vk			3vk	
BeyP. pfW9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
9hp	/ vkk	kvy)		/ vkk	/ vkk			kvy0			kvy2	
9V0AhrpPnpPl	kvy5	/ vkk		kvy5	/ vkk			kvy3			kvy1	
4epl w9Vd lRhr p(	/ 01)	/ 108		/ 01)	/ 101			/ 038			/ 062	
9V0APhv fppPl	kv85	/ vkk		kv88	/ vkk			kv12			kvy8	
4epl w9Vd lRPhv (	231	/ 108		2/ k	/ 101			/ 522			/ 32k	
APealdr i h0enpr h- A, 9	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5
Hl jw9Vd lgRc(	6	386	83	/ 6	3k8	/ 8	81	/	1	3	/	5
oLOo oPl inpfr y lgRc(	k	8	k	k	/	k	k	5	k	k	6	k
BeyP Ghr i R9Vd lgRc(	6	320	k	/ 6	3/ 6	k	k	68	k	k	)	k
Li hy LSRP	APhv	WH		APhv	WH		APhv	WH		APhv	WH	
AhrpPnpPl AceuPu		2			1			8			3	
APhv fppPl AceuPu	2			1			8			3		
Hnpi epPl GhPPy- G lu(	6/ vk	6/ vk		6/ vk	6/ vk			85vk			85vk	
m0CPnpfgP GhPPy- t lu(	6/ vk	6/ vk		6/ vk	6/ vk			85vk			85vk	
Hnpi epPl t 7N oepfr	kv23	kv23		kv23	kv23			kv60			kv60	
NVPeheynP Lfv Plu(	3vk	3vk		3vk	3vk			3vk			3vk	
s Pcfn\P mxpPyufr y lu(	kv8	kv8		6vk	6vk			kv8			kv8	
BeyP GhR NeR lgRc(	8/ 6	156		/ 13	153			530			3k8	
g7u oepfr Ahr p		nkv65			kv66							
g7u oepfr APhv	kvk/			kvk6				nkvk8			kvk/	
g7h oepfr	kvk/	kv03		kvk0	kv08			kvk3			kvk/	
. yfC hv DPVeS- I /	/ kv	/ 5v2		/ kv2	/ 2vy			/ 6vy			/ 6v0	
Ahr t hPuufr y 9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
FynhPv PypeVDPVeS- I 8	kvk	6v5		kv8	8vy			kv8			kvk	
DPVeS lu(	/ kv	/ 1vt		/ kv3	/ 0vt			/ 2vv			/ 6v0	
BPgPVr C4 PhgfnP	E	E		E	E			E			E	
HRRhr enc DPVeS lu(		/ 1vt			/ 0v0			/ 2vv			/ 6v0	
HRRhr enc BO4		E			E			E			E	

FypPhuPnpfr y 4i v v ehS				
, NM 8kkk Nr ydhr VDPVeS	/ 1vv	, NM 8kkk BPgPVr C4 PhgfnP	E	
, NM 8kkk s r Vv P pr NeRenfpS hepfr	kv22			
Hnpi epPl NShVP BPyt pc lu(	31vk	4i v r CVuppfv Plu(	/ 8vk	
FypPhuPnpfr y NeRenfpS. pfVzepfr y	36v5%	fN. BPgPVr C4 PhgfnP	E	
HyeV8ufu APhfr l lv fy(	/ 5			

n NhfpfneVBeyP Ghr i R

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ot i hepdr yu						
LheOOh s r Vv P lgPc7c(	3kk	3	1	5) 6	8	0
9i pi hP s r Vv P ls Pc7c(	3kk	3	1	5) 6	8	0
4 ft y Nry pdr V	9hPP			9hPP	4 pr R	
Ghel P	k%			k%	k%	
APea , ri h9enpr h	kwy8	kwy8	kwy8	kwy8	kwy8	kwy8
, ri hNS OVd hepP lgRc(	358	0	)	325	8	1
APl Puphfeyu						
BeyP T fl pc lv (						
T eVafyt 4 RPPl lv 7u(						
APhmPypE Vnaet P						
o ft cppi hy OeHP lgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey upr het P gPc(	8			8		
. RuphPev uft yeVlv (	/ 86					
RX- RvepP r y i ybVnaPl			kw0k		kw0k	kw0k
gN- nr yOfhpfyt gr Vv P			35)		/ 6/ 1	353
gN/ - upet P / nr yCgr V					353	
gN8- upet P 8 nr yCgr V					336	
gNi - i ybVnaPl gr V			8) 6		/ 82k	811
pN- ufyt VPlu(			2w		3w2	3w8
pN- 8 upet P lu(					5w2	
p9 lu(			8w8		6w5	6w6
Rk qi Pi P OPP %			))		))	) 1
nM neRenfpS lgPc7c(			112		61/	586

DffPnpdr y- BeyP #	mE /	T E /	T E 8	WE /
s r Vv P Lr peV	35)	)	325	/ k
s r Vv P BPQp	k	)	k	8
s r Vv P oft cp	0	k	k	1
n4 ,	/ 0kk	112	/ 0kk	210
s r Vv P pr NeRenfpS	kw6)	kwk/	kw61	kwk8
Qi Pi P BPyt pc) 5pc lv (	kwk	kw8	kwk	kw5
Nry pdr VDPvéSlu(	kwk	) w	kwk	/ 8w8
BeyP BO4		H		E
HRRhr enc DPvéSlu(	kwk	kw		/ 8w8
HRRhr enc BO4				E

FypPhuPnpdr y 4i v v ehS							
HgPhet P DPvéS			kw8				
FypPhuPnpdr y NeRenfpS . pVzepdr y			2/ vy%		fN.	BPgPVr C4 PhgfnP	H
Hye\Sufu APhfr l lv fy(			/ 5				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	181	63	116	188	152	87	456	103	198	558	109
Future Volume (vph)	142	181	63	116	188	152	87	456	103	198	558	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	7.0		7.0	7.0	7.0	4.5	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	1793		1390	1886	1585	1360	6411	1523	1772	6680	1301
Flt Permitted	0.44	1.00		0.30	1.00	1.00	0.65	1.00	1.00	0.67	1.00	1.00
Satd. Flow (perm)	867	1793		1034	1886	1585	592	6411	1523	385	6680	1301
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	171	218	46	163	227	186	105	543	128	269	372	161
RTOR Reduction (vph)	0	8	0	0	0	148	0	0	82	0	0	81
Lane Group Flow (vph)	171	256	0	163	227	65	105	543	43	269	372	50
Heavy Vehicles (%)	2%	2%	13%	8%	2%	6%	12%	7%	7%	6%	8%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	3	
Permitted Phases	4			8		8	2		2	3		3
Actuated Green, G (s)	60.9	60.9		13.9	13.9	13.9	63.5	61.4	61.4	42.3	66.7	66.7
Effective Green, g (s)	60.9	60.9		13.9	13.9	13.9	63.5	61.4	61.4	42.3	66.7	66.7
Actuated g/C Ratio	0.65	0.65		0.19	0.19	0.19	0.41	0.63	0.63	0.48	0.68	0.68
Clearance Time (s)	2.0	7.0		7.0	7.0	7.0	4.5	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	6.0	6.0		6.0	6.0	6.0	6.0	1.0	1.0	6.0	1.0	1.0
Lane Grp Cap (vph)	422	329		206	630	606	605	1214	546	440	1291	311
v/s Ratio Prot	c0.03	0.14			0.12		0.02	0.13		c0.05	0.20	
v/s Ratio Perm	0.09			c0.16		0.02	0.12		0.06	c0.21		0.06
v/c Ratio	0.41	0.40		0.37	0.36	0.12	0.64	0.45	0.08	0.54	0.52	0.08
Uniform Delay, d1	20.8	21.7		66.1	62.8	29.5	13.6	21.8	18.9	16.9	21.0	17.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.4		8.1	6.3	0.2	0.7	1.2	0.6	1.4	1.5	0.6
Delay (s)	21.4	22.1		41.2	63.4	29.3	17.0	26.0	19.2	15.6	22.5	17.3
Level of Service	C	C		D	D	C	B	C	B	B	C	B
Approach Delay (s)		21.8			65.6			21.5			20.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	20.5
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	457	26	6	698	4	46	1	8	14	1	4
Future Volume (vph)	3	457	26	6	698	4	46	1	8	14	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.93			0.93	
Satd. Flow (prot)	1789	1851		1789	1832			1700			1736	
Flt Permitted	0.67	1.00		0.28	1.00			0.79			0.85	
Satd. Flow (perm)	391	1851		528	1832			1403			1556	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	7	551	28	4	480	5	52	1	10	17	1	5
RTOR Reduction (vph)	0	6	0	0	1	0	0	3	0	0	6	0
Lane Group Flow (vph)	7	573	0	4	484	0	0	57	0	0	20	0
Heavy Vehicles (%)	2%	6%	4%	2%	6%	2%	5%	2%	16%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			3	
Permitted Phases	4			8			2			3		
Actuated Green, G (s)	61.0	61.0		61.0	61.0			25.0			25.0	
Effective Green, g (s)	61.0	61.0		61.0	61.0			25.0			25.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.67			0.67	
Clearance Time (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Vehicle Extension (s)	0.2	0.2		6.0	6.0			0.2			0.2	
Lane Grp Cap (vph)	615	846		240	848			513			570	
v/s Ratio Prot		c0.61			0.23							
v/s Ratio Perm	0.01			0.01				c0.04			0.01	
v/c Ratio	0.02	0.38		0.02	0.57			0.11			0.06	
Uniform Delay, d1	10.2	14.3		10.1	16.3			14.2			16.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	1.8		0.0	0.9			0.4			0.1	
Delay (s)	10.2	13.5		10.2	14.5			14.3			16.9	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		13.4			14.5			14.3			16.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	38.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	473	6	4	401	4	11
Future Volume (Veh/h)	473	6	4	401	4	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)	517	6	4	463	4	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	126					
pX, platoon unblocked			0.73		0.73	0.73
vC, conflicting volume			520		932	518
vC1, stage 1 conf vol					518	
vC2, stage 2 conf vol					444	
vCu, unblocked vol			215		795	216
tC, single (s)			4.1		3.4	3.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		6.5	6.6
p0 queue free %			100		99	98
cM capacity (veh/h)			1066		502	361

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	520	4	463	13
Volume Left	0	4	0	4
Volume Right	6	0	0	12
cSH	1700	1066	1700	596
Volume to Capacity	0.61	0.00	0.23	0.06
Queue Length 95th (m)	0.0	0.1	0.0	0.3
Control Delay (s)	0.0	8.5	0.0	11.2
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		11.2
Approach LOS				B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	65.2%	ICU Level of Service	A
Analysis Period (min)	15		

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfryu												
LheC0h srV v PlgRc(	8/ 8	82k	) /	63	5k/	8))	01	3/ 8	68	52/	0) 0	/ 1k
9i pihPsrV v PlgRc(	8/ 8	82k	) /	63	5k/	8))	01	3/ 8	68	52/	0) 0	/ 1k
FfPeV9V d lgRcRV	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk
LrpeVBruppfv Plu(	8vk	0vk		0vk	0vk	0vk	2vy	0vk	0vk	5vk	0vk	0vk
BeyP. pfW9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	kv6)	/ vkk	/ vkk	kv6)	/ vkk
9hp	/ vkk	kv60		/ vkk	/ vkk	kvt)	/ vkk	/ vkk	kvt)	/ vkk	/ vkk	kvt)
9V0AhrpPnpPl	kv6)	/ vkk		kv6)	/ vkk	/ vkk	kv6)	/ vkk	/ vkk	kv6)	/ vkk	/ vkk
4epl w9V d IRhrp(	/ 016	/ 181		/ 051	/ 115	/ 3k/	/ 088	5) 22	/ 3k/	/ 016	5) 06	/) 1)
9V0APhv fppPl	kv5/	/ vkk		kvy1	/ vkk	/ vkk	kv8)	/ vkk	/ vkk	kv5/	/ vkk	/ vkk
4epl w9V d IRPhv (	) 1)	/ 181		/ k) 5	/ 115	/ 3k/	2) 8	5) 22	/ 3k/	) 0)	5) 06	/) 1)
APealctr ih0enprh-A, 9	kv63	kv63	kv63	kv63	kv63	kv63	kv63	kv63	kv63	kv63	kv63	kv63
HIjw9V d lgRc(	88/	8) k	) 5	/ kk	5/ 2	833	1/	351	63	5))	016	/ 11
oLOo oPl inpfry lgRc(	k	6	k	k	k	8k0	k	k	35	k	k	/ 8k
BeyP Ghri R9V d lgRc(	88/	862	k	/ kk	5/ 2	) 6	1/	351	55	5))	016	31
, PegSs PcfnVPu l%(	8%	8%	2%	) %	8%	8%	3%	5%	8%	8%	8%	5%
Li hy LSRP	Rv +Rp	WH		APhv	WH	APhv	Rv +Rp	WH	APhv	Rv +Rp	WH	APhv
AhrpPnpPl AceuPu	0	2			1		)	8		/	3	
APhv fppPl AceuPu	2			1		1	8		8	3		3
Hnpi epPl GhPPy- G lu(	53v2	53v2		8kv6	8kv6	8kv6	50v2	58v5	58v5	2/ v6	55vt	55vt
m0CPnpfgP GhPPy- t lu(	53v2	53v2		8kv6	8kv6	8kv6	50v2	58v5	58v5	2/ v6	55vt	55vt
Hnpi epPl t 7N oepfr	kv56	kv56		kv88	kv88	kv88	kv2k	kv52	kv52	kv2)	kv53	kv53
NVPeheynP Lfv Plu(	8vk	0vk		0vk	0vk	0vk	2vy	0vk	0vk	5vk	0vk	0vk
sPcfnVP mxpPyufry lu(	5vk	5vk		5vk	5vk	5vk	5vk	/ vk	/ vk	5vk	/ vk	/ vk
BeyP GhR NeR lgRc(	2kk	0k6		852	2/ 6	5) 3	826	/ 88k	)) /	53/	/ 816	) 0/
g7u oepfr Ahrp	nkvk1	kv/ 3			nkv/ 0		kvk8	kv/ 1		nkvk1	kv88	
g7u oepfr APhv	kv/ 5			kvk6		kvk2	kv/		kvk8	nkv5)		kvk2
g7h oepfr	kvy)	kv28		kv25	kv0)	kv/ 0	kv55	kvy8	kvk3	kv61	kv8/	kv/ 8
. yfCh v DPvéS-I /	8kvt	8kv6		5/ v5	52vk	86v2	/ 1v5	82v8	8kv8	85v/	82v8	8kvk
Ahrt hPuufry 9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk
FynhPv PypeVDPvéS-I 8	/ v0	kv2		/ v5	0v8	kv8	kvt	/ v3	kv8	28v3	8v8	kv2
DPvéSlu(	88v2	8/ v5		58v3	2/ v8	86v3	/ 6v/	83v8	8kvt	3) v0	83vt	8kvy
BPgPVr C4 PhgfnP	N	N		N	D	N	E	N	N	m	N	N
HRRhr enc DPvéSlu(		8/ vt			5) v2			82v6			53v5	
HRRhr enc BO4		N			D			N			D	

FypPhuPnpfry 4i v v ehS					
, NM 8kkk Nrypfr VDPvéS	5/ v/	, NM 8kkk BPgPVr C4 PhgfnP		N	
, NM 8kkk srV v P pr NeRenfpShepfr	kvt0				
Hnpi epPl NSnVP BPyt pc lu(	65vt	4i v r CVuppfv Plu(		8kvy	
FypPhuPnpfry NeRenfpS. pfVzepfr y	16vt%	RN. BPgPVr C4 PhgfnP		m	
Hye\Sufu APhfr l lv fy(	/)				
n NhfpfneVBeyP Ghri R					

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry Ct i hepfr yu												
LheCCh s r Vv P lgRc(	5	351	8)	/ 8	3/ 3	/ /	80	/	1	3	/	)
9i pi hP s r Vv P lgRc(	5	351	8)	/ 8	3/ 3	/ /	80	/	1	3	/	)
FfPeV9 Vd lgRcRV/	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk	/ 6kk
Lr peVBr uppfv P lu(	3vk	3vk		3vk	3vk			3vk			3vk	
BeyP. pfW9 enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
9hp	/ vkk	kv66		/ vkk	/ vkk			kv60			kv62	
9V¼AhrpPnpPl	kv6)	/ vkk		kv6)	/ vkk			kv63			kv61	
4epl w9 Vd lRhr p(	/ 016	/ 105		/ 016	/ 101			/ 038			/ 052	
9V¼APhv fppPl	kv8/	/ vkk		kv/0	/ vkk			kv12			kv68	
4epl w9 Vd lRPhv (	568	/ 105		586	/ 101			/) 22			/ 32k	
APealctr i hGenpr h- A, 9	kv6)	kv6)	kv6)	kv6)	kv6)	kv6)	kv6)	kv6)	kv6)	kv6)	kv6)	kv6)
Hl jw9 Vd lgRc(	5	308	83	/ 5	321	/ 8	81	/	1	3	/	)
oL Oo oP l inpfr y lgRc(	k	8	k	k	/	k	k	)	k	k	5	k
BeyP Ghr i R9 Vd lgRc(	5	363	k	/ 5	3) 6	k	k	58	k	k	6	k
Li hy LSRP	APhv	WH		APhv	WH		APhv	WH		APhv	WH	
AhrpPnpPl AceuPu		2			1			8			3	
APhv fppPl AceuPu	2			1			8			3		
Hnpi epPl GhPPy- G lu(	5/ vk	5/ vk		5/ vk	5/ vk			8) vk			8) vk	
mCCPnpfgP GhPPy- t lu(	5/ vk	5/ vk		5/ vk	5/ vk			8) vk			8) vk	
Hnpi epPl t 7N o epfr	kv23	kv23		kv23	kv23			kv50			kv50	
NVPeheynP Lfv P lu(	3vk	3vk		3vk	3vk			3vk			3vk	
s Pcfn VP mxpPyufr y lu(	kv8	kv8		5vk	5vk			kv8			kv8	
BeyP GhR NeR lgRc(	/ 01	1) 5		/ 26	1) 3			) 30			3k8	
g7u o epfr Ahr p		nkv50			kv5)							
g7u o epfr APhv	kvk/			kvk2				nkvk8			kvk/	
g7h o epfr	kvk8	kv18		kvk6	kv00			kvk3			kvk/	
. yfCh v DPvéS- I /	/ kv/	/ 3vk		/ kvy	/) vy			/ 5v6			/ 5v0	
Ahr t hPuufr y 9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
FynhPv PypeVDPvéS- I 8	kvk	) v0		kv5	2v8			kv8			kvk	
DPvéS lu(	/ kv8	8/ vt		/ kv0	/ 6v0			/ 2vv			/ 5v0	
BPgPVr C4 PhgfnP	E	N		E	E			E			E	
HRRhr enc DPvéS lu(		8/ v0			/ 6v8			/ 2vv			/ 5v0	
HRRhr enc BO4		N			E			E			E	

FypPhuPnpfr y 4i v v ehS			
, NM 8kkk Nry phr VDPvéS	8kv2	, NM 8kkk BPgPVr C4 PhgfnP	N
, NM 8kkk s r Vv P pr NeRenfpS hepfr	kv21		
Hnpi epPl NSnVP BPyt pc lu(	31vk	4i v r CVf uppfv P lu(	/ 8vk
FypPhuPnpfr y NeRenfpS. pfVzepfr y	3) v6%	fN. BPgPVr C4 PhgfnP	N
Hye V8ufu APhfr l lv fy(	/)		

n NhfpfneVBeyP Ghr i R

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ot i hepdr yu						
LheOOh s r Vv P lgPc7c(	323	3	1	350	8	0
9i pi hP s r Vv P ls Pc7c(	323	3	1	350	8	0
4 ft y Nr ydr V	9hPP			9hPP	4 pr R	
Ghel P	k%			k%	k%	
APea , ri h9enpr h	kv68	kv68	kv68	kv68	kv68	kv68
, ri hNS OVd hepP lgRc(	0k8	0	6	368	8	1
APl Puphfeyu						
BeyP T fl pc lv (						
T eVafyt 4 RPPl lv 7u(						
APhmPypE Vr naet P						
o ft cppi hy OVeHP lgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey upr het P gPc(	8			8		
. RuphPev uft yeVlv (	/ 85					
RX- RVepr r y i ybVr naPl			kv83		kv83	kv83
gN- nr y OVhpfyt gr Vv P			0k6		/ 2/ 3	0k3
gN/ - upet P / nr y Cgr V					0k3	
gN8- upet P 8 nr y Cgr V					0/ k	
gNi - i ybVr naPl gr V			860		/ 50/	868
pN- ufyt VP lu(			2vv		3v2	3v8
pN- 8 upet P lu(					) v2	
p9 lu(			8v8		5vy	5v5
Rk qi Pi P OPP %			66		66	61
nM neRenfpS lgPc7c(			15/		5) 5	268

DffPnpdr y- BeyP #	mE /	T E /	T E 8	WE /
s r Vv P Lr peV	0k6	6	368	/ k
s r Vv P BPQp	k	6	k	8
s r Vv P o ft cp	0	k	k	1
n4 ,	/ 0kk	15/	/ 0kk	2) 3
s r Vv P pr NeRenfpS	kv28	kvk/	kv2/	kvk8
Qi Pi P BPyt pc 6) pc lv (	kvk	kv8	kvk	kvy
Nr ydr VDPVeS lu(	kvk	6v2	kvk	/ 5vv
BeyP BO4		H		E
HRRhr enc DPVeS lu(	kvk	kvv		/ 5vv
HRRhr enc BO4				E

FypPhuPnpdr y 4i v v ehS							
HgPhet P DPVeS			kv8				
FypPhuPnpdr y NeRenfpS . pNzepdr y			22v2%		fN.	BPgPVr C4 PhgfnP	H
HyeVSufu APhfr l lv fy(			/)				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	156	35	121	203	194	53	488	114	214	901	118
Future Volume (vph)	163	156	35	121	203	194	53	488	114	214	901	118
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	2.0	7.0		7.0	7.0	7.0	4.6	7.0	7.0	3.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.56	1.00	1.00	0.56	1.00
Frt	1.00	0.57		1.00	1.00	0.86	1.00	1.00	0.86	1.00	1.00	0.86
Flt Protected	0.56	1.00		0.56	1.00	1.00	0.56	1.00	1.00	0.56	1.00	1.00
Satd. Flow (prot)	1785	1756		1950	1883	1686	1930	3411	1629	1772	3380	1901
Flt Permitted	0.42	1.00		0.65	1.00	1.00	0.31	1.00	1.00	0.33	1.00	1.00
Satd. Flow (perm)	783	1756		1043	1883	1686	631	3411	1629	921	3380	1901
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	184	236	47	149	246	158	112	688	137	268	724	142
RTOR Reduction (vph)	0	8	0	0	0	168	0	0	85	0	0	85
Lane Group Flow (vph)	184	274	0	149	246	40	112	688	48	268	724	63
Heavy Vehicles (%)	2%	2%	19%	8%	2%	3%	12%	7%	7%	3%	8%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		6	2		1	9	
Permitted Phases	4			8		8	2		2	9		9
Actuated Green, G (s)	32.6	32.6		18.1	18.1	18.1	39.6	31.4	31.4	43.0	33.5	33.5
Effective Green, g (s)	32.6	32.6		18.1	18.1	18.1	39.6	31.4	31.4	43.0	33.5	33.5
Actuated g/C Ratio	0.39	0.39		0.20	0.20	0.20	0.41	0.36	0.36	0.48	0.38	0.38
Clearance Time (s)	2.0	7.0		7.0	7.0	7.0	4.6	7.0	7.0	3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	421	948		205	378	318	277	1150	632	413	1273	903
v/s Ratio Prot	c0.09	0.16			0.13		0.02	0.17		c0.09	0.21	
v/s Ratio Perm	0.10			c0.14		0.03	0.14		0.03	c0.24		0.03
v/c Ratio	0.44	0.42		0.70	0.96	0.13	0.40	0.45	0.05	0.92	0.67	0.05
Uniform Delay, d1	20.7	21.7		33.4	33.0	25.6	17.3	23.1	15.7	14.8	22.3	18.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.4		5.8	3.8	0.2	1.0	1.6	0.3	2.5	1.8	0.3
Delay (s)	21.6	22.1		43.2	39.8	25.9	18.3	24.6	20.0	17.8	24.1	18.4
Level of Service	C	C		D	D	C	B	C	C	B	C	B
Approach Delay (s)		21.5			39.0			22.5			21.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	20.6
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	16		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	453	23	3	428	4	43	1	8	14	1	4
Future Volume (vph)	9	453	23	3	428	4	43	1	8	14	1	4
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	9.0	9.0		9.0	9.0			9.0			9.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.55		1.00	1.00			0.58			0.57	
Flt Protected	0.56	1.00		0.56	1.00			0.59			0.59	
Satd. Flow (prot)	1785	1862		1785	1893			1700			1793	
Flt Permitted	0.33	1.00		0.24	1.00			0.75			0.86	
Satd. Flow (perm)	927	1862		466	1893			1409			1663	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	654	28	4	619	6	62	1	10	17	1	6
RTOR Reduction (vph)	0	3	0	0	1	0	0	9	0	0	3	0
Lane Group Flow (vph)	7	915	0	4	620	0	0	67	0	0	20	0
Heavy Vehicles (%)	2%	3%	4%	2%	3%	2%	6%	2%	13%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			9	
Permitted Phases	4			8			2			9		
Actuated Green, G (s)	31.0	31.0		31.0	31.0			26.0			26.0	
Effective Green, g (s)	31.0	31.0		31.0	31.0			26.0			26.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49			0.37			0.37	
Clearance Time (s)	9.0	9.0		9.0	9.0			9.0			9.0	
Vehicle Extension (s)	0.2	0.2		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	286	844		207	845			619			670	
v/s Ratio Prot		c0.33			0.28							
v/s Ratio Perm	0.01			0.01				c0.04			0.01	
v/c Ratio	0.02	0.73		0.02	0.91			0.11			0.03	
Uniform Delay, d1	10.2	16.1		10.2	14.0			14.2			13.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	2.5		0.0	1.3			0.4			0.1	
Delay (s)	10.2	18.0		10.2	16.3			14.9			13.5	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		17.5			16.3			14.9			13.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	B
Analysis Period (min)	16		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	612	3	4	431	4	11
Future Volume (Veh/h)	612	3	4	431	4	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.52	0.52	0.52	0.52	0.52	0.52
Hourly flow rate (vph)	667	3	4	498	4	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	123					
pX, platoon unblocked			0.73		0.73	0.73
vC, conflicting volume			690		1034	668
vC1, stage 1 conf vol					668	
vC2, stage 2 conf vol					479	
vCu, unblocked vol			219		894	214
tC, single (s)			4.1		9.4	9.2
tC, 2 stage (s)					6.4	
tF (s)			2.2		3.6	3.3
p0 queue free %			100		55	58
cM capacity (veh/h)			551		476	906

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	690	4	498	19
Volume Left	0	4	0	4
Volume Right	3	0	0	12
cSH	1700	551	1700	699
Volume to Capacity	0.33	0.00	0.28	0.03
Queue Length 56th (m)	0.0	0.1	0.0	0.7
Control Delay (s)	0.0	8.9	0.0	11.6
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		11.6
Approach LOS				B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	16		

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfryu												
LheC0h sr Vv PlgRc(	881	8) 1	))	/ k6	682	802	12	3) 5	/ kk	631	1/ 3	/ 52
9ipihPsr Vv PlgRc(	881	8) 1	))	/ k6	682	802	12	3) 5	/ kk	631	1/ 3	/ 52
FfPeV9Vd lgRcRV	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk
Lr peVBruppfv Plu(	8vk	0vk		0vk	0vk	0vk	2vy	0vk	0vk	6vk	0vk	0vk
BeyP. pfW9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	kv5)	/ vkk	/ vkk	kv5)	/ vkk
9hp	/ vkk	kv50		/ vkk	/ vkk	kv1)	/ vkk	/ vkk	kv1)	/ vkk	/ vkk	kv1)
9\ÿAhrpPnpPl	kv5)	/ vkk		kv5)	/ vkk	/ vkk	kv5)	/ vkk	/ vkk	kv5)	/ vkk	/ vkk
4epl w9Vd IRhrp(	/ 015	/ 181		/ 061	/ 116	/ 3k/	/ 088	6) 22	/ 3k/	/ 015	6) 05	/) 1)
9\ÿAPhv fppPl	kv83	/ vkk		kvy3	/ vkk	/ vkk	kv6/	/ vkk	/ vkk	kv8/	/ vkk	/ vkk
4epl w9Vd IRPhv (	252	/ 181		/ k6/	/ 116	/ 3k/	) 32	6) 22	/ 3k/	2k)	6) 05	/) 1)
APealctr ih0enprh-A, 9	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53	kv53
HIjw9Vd lgRc(	861	835	) 0	/ k0	661	81)	11	313	/ k2	616	1) k	8k8
oLOo oPl inpfry lgRc(	k	0	k	k	k	8/ 5	k	k	02	k	k	/ 8/
BeyP Ghri R9Vd lgRc(	861	6/ 5	k	/ k0	661	33	11	313	6k	616	1) k	1/
, PegSs PcfnWPu l%(	8%	8%	2%	) %	8%	8%	3%	6%	8%	8%	8%	6%
Li hy LSRP	Rv +Rp	WH		APhv	WH	APhv	Rv +Rp	WH	APhv	Rv +Rp	WH	APhv
AhrpPnpPl AceuPu	0	2			1		)	8		/	3	
APhv fppPl AceuPu	2			1		1	8		8	3		3
Hnpi epPl GhPPy- G lu(	2/ v2	2/ v2		8) vv	8) vv	8) vv	63v2	6/ v6	6/ v6	) 6v2	26v1	26v1
mC0PnpfgP GhPPy- t lu(	2/ v2	2/ v2		8) vv	8) vv	8) vv	63v2	6/ v6	6/ v6	) 6v2	26v1	26v1
Hnpi epPl t 7N oepfr	kv61	kv61		kv86	kv86	kv86	kv66	kv85	kv85	kv25	kv2k	kv2k
NWPeheynP Lfv Plu(	8vk	0vk		0vk	0vk	0vk	2vy	0vk	0vk	6vk	0vk	0vk
sPcfnWP mxpPyufry lu(	6vk	6vk		6vk	6vk	6vk	6vk	/ vk	/ vk	6vk	/ vk	/ vk
BeyP GhR NeR lgRc(	6) 1	35)		860	262	635	828	/ k/ 5	23k	22/	/ 22k	361
g7u oepfr Ahrp	nkvk5	kv/ 0			nkv/ 1		kvk8	kv/ 5		nkv/)	kv82	
g7u oepfr APhv	kv/ 0			kv/ k		kvk2	kv/ k		kvk8	nkv80		kvk)
g7h oepfr	kv83	kv23		kv2)	kv01	kv/ 1	kv63	kv80	kvk0	kv10	kvy5	kv/ 6
. yfC hv DPvéS- I /	8) v6	8) v6		6) v5	65v8	66v8	8) v2	62v8	81v/	8kv8	8) vy	8kvy
Ahrt hPuufry 9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk
FynhPv PypeVDPvéS- I 8	2v8	kvy		/ v2	1v8	kv8	kv5	6v8	kv6	/ 3v2	/ v1	kv2
DPvéS lu(	85v5	8) v1		60v6	20v1	66v1	83v6	60v1	81v2	63v8	80v6	8kv5
BPgPVr C4 PhgfnP	N	N		D	D	N	N	D	N	D	N	N
HRRhr enc DPvéS lu(		80vy			2kv1			6) vy			81v5	
HRRhr enc BO4		N			D			D			N	

FypPhuPnpfry 4i v v ehS					
, NM 8kkk Nr ypr VDPvéS	68v0	, NM 8kkk BPgPVr C4 PhgfnP		N	
, NM 8kkk sr Vv P pr NeRenfpS hepfr	kv1)				
Hnpi epPl NSnWP BPyt pc lu(	/ k1v1	4i v r CVruppfv Plu(		8kvy	
FypPhuPnpfry NeRenfpS. pfWzepfr y	56v2%	RN. BPgPVr C4 PhgfnP		9	
Hye\$ufu APhfr I lv fy(	/)				
n NhfpfneVBeyP Ghri R					

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfr yu												
LheC0h sr V v PlgRc(	6	310	8)	/ 8	332	/ /	80	/	1	3	/	)
9i pihPsr V v PlgRc(	6	310	8)	/ 8	332	/ /	80	/	1	3	/	)
FfPeV9V d lgRcRV/	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk	/ 5kk
Lr peVBr uppfv Plu(	3vk	3vk		3vk	3vk			3vk			3vk	
BeyP. pfW9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
9hp	/ vkk	kv55		/ vkk	/ vkk			kv50			kv52	
9V0AhrpPnpPl	kv5)	/ vkk		kv5)	/ vkk			kv53			kv51	
4epl w9V d lRhr p(	/ 015	/ 102		/ 015	/ 105			/ 038			/ 062	
9V0APhv fppPl	kv/3	/ vkk		kv/6	/ vkk			kv12			kv58	
4epl w9V d lRPhv (	6k1	/ 102		823	/ 105			/) 22			/ 32k	
APealdr i h0enpr h- A, 9	kv5)	kv5)	kv5)	kv5)	kv5)	kv5)	kv5)	kv5)	kv5)	kv5)	kv5)	kv5)
HI jw9V d lgRc(	6	086	83	/ 6	355	/ 8	81	/	1	3	/	)
oLOo oPl i npfr y lgRc(	k	8	k	k	/	k	k	)	k	k	6	k
BeyP Ghr i R9V d lgRc(	6	020	k	/ 6	0/ k	k	k	68	k	k	5	k
Li hy LSRP	APhv	WH		APhv	WH		APhv	WH		APhv	WH	
AhrpPnpPl AceuPu		2			1			8			3	
APhv fppPl AceuPu	2			1			8			3		
Hnpi epPl GhPPy- G lu(	6/ vk	6/ vk		6/ vk	6/ vk			8) vk			8) vk	
m0CPnpfgP GhPPy- t lu(	6/ vk	6/ vk		6/ vk	6/ vk			8) vk			8) vk	
Hnpi epPl t 7N o epfr	kv23	kv23		kv23	kv23			kv60			kv60	
NVPeheynP Lfv Plu(	3vk	3vk		3vk	3vk			3vk			3vk	
s Pcfn\P mxpPyufr y lu(	kv8	kv8		6vk	6vk			kv8			kv8	
BeyP GhR NeR lgRc(	/ 2k	1) 2		/ / 8	1) 3			) 30			3k8	
g7u o epfr Ahr p		nkv2k			kv61							
g7u o epfr APhv	kvk/			kvk)				nkvk8			kvk/	
g7h o epfr	kvk8	kv/1		kv/8	kv16			kvk3			kvk/	
. yf0Chv DPVeS- I /	/ kv8	/ 3v0		/ kv8	/ 3v8			/ 6v5			/ 6v0	
Ahr t hPuufr y 9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
FynhPv PypeVDPVeS- I 8	kvk	5v0		kvy	3v0			kv8			kvk	
DPVeS lu(	/ kv8	83v2		/ / w	88v5			/ 2w			/ 6v0	
BPgPVr C4 PhgfnP	E	N		E	N			E			E	
HRRhr enc DPVeS lu(		83v6			88v0			/ 2w			/ 6v0	
HRRhr enc BO4		N			N			E			E	

FypPhuPnpfr y 4i v v ehS					
, NM 8kkk Nr ydhr VDPVeS	82v8	, NM 8kkk BPgPVr C4 PhgfnP		N	
, NM 8kkk sr V v P pr NeRenfpS hepfr	kvy/				
Hnpi epPl NSnVP BPyt pc lu(	31vk	4i v r CVuppfv Plu(		/ 8vk	
FypPhuPnpfr y NeRenfpS. pfWzepfr y	31vy%	fN. BPgPVr C4 PhgfnP		N	
HyeV8ufu APhfr l lv fy(	/)				

n NhfpfneVBeyP Ghr i R

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ct i hepr yu						
LheCth s r Vv P lgPc7c(	35)	3	1	31)	8	0
9i pi hP s r Vv P ls Pc7c(	35)	3	1	31)	8	0
4ft y Nry pr V	9hPP			9hPP	4pr R	
Ghel P	k%			k%	k%	
APea , ri h9enpr h	kw68	kw68	kw68	kw68	kw68	kw68
, ri hNS CVd hepP lgRc(	0))	0	5	02)	8	1
APl Puphfeyu						
BeyP T fl pc lv (						
T eVafyt 4RPPl lv 7u(						
APhmPypEVnaet P						
o ft cppi hy CVeHP lgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey upr het P gPc(	8			8		
. RuphPev uft yeVlv (	/ 86					
RX- RVepr r y i ybVnaPl			kw8/		kw8/	kw8/
gN- nr y CVhpfyt gr Vv P			038		/) 88	0) 1
gN/ - upet P / nr y Cgr V					0) 1	
gN8- upet P 8 nr y Cgr V					036	
gNi - i ybVnaPl gr V			853		/) 6)	85k
pN- ufyt VP lu(			2w		3w2	3w8
pN- 8 upet P lu(					) w2	
p9 lu(			8w8		6wy	6w6
Rk qi Pi P CPP %			55		55	51
nM neRenfpS lgPc7c(			003		68)	2) 5

DftPnpr y- BeyP #	mE /	T E /	T E 8	WE /
s r Vv P Lr peV	038	5	02)	/ k
s r Vv P BPQp	k	5	k	8
s r Vv P oft cp	0	k	k	1
n4 ,	/ 0kk	003	/ 0kk	282
s r Vv P pr NeRenfpS	kw2)	kwk/	kw22	kwk8
Qi Pi P BPyt pc 5) pc lv (	kwk	kw6	kwk	kw8
Nry pr VDPVeSlu(	kwk	5w0	kwk	/ 6w0
BeyP BO4		H		E
HRRhr enc DPVeSlu(	kwk	kw		/ 6w0
HRRhr enc BO4				E

FypPhuPnpr y 4i v v ehS							
HgPhet P DPVeS			kw				
FypPhuPnpr y NeRenfpS . pVzepr y			23w5%		fN.	BPgPVr C4 PhgfnP	H
HyeVSufu APhfr l lv fy(			/)				

Appendix F:
Traffic Operations – Total

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	172	66	116	184	133	81	420	102	185	318	101
9uture Volume (vph)	162	172	66	116	184	133	81	420	102	185	318	101
Ideal 9low (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	2v0	7v0		7v0	7v0	7v0	4v3	7v0	7v0	6v0	7v0	7v0
Lane . tilw9actor	1v00	1v00		1v00	1v00	1v00	1v00	0v53	1v00	1v00	0v53	1v00
9rt	1v00	0v58		1v00	1v00	0v83	1v00	1v00	0v83	1v00	1v00	0v83
9lt Protectel	0v53	1v00		0v53	1v00	1v00	0v53	1v00	1v00	0v53	1v00	1v00
Satl w9lod (prot)	1785	1758		1U50	1886	1383	1U60	6411	132U	1772	6680	1U01
9lt Permittel	0v43	1v00		0vU1	1v00	1v00	0v67	1v00	1v00	0v41	1v00	1v00
Satl w9lod (perm)	837	1758		1077	1886	1383	U60	6411	132U	738	6680	1U01
Peak-hour factor, PH9	0v86	0v86	0v86	0v86	0v86	0v86	0v86	0v86	0v86	0v86	0v86	0v86
Al jw9lod (vph)	135	207	40	16U	222	187	58	30U	126	228	U24	122
RTOR Rel uction (vph)	0	8	0	0	0	131	0	0	75	0	0	7U
Lane Group 9lod (vph)	135	265	0	16U	222	6U	58	30U	44	228	U24	4U
Heavy Vehicles (%)	2%	2%	1U%	8%	2%	6%	12%	7%	7%	6%	8%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protectel Phases	7	4			8		3	2		1	U	
Permittel Phases	4			8		8	2		2	U		U
Actuatel Green, G (s)	60v2	60v2		1UvU	1UvU	1UvU	67v1	61v4	61v4	41vU	62v5	62v5
Effective Green, g (s)	60v2	60v2		1UvU	1UvU	1UvU	67v1	61v4	61v4	41vU	62v5	62v5
Actuatel g/C Ratio	0v63	0v63		0v15	0v15	0v15	0v42	0v6U	0v6U	0v48	0v68	0v68
Clearance Time (s)	2v0	7v0		7v0	7v0	7v0	4v3	7v0	7v0	6v0	7v0	7v0
Vehicle Extension (s)	6v0	6v0		6v0	6v0	6v0	6v0	1v0	1v0	6v0	1v0	1v0
Lane Grp Cap (vph)	420	U21		204	638	601	666	122U	348	4U2	1276	UU6
v/s Ratio Prot	0v03	c0v16			0v12		0v02	0v13		c0v03	0v18	
v/s Ratio Perm	0v08			c0v16		0v02	0v11		0v06	c0v15		0v06
v/c Ratio	0v68	0v65		0vU7	0vU2	0v12	0v25	0v41	0v08	0v45	0v45	0v08
. niform Delay, I 1	20v7	21v3		62v8	62v3	25v6	13v4	21v0	18v4	16v5	20v8	17v3
Progression 9actor	1v00	1v00		1v00	1v00	1v00	1v00	1v00	1v00	1v00	1v00	1v00
Incremental Delay, I 2	0vU	0v4		8v0	6v6	0v2	0v3	1v0	0v6	0v8	1v4	0v2
Delay (s)	21v2	21v5		40v8	63v8	25v3	13v5	22v0	18v7	14v7	22v1	17v7
Level of Service	C	C		D	D	C	B	C	B	B	C	B
Approach Delay (s)		21v7			64v5			20v7			15v8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	26v4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0v34		
Actuatel Cycle Length (s)	87v6	Sum of lost time (s)	20v3
Intersection Capacity . tilization	73v7%	IC. Level of Service	D
Analysis Periol (min)	13		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	U	468	26	6	674	4	46	1	8	14	1	4
9uture Volume (vph)	U	468	26	6	674	4	46	1	8	14	1	4
Ideal 9low (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	U.0	U.0		U.0	U.0			U.0			U.0	
Lane . tilw9actor	1.00	1.00		1.00	1.00			1.00			1.00	
9rt	1.00	0.85		1.00	1.00			0.98			0.97	
9lt Protectel	0.53	1.00		0.53	1.00			0.5U			0.5U	
Satl w9low (prot)	1785	1830		1785	18U2			1700			17U6	
9lt Permittel	0.65	1.00		0.60	1.00			0.75			0.83	
Satl w9low (perm)	746	1830		3U7	18U2			140U			1336	
Peak-hour factor, PH9	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
AI jw9low (vph)	7	328	28	4	431	3	32	1	10	17	1	3
RTOR Rel uction (vph)	0	6	0	0	1	0	0	U	0	0	6	0
Lane Group 9low (vph)	7	336	0	4	433	0	0	37	0	0	20	0
Heavy Vehicles (%)	2%	6%	4%	2%	6%	2%	3%	2%	16%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protectel Phases		4			8			2			U	
Permittel Phases	4			8			2			U		
Actuatel Green, G (s)	61.0	61.0		61.0	61.0			23.0			23.0	
Effective Green, g (s)	61.0	61.0		61.0	61.0			23.0			23.0	
Actuatel g/C Ratio	0.41U	0.41U		0.41U	0.41U			0.67			0.67	
Clearance Time (s)	U.0	U.0		U.0	U.0			U.0			U.0	
Vehicle Extension (s)	0.2	0.2		6.0	6.0			0.2			0.2	
Lane Grp Cap (vph)	668	846		238	848			31U			370	
v/s Ratio Prot		c0.60			0.24							
v/s Ratio Perm	0.01			0.01				c0.04			0.01	
v/c Ratio	0.02	0.UU		0.02	0.84			0.11			0.06	
. niform Delay, I 1	10.2	14.4		10.1	16.6			14.2			16.8	
Progression 9actor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, I 2	0.0	1.4		0.0	0.7			0.4			0.1	
Delay (s)	10.2	13.8		10.2	14.0			14.U			16.5	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		13.7			14.0			14.U			16.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuatel Cycle Length (s)	U8.0	Sum of lost time (s)	12.0
Intersection Capacity . tilization	3U.7%	IC. Level of Service	B
Analysis Periol (min)	13		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	437	6	4	677	4	11
9uture Volume (Veh/h)	437	6	4	677	4	11
Sign Control	9ree			9ree	Stop	
Gral e	0%			0%	0%	
Peak Hour 9actor	0v52	0v52	0v52	0v52	0v52	0v52
Hourly flod rate (vph)	457	6	4	410	4	12
Pel estrians						
Lane Wil th (m)						
Walking Speel (m/s)						
Percent Blockage						
Right turn flare (veh)						
Mel ian type	TWLTL			TWLTL		
Mel ian storage veh)	2			2		
. pstream signal (m)	126					
pX, platoon unblockel			0w78		0w78	0w78
vC, conflicting volume			300		51U	458
vC1, stage 1 conf vol					458	
vC2, stage 2 conf vol					418	
vCu, unblockel vol			214		730	212
tC, single (s)			4w1		Uw4	Uw2
tC, 2 stage (s)					3w4	
t9 (s)			2w2		6w3	6w6
p0 queue free %			100		55	58
cM capacity (veh/h)			1033		315	U44

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	300	4	410	1U
Volume Left	0	4	0	4
Volume Right	6	0	0	12
cSH	1700	1033	1700	U07
Volume to Capacity	0w25	0w00	0w24	0w06
Queue Length 53th (m)	0w0	0w1	0w0	0wU
Control Delay (s)	0w0	8w4	0w0	11w1
Lane LOS		A		B
Approach Delay (s)	0w0	0w1		11w1
Approach LOS				B

Intersection Summary			
Average Delay	0w2		
Intersection Capacity . tilization	64w2%	FC. Level of Service	A
Analysis Periol (min)	13		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	431	11	3	41U	61	16
9uture Volume (Veh/h)	431	11	3	41U	61	16
Sign Control	9ree			9ree	Stop	
Gral e	0%			0%	0%	
Peak Hour 9actor	0v52	0v52	0v52	0v52	0v52	0v52
Hourly flod rate (vph)	450	12	3	432	64	14
Pel estrians						
Lane Wil th (m)						
Walking Speel (m/s)						
Percent Blockage						
Right turn flare (veh)						
Mel ian type	TWLTL			TWLTL		
Mel ian storage veh)	2			2		
. pstream signal (m)	6U3			133		
pX, platoon unblockel			1v00		0v84	1v00
vC, conflicting volume			302		538	45U
vC1, stage 1 conf vol					45U	
vC2, stage 2 conf vol					4U2	
vCu, unblockel vol			455		847	456
tC, single (s)			4v1		Uv4	Uv2
tC, 2 stage (s)					3v4	
t9 (s)			2v2		6v3	6v6
p0 queue free %			100		56	58
cM capacity (veh/h)			10U2		301	374

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	302	3	432	48
Volume Left	0	3	0	64
Volume Right	12	0	0	14
cSH	1700	10U2	1700	320
Volume to Capacity	0v60	0v00	0v27	0v05
Queue Length 53th (m)	0v0	0v1	0v0	2v6
Control Delay (s)	0v0	8v4	0v0	12vU
Lane LOS		A		B
Approach Delay (s)	0v0	0v1		12vU
Approach LOS				B

Intersection Summary			
Average Delay	0vU		
Intersection Capacity . tilization	64v4%	FC. Level of Service	A
Analysis Periol (min)	13		

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfryu												
LheC0hsrV v PlgRc(	/) 0	868	20	) 3	813	823	08	351	) 3	66/	0k6	/ 50
9ipihPsrV v PlgRc(	/) 0	868	20	) 3	813	823	08	351	) 3	66/	0k6	/ 50
FfPeV9V d lgRcRV	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk
LrpeVBruppfv Plu(	8vk	0vk		0vk	0vk	0vk	2v8	0vk	0vk	6vk	0vk	0vk
BeyP. pfW9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	kvy3	/ vkk	/ vkk	kvy3	/ vkk
9hp	/ vkk	kvy0		/ vkk	/ vkk	kvt3	/ vkk	/ vkk	kvt3	/ vkk	/ vkk	kvt3
9\ÿAhrpPnpPl	kvy3	/ vkk		kvy3	/ vkk	/ vkk	kvy3	/ vkk	/ vkk	kvy3	/ vkk	/ vkk
4epl w9V d IRhrp(	/ 01)	/ 16k		/ 061	/ 116	/ 5k/	/ 088	6322	/ 5k/	/ 01)	630)	/ 313
9\ÿAPhv fppPl	kv66	/ vkk		kv81	/ vkk	/ vkk	kv8)	/ vkk	/ vkk	kv62	/ vkk	/ vkk
4epl w9V d IRPhv (	582	/ 16k		/ k52	/ 116	/ 5k/	38/	6322	/ 5k/	561	630)	/ 313
APealdrihGenprh-A, 9	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5
HIjw9V d lgRc(	8k3	828	2)	))	8) 0	833	03	3) 8	))	623	068	/ 02
oLOo oPlinpfry lgRc(	k	1	k	k	k	8kk	k	k	52	k	k	/ / k
BeyP GhriR9V d lgRc(	8k3	816	k	))	8) 0	33	03	3) 8	63	623	068	52
, PegSsPcfnVPul%(	8%	8%	2%	3%	8%	8%	5%	6%	8%	8%	8%	6%
Li hy LSRP	Rv +Rp	WH		APhv	WH	APhv	Rv +Rp	WH	APhv	Rv +Rp	WH	APhv
AhrpPnpPl AceuPu	0	2			1		3	8		/	5	
APhv fppPl AceuPu	2			1		1	8		8	5		5
HnpiepPl GhPPy-Glu(	62vy	62vy		/) vt	/) vt	/) vt	60v2	68v6	68v6	2/ vy	66vt	66vt
mCCPnpfgP GhPPy-tlu(	62vy	62vy		/) vt	/) vt	/) vt	60v2	68v6	68v6	2/ vy	66vt	66vt
HnpiepPl t7No epfr	kv61	kv61		kv8/	kv8/	kv8/	kv2/	kv63	kv63	kv23	kv60	kv60
NVPeheynPLfv Plu(	8vk	0vk		0vk	0vk	0vk	2v8	0vk	0vk	6vk	0vk	0vk
sPcfnVPmxpPyufrylu(	6vk	6vk		6vk	6vk	6vk	6vk	/ vk	/ vk	6vk	/ vk	/ vk
BeyP GhRNeRlgRc(	2k/	5) /		881	2k6	626	800	/ 82k	35k	6) k	/ 6/ k	31k
g7uoepfr Ahrp	nkvk0	kv/3			nkv/5		kvk/	kv/0		nkvk1	kv8k	
g7uoepfr APhv	kv/8			kvk)		kvk6	kvk)		kvk8	nkv68		kvk2
g7hoepfr	kv8/	kv2/		kv26	kv02	kv/5	kv80	kv21	kvk5	kvt1	kv85	kv/
. yfChv DPvéS-I /	8kv0	8/ v		6/ v2	66vt	8) v8	/ 0v2	86v2	/) vy	8kv8	86v6	/) v6
AhrthPuufry 9enprh	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk
FynhPv PypeVDPvéS-I 8	/ v	kv2		/ v6	5vy	kv8	kv8	/ v6	kv8	8kv8	/ v0	kv2
DPvéSlu(	8/ vt	8/ v8		68v0	2kv0	8) v0	/ 0vy	82v0	8kv/	2/ vk	83vk	/) v0
BPgPVr C4PhgfnP	N	N		N	D	N	E	N	N	D	N	E
HRRhrenc DPvéSlu(		8/ v5			63v8			86v8			81v0	
HRRhrenc BO4		N			D			N			N	

FypPhuPnpfry 4iv v ehS					
, NM 8kkk Nrypfr VDPvéS	80v0	, NM 8kkk BPgPVr C4PhgfnP		N	
, NM 8kkk srV v Ppr NeRenfpShepfr	kvt/				
HnpiepPl NSnVPBPytpclu(	) 8v6	4iv r CVfuppfv Plu(		8kv8	
FypPhuPnpfry NeRenfpS. pfWzepfry	10v5%	RN. BPgPVr C4PhgfnP		m	
HyeV8ufu APhfrI lv fy(	/ 3				
n NhfpfneVBeyP GhriR					

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfryu												
LheC0h sr Vv PlgRc(	6	5k/	83	/ 8	315	/ /	80	/	1	5	/	3
9i pihPsr Vv PlgRc(	6	5k/	83	/ 8	315	/ /	80	/	1	5	/	3
FfPeV9Vd lgRcRV/	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk
Lr peVBr uppfv Plu(	5vk	5vk		5vk	5vk			5vk			5vk	
BeyP. pfW9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
9hp	/ vkk	kvy)		/ vkk	/ vkk			kvy0			kvy2	
9V0AhrpPnpPl	kvy3	/ vkk		kvy3	/ vkk			kvy5			kvy1	
4epl w9Vd lRhr p(	/ 01)	/ 108		/ 01)	/ 101			/ 058			/ 062	
9V0APhv fppPl	kv82	/ vkk		kv8/	/ vkk			kv12			kvy8	
4epl w9Vd lRPhv (	226	/ 108		6) 2	/ 101			/ 322			/ 52k	
APealdr i h0enpr h- A, 9	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3	kvy3
Hl jw9Vd lgRc(	6	566	85	/ 6	5/ 0	/ 8	81	/	1	5	/	3
oLOo oPl i npfr y lgRc(	k	8	k	k	/	k	k	3	k	k	6	k
BeyP GhrriR9Vd lgRc(	6	530	k	/ 6	581	k	k	68	k	k	)	k
Li hy LSRP	APhv	WH		APhv	WH		APhv	WH		APhv	WH	
AhrpPnpPl AceuPu		2			1			8			5	
APhv fppPl AceuPu	2			1			8			5		
Hnpi epPl GhPPy- G lu(	6/ vk	6/ vk		6/ vk	6/ vk			83vk			83vk	
m0CPnpfgP GhPPy- t lu(	6/ vk	6/ vk		6/ vk	6/ vk			83vk			83vk	
Hnpi epPl t 7N o epfr	kv25	kv25		kv25	kv25			kv60			kv60	
NVPeheynP Lfv Plu(	5vk	5vk		5vk	5vk			5vk			5vk	
s Pcfn\P mxpPyufr y lu(	kv8	kv8		6vk	6vk			kv8			kv8	
BeyP GhR NeR lgRc(	8k/	136		/ 0)	135			350			5k8	
g7u o epfr Ahr p		nkv63			kv66							
g7u o epfr APhv	kvk/			kvk6				nkvk8			kvk/	
g7h o epfr	kvk/	kv00		kvk0	kv06			kvk5			kvk/	
. yf0Chv DPVeS- I /	/ kv	/ 3v3		/ kv2	/ 3v			/ 6vy			/ 6v0	
Ahr t hPuufr y 9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
FynhPv PypeVDPVeS- I 8	kvk	6vy		kv8	6v6			kv8			kvk	
DPVeS lu(	/ kv	/) v3		/ kv5	/ 1v2			/ 2v			/ 6v0	
BPgPVr C4 PhgfnP	E	E		E	E			E			E	
HRRhr enc DPVeS lu(		/) v2			/ 1v8			/ 2v			/ 6v0	
HRRhr enc BO4		E			E			E			E	

FypPhuPnpfr y 4i v v ehS				
, NM 8kkk Nr ydhr VDPVeS	/ 1v0	, NM 8kkk BPgPVr C4 PhgfnP	E	
, NM 8kkk sr Vv P pr NeRenfpS hepfr	kv23			
Hnpi epPl NSnVP BPyt pc lu(	51vk	4i v r CVuppfv Plu(	/ 8vk	
FypPhuPnpfr y NeRenfpS. pfVzepfr y	52vk%	fN. BPgPVr C4 PhgfnP	E	
HyeV8ufu APhfr l lv fy(	/ 3			

n NhfpfneVBeyP GhrriR

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ct i hepr yu						
LheCCh s r Vv P lgPc7c(	5k)	5	1	5k0	8	0
9i pi hP s r Vv P ls Pc7c(	5k)	5	1	5k0	8	0
4 ft y Nry pr V	9hPP			9hPP	4 pr R	
Ghel P	k%			k%	k%	
APea , ri h9enpr h	kwy8	kwy8	kwy8	kwy8	kwy8	kwy8
, ri hNS CVd hepP lgRc(	558	0	)	55k	8	1
APl Puphfeyu						
BeyP T fl pc lv (						
T eVafyt 4 RPPl lv 7u(						
APhmPypE Vnaet P						
o ft cppi hy CVeHP lgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey upr het P gPc(	8			8		
. RuphPev uft yeVlv (	/ 86					
RX- RVepr r y i yb Vnal Pl			kw5)		kw5)	kw5)
gN- nr y CVhnpfyt gr Vv P			55)		/ 622	555
gN/ - upet P / nr y Cgr V					555	
gN8- upet P 8 nr y Cgr V					501	
gNi - i yb Vnal Pl gr V			8) 2		/ 806	81)
pN- ufyt VP lu(			2w		5w2	5w8
pN- 8 upet P lu(					3w2	
p9 lu(			8w8		6w3	6w6
Rk qi Pi P CPP %			))		))	) 1
nM neRenfpS lgPc7c(			106		602	3/ 0

DffPnpr y- BeyP #	mE /	T E /	T E 8	WE /
s r Vv P Lr peV	55)	)	55k	/ k
s r Vv P BPQp	k	)	k	8
s r Vv P o ft cp	0	k	k	1
n4 ,	/ 0kk	106	/ 0kk	21k
s r Vv P pr NeRenfpS	kw6)	kwk/	kw6)	kwk8
Qi Pi P BPyt pc) 3pc lv (	kwk	kw8	kwk	kw3
Nry pr VDPVeSlu(	kwk	) w8	kwk	/ 8w0
BeyP BO4		H		E
HRRhr enc DPVeSlu(	kwk	kww		/ 8w0
HRRhr enc BO4				E

FypPhuPnpr y 4i v v ehS							
HgPhet P DPVeS			kw8				
FypPhuPnpr y NeRenfpS . pNzepr y			28w2%		fN. BPgPVr C4 PhgfnP		H
HyeVSufu APhfr l lv fy(			/ 3				

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ct i hepfr yu						
LheCCh s r Vv P lgPc7c(	583	68	/ 2	5k2	8/	)
9i pi hP s r Vv P ls Pc7c(	583	68	/ 2	5k2	8/	)
4 ft y Nry pr V	9hPP			9hPP	4 pr R	
Ghel P	k%			k%	k%	
APea , ri h9enpr h	kwy8	kwy8	kwy8	kwy8	kwy8	kwy8
, ri hNS CVd hepP lgRc(	50)	63	/ 3	530	86	/ k
APl Puphfeyu						
BeyP T fl pc lv (						
T eVafyt 4 RPPl lv 7u(						
APhmPypE Vnaet P						
o ft cppi hy CVeHP lgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey upr het P gPc(	8			8		
. RuphPev uft yeVlv (	653			/ 33		
RX- RVepr r y i ybVnaPl			kw6		kw0)	kw6
gN- nr y CVhpfyt gr Vv P			0/ 2		/ 612	5) 5
gN/ - upet P / nr y Cgr V					5) 5	
gN8- upet P 8 nr y Cgr V					510	
gNi - i ybVnaPl gr V			330		118	365
pN- ufyt VPlu(			2w		5w2	5w8
pN- 8 upet Plu(					3w2	
p9 lu(			8w8		6w3	6w6
Rk qi Pi P CPP %			) 1		) 2	) 1
nM neRenfpS lgPc7c(			123		2kk	232

DffPnpfr y- BeyP #	mE /	T E /	T E 8	WE /
s r Vv P Lr peV	0/ 2	/ 3	530	66
s r Vv P BPCp	k	/ 3	k	86
s r Vv P o ft cp	63	k	k	/ k
n4 ,	/ 0kk	123	/ 0kk	2/ 3
s r Vv P pr NeRenfpS	kw28	kwk8	kw6)	kwk1
Qi Pi P BPyt pc) 3pc lv (	kwk	kw2	kwk	8wk
Nry pr VDPvéSlu(	kwk	) w6	kwk	/ 2w2
BeyP BO4		H		E
HRRhr enc DPvéSlu(	kwk	kw8		/ 2w2
HRRhr enc BO4				E

FypPhuPnpfr y 4i v v ehS						
HgPhet P DPvéS			kw2			
FypPhuPnpfr y NeRenfpS . pVzepfr y			22w1%	fN.	BPgPVr C4 PhgfnP	H
Hye VSufu APhfr l lv fy(			/ 3			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	186	35	122	197	156	87	463	109	203	668	109
Future Volume (vph)	142	186	35	122	197	156	87	463	109	203	668	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	7.0		7.0	7.0	7.0	4.6	7.0	7.0	3.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.96	1.00
Frt	1.00	0.98		1.00	1.00	0.86	1.00	1.00	0.86	1.00	1.00	0.86
Flt Protected	0.96	1.00		0.96	1.00	1.00	0.96	1.00	1.00	0.96	1.00	1.00
Satd. Flow (prot)	1789	1798		1590	1883	1686	1530	3411	1625	1772	3380	1501
Flt Permitted	0.43	1.00		0.50	1.00	1.00	0.34	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	816	1798		1069	1883	1686	687	3411	1625	580	3380	1501
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	171	223	43	147	237	199	106	645	131	246	572	131
RTOR Reduction (vph)	0	8	0	0	0	169	0	0	86	0	0	82
Lane Group Flow (vph)	171	268	0	147	237	40	106	645	45	246	572	49
Heavy Vehicles (%)	2%	2%	15%	8%	2%	3%	12%	7%	7%	3%	8%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		6	2		1	5	
Permitted Phases	4			8		8	2		2	5		5
Actuated Green, G (s)	31.9	31.9		17.9	17.9	17.9	35.6	31.4	31.4	42.5	33.7	33.7
Effective Green, g (s)	31.9	31.9		17.9	17.9	17.9	35.6	31.4	31.4	42.5	33.7	33.7
Actuated g/C Ratio	0.35	0.35		0.20	0.20	0.20	0.41	0.36	0.36	0.48	0.38	0.38
Clearance Time (s)	2.0	7.0		7.0	7.0	7.0	4.6	7.0	7.0	3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	422	543		212	377	318	299	1200	637	433	1275	504
v/s Ratio Prot	c0.06	0.14			0.13		0.02	0.15		c0.05	0.20	
v/s Ratio Perm	0.09			c0.14		0.03	0.12		0.03	c0.21		0.03
v/c Ratio	0.41	0.40		0.59	0.53	0.13	0.36	0.45	0.09	0.67	0.63	0.08
Uniform Delay, d1	20.5	21.6		33.1	32.5	29.2	15.8	22.3	19.3	14.4	21.5	17.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.4		9.4	3.3	0.2	0.7	1.2	0.3	1.7	1.5	0.3
Delay (s)	21.2	21.9		42.6	36.9	29.4	17.6	23.6	19.5	15.1	23.1	18.1
Level of Service	C	C		D	D	C	B	C	B	B	C	B
Approach Delay (s)		21.5			36.3			22.1			20.9	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	20.6
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	16		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	471	23	3	403	4	43	1	8	14	1	4
Future Volume (vph)	5	471	23	3	403	4	43	1	8	14	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.98			0.97	
Flt Protected	0.96	1.00		0.96	1.00			0.95			0.95	
Satd. Flow (prot)	1789	1861		1789	1852			1700			1753	
Flt Permitted	0.35	1.00		0.27	1.00			0.79			0.86	
Satd. Flow (perm)	580	1861		600	1852			1405			1663	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	657	28	4	485	6	62	1	10	17	1	6
RTOR Reduction (vph)	0	3	0	0	1	0	0	5	0	0	3	0
Lane Group Flow (vph)	7	692	0	4	490	0	0	67	0	0	20	0
Heavy Vehicles (%)	2%	3%	4%	2%	3%	2%	6%	2%	13%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			5	
Permitted Phases	4			8			2			5		
Actuated Green, G (s)	31.0	31.0		31.0	31.0			26.0			26.0	
Effective Green, g (s)	31.0	31.0		31.0	31.0			26.0			26.0	
Actuated g/C Ratio	0.45	0.45		0.45	0.45			0.37			0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	0.2	0.2		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	310	843		227	848			615			670	
v/s Ratio Prot		c0.32			0.25							
v/s Ratio Perm	0.01			0.01				c0.04			0.01	
v/c Ratio	0.02	0.70		0.02	0.68			0.11			0.03	
Uniform Delay, d1	10.2	14.8		10.1	13.7			14.2			13.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	2.2		0.0	1.0			0.4			0.1	
Delay (s)	10.2	17.0		10.2	14.5			14.5			13.9	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		15.9			14.5			14.5			13.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	B
Analysis Period (min)	16		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	490	3	4	405	4	11
Future Volume (Veh/h)	490	3	4	405	4	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)	633	3	4	441	4	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	123					
pX, platoon unblocked			0.76		0.76	0.76
vC, conflicting volume			635		984	634
vC1, stage 1 conf vol					634	
vC2, stage 2 conf vol					449	
vCu, unblocked vol			217		812	216
tC, single (s)			4.1		5.4	5.2
tC, 2 stage (s)					6.4	
tF (s)			2.2		3.6	3.3
p0 queue free %			100		99	98
cM capacity (veh/h)			1015		494	520

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	635	4	441	15
Volume Left	0	4	0	4
Volume Right	3	0	0	12
cSH	1700	1015	1700	683
Volume to Capacity	0.32	0.00	0.25	0.03
Queue Length 96th (m)	0.0	0.1	0.0	0.5
Control Delay (s)	0.0	8.5	0.0	11.4
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		11.4
Approach LOS				B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	16		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	485	11	6	446	31	13
Future Volume (Veh/h)	485	11	6	446	31	13
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)	628	12	6	484	34	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	356			166		
pX, platoon unblocked			0.98		0.83	0.98
vC, conflicting volume			640		1028	634
vC1, stage 1 conf vol					634	
vC2, stage 2 conf vol					494	
vCu, unblocked vol			621		875	616
tC, single (s)			4.1		5.4	5.2
tC, 2 stage (s)					6.4	
tF (s)			2.2		3.6	3.3
p0 queue free %			100		93	97
cM capacity (veh/h)			1026		481	649

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	640	6	484	48
Volume Left	0	6	0	34
Volume Right	12	0	0	14
cSH	1700	1026	1700	499
Volume to Capacity	0.32	0.00	0.28	0.10
Queue Length 96th (m)	0.0	0.1	0.0	2.4
Control Delay (s)	0.0	8.6	0.0	13.0
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		13.0
Approach LOS				B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	16		

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfryu												
LheC0hsrV̈v PlgRc(	8/8	82)	6/	/k8	3k0	853	01	5/8	/k8	366	060	/1k
9ipihPsrV̈v PlgRc(	8/8	82)	6/	/k8	3k0	853	01	5/8	/k8	366	060	/1k
FfPeV9Vd lgRcRV/	/)kk	/)kk	/)kk	/)kk	/)kk	/)kk	/)kk	/)kk	/)kk	/)kk	/)kk	/)kk
LrpeVBruppfv Plu(	8vk	0vk		0vk	0vk	0vk	2v6	0vk	0vk	3vk	0vk	0vk
BeyP. pfW9enprh	/vkk	/vkk		/vkk	/vkk	/vkk	/vkk	kvy6	/vkk	/vkk	kvy6	/vkk
9hp	/vkk	kvy0		/vkk	/vkk	kvt6	/vkk	/vkk	kvt6	/vkk	/vkk	kvt6
9V0AhrpPnpPl	kvy6	/vkk		kvy6	/vkk	/vkk	kvy6	/vkk	/vkk	kvy6	/vkk	/vkk
4epdw9Vd IRhrp(	/01)	/18)		/031	/113	/5k/	/088	3622	/5k/	/01)	360)	/616
9V0APhv fppPl	kv8)	/vkk		kv60	/vkk	/vkk	kv3/	/vkk	/vkk	kv80	/vkk	/vkk
4epdw9Vd IRPhv(	662	/18)		/k22	/113	/5k/	665	3622	/5k/	6k3	360)	/616
APealdrihGenprh-A, 9	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5	kvy5
HIjw9Vd lgRc(	88/	86)	63	/k5	38k	802	1/	531	/k5	30k	01)	/11
oLOo oPlinpfry lgRc(	k	0	k	k	k	8/8	k	k	03	k	k	//5
BeyP GhriR9Vd lgRc(	88/	3k6	k	/k5	38k	58	1/	531	33	30k	01)	08
,PegSsPcfnVPul%(	8%	8%	2%	6%	8%	8%	5%	3%	8%	8%	8%	3%
Lihy LSRP	Rv+Rp	WH		APhv	WH	APhv	Rv+Rp	WH	APhv	Rv+Rp	WH	APhv
AhrpPnpPl AceuPu	0	2			1		6	8		/	5	
APhv fppPl AceuPu	2			1		1	8		8	5		5
HnpiepPl GhPPy-Glu(	31v2	31v2		88v0	88v0	88v0	35v2	3/v3	3/v3	21v2	31vt	31vt
m0CPnpfgPGhPPy-tlu(	31v2	31v2		88v0	88v0	88v0	35v2	3/v3	3/v3	21v2	31vt	31vt
HnpiepPl t7No epfr	kv81	kv81		kv83	kv83	kv83	kv85	kv8/	kv8/	kv21	kv81	kv81
NVPeheynPLfv Plu(	8vk	0vk		0vk	0vk	0vk	2v6	0vk	0vk	3vk	0vk	0vk
sPcfnVPmxpPyufry lu(	3vk	3vk		3vk	3vk	3vk	3vk	/vk	/vk	3vk	/vk	/vk
BeyP GhRNeRlgRc(	301	5)5		836	282	35k	86)	//kk	2)0	28/	/300	5/k
g7uoepfr Ahrp	nkvk1	kv/0			nkv/0		kvk8	kv/1		nkv/8	kv88	
g7uoepfr APhv	kv/2			kv/k		kvk2	kv/k		kvk8	nkv8k		kvk6
g7hoepfr	kv61	kv22		kv26	kv06	kv/0	kv8/	kv61	kvk0	kvt1	kv60	kv/8
.yfChv DPvéS-I/	88vy	83v8		33v0	35v6	3/v6	8/v0	8)v8	82v6	/1v6	82v6	8kvk
AhrthPuufry 9enprh	/vkk	/vkk		/vkk	/vkk	/vkk	/vkk	/vkk	/vkk	/vkk	/vkk	/vkk
FynhPv PypeVDPvéS-I8	8v8	kv2		/v2	0v6	kv8	kv0	8v8	kv8	/1v2	/v0	kv2
DPvéSlu(	86v8	83v5		36v/	23vy	3/v0	88v2	3/v6	82v0	35vy	85v8	8kv2
BPgPVrC4PhgfnP	N	N		D	D	N	N	N	N	D	N	N
HRRhrenc DPvéSlu(		82v8			30vt			8)v0			81v8	
HRRhrenc BO4		N			D			N			N	

FypPhuPnpfry 4ivveh S					
,NM8kkk NrypfrVDPvéS	3kvk	,NM8kkk BPgPVrC4PhgfnP		N	
,NM8kkk srV̈v Ppr NeRenfpShepfr	kvt3				
HnpiepPl NSnVPBPytpclu(	/kkvt	4ivrCVruppfv Plu(		8kv6	
FypPhuPnpfry NeRenfpS.pfVzepfry	)kvy%	RN. BPgPVrC4PhgfnP		m	
HyeV8ufuAPhfrIlvfy(	/6				
n NhfpfneVBeyPGhriR					

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfr yu												
LheC0h sr Vv PlgRc(	3	525	86	/ 8	53k	/ /	80	/	1	5	/	6
9ipihPsr Vv PlgRc(	3	525	86	/ 8	53k	/ /	80	/	1	5	/	6
FfPeV9Vd lgRcRV/	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk	/) kk
Lr peVBr uppfv Plu(	5vk	5vk		5vk	5vk			5vk			5vk	
BeyP. pfW9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
9hp	/ vkk	kvy)		/ vkk	/ vkk			kvy0			kvy2	
9\ÿAhr pPnpPl	kvy6	/ vkk		kvy6	/ vkk			kvy5			kvy1	
4epl w9Vd lRhr p(	/ 01)	/ 103		/ 01)	/ 101			/ 058			/ 032	
9\ÿAPhv fppPl	kvv)	/ vkk		kvv0	/ vkk			kvt2			kvy8	
4epl w9Vd lRPhv (	350	/ 103		3/ 5	/ 101			/ 622			/ 52k	
APealdr i hGenpr h- A, 9	kvy6	kvy6	kvy6	kvy6	kvy6	kvy6	kvy6	kvy6	kvy6	kvy6	kvy6	kvy6
Hl jw9Vd lgRc(	3	51k	85	/ 3	553	/ 8	81	/	1	5	/	6
oLOo oPl i npfr y lgRc(	k	8	k	k	/	k	k	6	k	k	3	k
BeyP Ghr i R9Vd lgRc(	3	0k2	k	/ 3	502	k	k	38	k	k	)	k
Li hy LSRP	APhv	WH		APhv	WH		APhv	WH		APhv	WH	
Ahr pPnpPl AceuPu		2			1			8			5	
APhv fppPl AceuPu	2			1			8			5		
Hnpi epPl GhPPy- G lu(	3/ vk	3/ vk		3/ vk	3/ vk			86vk			86vk	
mC0PnpfgP GhPPy- t lu(	3/ vk	3/ vk		3/ vk	3/ vk			86vk			86vk	
Hnpi epPl t 7N o epfr	kv25	kv25		kv25	kv25			kv30			kv30	
NVPeheynP Lfv Plu(	5vk	5vk		5vk	5vk			5vk			5vk	
s Pcfn\P mxpPyufr y lu(	kv8	kv8		3vk	3vk			kv8			kv8	
BeyP GhR NeR lgRc(	/ 50	163		/ 22	165			650			5k8	
g7u o epfr Ahr p		nkv31			kv35							
g7u o epfr APhv	kvk/			kvk2				nkvk8			kvk/	
g7h o epfr	kvk8	kv13		kvk)	kv0)			kvk5			kvk/	
. yfC hv DPv\eS- I /	/ kvv	/ 5vv		/ kv6	/ 6v0			/ 3vy			/ 3v0	
Ahr t hPuufr y 9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
FynhPv PypeVDPv\eS- I 8	kvk	5v8		kv3	2vt			kv8			kvk	
DPv\eSlu(	/ kv8	88v2		/ kvt	8kv6			/ 2vv			/ 3v0	
BPgPVr C4 PhgfnP	E	N		E	N			E			E	
HRRhr enc DPv\eSlu(		88v3			8kv3			/ 2vv			/ 3v0	
HRRhr enc BO4		N			N			E			E	

FypPhuPnpfr y 4i v v ehS					
, NM 8kkk Nr ydhr VDPv\eS	8/ vv	, NM 8kkk BPgPVr C4 PhgfnP		N	
, NM 8kkk sr Vv P pr NeRenfpS hepfr	kv21				
Hnpi epPl NSnVP BPyt pc lu(	51vk	4i v r CVuppfv Plu(		/ 8vk	
FypPhuPnpfr y NeRenfpS. pfWzepfr y	55v3%	fN. BPgPVr C4 PhgfnP		N	
HyeV3ufu APhfr l lv fy(	/ 6				

n NhfpfneVBeyP Ghr i R

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ctihepdryu						
LheCCh srVv PlgPc7c(	562	5	1	56/	8	0
9ipihPsrVv PlsPc7c(	562	5	1	56/	8	0
4fty Nrydry V	9hPP			9hPP	4prR	
GhelP	k%			k%	k%	
APea, rih9enpr h	kwy8	kwy8	kwy8	kwy8	kwy8	kwy8
, rihSCVd hepPlgRc(	0//	0	)	0k1	8	1
APl Puphfeyu						
BeyP T flpc lv (						
T eVafyt 4RPPl lv 7u(						
APhmPypEVnaet P						
oftcppihy CVehPlgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey uprhet PgPc(	8			8		
. RuphPev uftyeVlv (	/83					
RX-RVepr ry i ybVnaPl			kw56		kw56	kw56
gN-nry CVhpfyt grVv P			0/1		/22k	0/2
gN/-upet P/ nry Cgr V					0/2	
gN8-upet P8 nry Cgr V					085	
gNi-iybVnaPl gr V			8)1		/2k)	8)3
pN-ufyt VPlu(			2w		5w2	5w8
pN-8 upet Plu(					6w2	
p9lu(			8w8		3w6	3w8
Rk qi Pi P CPP %			))		))	)1
nM neRenfpSlgPc7c(			188		325	215

DffPnpdry-BeyP #	mE/	T E/	T E8	WE/
srVv PLrpeV	0/1	)	0k1	/k
srVv PBPCp	k	)	k	8
srVv Poftcp	0	k	k	1
n4,	/0kk	188	/0kk	22)
srVv Ppr NeRenfpS	kw28	kwk/	kw28	kwk8
Qi Pi P BPyt pc)6pc lv (	kwk	kw8	kwk	kw6
Nrydry VDPvéSlu(	kwk	)w2	kwk	/3w8
BeyP BO4		H		E
HRRhrenc DPvéSlu(	kwk	kwv		/3w8
HRRhrenc BO4				E

FypPhuPnpdry 4ivvehS							
HgPhet P DPvéS			kw8				
FypPhuPnpdry NeRenfpS. pVzepdry			22w1%		fN. BPgPVr C4PhgfnP		H
HyeVSufu APhfrl lv fy(			/6				

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ot i hepr yu						
LheOh sr Vv P lgPc7c(	502	38	/ 2	521	8/	)
9i pi hP sr Vv P lsPc7c(	502	38	/ 2	521	8/	)
4ft y Nry pr V	9hPP			9hPP	4pr R	
Ghel P	k%			k%	k%	
APea , ri h9enpr h	kwy8	kwy8	kwy8	kwy8	kwy8	kwy8
, ri hNS OVd hepP lgRc(	033	36	/ 6	0k2	83	/ k
APl Puphfeyu						
BeyP T fl pc lv (						
T eVafyt 4RPPl lv 7u(						
APhmPypEVr naet P						
o ft cppi hy OVeHP lgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey upr het P gPc(	8			8		
. RuphPev uft yeVlv (	356			/ 66		
RX- RVepr r y i ybVr naPl			kw0)		kw01	kw0)
gN- nr y OVhpfyt gr Vv P			051		/ 212	06k
gN/ - upet P / nr y Cgr V					06k	
gN8- upet P 8 nr y Cgr V					032	
gNi - i ybVr naPl gr V			600		11k	662
pN- ufyt VP lu(			2w		5w2	5w8
pN- 8 upet P lu(					6w2	
p9 lu(			8w8		3w6	3w8
Rk qi Pi P OPP %			) 1		) 2	) 1
nM neRenfpS lgPc7c(			0) k		301	28/

DffPnpr y- BeyP #	mE /	T E /	T E 8	WE /
sr Vv P Lr peV	051	/ 6	0k2	33
sr Vv P BPQp	k	/ 6	k	83
sr Vv P oft cp	36	k	k	/ k
n4 ,	/ 0kk	0) k	/ 0kk	3) /
sr Vv P pr NeRenfpS	kw26	kwk8	kw2/	kwk1
Qi Pi P BPyt pc) 6pc lv (	kwk	kw2	kwk	8w
Nry pr VDPVeSlu(	kwk	) w5	kwk	/ 6w
BeyP BO4		H		N
HRRhr enc DPVeSlu(	kwk	kw8		/ 6w
HRRhr enc BO4				N

FypPhuPnpr y 4i v v ehS						
HgPhet P DPVeS			kw2			
FypPhuPnpr y NeRenfpS . pNzepr y			20w2%	fN.	BPgPVr C4 PhgfnP	H
HyeVSufu APhfr l lv fy(			/ 6			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	155	35	130	212	177	53	488	117	215	901	118
Future Volume (vph)	163	155	35	130	212	177	53	488	117	215	901	118
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	2.0	7.0		7.0	7.0	7.0	4.6	7.0	7.0	3.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.56	1.00	1.00	0.56	1.00
Frt	1.00	0.58		1.00	1.00	0.86	1.00	1.00	0.86	1.00	1.00	0.86
Flt Protected	0.56	1.00		0.56	1.00	1.00	0.56	1.00	1.00	0.56	1.00	1.00
Satd. Flow (prot)	1785	1757		1950	1883	1686	1930	3411	1629	1772	3380	1901
Flt Permitted	0.41	1.00		0.68	1.00	1.00	0.31	1.00	1.00	0.33	1.00	1.00
Satd. Flow (perm)	795	1757		1035	1883	1686	624	3411	1629	914	3380	1901
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	184	240	47	167	266	213	112	688	141	294	724	142
RTOR Reduction (vph)	0	8	0	0	0	198	0	0	53	0	0	85
Lane Group Flow (vph)	184	275	0	167	266	46	112	688	48	294	724	63
Heavy Vehicles (%)	2%	2%	19%	8%	2%	3%	12%	7%	7%	3%	8%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		6	2		1	9	
Permitted Phases	4			8		8	2		2	9		9
Actuated Green, G (s)	33.8	33.8		15.4	15.4	15.4	39.6	31.4	31.4	43.0	33.5	33.5
Effective Green, g (s)	33.8	33.8		15.4	15.4	15.4	39.6	31.4	31.4	43.0	33.5	33.5
Actuated g/C Ratio	0.37	0.37		0.21	0.21	0.21	0.40	0.34	0.34	0.47	0.37	0.37
Clearance Time (s)	2.0	7.0		7.0	7.0	7.0	4.6	7.0	7.0	3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	423	996		220	400	339	271	1173	624	404	1266	654
v/s Ratio Prot	c0.09	0.19			0.14		0.02	0.17		c0.07	0.21	
v/s Ratio Perm	0.10			c0.16		0.03	0.14		0.03	c0.24		0.03
v/c Ratio	0.43	0.42		0.71	0.94	0.13	0.41	0.60	0.05	0.96	0.68	0.05
Uniform Delay, d1	20.6	21.4		33.4	32.7	25.1	17.5	23.7	20.3	16.6	23.0	18.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.4		10.4	3.3	0.2	1.0	1.6	0.4	3.8	1.5	0.3
Delay (s)	21.2	21.5		43.8	39.1	25.3	18.5	26.3	20.9	15.3	24.5	15.0
Level of Service	C	C		D	D	C	B	C	C	B	C	B
Approach Delay (s)		21.9			36.7			23.7			22.8	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	20.6
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	16		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	609	23	3	433	4	43	1	8	14	1	4
Future Volume (vph)	9	609	23	3	433	4	43	1	8	14	1	4
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Total Lost time (s)	9.0	9.0		9.0	9.0			9.0			9.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.55		1.00	1.00			0.58			0.57	
Flt Protected	0.56	1.00		0.56	1.00			0.59			0.59	
Satd. Flow (prot)	1785	1862		1785	1893			1700			1793	
Flt Permitted	0.33	1.00		0.23	1.00			0.75			0.86	
Satd. Flow (perm)	917	1862		428	1893			1409			1663	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	7	910	28	4	622	6	62	1	10	17	1	6
RTOR Reduction (vph)	0	2	0	0	1	0	0	9	0	0	3	0
Lane Group Flow (vph)	7	939	0	4	629	0	0	67	0	0	20	0
Heavy Vehicles (%)	2%	3%	4%	2%	3%	2%	6%	2%	13%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			9	
Permitted Phases	4			8			2			9		
Actuated Green, G (s)	31.0	31.0		31.0	31.0			26.0			26.0	
Effective Green, g (s)	31.0	31.0		31.0	31.0			26.0			26.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49			0.37			0.37	
Clearance Time (s)	9.0	9.0		9.0	9.0			9.0			9.0	
Vehicle Extension (s)	0.2	0.2		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	281	844		156	845			619			670	
v/s Ratio Prot		c0.34			0.28							
v/s Ratio Perm	0.01			0.01				c0.04			0.01	
v/c Ratio	0.02	0.76		0.02	0.92			0.11			0.03	
Uniform Delay, d1	10.2	16.3		10.2	14.0			14.2			13.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	3.4		0.0	1.4			0.4			0.1	
Delay (s)	10.2	18.7		10.2	16.4			14.9			13.5	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		18.7			16.4			14.9			13.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	B
Analysis Period (min)	16		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	626	3	4	439	4	11
Future Volume (Veh/h)	626	3	4	439	4	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.52	0.52	0.52	0.52	0.52	0.52
Hourly flow rate (vph)	671	3	4	474	4	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	123					
pX, platoon unblocked			0.72		0.72	0.72
vC, conflicting volume			674		1064	672
vC1, stage 1 conf vol					672	
vC2, stage 2 conf vol					482	
vCu, unblocked vol			214		882	212
tC, single (s)			4.1		9.4	9.2
tC, 2 stage (s)					6.4	
tF (s)			2.2		3.6	3.3
p0 queue free %			100		55	58
cM capacity (veh/h)			579		498	659

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	674	4	474	19
Volume Left	0	4	0	4
Volume Right	3	0	0	12
cSH	1700	579	1700	668
Volume to Capacity	0.34	0.00	0.28	0.03
Queue Length 56th (m)	0.0	0.1	0.0	0.7
Control Delay (s)	0.0	8.7	0.0	11.9
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		11.9
Approach LOS				B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	16		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	623	11	6	476	31	13
Future Volume (Veh/h)	623	11	6	476	31	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.52	0.52	0.52	0.52	0.52	0.52
Hourly flow rate (vph)	698	12	6	619	34	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	396			166		
pX, platoon unblocked			0.59		0.81	0.59
vC, conflicting volume			680		1100	674
vC1, stage 1 conf vol					674	
vC2, stage 2 conf vol					629	
vCu, unblocked vol			641		858	636
tC, single (s)			4.1		9.4	9.2
tC, 2 stage (s)					6.4	
tF (s)			2.2		3.6	3.3
p0 queue free %			55		53	57
cM capacity (veh/h)			589		492	623

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	680	6	619	48
Volume Left	0	6	0	34
Volume Right	12	0	0	14
cSH	1700	589	1700	475
Volume to Capacity	0.34	0.01	0.30	0.10
Queue Length 56th (m)	0.0	0.1	0.0	2.6
Control Delay (s)	0.0	8.7	0.0	13.4
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		13.4
Approach LOS				B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	16		

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry©ti hepfr yu												
LheC©h s r Vv P lgRc(	881	8) 1	66	/ k3	55k	815	12	) 63	/ k3	518	1/)	/ 32
9i pi hP s r Vv P lgRc(	881	8) 1	66	/ k3	55k	815	12	) 63	/ k3	518	1/)	/ 32
FfPeV9Vd lgRcRV	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk
Lr peVBr uppfv P lu(	8vk	0vk		0vk	0vk	0vk	2v6	0vk	0vk	5vk	0vk	0vk
BeyP. pfW9enpr h	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	kv86	/ vkk	/ vkk	kv86	/ vkk
9hp	/ vkk	kv80		/ vkk	/ vkk	kv16	/ vkk	/ vkk	kv16	/ vkk	/ vkk	kv16
9V©AhrpPnpPl	kv86	/ vkk		kv86	/ vkk	/ vkk	kv86	/ vkk	/ vkk	kv86	/ vkk	/ vkk
4epl w9Vd IRhrp(	/ 013	/ 183		/ 051	/ 115	/) k/	/ 088	5622	/) k/	/ 013	5603	/ 616
9V©APhv fppPl	kv8)	/ vkk		kv6)	/ vkk	/ vkk	kv5/	/ vkk	/ vkk	kv8/	/ vkk	/ vkk
4epl w9Vd IRPhv (	210	/ 183		/ k88	/ 115	/) k/	6) k	5622	/) k/	2k/	5603	/ 616
APealctr ih©enpr h- A, 9	kv8)	kv8)	kv8)	kv8)	kv8)	kv8)	kv8)	kv8)	kv8)	kv8)	kv8)	kv8)
HI jw9Vd lgRc(	851	803	60	/ / 2	522	836	11	) 1)	/ / 2	531	16k	8k8
oLOo oPl inpfr y lgRc(	k	0	k	k	k	88)	k	k	1/	k	k	/ 8/
BeyP Ghri R9Vd lgRc(	851	583	k	/ / 2	522	) 3	11	) 1)	55	531	16k	1/
, PegSs PcfnVPu l%(	8%	8%	2%	6%	8%	8%	) %	5%	8%	8%	8%	5%
Li hy LSRP	Rv +Rp	WH		APhv	WH	APhv	Rv +Rp	WH	APhv	Rv +Rp	WH	APhv
AhrpPnpPl AceuPu	0	2			1		6	8		/	)	
APhv fppPl AceuPu	2			1		1	8		8	)		)
Hnpi epPl GhPPy- G lu(	28vk	28vk		86v0	86v0	86v0	5) v2	5/ v5	5/ v5	65v2	25vt	25vt
m©PnpfgP GhPPy- t lu(	28vk	28vk		86v0	86v0	86v0	5) v2	5/ v5	5/ v5	65v2	25vt	25vt
Hnpi epPl t 7N oepfr	kv51	kv51		kv85	kv85	kv85	kv55	kv83	kv83	kv23	kv2k	kv2k
NVPeheynP Lfv P lu(	8vk	0vk		0vk	0vk	0vk	2v6	0vk	0vk	5vk	0vk	0vk
sPcfnVP mxpPyufr y lu(	5vk	5vk		5vk	5vk	5vk	5vk	/ vk	/ vk	5vk	/ vk	/ vk
BeyP GhR NeR lgRc(	560	0k8		82k	228	50)	82k	/ k/ 5	261	251	/ 258	) 52
g7u oepfr Ahrp	nkvk3	kv/1			nkv/1		kvk8	kv/3		nkv/)	kv82	
g7u oepfr APhv	kv/0			kv/		kvk2	kv/k		kvk8	nkv81		kvk6
g7h oepfr	kvy0	kv20		kv20	kv01	kv/1	kv50	kvy1	kvk0	kv8/	kv63	kv/5
. yfC hv DPvéS- I /	86v8	86v5		5) vk	53v8	55v6	86v0	52vy	81v6	8kv8	86vt	8kv0
Ahrt hPuufr y 9enpr h	/ vkk	/ vkk		/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk	/ vkk
FynhPv PypeVDPvéS- I 8	2v0	kv6		/ v6	1v2	kv8	/ vk	5vy	kv5	88v5	/ vt	kv2
DPvéS lu(	83v8	86vt		50v6	20vy	55v0	8) vy	51v8	81vt	25vv	80vy	8/ vv
BPgPVr C4 PhgfnP	N	N		D	D	N	N	D	N	D	N	N
HRRhr enc DPvéS lu(		80v6			2kvy			56v8			5/ vk	
HRRhr enc BO4		N			D			D			N	

FypPhuPnpfr y 4i v v ehS					
, NM 8kkk Nr ypr VDPvéS	55vy	, NM 8kkk BPgPVr C4 PhgfnP		N	
, NM 8kkk s r Vv P pr NeRenfpS hepfr	kvt0				
Hnpi epPl NSnVP BPyt pc lu(	/ k3v2	4i v r CVuppfv P lu(		8kv6	
FypPhuPnpfr y NeRenfpS. pfWzepfr y	32v6%	RN. BPgPVr C4 PhgfnP		9	
Hye V8ufu APhfr I lv fy(	/ 6				
n NhfpfneVBeyP Ghri R					

MrgPv Pyp	mEB	mEL	mEo	T EB	T EL	T Eo	WEB	WEL	WEo	4EB	4EL	4Eo
BeyP Nry0ti hepfr yu												
LheC0h sr Vv PlgRc(	5	) 3)	86	/ 8	) 01	/ /	80	/	1	)	/	6
9i pihPsr Vv PlgRc(	5	) 3)	86	/ 8	) 01	/ /	80	/	1	)	/	6
FfPeV9Vd lgRcRV/	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk	/ 3kk
Lr peVBr uppfv Plu(	) vk	) vk		) vk	) vk			) vk			) vk	
BeyP. pfW9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
9hp	/ vkk	kv83		/ vkk	/ vkk			kv80			kv82	
9V0AhrpPnpPl	kv86	/ vkk		kv86	/ vkk			kv8)			kv81	
4epl w9Vd lRhr p(	/ 013	/ 102		/ 013	/ 103			/ 0) 8			/ 052	
9V0APhv fppPl	kv/ 6	/ vkk		kv/ 5	/ vkk			kv12			kv88	
4epl w9Vd lRPhv (	812	/ 102		825	/ 103			/ 622			/) 2k	
APealtr i h0enpr h- A, 9	kv86	kv86	kv86	kv86	kv86	kv86	kv86	kv86	kv86	kv86	kv86	kv86
HI jw9Vd lgRc(	5	055	8)	/ 5	0/ 2	/ 8	81	/	1	)	/	6
oLOo oPl i npfr y lgRc(	k	8	k	k	/	k	k	6	k	k	5	k
BeyP Ghr i R9Vd lgRc(	5	060	k	/ 5	086	k	k	58	k	k	3	k
Li hy LSRP	APhv	WH		APhv	WH		APhv	WH		APhv	WH	
Ahr pPnpPl AceuPu		2			1			8			)	
APhv fppPl AceuPu	2			1			8			)		
Hnpi epPl GhPPy- G lu(	5/ vk	5/ vk		5/ vk	5/ vk			86vk			86vk	
m0CPnpfgP GhPPy- t lu(	5/ vk	5/ vk		5/ vk	5/ vk			86vk			86vk	
Hnpi epPl t 7N o epfr	kv2)	kv2)		kv2)	kv2)			kv50			kv50	
NVPeheynP Lfv Plu(	) vk	) vk		) vk	) vk			) vk			) vk	
s Pcfn\P mxpPyufr y lu(	kv8	kv8		5vk	5vk			kv8			kv8	
BeyP GhR NeR lgRc(	/ 83	162		/ / k	16)			6) 0			) k8	
g7u o epfr Ahr p		nkv2k			kv53							
g7u o epfr APhv	kvk/			kvk6				nkvk8			kvk/	
g7h o epfr	kvk8	kv/ 3		kv/ 8	kv16			kvk)			kvk/	
. yfC hv DPVeS- I /	/ kv8	/) v3		/ kvy	/) v2			/ 5v3			/ 5v0	
Ahr t hPuufr y 9enpr h	/ vkk	/ vkk		/ vkk	/ vkk			/ vkk			/ vkk	
FynhPv PypeVDPVeS- I 8	kvk	/ kv0		kv6	0v1			kv8			kvk	
DPVeS lu(	/ kv8	80vy		/ / w	82v8			/ 2w			/ 5v0	
BPgPVr C4 PhgfnP	E	N		E	N			E			E	
HRRhr enc DPVeS lu(		80v6			85v8			/ 2w			/ 5v0	
HRRhr enc BO4		N			N			E			E	

FypPhuPnpfr y 4i v v ehS				
, NM 8kkk Nr ydhr VDPVeS	86v2	, NM 8kkk BPgPVr C4 PhgfnP	N	
, NM 8kkk sr Vv P pr NeRenfpS hepfr	kv68			
Hnpi epPl NSnVP BPyt pc lu(	) 1vk	4i v r CVuppfv Plu(	/ 8vk	
FypPhuPnpfr y NeRenfpS. pfVzepfr y	) 3vk%	fN. BPgPVr C4 PhgfnP	N	
HyeV8ufu APhfr I lv fy(	/ 6			

n NhfpfneVBeyP Ghr i R

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ct i hepr yu						
LheCCh s r Vv P lgPc7c(	0k2	)	1	) 33	8	0
9i pi hP s r Vv P ls Pc7c(	0k2	)	1	) 33	8	0
4 ft y Nry pr V	9hPP			9hPP	4 pr R	
Ghel P	k%			k%	k%	
APea , ri h9enpr h	kw88	kw88	kw88	kw88	kw88	kw88
, ri hNS OVd hepP lgRc(	0) 6	0	3	0) k	8	1
APl Puphfeyu						
BeyP T fl pc lv (						
T eVafyt 4 RPPl lv 7u(						
APhmPypE Vnaet P						
o ft cppi hy OVeHP lgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey upr het P gPc(	8			8		
. RuphPev uft yeVlv (	/ 85					
RX- RVepr r y i yb Vnal Pl			kwyk		kwyk	kwyk
gN- nr y OVhpfyt gr Vv P			008		/ 62)	0) 1
gN/ - upet P / nr y Cgr V					0) 1	
gN8- upet P 8 nr y Cgr V					001	
gNi - i yb Vnal Pl gr V			832		/ 600	811
pN- ufyt VP lu(			2w		) w2	) w8
pN- 8 upet P lu(					6w2	
p9 lu(			8w8		5w6	5w5
Rk qi Pi P OPP %			33		33	31
nM neRenfpS lgPc7c(			0) 6		5/ 1	265

DffPnpr y- BeyP #	mE /	T E /	T E 8	WE /
s r Vv P Lr peV	008	3	0) k	/ k
s r Vv P BPQp	k	3	k	8
s r Vv P oft cp	0	k	k	1
n4 ,	/ 0kk	0) 6	/ 0kk	2/ 1
s r Vv P pr NeRenfpS	kw26	kwk/	kw26	kwk8
Qi Pi P BPyt pc 36pc lv (	kwk	kw5	kwk	kwy
Nry pr VDPVeS lu(	kwk	3w1	kwk	/ 5w1
BeyP BO4		H		E
HRRhr enc DPVeS lu(	kwk	kww		/ 5w1
HRRhr enc BO4				E

FypPhuPnpr y 4i v v ehS						
HgPhet P DPVeS			kww			
FypPhuPnpr y NeRenfpS . pNzepr y			20w2%	fN.	BPgPVr C4 PhgfnP	H
HyeVSufu APhfr l lv fy(			/ 6			

MrgPv Pyp	mEL	mEo	T EB	T EL	WEB	WEo
BeyP Nry Ct i hepdr yu						
LheCCh s r Vv P lgPc7c(	08)	58	/ 2	) 3)	8/	3
9i pi hP s r Vv P ls Pc7c(	08)	58	/ 2	) 3)	8/	3
4ft y Nr ydr V	9hPP			9hPP	4pr R	
Ghel P	k%			k%	k%	
APea , ri h9enpr h	kw88	kw88	kw88	kw88	kw88	kw88
, ri hNS CVd hepP lgRc(	013	56	/ 6	060	85	/ k
APl Puphfeyu						
BeyP T fl pc lv (						
T eVafyt 4RPPl lv 7u(						
APhmPypEVr naet P						
o ft cppi hy CVeHP lgPc(						
MPl fey pSRP	LT BLB			LT BLB		
MPl fey upr het P gPc(	8			8		
. RuphPev uft yeVlv (	5) 6			/ 66		
RX- RVepr r y i ybVr naPl			kw06		kw06	kw06
gN- nr y CVhpfyt gr Vv P			182		/ 632	1k)
gN/ - upet P / nr y Cgr V					1k)	
gN8- upet P 8 nr y Cgr V					010	
gNi - i ybVr naPl gr V			) k/		112	601
pN- ufyt VP lu(			2w		) v2	) v8
pN- 8 upet P lu(					6v2	
p9 lu(			8v8		5v6	5v5
Rk qi Pi P CPP %			31		35	30
nM neRenfpS lgPc7c(			052		562	511

DffPnpdr y- BeyP #	mE /	T E /	T E 8	WE /
s r Vv P Lr peV	182	/ 6	060	55
s r Vv P BPQp	k	/ 6	k	85
s r Vv P o ft cp	56	k	k	/ k
n4 ,	/ 0kk	052	/ 0kk	5) 5
s r Vv P pr NeRenfpS	kv21	kvk8	kv26	kvk3
Qi Pi P BPyt pc 36pc lv (	kvk	kv6	kvk	8v5
Nr ydr VDPVeSlu(	kvk	/ kvk	kvk	/ 6v8
BeyP BO4		E		N
HRRhr enc DPVeSlu(	kvk	kv8		/ 6v8
HRRhr enc BO4				N

FypPhuPnpdr y 4i v v ehS						
HgPhet P DPVeS			kv2			
FypPhuPnpdr y NeRenfpS . pNzepdr y			6kw%	fN.	BPgPVr C4 PhgfnP	H
HyeVSufu APhfr l lv fy(			/ 6			