Appendix B

Transportation Problem and Opportunity

- B.1 Traffic Impact Study

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B.1 Traffic Impact Study

Region of Peel
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Mississauga Road Class EA Study (North of Bovaird Drive West to Mayfield Road) Needs Assessment and Traffic Performance

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description
1	Winnie Lai	September 1, 2009	Integrating Roundabout Analysis Results into Report
2	Winnie Lai	October 8, 2009	Addressing comments from Region of Peel
3	Francis Li	December 24, 2009	Integrating updated Roundabout Analysis Results into Report
4	Francis Li	April 13, 2010	Addressing comments from Region of Peel
5	Morjina Begum	November 23, 2010	Revising the operational analysis with new collector roads and new growth rate assumption Integrating results into the report
6	Francis Li	January 11, 2012	Addressing comments from Region of Peel
7	Khalid Khan	December 19, 2012	Addressing comments received from Region of Peel
8	Jessica Mollo	April 4, 2013	Addressing comments from Region of Peel

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1. Introduction

The Region of Peel has retained AECOM Canada Ltd. to undertake a Municipal Class Environmental Assessment (EA), Schedule "C" for Mississauga Road between Mayfield Road and Bovaird Drive West, in the City of Brampton. **Figure 1.1** shows the study area along the Mississauga Road corridor from Mayfield Road to Bovaird Drive West.

The Long Range Transportation Plan (Final Report) prepared by the Region of Peel in September 2005 identified road improvements in the Region of Peel which are required to address transportation challenges over the next 10, 15 and 25 years. These road improvements were based on projections for future population growth between the years 2001 to 2031 and development within the existing urban boundary. For the section of Mississauga Road studied in the EA, the Long Range Transportation Plan identified the need to widen Mississauga Road from its current two lane section to a four lane section by the year 2021.

In addition to the Region of Peel Long Range Transportation Plan report, there have been a number of other studies undertaken by the City of Brampton which also indicates the need to provide additional road capacity in the north/south direction in order to accommodate future growth in this area. The expansion of the City of Brampton's urban boundary to include the development area referred to as the Northwest Brampton Area, will potentially reach a population of approximately 76,000 people and approximately 19,300 employment[1], and there will be further need for additional transportation capacity in this corridor to accommodate the future growth.

In 2004, the City of Brampton undertook a Transportation and Transit Master Plan (TTMP) which identified the need to widen the section of Mississauga Road within the study area to 6 lanes by 2031. The City of Brampton, in July 2009, approved and adopted an update to the TTMP. The updated City of Brampton TTMP followed the Municipal Class EA process for Phase 1 and Phase 2, establishing the need and justification for the projects proposed in its study. The City's updated TTMP had taken into consideration a number of changes to the road network and has resulted in changes to the recommended implementation plan. Changes pertaining to our study area are: widening of Mississauga Road to 4 lanes from Bovaird Drive West to Mayfield Road by 2016, 6 lanes from Bovaird Drive West to Sandalwood Parkway by 2021 and 6 lanes from Sandalwood Parkway to Mayfield Road beyond 2031.

A Development Charges study undertaken by the Region of Peel in 2007, reviewed road improvements required to support growth in the area. This study indicated that the section of Mississauga Road between Mayfield Drive and Bovaird Drive West will require widening to 6 lanes by 2023.

This report documents the traffic volumes in the study area under existing (2008) and future conditions, to the horizon years 2018 and 2031. It identifies any need for additional road improvements required along Mississauga Road, between Bovaird Drive West and Mayfield Road to accommodate anticipated future traffic volumes associated with growth in the area.

The City of Brampton undertook a Transportation Master Plan (TMP) for the Mount Pleasant Secondary Plan Area in July 2009. The Mount Pleasant Secondary Plan Area TMP Study addressed the transportation requirements for the Mount Pleasant Secondary Plan area by ensuring that both the road network and the community-friendly transit service are planned and implemented in conjunction with one another. The City of Brampton has identified the need for growth in Northwest Brampton in a phased manner. The first phase of future urban expansion will be in the Mount Pleasant Community, it is forecasted that this community will reach a population of more than 40,000 people and employment of over 3,000 employees, prior to year 2021.

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1. *Northwest Brampton Transportation Infrastructure Review Updated Report, iTrans Consulting Inc., April 2005, Pg 24.*

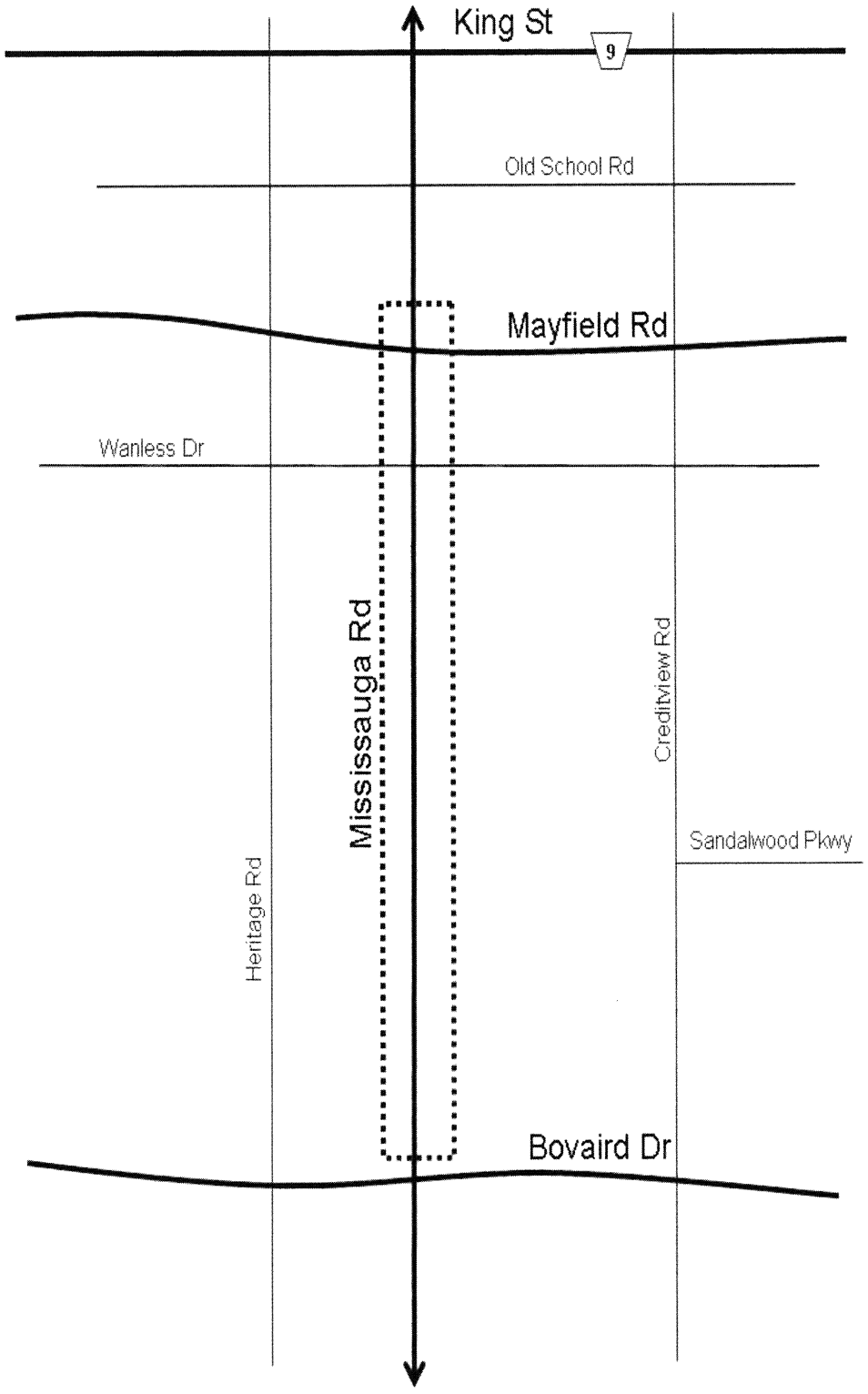

Figure 1.1 Study Area

The existing transportation system of roads, transit and associated pedestrian linkages and pathways are insufficient to meet the demands of this expanding community.[2] The TMP, under Alternative 2, identified a preliminary planning transportation network for the Mount Pleasant Secondary Plan Area to address the deficiency within the current network. Improvements, under Alternative 2 comprise of:[3]

- Creditview Road as a Minor Arterial Road (36.0 m ROW) with a south re-alignment (Bovaird Drive West-Mayfield Road) and widened to four lanes.
- Four-lane extension of Sandalwood Parkway as a Minor Arterial Road (36.0 m ROW) from Creditview Road to Mississauga Road.
- Required additional (beyond programmed improvements) arterial road improvements in the Study Area, including:
  - Bovaird Drive West widened to six lanes (east of Mississauga Road)
  - Wanless Drive widened to four lanes (Chinguacousy Road – Mississauga Road)
  - Mayfield Road widened to six lanes (McLaughlin Road – Chinguacousy Road)
  - Mayfield Road widened to four lanes (Chinguacousy Road – Creditview Road)
  - Mississauga Road widened to six lanes (Bovaird Drive West – Sandalwood Parkway)
  - a north-south collector road (i.e., the TOD corridor), comprising four lanes (26.0 m ROW) (Creditview Road - Mayfield Road)
  - a grid network of collector roads in the Mount Pleasant Secondary Plan area

Similarly, as recommended in the Halton-Peel Region Boundary Area Transportation Study (HPBATS) Amended Final Report, Mississauga Road should be widened from two to six lanes from 407 ETR to Sandalwood Parkway and from two to four lanes up to Mayfield Road. It is also recognized that the development of the HPBATS network and the Halton-Peel Freeway will have opportunities to connect with the proposed GTA West Corridor. Schedules regarding GTA West Corridor are being planned by the Ontario Ministry of Transportation.

2. *Mount Pleasant Secondary Plan Area Transportation Master Plan, City of Brampton, July 2009, Pg. ii*
3. *Mount Pleasant Secondary Plan Area Transportation Master Plan, City of Brampton, July 2009, Pg. 155*

2. Study Area Context

2.1 Study Area

The section of Mississauga Road in the study area is located in the northwest quadrant of the City of Brampton and is bounded by Mayfield Road to the north and Bovaird Drive West to the south. The lands immediately surrounding the study area are rural in nature and are currently used for agricultural purposes. Further to the east are new urban subdivisions, with Brampton Bricks on Wanless Drive, east of Mississauga Road. Future land uses in the area has been identified as the Northwest Brampton Area to be comprised of medium and low density residential developments and employment.

North of Bovaird Drive West, bisecting Mississauga Road is the Canadian National (CNR) Halton subdivision. GO Transit operates its Georgetown service on this line with a GO station located on the north side of Bovaird Drive West, east of Mississauga Road.

2.2 Population and Employment Growth

The Province of Ontario's Growth Plan for the Greater Golden Horseshoe (2006) identifies a significant amount of growth in population and employment in the Region of Peel between the years 2001 and 2031. **Table 2.1** summarizes the amount of growth expected in the Region, as identified in Places to Grow (2006).

Table 2.1 Future Growth in Region of Peel

Year	Region of Peel			
	Population		Employment	
	Amount	*Annual Growth Rate (%)*	*Amount*	*Annual Growth Rate (%)*
2001-2011	1,030,000-1,320,000	2.5	530,000-730,000	3.3
2011-2021	1,320,000-1,490,000	1.2	730,000-820,000	1.2
2021-2031	1,490,000-1,640,000	1.0	820,000-870,000	0.6

Source: Provincial Places to Grow (2006) Schedule 3

Within the Region of Peel, the City of Brampton has established future population and employment projections for its local municipality for time periods between 2001 and 2031. **Table 2.2** summarizes the anticipated future growth in the City, as established by the City of Brampton in its Growth Management Program (2009).

Table 2.2 Future Growth in the City of Brampton

Year	City of Brampton	
	Population	*Employment*
1996	274,000	104,000
2001	325,000	134,000
2011	510,000	182,000
2021	646,000	274,000
2031	738,000 (758,310)*	319,000 (320,000)*

Source: Brampton Growth Management Program, Development Outlook Report Part 1: Report 2009, Table 1
** Source: City of Brampton Transportation and Transit Master Plan Sustainable Update – Final Draft Report, July 2009*

In the immediate area surrounding the study area is the Northwest Brampton Study Area with projected population and employment forecasts as outlined in **Table 2.3**. The boundary of the Northwest Brampton area is bounded by Mayfield Road to the north, Winston Churchill Road to the west, the Credit River to the south and Mississauga Road, Creditview Road and McLaughlin Road to the east. The Northwest Brampton study area is to be comprised of the Mount Pleasant Community (SP 51) located on the east side of Mississauga Road, north of Bovaird Drive West (approximately 51% of potential development) and the remainder of the Northwest Brampton (SP 52 and SP 53) is located on the west side of Mississauga Road with a majority of the area north of Bovaird Drive. A small area of the Northwest Brampton area is located on the west side of Mississauga Road, south of Bovaird Drive.

Figure 2.1 illustrates the northwest Brampton area and limits of the secondary plan.

Figure 2.1 Northwest Brampton Area

As shown in **Table 2.3** there is a significant amount of population and employment planned for the immediate area, with approximately 41% of the expected population and employment occurring by 2021 and 100% by the year 2031. Within the 2021 time horizon, approximately 66% of the Mount Pleasant community is anticipated to be built out. The City of Brampton anticipated that 50% of the Mount Pleasant population and employment will be built-out by 2018. For the balance of the Northwest Brampton area, 1% and 6% of population and employment are expected to be built-out by 2018 respectively.

Table 2.3 Population and Employment in Northwest Brampton

Year	Mount Pleasant		Remainder of Northwest Brampton		Total Northwest Brampton	
	Population	*Employment*	*Population*	*Employment*	*Population*	*Employment*
2006	230	10	240	80	470	90
2011	1,390	30	250	80	1,640	110
2021	33,960	2,090	4,250	3,390	38,210	5,480
2031	51,740	2,740	38,250	17,650	85,990	20,390

Sources: City of Brampton – Preliminary Population and Employment Forecast. Appendix III, June 2008, approved by Council to use in respond to the Provincial Growth Plan.

2.3 Background Studies

Past studies referenced for background information include the following reports:

- City of Brampton Transportation and Transit Master Plan, June 2004
- Region of Peel, Long Range Transportation Plan Final Report, September 2005
- Mississauga Road Class EA Study Needs Assessment and Safety Performance Final Report, iTrans, August 2005
- City of Brampton Northwest Brampton Transportation Infrastructure Review, Updated Report, iTrans Consulting, April 2005
- City of Brampton Growth Management Program, Development Outlook Report 2006
- City of Brampton, Mount Pleasant Community Transportation Strategy and Creditview Road and Sandalwood Parkway Transportation Corridors Class Environmental Assessment Study, Phase 2 Final Report, Entra Consultants, September 2007
- Region of Peel Development Charges Study, 2007
- City of Brampton Transportation and Transit Master Plan (TTMP) Draft Final Report, July 2009
- City of Brampton, Mount Pleasant Secondary Plan Area Transportation Master Plan, July 2009
- "Traffic Impact Study Osmington Regional Centre Mississauga Road and Bovaird Drive West Brampton", by Read, Voorhees & Associates Ltd., February 2010
- Halton-Peel Boundary Area Transportation Study (HPBATS), Amended Final Report, May 2010
- "Mount Pleasant Block 51-1 Transportation Study and Collector Road Environmental Assessment Study" by BA Group Transportation Consultants, August 2011

3. Transportation Analysis

3.1 Road Network

Mississauga Road is a major north-south arterial road under the jurisdiction of the Region of Peel. It is currently a two lane road with a rural cross-section and has a posted speed limit of 80km/hour.

Bovaird Drive West intersects Mississauga Road at the south end of the EA study limit. Bovaird Drive West is under the jurisdiction of the Region of Peel and is currently a two lane arterial road and is signal controlled. Existing EA study for the Bovaird Drive West (Lake Louise/Worthington Avenue to 1.45 km west of Heritage Road) is anticipated to be completed by the end of 2012.

Wanless Drive is a two lane rural road that runs east-west intersecting Mississauga Road. The intersection of Mississauga Road and Wanless Drive is unsignalized. The City of Brampton has jurisdiction over Wanless Drive. EA study for the Wanless Drive has been completed by the City of Brampton.

Mayfield Road is located at the north end of the EA study limit and is a two lane rural arterial road which runs east-west. Mayfield Road is under the jurisdiction of the Region of Peel and intersects Mississauga Road at a signalized intersection. EA study for Mayfield Road is upcoming in 2013. The existing lane configuration along Mississauga Road is illustrated in **Figure 3.1.**

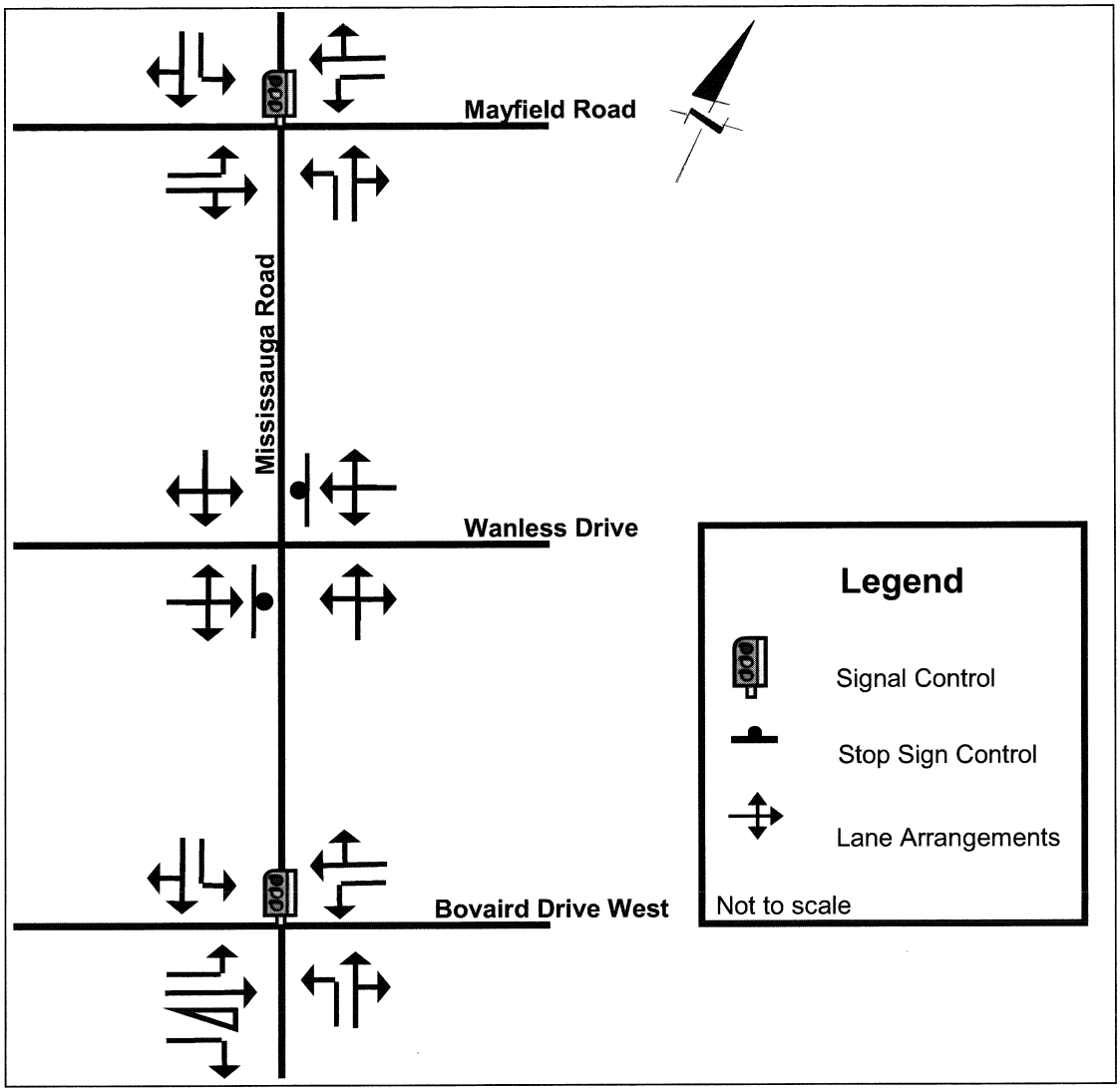

Figure 3.1 Existing Lane Configuration

3.2 Non-Auto Network

At the present time, local transit does not service the study area. The closest transit stop is the GO Transit on-street bus stop located on Bovaird Drive West immediately west of the intersection with Mississauga Road. The current infrastructure along Mississauga Road, within the study area, does not provide for any pedestrian or cycling facilities.

Under the City of Brampton's Revised Pathways Routing Plan (2006), Class I Pathway will be located along Mississauga Road within the City's boundary as 3.0 m wide multi-use trail.

3.3 Existing 2008 Traffic Conditions

The Region of Peel provided AECOM with historical and available existing traffic data for the study area. The Region of Peel provided updated turning movement counts reflecting September 2008 conditions for the intersection of Mississauga Road at Bovaird Drive West, Mississauga Road at Mayfield Road, and Mississauga Road at Wanless Drive.

While it is recognized that the intersection of Mississauga Road and Bovaird Drive West is not within the Study area, it has been included in the analysis as the operations of the north leg of the intersection could influence the lane recommendations on Mississauga Road.

Figure 3.2 illustrates the intersection turning movement volumes for the existing conditions (2008), while the existing turning movement volumes and signal timing plans are attached in **Appendix A**.

Along Mississauga Road, there is a significant peak directional flow with the dominant movement in the southbound direction during the AM Peak hour and in the reverse, northbound direction, in the PM peak hour. At the point just north of Bovaird Drive West, the peak directional traffic flow is in the southbound direction during the AM Peak carrying in the order of 540 vehicle trips. During the PM peak hour, the peak traffic flow is in the northbound direction and carries approximately 490 vehicle trips during the PM peak hour. In the north-bound direction, the AM volume is approximately 150 vehicle trips, while during the PM, the south-bound direction is approximately 220 vehicle trips.

3.3.1 Truck Traffic

The 24 hour classification counts for the study area (2.1 km north of Bovaird Drive West) were done on September 18, 2008. **Table 3.1** provides a summary of the truck traffic on Mississauga Road for both the northbound and southbound directions.

Figure 3.3 illustrates that the percentage of medium and heavy truck traffic along this section of Mississauga Road peaks near 3 AM, gradually tapering off until 7 AM and starts to increase and peaks again at mid-day, but at a lower value than the 3 AM percentage. After mid-day, medium and heavy truck traffic taper off again to a low of 1% at 8 PM. The average of medium and heavy truck percentage throughout the day along Mississauga Road is approximately 10%.

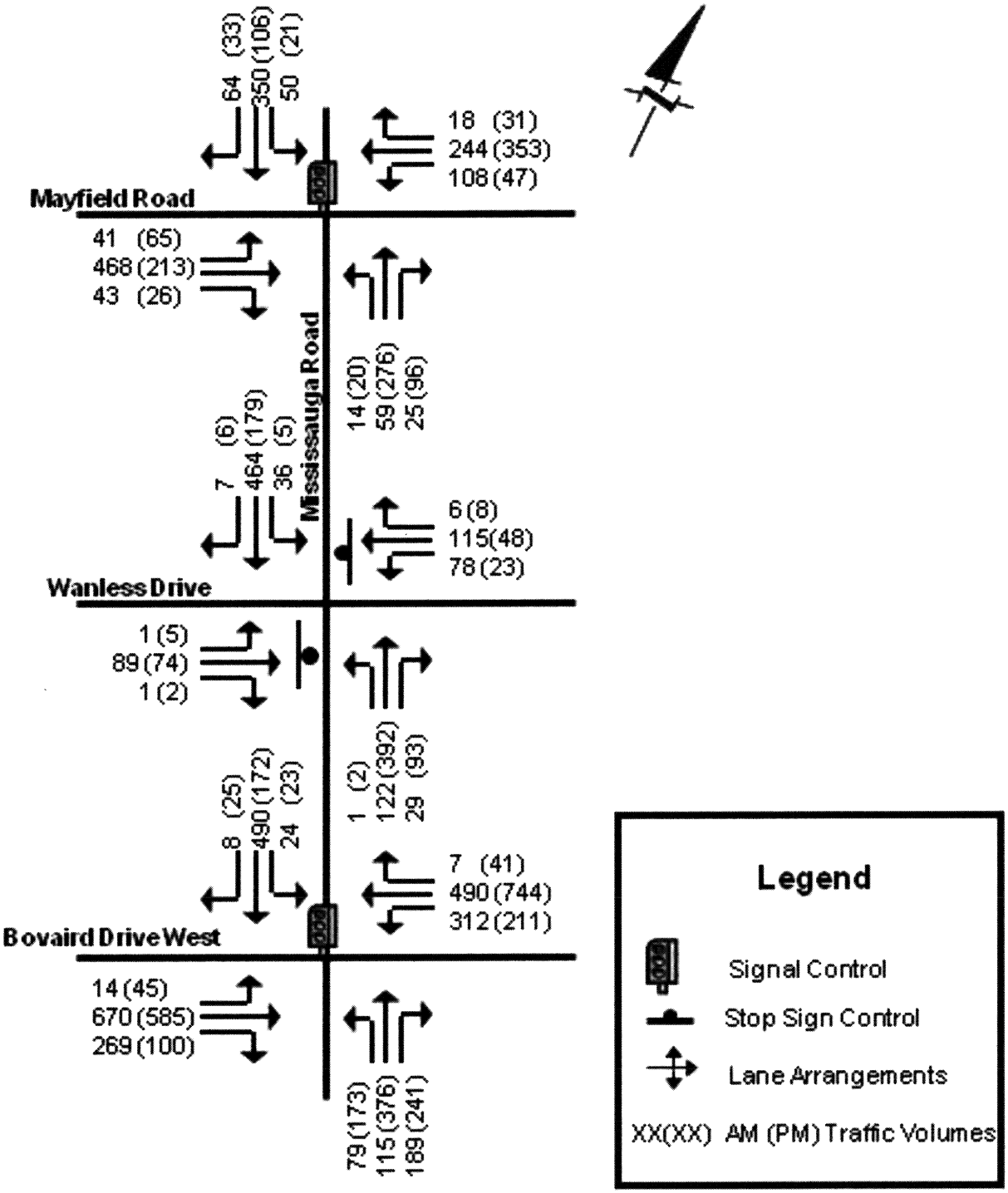

Figure 3.2 Existing 2008 Turning Movement Volumes

Table 3.1 Medium and Heavy Truck Percentages

Time	Medium and Heavy Vehicles	Medium and Heavy Vehicles Percentage
12:00 AM	0	0%
01:00 AM	1	6%
02:00 AM	1	8%
03:00 AM	4	27%
04:00 AM	6	18%
05:00 AM	21	14%
06:00 AM	55	13%
07:00 AM	62	9%
08:00 AM	67	11%
09:00 AM	44	11%
10:00 AM	47	15%
11:00 AM	37	14%
12:00 PM	47	16%
01:00 PM	37	12%
02:00 PM	37	11%
03:00 PM	52	11%
04:00 PM	46	8%
05:00 PM	41	6%
06:00 PM	30	6%
07:00 PM	16	5%
08:00 PM	3	1%
09:00 PM	8	4%
10:00 PM	4	4%
11:00 PM	4	6%
Total	670	10%

Source: Region of Peel -24 Hour Classification Counts 2.1 km north of Bovaird Drive West (September 18, 2008)

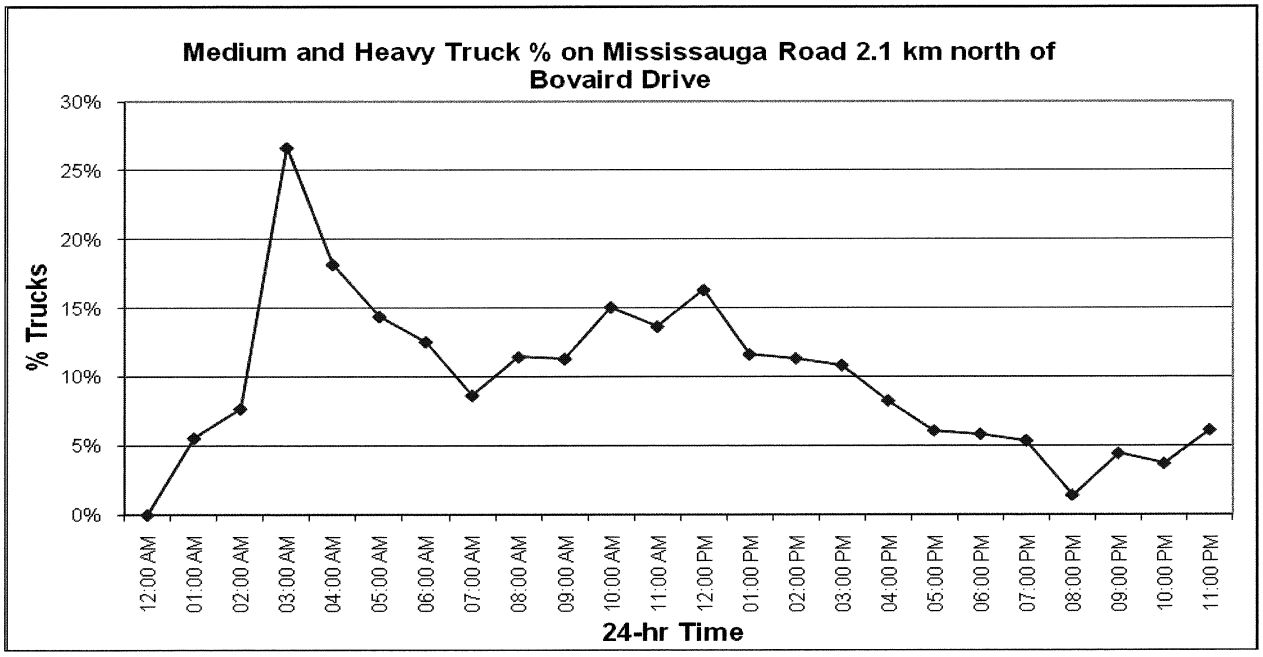

Figure 3.3 Existing 2008 Medium and Heavy Truck % on Mississauga Road 2.1 km north of Bovaird Drive West

3.3.2 Level of Service Definition

Key indicators are used to identify the operating conditions of a corridor. The capacity of a road facility reflects its ability to accommodate a moving stream of vehicles and represents the maximum number of vehicles that can reasonably be expected to pass a given point during a specified period.

Level of service (LOS) describes the range of operating conditions of a roadway through intersections including:

- Speed and travel time;
- Freedom to manoeuvre (density);
- Traffic interruptions;
- Comfort;
- Convenience; and
- Safety.

Six levels of LOS are defined using the letters "A" to "F". **Table 3.2** describes the LOS for signalized and unsignalized intersections considering the average delay in seconds per vehicle.

Table 3.2 Level of Service Description

LOS Description		Signalized Intersection	Unsignalized Intersection
		Average Delay per Vehicle (s/veh)	Average Delay per Vehicle (s/veh)
A	Vehicles rarely need to stop. Excellent conditions.	≤ 10	≤ 10
B	Some traffic stopped. Very good conditions.	> 10 – 20	> 10 – 15
C	Greater percentage of traffic is stopped. An occasional signal cycle "fails". Good conditions.	> 20 – 35	> 15 – 25
D	Most vehicles breakdown in operation. Long vehicular queues. Greater number of signal cycle "failures". Fair conditions.	> 35 – 55	> 25 – 35
E	Noticeable breakdown in operation. Long vehicular queues. Poor conditions.	> 55 – 80	> 35 – 50
F	Traffic arrivals exceed capacity. Severe congestion. Extremely poor conditions.	> 80	> 50

3.3.3 Link/Midblock Analysis

Key indicators are used to identify the operating conditions of a corridor. The capacity of a facility reflects its ability to accommodate a moving stream of vehicles and represents the maximum number of vehicles that can reasonably be expected to pass a given point during a specified period.

The Region of Peel identifies that the Level of Service for corridor operation should be based on a desired service volume of 900 vehicles per lane for a major arterial road. For a two lane road, the desired capacity is 1800 and 2700 for a three lane road. **Table 3.3** outlines the current operating condition of the corridor.

Table 3.3 Existing 2008 -Corridor Volumes and Levels of Service

Road Section	No. of Lanes per Direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Vol	v/c	Vol	v/c	Vol	v/c	Vol	v/c
Bovaird Drive West to Wanless Drive	1	900	150	0.17	540	0.60	490	0.54	220	0.24
Wanless Drive to Mayfield Road	1	900	130	0.14	500	0.56	405	0.45	190	0.21

Results from the assessment indicate that the current two lane section of Mississauga Road can accommodate existing traffic volumes.

3.3.4 Intersection Analysis

Based on the 2008 intersection traffic volumes, operations of the key intersections within the study area were investigated using Synchro 7.0 (Build 739) software, in accordance with the methodology outlined in the Transportation Research Board's "*Highway Capacity Manual, HCM 2000*". The capacity analysis results, including the existing v/c ratios, level of service (LOS) and delays for the signalized and unsignalized intersections are summarized in **Table 3.4** and **Table 3.5**, respectively. The level of service definitions are provided in **Appendix B**. Detailed capacity analysis worksheets for the existing conditions are attached in **Appendix C**. The intersection calculations undertaken for this assignment were undertaken in accordance with the most up to date Region of Peel's Guidelines for using Synchro, (Version 5.0) Revision 1.2 dated March 2003. The parameters for the analysis were based on requirements set out in the guidelines and as requested by the Region (e.g., lost time adjustment parameter).

Table 3.4 Existing (2008) Traffic Capacity Analysis-Signalized Intersections

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Bovaird Drive West	EB	Left	21.3	C	0.04	31.9	C	0.40
		Thru	46.9	D	0.89	42.9	D	0.83
		Right	25.0	C	0.23	0.1	A	0.07
	WB	Left	84.4	F	0.98	46.3	D	0.81
		Thru/Right	14.8	B	0.47	30.6	C	0.82
	NB	Left	46.1	D	0.55	25.2	C	0.42
		Thru/Right	30.8	C	0.42	39.3	D	0.81
	SB	Left	23.3	C	0.09	26.4	C	0.18
		Thru/Right	60.2	E	0.94	26.7	C	0.35
	Overall Intersection		**43.4**	**D**	**0.91**	**34.6**	**C**	**0.82**

Mississauga Road/Mayfield Road	EB	Left	21.3	C	0.11	35.9	D	0.42
		Thru/Right	32.2	C	0.70	33.0	C	0.40
	WB	Left	35.7	D	0.61	30.7	C	0.20
		Thru/Right	24.6	C	0.38	39.1	D	0.66
	NB	Left	8.6	A	0.04	4.5	A	0.03
		Thru/Right	7.9	A	0.09	5.7	A	0.34
	SB	Left	14.2	B	0.08	8.5	A	0.04
		Thru/Right	18.9	B	0.44	9.1	A	0.13
	Overall Intersection		**24.9**	**C**	**0.55**	**23.5**	**C**	**0.45**

Table 3.5 Existing (2008) Traffic Capacity Analysis-Unsignalized Intersections

Intersection	**Approach/Movement**		**Weekday**					
			AM			**PM**		
			Delay	**LOS**	**v/c**	**Delay**	**LOS**	**v/c**
Mississauga Road/Wanless Drive	EB	Left/Thru/Right	18.5	C	0.25	17.3	C	0.22
	WB	Left/Thru/Right	31.8	D	0.61	17.0	C	0.21
	NB	Left/Thru/Right	0.1	A	0.00	0.0	A	0.00
	SB	Left/Thru/Right	0.8	A	0.03	0.3	A	0.00
	Overall Intersection		**8.9**	**A**	**0.61**	**3.4**	**A**	**0.22**

Under the existing traffic conditions, the signalized intersection of Mississauga Road/ Mayfield Road operates at good level of service during both weekday AM and PM peak hours. However, the intersection of Mississauga Road/Bovaird Drive West, experiences some delays and poor levels of services due to the heavy westbound/eastbound traffic along Bovaird Drive West. In particular, the eastbound through and westbound left-turn movements operate at capacity during the AM peak hour, while all movements are operating below capacity during the PM peak hour.

The unsignalized intersection of Mississauga Road/ Wanless Drive currently operates well as indicated by the average delay, with residual capacity for each movement during both weekdays AM and PM peak hours.

3.4 Collision Data Review

Reported collision data from years 2002 to 2009 was obtained from the Region of Peel and was summarized in the **Table 3.6** below. Detailed summary of the collision records are attached in **Appendix D**. A total of 149 reported collisions occurred within the study limit during 2002 to 2009. The majority of collisions (approximately 62%) occurred at / near Mississauga Road/ Bovaird Drive West intersection. Over 80% of the collisions involved only property damage. None of the collisions reported resulted in fatal injuries. Rear end collisions and angle (T-bone) collisions at the intersections were most prevalent.

The majority of the collisions (approximately 65%) occurred after year 2007, among which, over 50% of the collisions occurred between May to October. The majority of the collisions occurred during the daylight under clear environmental conditions. Furthermore, approximately 50% of the collisions occurred during either the AM (6:00 a.m. to 9:00 a.m.) or

PM (3:00 p.m. to 6:00 p.m.) peak periods, when the heaviest traffic volumes happen along the road (more than 1,000 two-way vehicles per hour during the PM peak hour).

Table 3.6 Collision Summary along Mississauga Road (2002-2009)

Location	Fatal	Injury	PDO	Other	Total	Collision Types
Mississauga Rd./ Bovaird Drive West	0	14	77	2	93	Approaching (2) Sideswipe (7) Turning Movement (15) Rear End (38) Angle (19) Other (12)
Mississauga Rd. Between Bovaird Drive West & Wanless Dr.	0	7	24	0	31	Approaching (1) Turning Movement (2) Rear End (17) Angle (1) Sideswipe (1) Other (9)
Mississauga Rd./ Wanless Dr. Intersection	0	2	9	0	11	Approaching (1) Turning Movement (2) Rear End (2) Angle (2) Other (4)
Mississauga Rd. between Wanless Dr. & Mayfield Rd.	0	0	4	0	4	Sideswipe (1) Rear End (1) Other (2)
Mississauga Rd./ Mayfield Rd. Intersection	0	2	7	1	10	Approaching (1) Rear End (5) Angle (2) Other (2)
Total	**0**	**25**	**121**	**3**	**149**	

3.4.1 Mississauga Road / Mayfield Road Intersection

Ten collisions occurred at the Mississauga Road/ Mayfield Road intersection, resulting in seven property damages. Five reported collisions were rear end collisions happened in poor weather and road conditions. Two reported collisions occurred as an angle (T-bone) collision under good weather and road conditions. One reported collision occurred when approaching vehicles had a head-on collision during wet surface and poor weather condition.

3.4.2 Mississauga Road / Wanless Drive Intersection

Eleven collisions were reported between year 2004 and 2008. Four collisions involved single vehicle with improper driver action, causing minor property damage. The majority of the collisions occurred during the day in good weather and road conditions.

3.4.3 Mississauga Road / Bovaird Drive West Intersection

Ninty-three out of the 149 collisions in a 8-year period (2002-2009) occurred at the intersection of Mississauga Road/ Bovaird Drive West. Some of the road conditions were reported to be poor with wet road surface conditions at the collision sites.

The review of the collision data shows that majority of the collisions (approximately 63%) occurred at the intersection of Mississauga Road /Bovaird Drive West and in the mid-block (approximately 21%) along Mississauga Road between Bovaird Drive West and Wanless Drive. About 24% of the collisions occurred on wet or icy road surface

conditions, while 32% collisions occurred during the winter season from November to February. Loose snow and ice on the road and wet road surface condition would unquestionably be one of the attributes to the cause of the collisions.

Furthermore, approximately 48% of the collisions occurred during either the AM (6:00 a.m.-9:00a.m.) or PM (3:00 p.m. – 6:00 p.m.) peak periods, when the heaviest traffic volumes happen along Mississauga Road and Bovaird Drive West. Amending the traffic signal timings and designated left-turn signals with either protected phase or protected permissive phase would be some recommendations to reduce collisions at these intersections along Mississauga Road. Also, 58% of the total reported collisions were either rear end or turning movement type. The high percentage of rear end and turning movement type collisions appear to be associated with the poor traffic capacity and insufficient exclusive lanes for the turning vehicles along Mississauga Road and Bovaird Drive West in the study area. Longer delays and poor LOS at the intersection and in the mid-block between Bovaird Drive West and Wanless Drive attribute to rear end collisions.

Increase in the capacity along Mississauga Road and the intersecting roads in the study area and improvement in corridor traffic flow along Mississauga Road using signal co-ordination will potentially enhance the safety of the road users in the study area. It is further recommended that the Region of Peel should monitor the safety conditions in the area closely after the implementation of the proposed improvements to determine any unsafe zones for which the detailed safety analysis would be conducted.

3.5 Future Traffic Conditions

3.5.1 Background Traffic Growth

Based on analysis from the Halton-Peel Boundary Study (HPBATS), the Region of Peel, given historic traffic and land use forecasts, provided a growth rate of 4% to estimate the future traffic demand in the horizon years 2018 and 2031.

3.5.2 Development Traffic

In addition to the growth in background traffic, there will be traffic associated with the development of the Northwest Brampton Development Area which immediately surrounds the study area. According to the land use forecast published in June 2008 by the City of Brampton, 41% of the expected population and employment in Northwest Brampton will occur by 2021 and 100% by the year 2031.

As the time horizons examined in this study are 10 and 25 years, the traffic volumes were projected to reflect anticipated development in 2018 and 2031.

As per Region of Peel's request, AECOM reviewed the anticipated future background developments on the east and west side of Mississauga road in order to assess the future transportation needs. The "Mount Pleasant Block 51-1 Transportation Study and Collector Road Environmental Assessment Study", report[4] was reviewed and their findings were included for the traffic analysis:

This study investigated and recommended the collector road network as well as associated transportation infrastructure to support the development of Block 51-1 Mount Pleasant Secondary Master Plan Area on the east side of Mississauga Road. It also formed part of the phases 3 & 4 of the EA process for the collector road network contained within the block.

[4] *Mount Pleasant Block 51-1 Transportation Study and Collector Road Environmental Assessment Study, BA Group Transportation Consultants, August 2011*

The preferred road network and the transportation solutions for the Mount Pleasant Secondary Plan Area are focused on developing an innovative, pedestrian-friendly and transit-oriented community. The transit spine (shown as North-south Spine Road and East-west Spine Road in **Figure 3.4**) represents one of the major elements of the Mount Pleasant transit-oriented development. It extends from the Village Core at the southern end to the northeast limits of the community. The function of the transit spine is to provide convenient access to public transit and reduce the number of automobiles and increase the frequency of transit usage in Mount Pleasant area and adjacent communities. The transit spine is expected to offer a high level of transit service (i.e. less than 10 minutes) that connects from north to south to the Mount Pleasant GO station.

The study assumed that the Block 51-1 will be fully built out by 2016, which will connect all planned collector roads with Regional Road 1 (Mississauga Road) except Road D and F. Collector Road D and F will be built out after 2018 horizon year.

The study assessed the 2031 traffic forecasts and examined the operations of the collector road network. The study also included the interim 2016 road network assessment.

Based on the study the following four collector roads were assumed to be built-out by the two horizon years considered:

By 2018	By 2031
• Collector Road C • Extension of Buick Boulevard up to Mississauga Road	• Collector Road D • Collector Road F

Location of these collector roads are shown in **Figure 3.4**.

The site traffic volumes resulting from the development of the block 51-1, as reflected in the Mount Pleasant Report, were utilized to estimate future traffic demand for the two horizon years 2018 and 2031.
Figure 3.5 and 3.6 provides the future 2018 and 2031 turning movement volumes during the AM and PM peak hours along Mississauga Road between Bovaird Drive West and Mayfield Road.

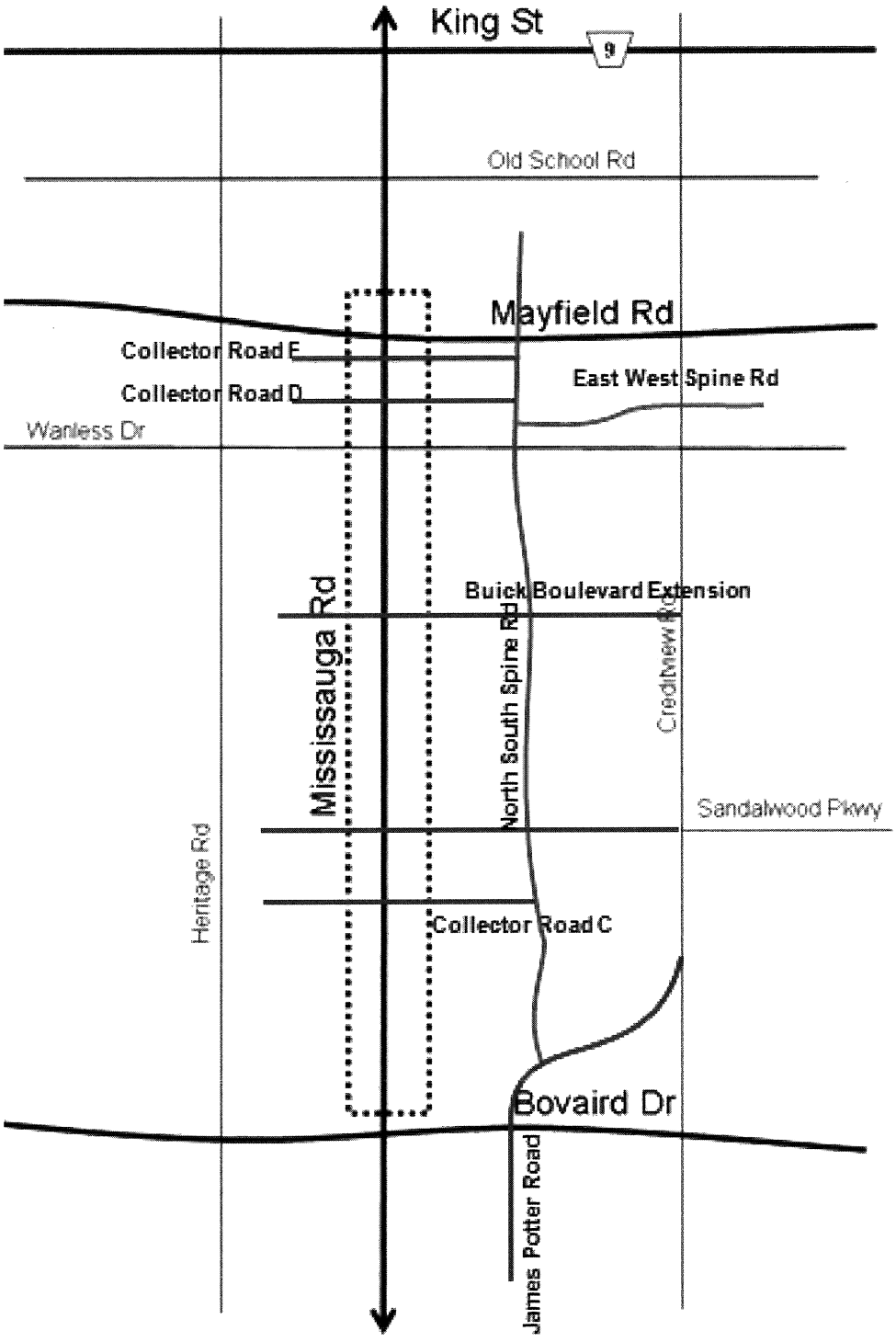

Figure 3.4 Location of the Collector Roads (Not to Scale)

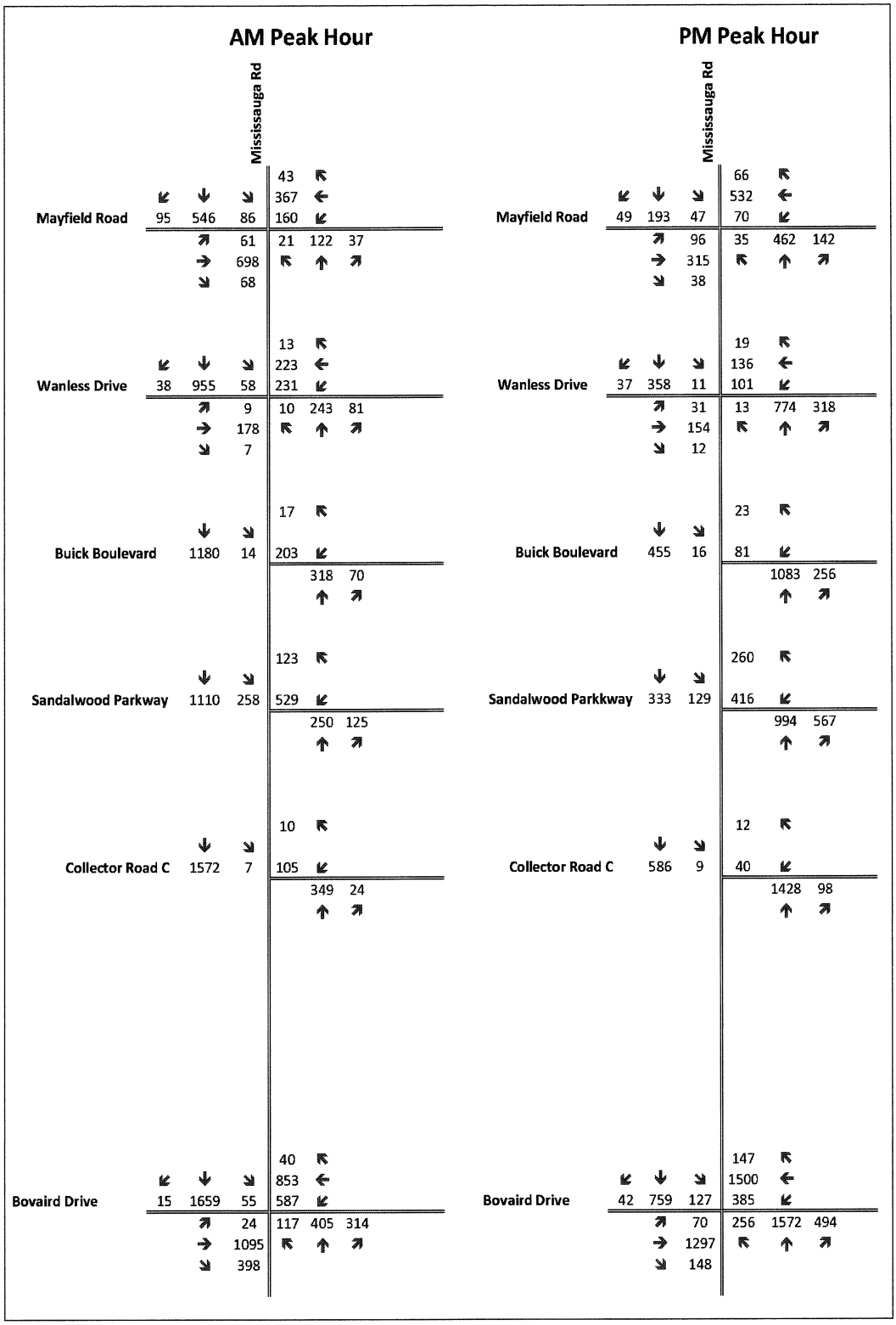

Figure 3.5 Future 2018 Turning Movement Volumes

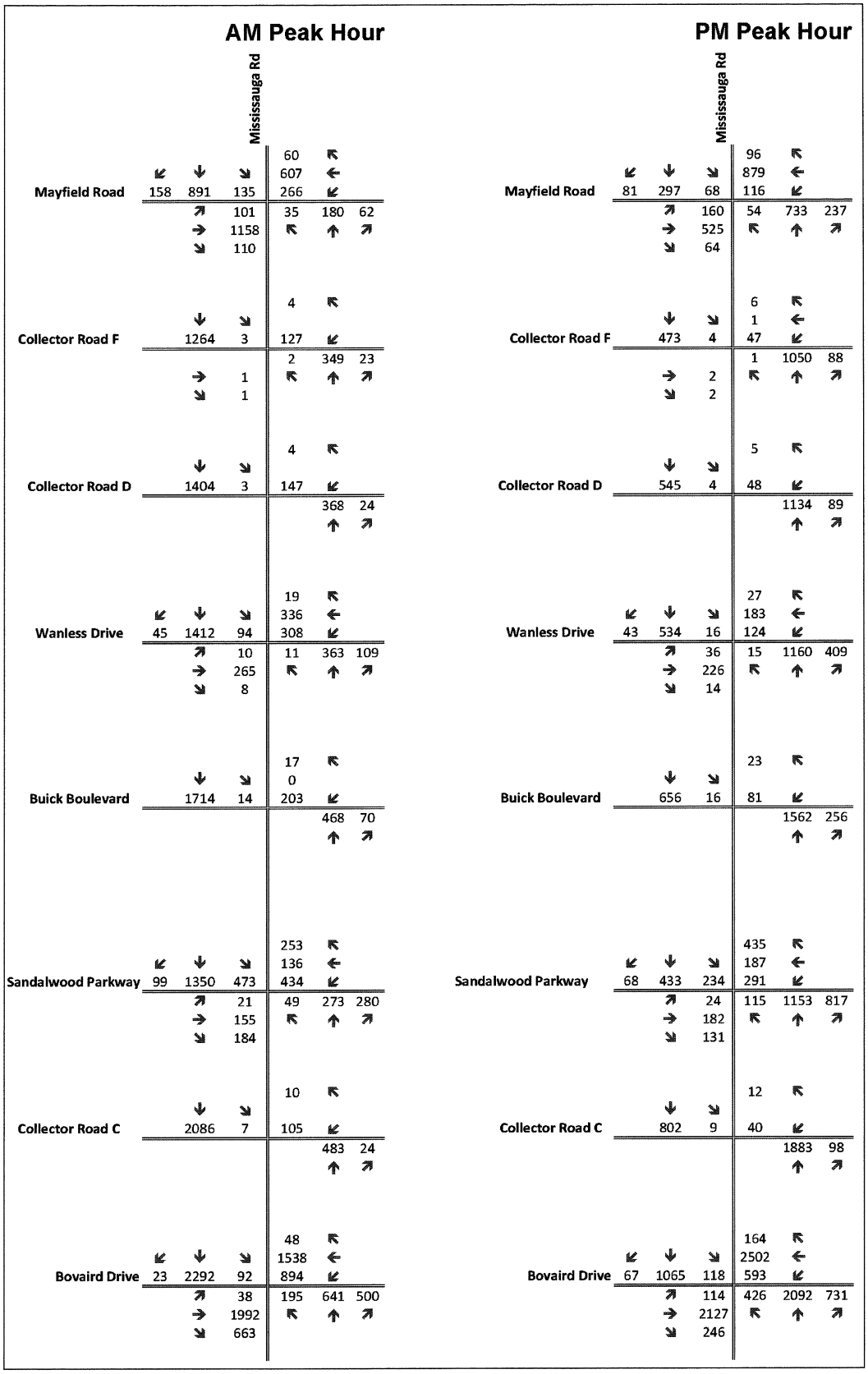

Figure 3.6 Future 2031 Turning Movement Volumes (Assuming Without North South Transportation Corridor)

3.5.3 Other Planned Road Improvements

In 2004, the City of Brampton undertook a Transportation and Transit Master Plan (TTMP). In July 2009, the City approved and adopted an update to the TTMP. The updated City of Brampton TTMP followed the Municipal Class EA process for Phase 1 and Phase 2, establishing the need and justification for the projects proposed in its study. TTMP recommended that Mississauga Road to be widened to:

- 4 lanes from Bovaird Drive West to Mayfield Road by 2016;
- 6 lanes from Bovaird Drive West to Sandalwood Parkway by 2021; and
- 6 lanes from Sandalwood Parkway to Mayfield Road beyond 2031.

The City of Brampton undertook a Transportation Master Plan (TMP) for the Mount Pleasant Secondary Plan Area in July 2009, which addressed the transportation requirements for the area by ensuring that both the road network and the community-friendly transit service are planned and implemented in conjunction with one another. The existing transportation system of roads, transit and associated pedestrian linkages and pathways are insufficient to meet the demands of this expanding community. The TMP identified a preliminary planning transportation network for the Mount Pleasant Secondary Plan Area to address the deficiency within the current network. Improvements comprise of:

- Creditview Road as a Minor Arterial Road with a south re-alignment and widened to four lanes.
- Four-lane extension of Sandalwood Parkway as a Minor Arterial Road from Creditview Road to Mississauga Road.
- Required additional (beyond programmed improvements) arterial road improvements in the Study Area, including:
  - Bovaird Drive West widened to six lanes (east of Mississauga Road);
  - Wanless Drive widened to four lanes (Chinguacousy Road – Mississauga Road);
  - Mayfield Road widened to six lanes (McLaughlin Road – Chinguacousy Road);
  - Mayfield Road widened to four lanes (Chinguacousy Road – Creditview Road);
  - Mississauga Road widened to six lanes (Bovaird Drive West– Sandalwood Parkway);
  - a north-south collector road (i.e., the TOD corridor), comprising four lanes (Creditview Road - Mayfield Road); and
  - a grid network of collector roads in the Mount Pleasant Secondary Plan area.

The Halton-Peel Boundary Area Transportation Study (HPBATS) as summarized in Section 3 is a joint study between the Region of Peel, Halton Region, City of Brampton, Town of Caledon, and the Town of Halton Hills. The study had been initiated to identify the long-term (2021 – 2031) transportation infrastructure needed to support provincial and inter-municipal planning goals, and to serve future transportation demands.[5] One of the specific goals and objectives of the HPBATS is to examine the requirement for a new north/south high speed arterial to the west of Mississauga Road (North South Transportation Corridor, (NSTC)). Since the HPBATS study has not arrived at its recommendations yet, the updated Brampton TTMP performed a number of study specific analyses to conceptualize the role, function, geographic limits, costs and connectivity of NSTC if located only within the limits of the City of Brampton and Peel Region.[6]

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5. *West Brampton Development Analyses – Appendix H, City of Brampton, May 2009*
6. *Ibid.*

It is within the HPBATS scope and mandate to make further recommendations on the NSTC. As a result, this traffic assessment examined two case scenarios:

Scenario #1: NSTC not be in place by 2031
Scenario #1: NSTC in place by 2031, as recommended in the updated TTMP.

The Region of Peel Long Range Transportation Plan (LRTP), Mayfield Road was identified (part of Appendix D, Table 3) to be widened to 4-lanes between Hurontario Street and Winston-Churchill Blvd in the short and medium term and to 6-lanes in the long term. The recent update to the LRTP, has identified the need for a six lane cross-section along Mayfield Road (up to 1.5 km west of Mississauga Road) by 2031. For our planning purposes, Mayfield Road is assumed to be widened to 4-lanes through the intersection by 2018 and to 6-lanes by 2031.

3.5.4 Future Link/Midblock Analysis

AECOM analyzed two different time horizons, a medium term time horizon of 2018 and a long term horizon of 2031. The traffic assessment first determines the operating conditions and levels of service of the adjacent intersections and road segment corridors under the do-nothing scenario. The do-nothing scenario includes the existing lane configuration of Mississauga Road through the study area and planned road improvements for roads adjacent to the study corridor. In 2018, the section of Mississauga Road between Bovaird Drive West and Mayfield Road will experience capacity problems in the peak direction (i.e. southbound during the AM peak and northbound during PM peak); therefore, one lane per direction is not sufficient for the 2018 traffic demand along Mississauga Road between Bovaird Drive West and Mayfield Road.

Table 3.7 and **Table 3.8** summarize mid-block volumes with the existing configuration of one lane along Mississauga Road for the years 2018 and 2031.

In 2018, the section of Mississauga Road between Bovaird Drive West and Mayfield Road Drive will experience capacity problems in the peak direction (i.e., southbound during the AM Peak and northbound during the PM peak); therefore, one lane per direction is not sufficient for the 2018 traffic demand along Mississauga Road between Bovaird Drive West and Mayfield Road.

Table 3.7 2018 Mid-Block Volumes – Do-Nothing Configuration

Road Section	No. of Lanes per direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	1	900	469	0.52	1729	**1.92**	1789	**1.99**	928	**1.03**
Collector Road C to Sandalwood Parkway	1	900	379	0.42	1643	**1.83**	1571	**1.75**	755	0.84
Sandalwood Parkway to Buick Boulevard	1	900	389	0.43	1392	**1.55**	1339	**1.49**	536	0.60
Buick Boulevard to Wanless Drive	1	900	335	0.37	1194	**1.33**	1106	**1.23**	471	0.52
Wanless Drive to Mayfield Road	1	900	265	0.29	1051	**1.17**	824	**0.92**	406	0.45

Table 3.8 2031 Mid-Block Volumes – Do-Nothing Configuration

Road Section	No. of Lanes per direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	1	900	727	0.81	2407	**2.67**	2370	**2.63**	1250	**1.39**
Collector Road C to Sandalwood Parkway	1	900	602	0.67	2093	**2.33**	2085	**2.32**	855	**0.95**
Sandalwood Parkway to Buick Boulevard	1	900	547	0.61	1922	**2.14**	1818	**2.02**	737	0.82
Buick Boulevard to Wanless Drive	1	900	485	0.54	1728	**1.92**	1585	**1.76**	672	0.75
Wanless Drive to Collector Road D	1	900	392	0.44	1551	**1.72**	1223	**1.36**	593	0.66
Collector Road D to Collector Road F	1	900	374	0.42	1407	**1.56**	1139	**1.27**	549	0.61
Collector Road F to Mayfield Road	1	900	353	0.39	1267	**1.41**	1056	**1.17**	477	0.53

By 2031, the existing lane configuration of one lane in each direction on Mississauga Road between Bovaird Drive West and Mayfield Road will not be sufficient to accommodate the anticipated traffic volumes. The anticipated peak directional traffic demand in 2031 is higher than the capacity of the one lane.

3.5.5 Future Intersection Operations

In addition to the corridor levels of service, the operating conditions at the intersections within the study area were also examined under 2018 and 2031 time horizons under the do-nothing condition.

Before proceeding with the operational analysis for the study area intersections, traffic signal warrant analysis was also completed for the following intersections for the horizon year 2018 and 2031 based on **MTO Book-12** methodologies.

- Mississauga Road and Sandalwood Parkway Extension
- Mississauga Road and Buick Boulevard Extension
- Mississauga Road and Wanless Drive
- Mississauga Road and Collector Road C
- Mississauga Road and Collector Road D
- Mississauga Road and Collector Road F

The results of signal warrant analysis indicated that traffic signals are warranted by 2018 at the following intersections. **Appendix E** includes detailed signal warrant calculation sheets.

- Mississauga Road and Sandalwood Parkway Extension
- Mississauga Road and Wanless Drive

Table 3.9, Table 3.10, Table 3.11 and Table 3.12 show the traffic analysis results for signalized and unsignalized intersections for the future 2018 and 2031 time horizons with no roadway improvements along Mississauga Road,

while planned improvements for other intersecting roads were taken into consideration. These "Do-Nothing" scenarios assumed the following:

- Sandalwood Parkway would be extended to Mississauga Road by 2018;
- The intersections of Mississauga Road/ Sandalwood Parkway Extension and Mississauga Road/ Wanless Drive are assumed to be signalized by 2018;
- Buick Boulevard would be extended to Mississauga Road by 2018;
- Collector road D and Collector Road F would be built-out and extended further west of Mississauga Road by 2031 forming 4-legged intersection with Mississauga Road; and
- Collector Road C, Sandalwood Parkway, Buick Boulevard would be extended further west of Mississauga Road by 2031 forming 4-legged intersection with Mississauga Road.

Appendix F shows detailed intersection calculation sheets for 2018 and **Appendix G** includes calculation sheets for 2031 Do-Nothing scenario.

Table 3.9 Future 2018 Traffic Capacity Analysis-Signalized Intersections (Do-Nothing)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Drive West	EB	Left	24.1	C	0.18	>80	F	1.37
		Thru	60.5	E	0.96	>80	F	2.10
		Right	0.1	A	0.04	0.1	A	0.09
	WB	Left	48.4	D	0.79	>80	F	1.60
		Thru/Right	19.7	B	0.45	>80	F	1.94
	NB	Left	29.7	C	0.21	>80	F	1.44
		Thru/Right	20.7	C	0.19	>80	F	2.41
	SB	Left	21.1	C	0.18	>80	F	2.27
		Thru/Right	31.5	C	0.90	>80	F	1.12
	Overall Intersection		**37.1**	**D**	**0.90**	**>80**	**F**	**2.25**
Mississauga Road/Sandalwood Pkwy	WB	Left	>80	F	1.30	>80	F	2.85
		Right	36.5	D	0.13	54.3	D	0.41
	NB	Thru/Right	6.0	A	0.29	35.5	D	1.02
	SB	Left/Thru	>80	F	1.33	>80	F	3.14
	Overall Intersection		**>80**	**F**	**1.32**	**>80**	**F**	**3.11**
Mississauga Road/Wanless Drive	EB	Left/Thru/Right	24.4	C	0.27	35.8	D	0.41
	WB	Left/Thru/Right	>80	F	1.08	50.5	D	0.77
	NB	Left/Thru/Right	17.0	B	0.35	30.7	C	0.95
	SB	Left/Thru/Right	71.6	E	1.10	13.0	B	0.35
	Overall Intersection		**65.2**	**E**	**1.09**	**30.1**	**C**	**0.90**
Mississauga Road/Mayfield Road	EB	Left	18.7	B	0.14	42.2	D	0.67
		Thru/Right	53.4	D	0.96	25.2	C	0.47

	WB	Left	48.7	D	0.78	22.3	C	0.23
		Thru/Right	14.8	B	0.43	40.3	D	0.84
	NB	Left	37.6	D	0.34	22.2	C	0.07
		Thru/Right	24.2	C	0.33	33.9	C	0.73
	SB	Left	25.7	C	0.23	17.8	B	0.21
		Thru/Right	65.1	E	0.97	16.9	B	0.26
	Overall Intersection		**45.4**	**D**	**0.94**	**31.7**	**C**	**0.78**

Table 3.10 Future 2018 Traffic Capacity Analysis-Unsignalized Intersections (Do-Nothing)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Collector Road C	WB	Left/Right	>50	F	>1.0	>50	F	0.78
	NB	Thru/Right	0.0	A	0.22	0.0	A	0.90
	SB	Left/Thru	0.7	A	0.01	0.6	A	0.02
	Overall Intersection		**>50**	**F**	**19.72**	**3.9**	**A**	**0.90**
Mississauga Road/Buick Boulevard	WB	Left/Right	>50	F	1.69	>50	F	0.93
	NB	Thru/Right	0.0	A	0.23	0.0	A	0.79
	SB	Left/Thru	0.4	A	0.01	0.9	A	0.03
	Overall Intersection		**49.2**	**E**	**1.69**	**7.7**	**A**	**0.93**

Table 3.9 illustrates that, many of the individual turning movements will operate at a level of service F, resulting in an overall level of service F at the intersections of Mississauga Road/Bovaird Drive West and Mississauga Road/ Sandalwood Parkway during PM peak hour. The peak directional through traffic flow at Mississauga Road/ Sandalwood Parkway will operate at level of service F with the intersection signalized. At Mississauga Road/ Bovaird Drive West, a number of turning movements will experience long delays or the traffic demand will exceed the traffic capacity of the intersection. Although some of the movements at the other two signalized intersections are either over capacity or experience long delays but overall, both the intersections are expected to operate at an overall level of service E or better during the AM and PM peak hours of operations.

Table 3.10 illustrates the results of operational analysis of the unsignalized intersections. Some of the individual cross traffic movements at these intersections will experience long delays resulting in level of service F. Overall, when factoring in the north and south-bound traffic; delay at the intersections will be within the acceptable operating conditions. The westbound movement at the intersections of Mississauga Road/Collector Road C and Mississauga Road/Buick Boulevard will experience long delays during both the AM and PM peak hours of operation.

Table 3.11 Future 2031 Traffic Capacity Analysis-Signalized Intersections (Do-Nothing)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Drive West	EB	Left	>80	F	0.81	>80	F	2.43
		Thru	>80	F	3.06	>80	F	2.97
		Right	0.8	A	0.42	0.2	A	0.16
	WB	Left	>80	F	3.15	>80	F	2.08
		Thru/Right	>80	F	1.70	>80	F	2.68
	NB	Left	>80	F	1.39	>80	F	1.98
		Thru/Right	>80	F	1.48	>80	F	3.93
	SB	Left	>80	F	1.77	>80	F	2.27
		Thru/Right	>80	F	3.42	>80	F	2.13
	Overall Intersection		**>80**	**F**	**3.07**	**>80**	**F**	**3.36**
Mississauga Road/Sandalwood Pkwy	EB	Left	20.6	C	0.07	25.8	C	0.27
		Thru/Right	24.9	C	0.44	26.2	C	0.42
	WB	Left	>80	F	1.34	65.0	E	0.92
		Thru/Right	25.3	C	0.47	46.7	D	0.88
	NB	Left/Thru/Right	31.2	C	0.78	>80	F	2.37
	SB	Left/Thru/Right	>80	F	3.17	>80	F	3.52
	Overall Intersection		**>80**	**F**	**2.35**	**>80**	**F**	**2.42**
Mississauga Road/Wanless Drive	EB	Left/Thru/Right	27.5	C	0.41	36.1	D	0.54
	WB	Left/Thru/Right	>80	F	1.55	71.6	E	0.93
	NB	Left/Thru/Right	19.3	B	0.50	>80	F	1.41
	SB	Left/Thru/Right	>80	F	1.62	13.5	B	0.54
	Overall Intersection		**>80**	**F**	**1.60**	**>80**	**F**	**1.26**
Mississauga Road/Mayfield Road	EB	Left	28.2	C	0.41	36.6	D	0.68
		Thru/Right	>80	F	1.64	59.8	E	0.93
	WB	Left	>80	F	1.36	32.5	C	0.59
		Thru/Right	25.9	C	0.72	>80	F	1.72
	NB	Left	>80	F	0.66	25.9	C	0.15
		Thru/Right	43.9	D	0.49	>80	F	1.53
	SB	Left	29.9	C	0.40	31.7	C	0.49
		Thru/Right	>80	F	1.50	24.2	C	0.44
	Overall Intersection		**>80**	**F**	**1.55**	**>80**	**F**	**1.48**

Table 3.12 Future 2031 Traffic Capacity Analysis-Unsignalized Intersections (Do-Nothing)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Collector Road C	EB	Left/Thru/Right	-	-	-	-	-	-
	WB	Left/Thru/Right	>50	F	>1.0	>50	F	4.71
	NB	Left/Thru/Right	-	-	-	0.0	A	0.03
	SB	Left/Thru/Right	0.0	A	0.01	1.2	A	0.03
	Overall Intersection		**>50**	**F**	**>1.0**	**>50**	**F**	**4.71**
Mississauga Road/Buick Boulevard	EB	Left/Thru/Right	-	-	-	-	-	-
	WB	Left/Thru/Right	>50	F	6.91	>50	F	3.72
	NB	Left/Thru/Right	-	-	-	0.0	A	0.01
	SB	Left/Thru/Right	0.1	A	0.01	1.6	A	0.05
	Overall Intersection		**>50**	**F**	**6.91**	**>50**	**F**	**3.72**
Mississauga Road/Collector Road D	EB	Left/Thru/Right	-	-	-	-	-	-
	WB	Left/Thru/Right	>50	F	2.80	>50	F	3.66
	NB	Left/Thru/Right	0.0	A	0.01	0.0	A	0.01
	SB	Left/Thru/Right	0.1	A	0.01	0.4	A	0.01
	Overall Intersection		**>50**	**F**	**2.80**	**>50**	**F**	**3.66**
Mississauga Road/Collector Road F	EB	Left/Thru/Right	>50	F	0.03	28.8	D	0.03
	WB	Left/Thru/Right	>50	F	3.48	>50	F	0.66
	NB	Left/Thru/Right	0.2	A	0.01	0.0	A	0.01
	SB	Left/Thru/Right	0.1	A	0.01	0.2	A	0.01
	Overall Intersection		**>50**	**F**	**3.48**	**3.7**	**A**	**0.66**

Table 3.11 and **3.12** illustrate that under the 2031 future traffic and without improvements to Mississauga Road, the signalized intersections within the study area are expected to operate at an unsatisfactory level of service and operating conditions will include significant delays during the peak hours.

Due to high traffic volumes along Mississauga Road, the movements at the intersecting roadways will experience long delays resulting in an unsatisfactory operating condition at the unsignalized intersections.

Figure 3.7 illustrates the midblock and intersection operations under the future 2018 and 2031 traffic condition without any improvement along Mississauga Road.

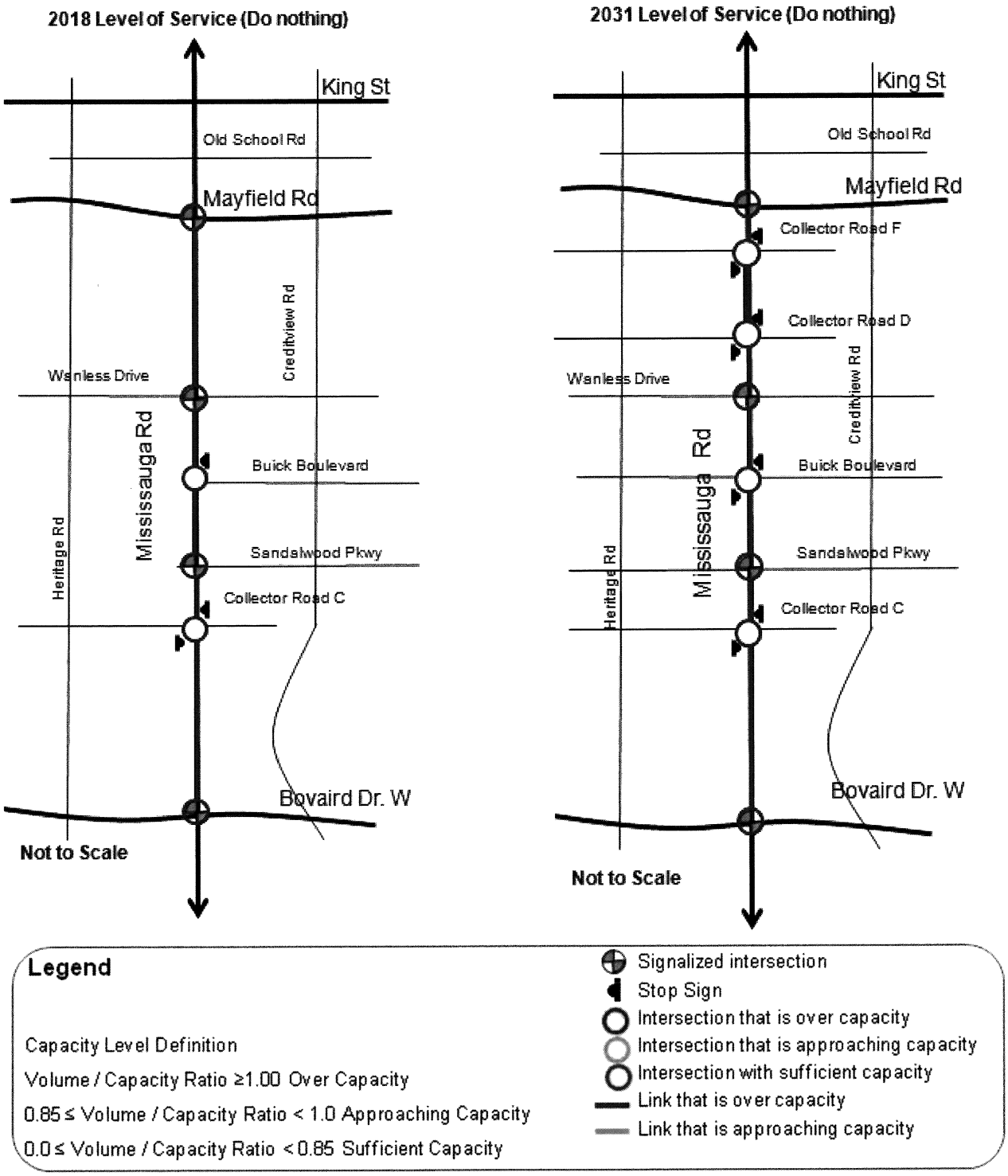


Figure 3.7 Midblock and Intersection Operations Under 2018 and 2031 Traffic Condition Without Improvements to Mississauga Road

4. Road Network Needs

The planned land developments adjacent to Mississauga Road will generate a significant amount of traffic and as shown in the preceding tables the traffic demand cannot be properly accommodated by the existing road network and lane configurations for the future horizon years 2018 and 2031.

For the future horizon 2018, the study area intersections and roadway links will be either over capacity or approaching capacity. However, for the future horizon year 2031, with the existing road network and lane configurations, all the intersections and roadway links within the study area will experience LOS F.

Some traffic relief would be provided by the planned widening of Creditview Road and the extension of Sandalwood Parkway to the west of Creditview Road as shown in the Mount Pleasant Community Transportation Strategy study and the updated TTMP, however, the analysis indicates that improvements will still be required on Mississauga Road in order to accommodate the anticipated future traffic volumes.

4.1 Road Improvements by 2018

Based on the future 2018 traffic analysis and also the road network suggested in the updated TTMP for 2016, a 4-lane section would be needed for Mississauga Road between Bovaird Drive West and Mayfield Road. **Figure 4.1** shows the proposed lane configuration for the 2018 time horizon.

Table 4.1 shows the corridor level of service with road improvement. With four lanes on Mississauga Road between Bovaird Drive West and Mayfield Road, the corridor is expected to operate with residual capacity during both the AM and PM peak period.

Table 4.1 2018 Mid-Block Volumes – Proposed Road Improvements

Road Section	No. of Lanes per Direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	2	1800	469	0.26	1729	**0.96**	1789	**0.99**	928	0.52
Collector Road C to Sandalwood Parkway	2	1800	379	0.21	1643	**0.91**	1571	0.87	755	0.42
Sandalwood Parkway to Buick Boulevard	2	1800	389	0.22	1392	0.77	1339	0.74	536	0.30
Buick Boulevard to Wanless Drive	2	1800	335	0.19	1194	0.66	1106	0.61	471	0.26
Wanless Drive to Mayfield Road	2	1800	265	0.15	1051	0.58	824	0.46	406	0.23

The results from the corridor analysis, presented in **Table 4.1** are further supported by the capacity calculations undertaken for the intersections within the study corridor. **Table 4.2** and **4.3** show the results of the analysis.

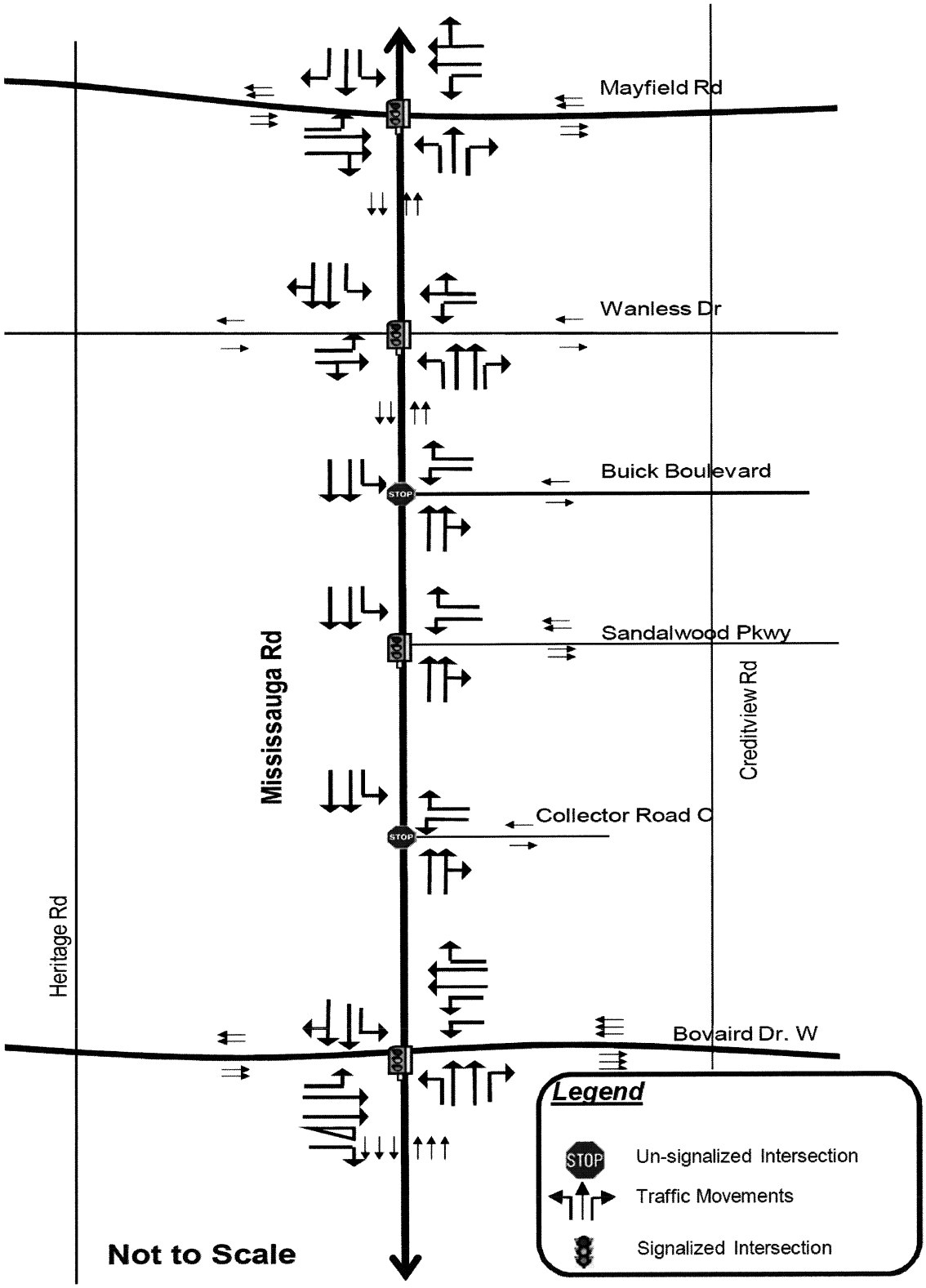


Figure 4.1 Future 2018 Improved Lane Configuration

Table 4.2 Future 2018 Traffic Capacity Analysis-Signalized Intersections (Improved)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Drive West	EB	Left	39.1	D	0.16	39.6	D	0.57
		Dual Thru	>80	F	1.13	>80	F	1.04
		Right	0.4	A	0.25	0.1	A	0.09
	WB	Dual Left	>80	F	1.17	>80	F	1.25
		Dual Thru	28.8	C	0.55	>80	F	1.08
		Right	21.4	C	0.03	27.2	C	0.15
	NB	Left	74.1	E	0.84	53.7	D	0.84
		Dual Thru	19.6	B	0.23	>80	F	1.12
		Right	19.5	B	0.20	38.9	D	0.65
	SB	Left	24.4	C	0.14	82.8	F	0.88
		Dual Thru/Right	>80	F	1.1	44.1	D	0.70
	Overall Intersection		**79.8**	**E**	**1.11**	**>80**	**F**	**1.10**
Mississauga Road/Sandalwood Pkwy	WB	Left	31.9	C	0.71	39.1	D	0.71
		Right	20.7	C	0.08	28.4	C	0.17
	NB	Dual Thru/Right	15.2	B	0.19	27.8	C	0.89
	SB	Left	24.1	C	0.54	36.7	D	0.64
		Dual Thru	21.7	C	0.60	13.8	B	0.15
	Overall Intersection		**23.1**	**C**	**0.65**	**28.3**	**C**	**0.81**
Mississauga Road/Wanless Drive	EB	Left	45.9	D	0.06	30.3	C	0.08
		Thru/Right	48.5	D	0.40	30.9	C	0.15
	WB	Left	32.3	C	0.53	20.1	C	0.18
		Thru/Right	28.8	C	0.20	19.5	B	0.09
	NB	Left	14.1	B	0.04	21.0	C	0.03
		Dual Thru	13.4	B	0.12	21.7	C	0.45
		Right	25.8	C	0.05	32.5	C	0.25
	SB	Left	10.3	B	0.09	15.9	B	0.04
		Dual Thru/Right	15.4	B	0.47	15.5	B	0.23
	Overall Intersection		**22.0**	**C**	**0.49**	**22.8**	**C**	**0.33**
Mississauga Road/Mayfield Road	EB	Left	31.3	C	0.21	22.1	C	0.28
		Dual Thru/Right	41.0	D	0.75	21.4	C	0.24
	WB	Left	25.2	C	0.56	34.2	C	0.27
		Dual Thru/Right	20.2	C	0.28	40.3	D	0.67
	NB	Left	11.5	B	0.09	24.5	C	0.06

		Thru	12.4	B	0.15	33.3	C	0.55
		Right	7.7	A	0.03	78.2	E	0.10
	SB	Left	17.6	B	0.15	16.5	B	0.15
		Right	25.8	C	0.62	16.5	B	0.21
		Right	16.3	B	0.06	14.6	B	0.03
	Overall Intersection		**28.1**	**C**	**0.66**	**33.4**	**C**	**0.55**

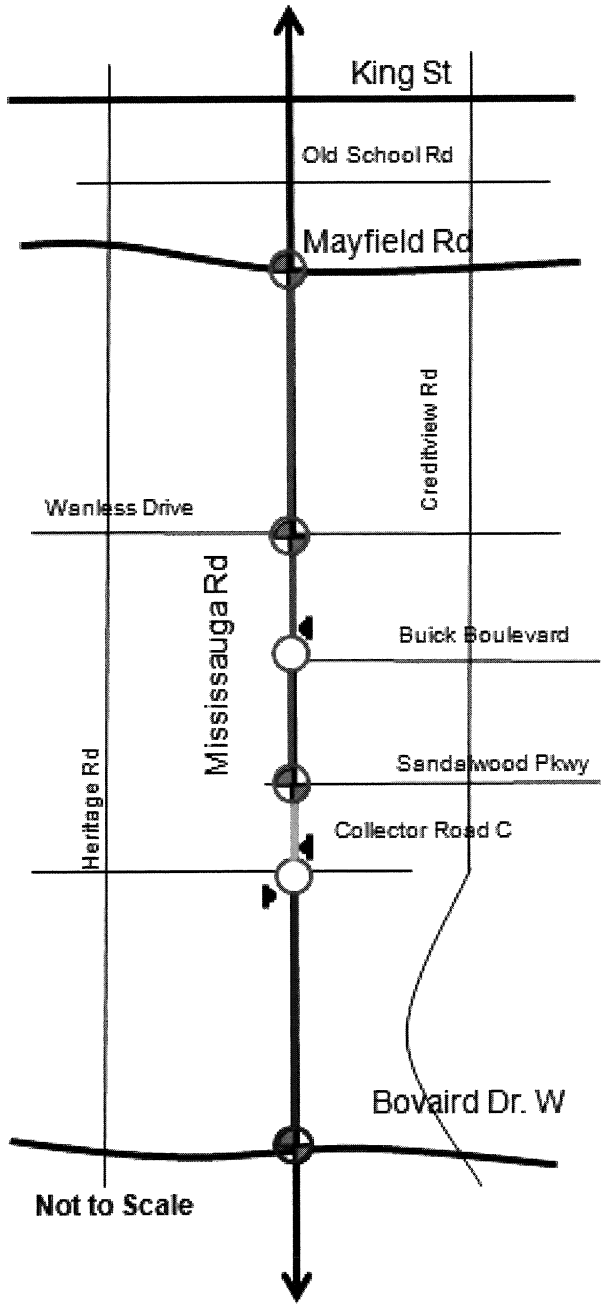
Table 4.3 Future 2018 Traffic Capacity Analysis-Unsignalized Intersections (Improved)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Collector Road C	WB	Left	22.1	C	0.33	>80	F	0.56
		Right	9.4	A	.01	15.7	C	0.03
	NB	Thru	0.0	A	.014	0.0	A	0.56
		Thru/Right	0.0	A	0.08	0.0	A	0.34
	SB	Left	8.1	A	0.01	13.5	B	0.02
		Thru	0.0	A	0.46	0.0	A	0.17
		Thru	0.0	A	0.46	0.0	A	0.17
	Overall Intersection		**1.2**	**A**	**0.46**	**2.1**	**A**	**0.56**
Mississauga Road/Buick Boulevard	WB	Left	62.9	F	0.82	>80	F	0.71
		Right	9.5	A	0.02	14.6	B	0.06
	NB	Thru	0.0	A	0.12	0.0	A	0.42
		Thru/Right	0.0	A	0.10	0.0	A	0.36
	SB	Left	0.0	A	0.01	12.3	B	0.03
		Thru	0.0	A	0.35	0.0	A	0.13
		Thru	0.0	A	0.35	0.0	A	0.13
	Overall Intersection		**7.2**	**A**	**0.82**	**4.1**	**A**	**0.71**

As illustrated in **Table 4.2**, all signalized intersections will operate at an overall Level of Service C or better except Mississauga Road intersection at Bovaird Drive West. The Mississauga Road/Bovaird Drive West intersection will operate at poor level of service for the AM and PM peak hours because some movements at this intersection will operate over or near capacity and will experience long delays. Summaries of the 2018 intersection capacity calculations for these intersections operating with proposed improvements are provided in **Appendix H.**

As illustrated in **Table 4.3**, all unsignalized intersections will experience minimal overall delay with westbound shared left/ right operating at unsatisfactory level of service due to heavy northbound and southbound traffic.

Figure 4.2 illustrates the midblock and intersection operations under the future 2018 traffic condition with road widening along Mississauga Road.



Legend

Capacity Level Definition

Volume / Capacity Ratio ≥1.00 Over Capacity

0.85 ≤ Volume / Capacity Ratio < 1.0 Approaching Capacity

0.0 ≤ Volume / Capacity Ratio < 0.85 Sufficient Capacity

- Signalized intersection
- Stop Sign
- Intersection that is over capacity
- Intersection that is approaching capacity
- Intersection with sufficient capacity
- Link that is over capacity
- Link that is approaching capacity

Figure 4.2 Midblock and Intersection Operations Under 2018 Traffic Condition With Road Improvements

The results summarized in **Table 4.2** and **Table 4.3** illustrate the need for 4 lanes along Mississauga Road between Bovaird Drive West and Mayfield Road. The intersection at Sandalwood Parkway will require exclusive southbound left lane. At Wanless Drive, exclusive left turn lanes should be provided in the northbound and southbound directions.

4.2 Need and Justification for a Grade Separation at Rail Crossing

An Exposure Index (EI) calculation, which was traditionally adopted by Ontario Ministry of Transportation (MTO), Transport Canada, municipalities and railway companies, provides a warrant to eliminate an existing railway level crossing through the construction of a grade separation.

EI = Annual Daily Traffic x Daily Number of Trains

By 2018 daily travel demand on Mississauga Road is expected to be greater than 14,000 vehicles at the rail crossing and it is also expected that at least 40 trains per day will be moved through the crossing by GO Transit alone.

An EI threshold of 200,000 is the criterion used for determining whether a grade separation is warranted. The EI value by 2018 is anticipated to exceed 560,000, and hence, a grade separation is supported from a transportation safety perspective.

4.3 Road Improvements by 2031 – Without North South Transportation Corridor (NSTC) in Place

Based on the future 2031 traffic analysis, without the proposed North South Arterial Road in place, six traffic lanes will be needed for Mississauga Road between Bovaird Drive West and Sandalwood Parkway Extension. Based on the material provided and the assumptions made in this report it is anticipated that the 4-lane section on Mississauga Road between Sandalwood Parkway Extension and Mayfield Road will be sufficient to accommodate the expected traffic volumes. **Table 4.4** summarizes the future 2031 corridor levels of service with proposed road improvements, while **Table 4.5** and **4.6** summarizes the intersection levels of services and operating conditions with proposed road improvements. Summaries of the 2031 intersection capacity calculations for these intersections with proposed improvements are provided in **Appendix I**.

Table 4.4 2031 Mid-Block Volumes – Proposed Lane Configuration without North South Transportation Corridor

Road Section	No. of Lanes per Direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	3	2700	727	0.27	2407	0.89	2370	0.88	1250	0.46
Collector Road C to Sandalwood Parkway	3	2700	602	0.22	2093	0.78	2085	0.77	855	0.32
Sandalwood Parkway to Buick Boulevard	2	1800	547	0.30	1922	**1.07**	1818	**1.01**	737	0.41
Buick Boulevard to Wanless Drive	2	1800	485	0.27	1728	**0.96**	1585	0.88	672	0.37
Wanless Drive to Collector Road D	2	1800	392	0.22	1551	0.86	1223	0.68	593	0.33
Collector Road D to Collector Road F	2	1800	374	0.21	1407	0.78	1139	0.63	549	0.31
Collector Road F to Mayfield Road	2	1800	353	0.20	1267	0.70	1056	0.59	477	0.27

Table 4.5 Future 2031 Traffic Capacity Analysis-Signalized Intersections – Improved (without North South Transportation Corridor)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Drive West	EB	Left	31.1	C	0.30	75.0	E	0.86
		Triple Thru	>80	F	1.26	>80	F	1.22
		Right	0.8	A	0.42	0.2	A	0.16
	WB	Dual Left	>80	F	1.45	>80	F	1.25
		Triple Thru/Right	32.9	C	0.71	>80	F	1.24
	NB	Dual Left	>80	F	1.15	72.0	E	0.85
		Triple Thru	34.1	C	0.36	>80	F	1.15
		Right	39.2	D	0.52	>80	F	1.07
	SB	Dual Left	74.2	E	0.51	73.0	E	0.65
		Triple Thru	>80	F	1.27	51.5	D	0.78
		Right	29.0	C	0.03	38.5	D	0.10
	Overall Intersection		**>80**	**F**	**1.27**	**>80**	**F**	**1.18**
Mississauga Road/Sandalwood Pkwy	EB	Left	44.7	D	0.12	45.3	D	0.15
		Dual Thru/Right	47.9	D	0.50	48.1	D	0.44
	WB	Left	50.4	D	0.91	52.6	D	0.85
		Dual Thru	22.5	C	0.10	30.0	C	0.17
		Right	23.2	C	0.16	34.3	C	0.50
	NB	Left	25.2	C	0.28	24.9	C	0.27
		Dual Thru	31.3	C	0.26	35.3	D	0.72
		Right	49.5	D	0.18	54.8	D	0.76
	SB	Left	25.1	C	0.70	35.7	D	0.67
		Dual Thru	40.8	D	0.84	12.1	B	0.19
		Right	23.2	C	0.12	16.8	B	0.04
	Overall Intersection		**38.0**	**D**	**0.86**	**38.1**	**D**	**0.78**
Mississauga Road/Wanless Drive	EB	Left	24.4	C	0.03	40.7	D	0.15
		Dual Thru	26.1	C	0.21	42.0	D	0.32
		Right	24.1	C	0.01	38.3	D	0.01
	WB	Left	49.4	D	0.83	29.4	C	0.33
		Dual Thru/Right	26.8	C	0.27	28.4	C	0.17
	NB	Left	11.1	B	0.11	13.6	B	0.03
		Dual Thru	11.4	B	0.18	18.3	B	0.56
		Right	9.1	A	0.07	52.3	D	0.26

	SB	Left	21.4	C	0.17	8.6	A	0.08
		Dual Thru/Right	33.7	C	0.73	9.5	A	0.27
	Overall Intersection		**29.7**	**C**	**0.77**	**24.9**	**C**	**0.48**
Mississauga Road/Mayfield Road	EB	Left	25.3	C	0.33	70.4	E	0.90
		Dual Thru	36.8	D	0.84	18.0	B	0.31
		Right	22.4	C	0.16	15.4	B	0.05
	WB	Left	53.2	D	0.85	19.3	B	0.34
		Dual Thru/Right	12.7	B	0.36	22.9	C	0.62
	NB	Left	72.0	E	0.57	24.6	C	0.14
		Dual Thru	30.5	C	0.16	31.1	C	0.52
		Right	60.4	E	0.04	34.2	C	0.29
	SB	Left	31.3	C	0.36	25.4	C	0.32
		Dual Thru/Right	45.2	D	0.87	20.8	C	0.24
	Overall Intersection		**35.5**	**D**	**0.85**	**26.6**	**C**	**0.72**

Table 4.6 Future 2031 Traffic Capacity Analysis-Unsignalized Intersections – Improved (without North South Transportation Corridor)

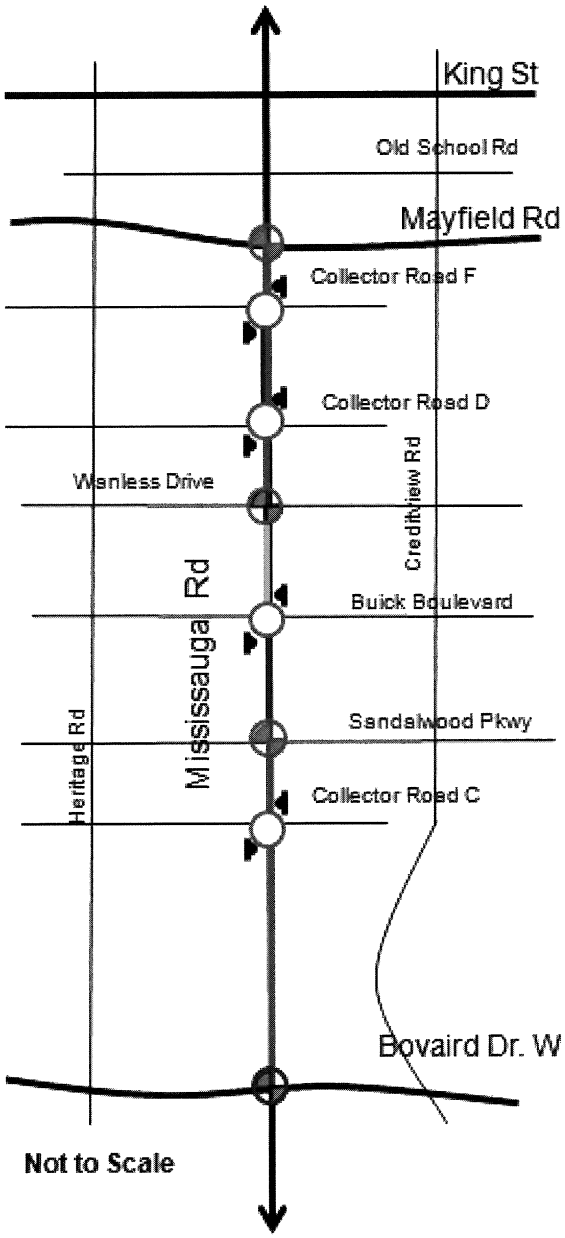
Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road/Collector Road C	EB	Left	-	-	-	-	-	-
		Thru/Right	-	-	-	-	-	-
	WB	Left	10.6	B	0.14	>50	F	1.7
		Thru/Right	9.3	A	0.01	14.4	B	0.03
	NB	Left	-	-	-	-	-	-
		Thru	0.0	A	0.11	0.0	A	0.44
		Thru	0.0	A	0.11	0.0	A	0.44
		Thru/Right	0.0	A	0.07	0.0	A	0.28
	SB	Left	8.4	A	0.01	17.9	C	0.03
		Thru	0.0	A	0.49	0.0	A	0.19
		Thru	0.0	A	0.49	0.0	A	0.19
		Thru/Right	0.0	A	0.25	0.0	A	0.09
	Overall Intersection		**0.5**	**A**	**0.49**	**9.9**	**A**	**1.70**
Mississauga Road/Buick Boulevard	EB	Left	-	-	-	-	-	-
		Thru/Right	-	-	-	-	-	-
	WB	Left	>50	F	1.89	>50	F	2.08
		Thru/Right	9.8	A	0.02	16.4	C	0.07
	NB	Left	-	-	-	-	-	-

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
		Thru	0.0	A	0.14	0.0	A	0.46
		Thru	0.0	A	0.14	0.0	A	0.46
		Right	0.0	A	0.04	0.0	A	0.15
	SB	Left	0.0	A	0.01	16.3	C	0.05
		Thru	0.0	A	0.67	0.0	A	0.26
		Thru/Right	0.0	A	0.34	0.0	A	0.13
	Overall Intersection		**41.1**	**E**	**1.89**	**22.7**	**C**	**2.08**
Mississauga Road/Collector Road D	EB	Left	-	-	-	-	-	-
		Thru/Right	-	-	-	-	-	-
	WB	Left	47.6	E	0.66	43.5	E	0.34
		Thru/Right	9.3	A	0.1	9.2	A	0.01
	NB	Left/Thru	-	-	-	0.0	A	0.39
		Thru/Right	0.0	A	0.12	0.0	A	0.39
	SB	Left/Thru	0.0	A	0.41	0.2	A	0.01
		Thru/Right	0.0	A	0.41	0.0	A	0.16
	Overall Intersection		**3.6**	**A**	**0.66**	**1.2**	**A**	**0.34**
Mississauga Road/Collector Road F	EB	Left	-	-	-	-	-	-
		Thru/Right	20.1	C	0.01	-	-	-
	WB	Left	15.6	C	0.27	>80	F	0.53
		Thru/Right	9.4	A	0.01	13.3	B	0.01
	NB	Left/Thru	0.1	A	0.12	0.0	A	0.39
		Thru/Right	0.1	A	0.12	0.0	A	0.39
	SB	Left/Thru	0.1	A	0.01	0.3	A	0.01
		Thru/Right	0.0	A	0.37	0.0	A	0.16
	Overall Intersection		**1.2**	**A**	**0.37**	**2.3**	**A**	**0.53**

Under the future 2031 traffic condition all the signalized intersections (except the intersection of Mississauga Road/Bovaird Drive West) are expected to operate at overall level of service C or better.

Individual cross traffic movement, westbound left movement at the unsignalized intersection of Mississauga Road/Collector Road C and Mississauga Road/Buick Boulevard will experience significant delays and will operate at unsatisfactory levels of services. The intersections of Mississauga Road/Collector Road D and Mississauga Road/Collector Road F will experience long delays for the individual cross traffic movement (westbound shared left-through/right) during AM and PM peak hour, respectively. As indicated in **Section 3.5.5,** signals are not warranted at these four intersections based on the available future forecast for the horizon year 2031. It is suggested that close monitoring of future traffic volumes be continued at these four intersections and traffic warrant analysis should be revised to reflect the change in future traffic volumes (if any); where signalization would improve the operation of these intersections.

At the present time, based on the land use, trip generation and road networks assumptions used in this assessment, four lanes on Mississauga Road north of Sandalwood Parkway to Mayfield Road with associated auxiliary turn lanes will be capable of accommodating expected traffic volumes projected for the year 2031. **Figure 4.3** illustrates the midblock and intersection operations under the future 2031 traffic condition with recommended widening along Mississauga Road, and **Figure 4.4** shows the lane configurations in 2031 without NSTC in place.



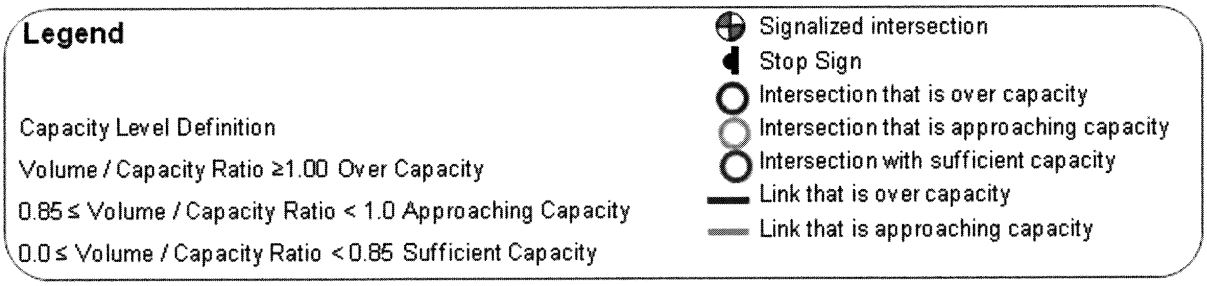


Figure 4.3 2031 Lane Configurations Without NSTC in Place

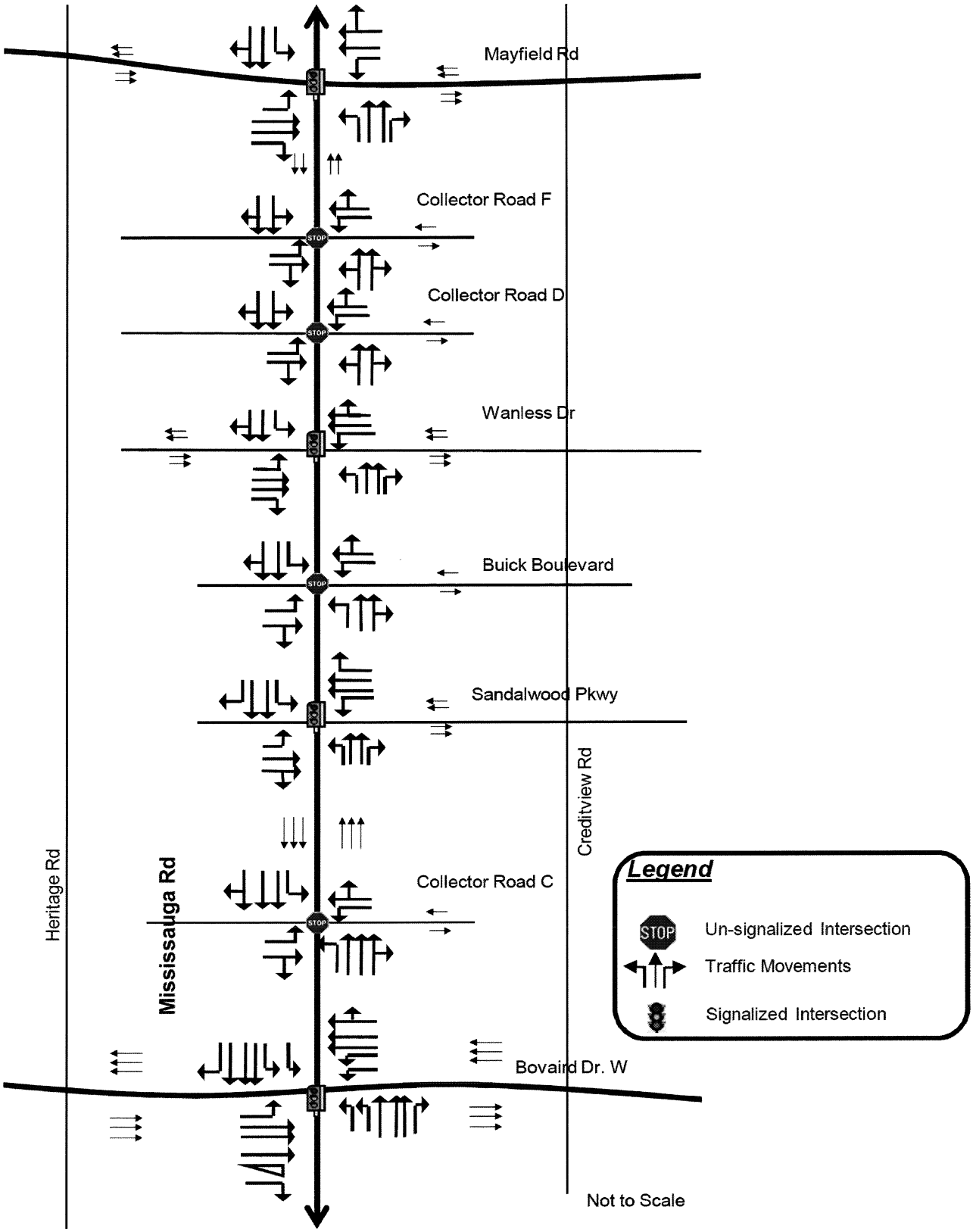


Figure 4.4 2031 Lane Configurations Without NSTC in Place

4.4 2031 Road Improvements with North South Transportation Corridor (NSTC) in Place

Under the updated City of Brampton's Transportation and Transit Master Plan (TTMP), the recommended road network for 2031 includes a new north/south high speed arterial road to the west of Mississauga Road (NSTC). Based on the City's transportation model output, some of the forecasted north-south traffic along Mississauga Road would be diverted to use the NSTC should it be in place by 2031 (See Appendix for model output); thereby improve traffic operations at the study area intersections. **Figure 4.5** shows the proposed lane configuration in 2031 should NSTC be in place. Based on the City's transportation model forecast for 2031, with NSTC in place north-south traffic volumes on Mississauga Road are reduced significantly as well as the east-west traffic on the intersection roads within the study area east of Mississauga Road. West of Mississauga Road, the east-west traffic is projected to increase when NSTC is in place, suggesting that the reduced traffic along Mississauga Road are the existing longer distance through traffic. Shorter distance trips, local and/ or development traffic in the immediate areas will travel Mississauga Road and using the intersecting east-west collector roads to access the NSTC or the new development areas. **Figure 4.6** shows the resulting traffic demand within the study area with NSTC in place. **Table 4.7** summarizes the future 2031 corridor levels of service, while **Table 4.8 and 4.9** summarize the intersection levels of service and operating conditions with future traffic demand within the study area with NSTC in place. Summaries of the 2031 intersection capacity calculations for these intersections are provided in **Appendix J**.

Table 4.7 2031 Mid-Block Volumes – 2031 Road Network with North South Transportation Corridor

Road Section	No. of Lanes per Direction	Desired Capacity	AM Peak Hour				PM Peak Hour			
			NB		SB		NB		SB	
			Volume	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*	*Volume*	*v/c*
Bovaird Drive West to Collector Road C	3	2700	468	0.17	1541	0.57	1615	0.60	750	0.28
Collector Road C to Sandalwood Parkway	3	2700	355	0.13	1609	0.60	1376	0.51	730	0.27
Sandalwood Parkway to Buick Boulevard	2	1800	455	0.25	1269	0.71	1245	0.69	434	0.24
Buick Boulevard to Wanless Drive	2	1800	319	0.18	1108	0.62	964	0.54	448	0.25
Wanless Drive to Collector Road D	2	1800	242	0.13	946	0.53	748	0.42	362	0.20
Collector Road D to Collector Road F	2	1800	223	0.12	816	0.45	663	0.37	319	0.18
Collector Road F to Mayfield Road	2	1800	211	0.12	867	0.48	599	0.33	388	0.22

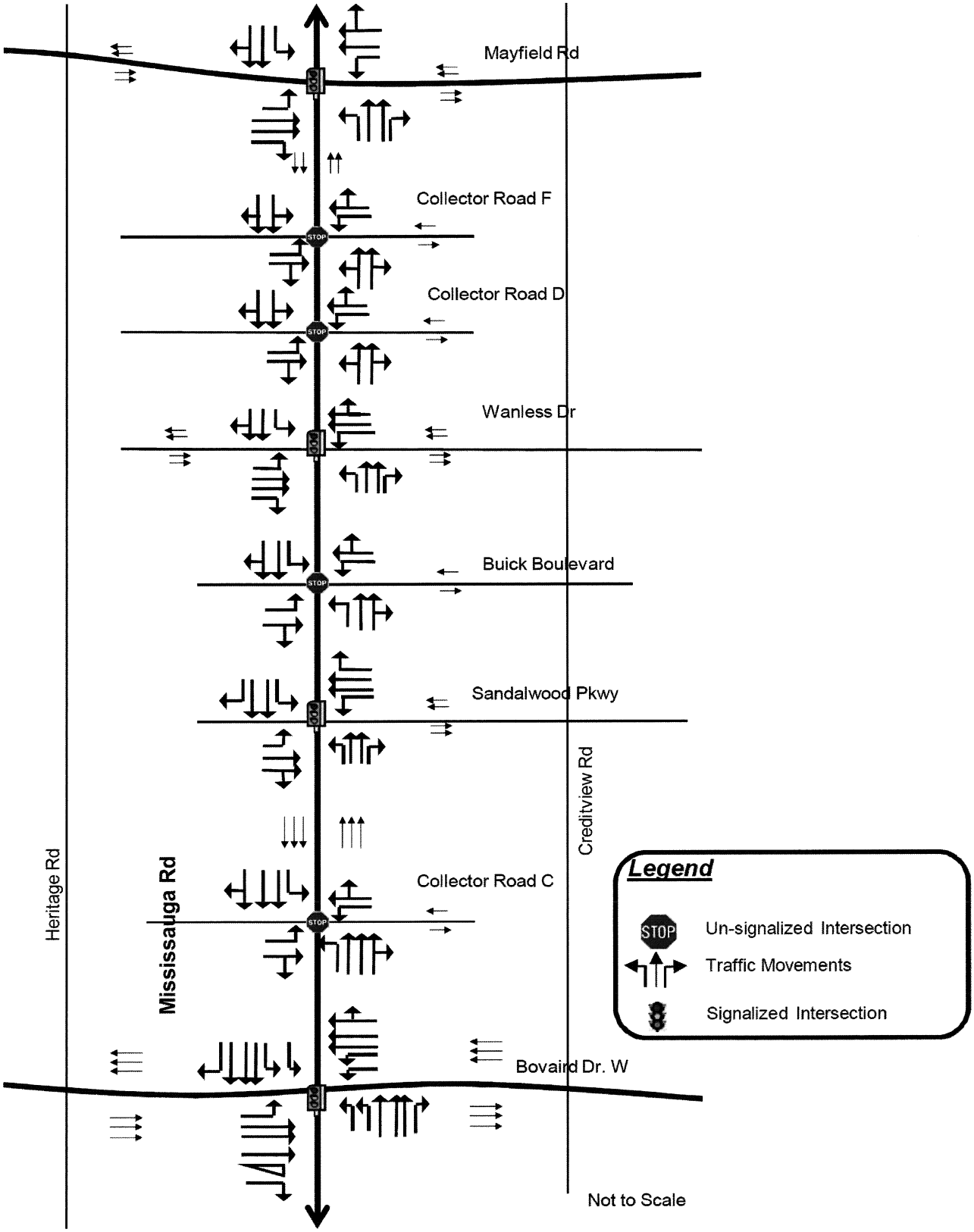


Figure 4.5 2031 Lane Configurations With NSTC in Place

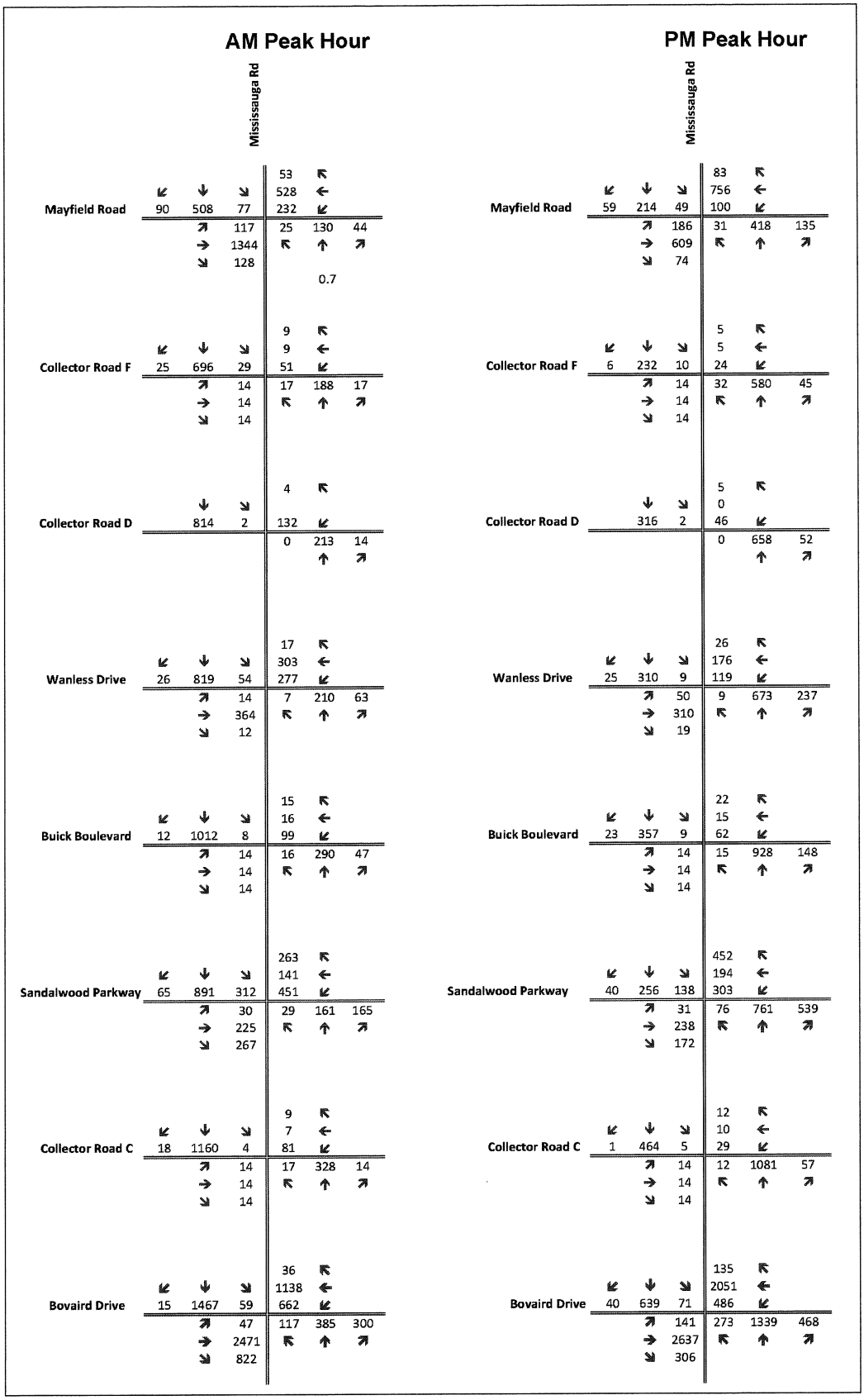


Figure 4.6 2031 Traffic Demand along Mississauga Road with NSTC in Place

Table 4.8 Future 2031 Traffic Capacity Analysis-Signalized Intersections – Improved (with North South Transportation Corridor)

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
Mississauga Road & Bovaird Drive West	EB	Left	29.8	C	0.29	60.7	E	0.75
		Triple Thru	>80	F	1.14	>80	F	1.12
		Right	1.3	A	0.52	0.3	A	0.20
	WB	Dual Left	>80	F	1.16	>80	F	1.20
		Triple Thru/Right	13.8	B	0.38	36.3	D	0.88
	NB	Left	>80	F	0.84	>80	F	1.04
		Dual Thru	41.0	D	0.29	74.5	E	1.00
		Right	40.3	D	0.19	64.5	E	0.83
	SB	Left	32.6	C	0.19	46.4	D	0.53
		Dual Thru	>80	F	1.03	53.3	D	0.62
		Right	36.1	D	0.03	44.8	D	0.06
	Overall Intersection		**72.4**	**E**	**1.06**	**73.6**	**E**	**1.09**
Mississauga Road/Sandalwood Pkwy	EB	Left	40.5	D	0.13	38.1	D	0.12
		Dual Thru/Right	46.8	D	0.63	41.7	D	0.42
	WB	Left	37.4	D	0.82	27.7	C	0.64
		Dual Thru	16.2	B	0.08	21.0	C	0.13
		Right	17.1	B	0.17	25.7	C	0.49
	NB	Left	19.7	B	0.17	15.4	B	0.13
		Dual Thru	16.7	B	0.10	25.8	C	0.50
		Right	18.1	B	0.11	24.0	C	0.34
	SB	Left	39.4	D	0.57	27.0	C	0.40
		Dual Thru	36.2	D	0.55	33.0	C	0.16
		Right	33.6	C	0.07	50.8	D	0.03
	Overall Intersection		**33.6**	**C**	**0.70**	**28.2**	**C**	**0.50**
Mississauga Road/Wanless Drive	EB	Left	37.8	D	0.06	31.0	C	0.14
		Dual Thru	43.3	D	0.48	32.4	C	0.29
		Right	36.9	D	0.01	29.1	C	0.01
	WB	Left	19.7	B	0.47	20.0	C	0.25
		Dual Thru/Right	17.1	B	0.18	19.2	B	0.12
	NB	Left	18.9	B	0.04	23.3	C	0.02
		Dual Thru	18.5	B	0.14	28.2	C	0.40
		Right	21.6	C	0.04	69.0	E	0.15

	SB	Left	32.5	C	0.11	13.9	B	0.03
		Dual Thru/Right	38.3	D	0.54	14.3	B	0.19
	Overall Intersection		**31.0**	**C**	**0.50**	**30.0**	**C**	**0.34**
Mississauga Road/Mayfield Road	EB	Left	18.5	B	0.29	16.5	B	0.46
		Dual Thru	28.7	C	0.81	13.5	B	0.32
		Right	16.6	B	0.16	11.3	B	0.05
	WB	Left	52.7	D	0.83	27.6	C	0.36
		Dual Thru/Right	8.7	A	0.28	32.8	C	0.69
	NB	Left	43.6	D	0.19	29.1	C	0.08
		Dual Thru	40.3	D	0.14	31.3	C	0.36
		Right	74.4	E	0.03	52.6	D	0.15
	SB	Left	34.0	C	0.23	26.4	C	0.18
		Dual Thru/Right	39.4	D	0.60	25.7	C	0.20
	Overall Intersection		**29.3**	**C**	**0.73**	**26.5**	**C**	**0.51**

Table 4.9 Future 2031 Traffic Capacity Analysis-Unsignalized Intersections – Improved (with North South Transportation Corridor)

Intersection	**Approach/Movement**		**Weekday**					
			AM			**PM**		
			Delay	**LOS**	**v/c**	**Delay**	**LOS**	**v/c**
Mississauga Road/Collector Road C	EB	Left	45.3	E	0.14	22.7	C	0.06
		Thru/Right	28	D	0.15	29.3	D	0.16
	WB	Left	27	D	0.33	50.0	E	0.27
		Thru/Right	23.1	C	0.07	26.9	D	0.12
	NB	Left	11.3	B	0.03	8.3	A	0.01
		Thru	0.0	A	0.08	0.0	A	0.25
		Thru	0.0	A	0.08	0.0	A	0.25
		Thru/Right	0.0	A	0.05	0.0	A	0.16
	SB	Left	8.0	A	0.01	11.00	B	0.01
		Thru	0.0	A	0.27	0.0	A	0.11
		Thru	0.0	A	0.27	0.0	A	0.11
		Thru/Right	0.0	A	0.15	0.0	A	0.06
	Overall Intersection		**2.5**	**A**	**0.27**	**1.9**	**A**	**0.27**
Mississauga Road/Buick Boulevard	EB	Left	40.0	C	1.12	24.5	C	0.07
		Thru/Right	24.5	D	0.13	25.0	C	0.13
	WB	Left	34.9	C	0.46	47.8	E	0.43
		Thru/Right	22.3	B	0.13	21.4	C	0.14

Intersection	Approach/Movement		Weekday					
			AM			PM		
			Delay	LOS	v/c	Delay	LOS	v/c
	NB	Left	10.5	A	0.02	8.1	A	0.01
		Thru	0.0	A	0.09	0.0	A	0.27
		Thru	0.0	A	0.09	0.0	A	0.27
		Right	0.0	A	0.03	0.0	A	0.09
	SB	Left	8.0	A	0.01	10.7	B	0.01
		Thru	0.0	A	0.40	0.0	A	0.14
		Thru/Right	0.0	A	0.21	0.0	A	0.08
	Overall Intersection		**3.6**	**A**	**0.46**	**3.1**	**A**	**0.43**
Mississauga Road/Collector Road D	EB	Left	-	-	-	-	-	-
		Thru/Right	-	-	-	-	-	-
	WB	Left	20.3	C	0.36	17.0	C	0.13
		Thru/Right	8.9	A	0.01	9.0	A	0.01
	NB	Left/Thru	0.0	A	0.01	0.0	A	0.22
		Thru/Right	0.0	A	0.07	0.0	A	0.22
	SB	Left/Thru	0.1	A	0.24	0.1	A	0.09
		Thru/Right	0.0	A	0.24	0.0	A	0.09
	Overall Intersection		**2.3**	**A**	**0.36**	**0.8**	**A**	**0.22**
Mississauga Road/Collector Road F	EB	Left	18.9	C	0.05	15.5	C	0.09
		Thru/Right	14.4	B	0.07	14.8	B	0.07
	WB	Left	14.4	B	0.12	21.4	C	0.10
		Thru/Right	14.0	B	0.04	14.9	B	0.03
	NB	Left/Thru	1.5	A	0.02	1.0	A	0.02
		Thru/Right	0.0	A	0.07	0.0	A	0.20
	SB	Left/Thru	0.8	A	0.02	0.8	A	0.01
		Thru/Right	0.8	A	0.22	0.0	A	0.07
	Overall Intersection		**2.0**	**A**	**0.22**	**1.7**	**A**	**0.20**

With the North South Transportation Corridor in place, all the signalized and unsignalized intersections within the study limit are expected to operate at acceptable level of service with the exception at the intersection of Mississauga Road/Bovaird Drive West, which will remain with capacity deficiencies and long delays for some traffic movements.

Figure 4.7 illustrates the midblock and intersection operations under the future 2031 traffic condition with road widening along Mississauga Road (NSTC in place).

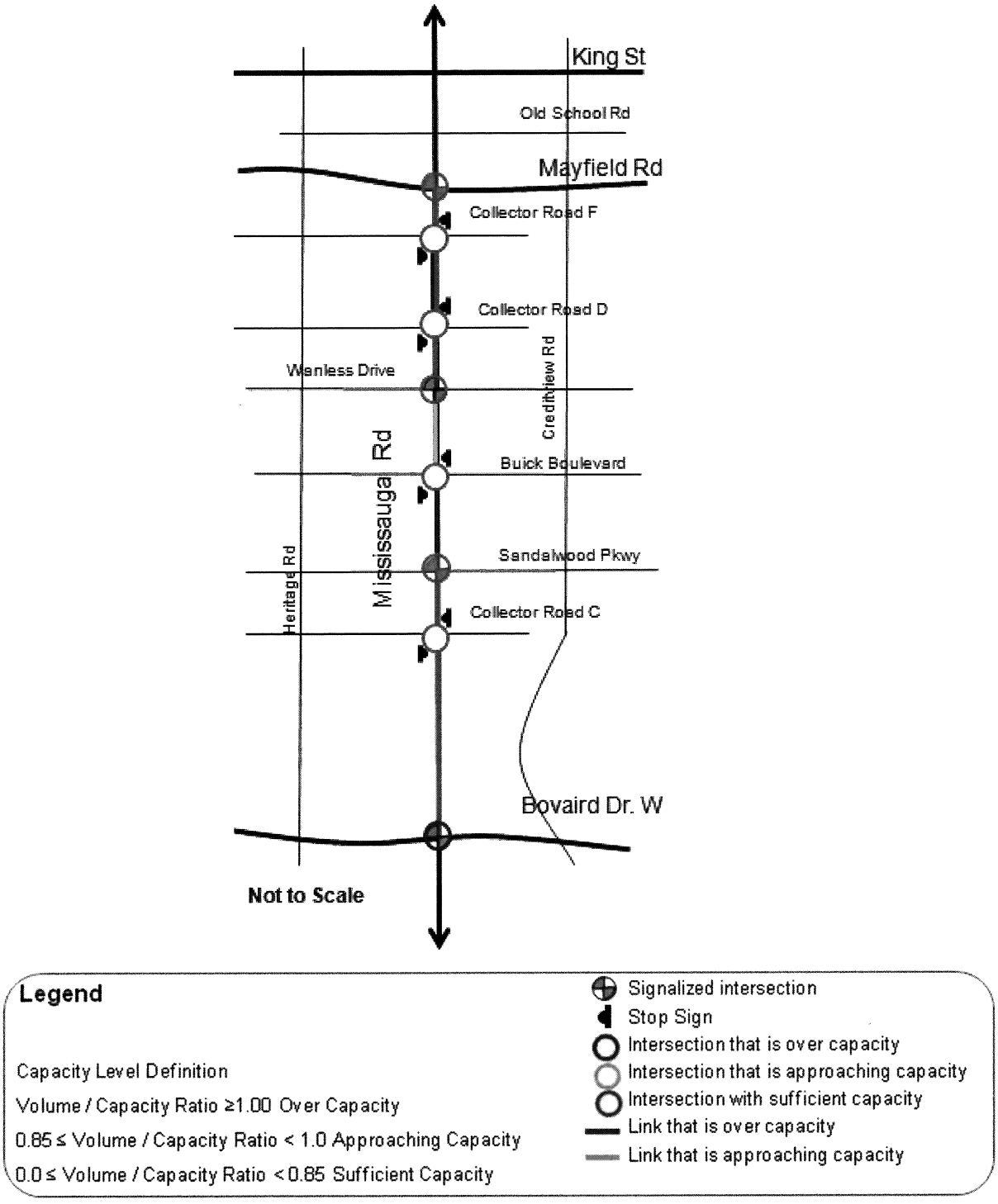


Figure 4.7 2031 Lane Configurations Without NSTC in Place

5. Roundabout Analysis

In order to cope better with the heavy travel demand in the future scenarios, AECOM has completed a separate roundabout analysis at the three key intersections within the study area in an attempt to further investigate at the needs of the 6-lane widening of the Mississauga Road. The analyses included the review of the intersections with two-lane roundabouts as the traffic control option. All analyses were conducted with Sidra Intersection 3.2 using the Highway Capacity Manual (Metric) settings.

The conceptual intersection configuration was used along with the same projected traffic volumes, truck percentages and peak hour factors described in earlier sections. Sidra Intersection includes multiple measures of effectiveness, including level of service (LOS) and volume to capacity ratio (v/c) for each approach and the overall intersection. The LOS criteria are summarized in **Table 5.1**.

Table 5.1 Intersection Level of Service Criteria

Level of Service	Average Control Delay (Seconds per Vehicle)	
	Signals and Roundabouts	Stop Signs
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

Sidra Intersection output tables are attached in **Appendix K**.
Table 5.2 summarizes the analysis results in terms of a LOS and v/c for each of the intersections. The scenarios being assessed are as follow:

- **2018** - forecasted 2018 traffic demand with 2-lane roundabouts
- **2031 without NSTC** - 2031 traffic demand as per landuse as shown in updated TTMP and as provided by the City of Brampton, 2 lanes roundabouts
- **2031 with NSTC** - 2031 traffic demand as per landuse as shown in updated TTMP with the North South Transportation Corridor in place, 2 lanes roundabouts

Table 5.2 Roundabout Analysis Results

Intersection	Approach	2018				2031 TTMP without NSTC				2031 TTMP with NSTC			
		AM		PM		AM		PM		AM		PM	
		LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c
Mississauga Road & Mayfield Road	NB	B	0.45	B	0.19	B	0.53	B	0.25	B	0.35	B	0.13
	SB	B	0.14	B	0.44	B	0.28	C	0.86	B	0.16	C	0.66
	EB	B	0.34	B	0.56	B	0.42	C	0.79	B	0.34	B	0.60
	WB	B	0.61	B	0.24	D	**0.99**	B	0.55	C	0.84	B	0.56
	All	*B*	*0.61*	*A*	*0.56*	*C*	***0.99***	*B*	*0.86*	*B*	*0.84*	*B*	*0.66*
Mississauga	N	B	0.60	B	0.22	C	**0.96**	B	0.32	B	0.53	B	0.16

Road & Wanless Drive	S	B	0.15	B	0.44	B	0.32	C	0.70	B	0.18	C	0.52
	E	B	0.33	B	0.41	B	0.44	B	0.65	B	0.38	B	0.47
	W	B	0.15	B	0.08	**F**	**1.21**	B	0.63	C	0.68	B	0.64
	All	*B*	*0.60*	*A*	*0.44*	*D*	***1.21***	*B*	*0.70*	*B*	*0.68*	*C*	*0.64*
Mississauga Road & Sandalwood Pkwy	N	B	0.49	B	0.25	B	0.78	B	0.41	B	0.46	B	0.23
	S	A	0.22	A	0.53	B	0.46	C	0.86	B	0.26	B	0.50
	E	B	0.28	B	0.47	B	0.28	C	0.78	B	0.25	B	0.54
	W	--	--	--	--	C	0.47	B	0.19	B	0.40	B	0.20
	All	*A*	*0.49*	*A*	*0.53*	*B*	*0.78*	*B*	*0.86*	*A*	*0.46*	*A*	*0.54*

Notes: 1) LOS is for the worst movement for each approach.
2) v/c is for the worst movement for each approach.
3) "All" LOS includes all movements.
4) "All" v/c is for the worst movement in the entire intersection

5.1 2018 Two-lane Roundabouts

As shown in **Table 5.2**, in year 2018 with two-lane roundabouts as the traffic control, there are no operational issues for any peak hour movements at any of the intersections. All movements operate at level of service B or better throughout the day.

5.2 2031 TTMP Scenario with Two-lane roundabouts – Without NSTC

As shown in **Table 5.2**Table 5.2, under the 2031 TTMP scenario, with two-lane roundabouts as the traffic control in the corridor, most of the movements operate at an acceptable level of service throughout the day.

Sandalwood Parkway - all movements operate at level of service C or better throughout the day.

Wanless Drive – with the assumption that right turn bypass lanes are in place in northwest, southwest and southeast quadrants, the north and west approaches will experience long delays during the AM Peak hour. The west approach is expected to operate at a v/c ratio of 1.21 which is beyond the capacity and at level of service F. This intersection will experience delays during peak periods due to high directional flows. During the AM peak hour, the west approach is expected to experience 95th percentile queues of approximately 270 meters. Although the north approach is projected to operate with a high v/c ratio (0.96), the delays are manageable (LOS C) and the queues are reasonable (95th percentile queues will be approximately 140 m). During the PM peak hour, all movements operate at level of service C or better.

Mayfield Road - experiences delay during AM peak period due to high north-south directional flow. Assuming a right turn bypass lane is in place in northwest quadrant, the west approach is expected to experience 95th percentile queues of approximately 175 meters during the AM peak hour, with manageable delays at level of service D. The overall intersection will operate at level of service C in the AM peak hour and level of service B in the PM peak hour.

5.3 2031 TTMP Scenario with Two-lane roundabouts – With NSTC

As shown in **Table 5.2**, with two-lane roundabouts as the traffic control in the corridor and with the same assumptions of the right turn bypass lanes in place as the previous section, all of the movements operate at an acceptable level of service throughout the day. All movements at all intersections operate well throughout the day at level of service C or better and v/c ratio at 0.84 or better.

6. Conclusion

6.1 Midblock Link Volume to Capacity Assessment

6.1.1 Existing (2008) Condition

Both the sections along Mississauga Road from Bovaird Drive West to Mayfield Road are operating with residual capacity, indicating that the current two lane section of Mississauga Road is sufficient to accommodate existing traffic volumes.

6.1.2 2018 Horizon Year

6.1.2.1 Do Nothing

In 2018 and without improvement, the traffic demand in the peak direction (i.e., southbound during the AM Peak and northbound during the PM peak) along the section of Mississauga Road between Bovaird Drive West and Mayfield Road will significantly exceed the available capacity; therefore, one lane per direction is not sufficient for the 2018 traffic demand along Mississauga Road between Bovaird Drive West and Mayfield Road.

6.1.2.2 With Improved Road Network

With Mississauga Road widened to 4-lane, all the sections along Mississauga Road within the study limit are expected to operate with residual capacity during both the AM and PM peak period except the sections between Bovaird Drive West and Sandalwood Pkwy Extension, where the 4-lane capacity will be insufficient to accommodate traffic demand for the horizon year 2018.

6.1.3 2031 Horizon Year

6.1.3.1 Do Nothing

In year 2031 and without road improvement, the traffic demand in the peak direction (i.e., southbound during the AM Peak and northbound during the PM peak) along the section of Mississauga Road between Bovaird Drive West and Mayfield Road will significantly exceed the available capacity; therefore, one lane in each direction will not be sufficient to accommodate the anticipated traffic demand in 2031.

6.1.3.2 With Improved Road Network and without the North South Transportation Corridor (NSTC)

Based on the future 2031 traffic analysis, without the proposed North South Arterial Road in place, six traffic lanes will be required for Mississauga Road between Bovaird Drive West and Sandalwood Parkway Extension. Under this condition, 4 lanes on Mississauga Road between Sandalwood Parkway Extension and Mayfield Road will be able to accommodate the expected traffic volumes. The road section between Sandalwood Parkway and Wanless Drive will reach its capacity with 2031 traffic volume. As such, close monitoring will be required for this section beyond 2031.

6.1.3.3 With Improved Road Network and with the North South Transportation Corridor (NSTC)

With the reduced traffic along Mississauga Road, it is anticipated that 6-lanes from Bovaird Drive West to Sandalwood Parkway Extension and 4-lanes from Sandalwood Parkway Extension and Mayfield Road will be able to accommodate the expected future traffic demand for the horizon year 2031.

6.2 Intersection Operations

6.2.1 Existing Condition

Under the existing traffic conditions, signalized intersection of Mississauga Road/ Mayfield Road operates at good levels of service during both weekday AM and PM peak hours. Although the overall delay and level of service at the intersection of Mississauga Road/ Bovaird Drive West is satisfactory (LOS D and LOS C) during both the AM and PM peak hours of operation, some delays and poor levels of services are experienced at some movements due to the heavy westbound/eastbound traffic along Bovaird Drive West.

The unsignalized intersection of Mississauga Road/ Wanless Drive operates well as indicated by the average delay, with residual capacity for each movement during both weekdays AM and PM peak hours.

6.2.2 2018 Horizon Year

6.2.2.1 Do Nothing

In 2018 and without improvement, many of the individual turning movements at the intersections of Mississauga Road/Bovaird Drive West for PM peak hour and Mississauga Road /Sandalwood Parkway for both the AM and PM peak hours are expected to exceed the desired level of service resulting in overall level of service F. Although some of the movements at the other two signalized intersections are expected to either operate at or over capacity or experience long delays, overall both intersections are expected to operate at a level of service E or better during the AM and PM peak hours of operations.

Although some of the individual movements at the unsignalized intersections are expected to experience long delays resulting in level of service F, the overall delay at these intersections will be within the acceptable operating conditions.

6.2.2.2 With Improved Road Network

With the improved road network all the signalized intersections are expected to operate at an overall Level of Service C or better except Mississauga Road/Bovaird Drive West intersection, which some movements experience longer delays with poor LOS . All the unsignalized intersections are expected to experience acceptable delay and levels of services, resulting in good operating conditions.

The proposed lane configuration is shown in **Figure 4.1**.

In addition, based on the Exposure Index calculation, grade separating the existing level railway crossing is warranted from a transportation safety perspective.

6.2.3 2031 Horizon Year

6.2.3.1 Do Nothing

Under the 2031 future traffic and without improvements to Mississauga Road, the signalized intersections within the study area are expected to operate at an unsatisfactory level of service and operating conditions, and experience significant delays during the peak hours.

Due to high traffic volumes along Mississauga Road, the movements at the intersecting roadways will experience long delays resulting in an unsatisfactory operating condition at the unsignalized intersections.

6.2.3.2 With Improved Road Network and without the North South Transportation Corridor (NSTC)

Under the future 2031 traffic condition with the improved road network all the signalized intersections (except the intersection of Mississauga Road/Bovaird Drive West) are expected to operate at level of service D or better.

Some of the individual movements at the unsignalized intersection of Mississauga Road at Collector Road C, Buick Boulevard and Collector Road F are expected to experience long delays during the AM and PM peak hours of operation.

It is suggested that close monitoring of future traffic volumes be continued at these three unsignalized intersections and traffic warrant analysis should be revised to reflect the change in future traffic volumes (if any); where signalization would improve the operation of these intersections.

The intersection of Mississauga Road and Bovaird Drive West is expected to continue to operate at a poor level of service during the AM and PM peak hours of operation. In order to accommodate the anticipated traffic volumes at this intersection, improvements assumed at this intersection includes three through lanes in both the northbound and southbound direction in addition to three through lanes in the eastbound and westbound directions, as per the TMP recommendations.

The proposed lane configurations in year 2031 assuming NSTC not in place is shown in **Figure 4.4.**

6.2.3.3 Roundabout Configuration without the North South Transportation Corridor (NSTC)

With two-lane roundabout option, the intersections will improve in the following level of service:

Mississauga Road & Mayfield Road – overall levels of service will not be improved.

Mississauga Road & Wanless Drive – overall levels of service will not be improved.

Mississauga Road & Sandalwood Parkway – improve from overall level of service C during both AM and PM peak hours to overall level of service B for both peak hours in the roundabout option.

6.2.3.4 With Improved Road Network and with the North South Transportation Corridor (NSTC)

With North South Transportation Corridor in place and improved lane configurations as shown on **Figure 4.5**) all the signalized intersection within the study limit are expected to operate at good level of service C or better with the exception at the intersection of Mississauga Road/Bovaird Drive West, which will still have capacity deficiencies and will experience long delays.

All unsignalized intersections in the study area, with future traffic demand for the horizon year 2031 (NSTC in place) and improved lane configurations, are expected at excellent levels of services.

6.2.3.5 Roundabout Configuration with the North South Transportation Corridor (NSTC)

An alternative to widening Mississauga Road from four to six lanes from Bovaird Drive West to Sandalwood Parkway Extension is to consider a two-lane roundabout option. With the roundabout option the intersections will improve in the following level of service:

Mississauga Road & Mayfield Road – improve from overall level of service C in AM Peak hour to level of service B.

Mississauga Road & Wanless Drive – overall levels of service will not be improved.

Mississauga Road & Sandalwood Parkway – improve from overall level of service C during the AM peak hour to level of service A and improve from overall level of service B during the PM peak hour to level of service A.

Appendix A

2008 Traffic Data

Ontario Traffic Inc

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:00:00
To: 8:00:00

Municipality: Peel
Site #: 0012101852
Intersection: Mississauga Rd & Bovaird Dr
TFR File #: 3
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Mississauga Rd runs N/S

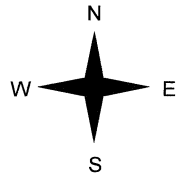
North Leg Total:	658			
North Entering:	522			
North Peds:	0			
Peds Cross:	⋈			
Heavys	0	8	0	8
Trucks	0	8	1	9
Cars	8	474	23	505
Totals	8	490	24	
Heavys	10			
Trucks	2			
Cars	124			
Totals	136			
East Leg Total:	1692			
East Entering:	809			
East Peds:	0			
Peds Cross:	⧖			

Mississauga Rd

Heavys	Trucks	Cars	Totals
13	5	559	577

Cars	Trucks	Heavys	Totals
7	0	0	7
476	3	11	490
298	2	12	312
781	5	23	

Bovaird Dr



Heavys	Trucks	Cars	Totals
2	0	12	14
15	7	648	670
4	2	263	269
21	9	923	

Bovaird Dr

Cars	Trucks	Heavys	Totals
849	11	23	883

Mississauga Rd

Peds Cross:	⧖			
West Peds:	0			
West Entering:	953			
West Leg Total:	1530			
Cars	1035			
Trucks	12			
Heavys	24			
Totals	1071			
Cars	75	105	178	358
Trucks	2	2	3	7
Heavys	2	8	8	18
Totals	79	115	189	
Peds Cross:	⋈			
South Peds:	0			
South Entering:	383			
South Leg Total:	1454			

Comments

Ontario Traffic Inc

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

Municipality: Peel
Site #: 0012101852
Intersection: Mississauga Rd & Bovaird Dr
TFR File #: 3
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Mississauga Rd runs N/S

North Leg Total:	295			
North Entering:	138			
North Peds:	0			
Peds Cross:	⋈			

Heavys	5	9	0	14
Trucks	0	3	0	3
Cars	9	96	16	121
Totals	14	108	16	

Heavys	14
Trucks	7
Cars	136
Totals	157

East Leg Total:	950
East Entering:	477
East Peds:	0
Peds Cross:	⧖

Mississauga Rd

Heavys	Trucks	Cars	Totals
33	12	402	447

Bovaird Dr

Cars	Trucks	Heavys	Totals
24	3	1	28
309	10	17	336
104	1	8	113
437	14	26	

N
W E
S

Heavys	Trucks	Cars	Totals
6	2	14	22
16	30	288	334
9	3	78	90
31	35	380	

Bovaird Dr

Cars	Trucks	Heavys	Totals
406	34	33	473

Mississauga Rd

Peds Cross:	⧖			
West Peds:	0			
West Entering:	446			
West Leg Total:	893			

Cars	278			
Trucks	7			
Heavys	26			
Totals	311			

Cars	84	98	102	284
Trucks	2	2	4	8
Heavys	11	7	17	35
Totals	97	107	123	

Peds Cross:	⋈
South Peds:	0
South Entering:	327
South Leg Total:	638

Comments

Ontario Traffic Inc

Afternoon Peak Diagram

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

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Peel
Site #: 0012101852
Intersection: Mississauga Rd & Bovaird Dr
TFR File #: 3
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Mississauga Rd runs N/S

North Leg Total: 682				
North Entering: 220				
North Peds: 0				
Peds Cross: ⋈				
Heavys	1	12	0	13
Trucks	0	2	0	2
Cars	24	158	23	205
Totals	25	172	23	
Heavys	9			
Trucks	7			
Cars	446			
Totals	462			
East Leg Total: 1845				
East Entering: 996				
East Peds: 0				
Peds Cross: ⧖				

Mississauga Rd

Heavys	Trucks	Cars	Totals
10	11	921	942

Bovaird Dr

Heavys	Trucks	Cars	Totals
1	2	42	45
11	3	571	585
7	1	92	100
19	6	705	

Cars	Trucks	Heavys	Totals
41	0	0	41
728	9	7	744
202	3	6	211
971	12	13	

N
W E
S

Bovaird Dr

Cars	Trucks	Heavys	Totals
829	5	15	849

Mississauga Rd

Peds Cross: ⧖				
West Peds: 0				
West Entering: 730				
West Leg Total: 1672				
Cars	452			
Trucks	6			
Heavys	25			
Totals	483			
Cars	169	363	235	767
Trucks	2	5	2	9
Heavys	2	8	4	14
Totals	173	376	241	
Peds Cross: ⋈				
South Peds: 0				
South Entering: 790				
South Leg Total: 1273				

Comments

Ontario Traffic Inc

Total Count Diagram

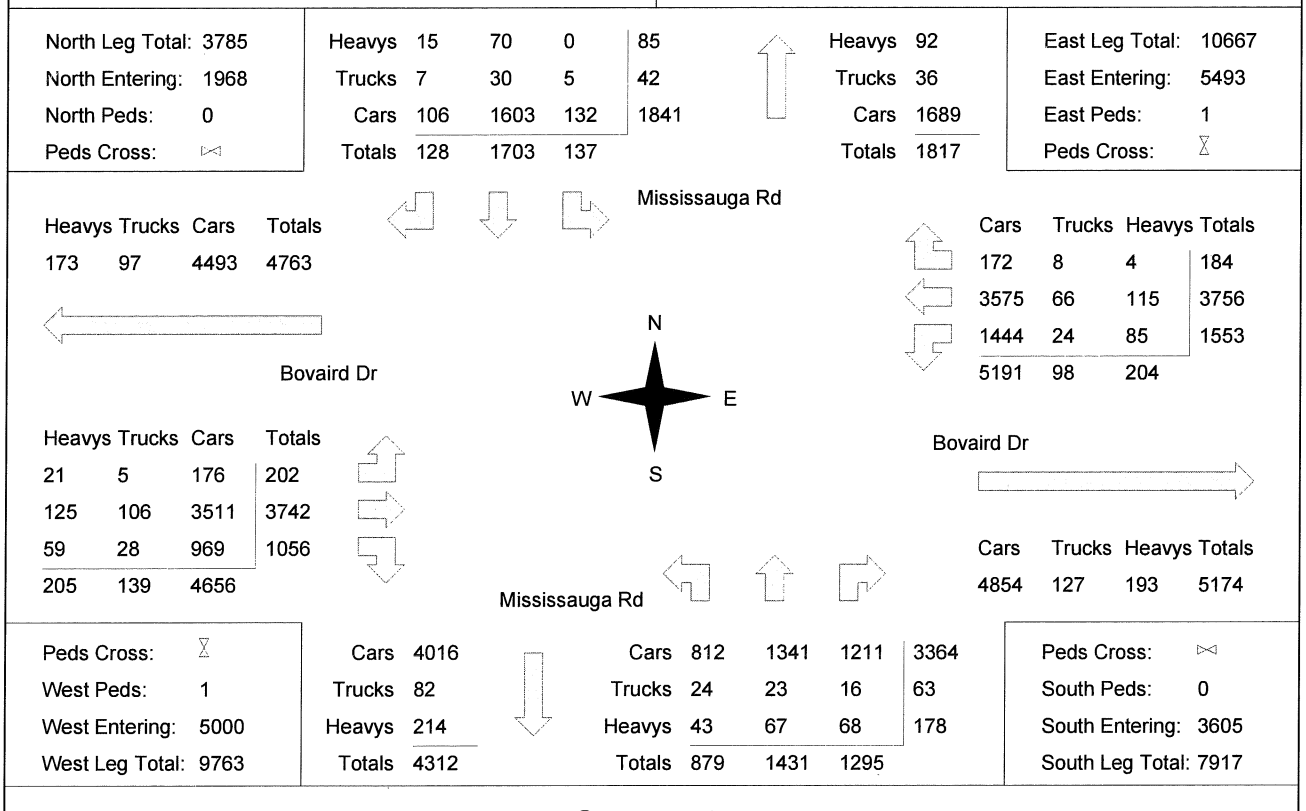
Municipality: Peel
Site #: 0012101852
Intersection: Mississauga Rd & Bovaird Dr
TFR File #: 3
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Mississauga Rd runs N/S



Comments

Ontario Traffic Inc
Traffic Count Summary

Intersection: Mississauga Rd & Bovaird Dr | **Count Date:** 30-Sep-08 | **Municipality:** Peel

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	24	490	8	522	0	905
9:00:00	5	464	7	476	0	780
11:00:00	0	0	0	0	0	0
12:00:00	20	99	18	137	0	371
13:00:00	20	90	21	131	0	384
14:00:00	16	108	14	138	0	465
15:00:00	0	0	0	0	0	0
16:00:00	16	121	15	152	0	747
17:00:00	21	164	20	205	0	953
18:00:00	15	167	25	207	0	968
Totals:	137	1703	128	1968	0	5573

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	79	115	189	383	0
9:00:00	90	76	138	304	0
11:00:00	0	0	0	0	0
12:00:00	72	80	82	234	0
13:00:00	78	89	86	253	0
14:00:00	97	107	123	327	0
15:00:00	0	0	0	0	0
16:00:00	139	243	213	595	0
17:00:00	183	346	219	748	0
18:00:00	141	375	245	761	0
Totals:	879	1431	1295	3605	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	312	490	7	809	0	1762
9:00:00	310	450	10	770	0	1520
11:00:00	2	0	0	2	0	2
12:00:00	128	287	18	433	0	827
13:00:00	111	294	21	426	0	837
14:00:00	113	336	28	477	0	923
15:00:00	0	0	0	0	0	0
16:00:00	169	607	27	803	0	1446
17:00:00	191	677	27	895	0	1527
18:00:00	217	615	46	878	1	1649
Totals:	1553	3756	184	5493	1	10493

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	14	670	269	953	0
9:00:00	12	529	209	750	1
11:00:00	0	0	0	0	0
12:00:00	19	302	73	394	0
13:00:00	21	287	103	411	0
14:00:00	22	334	90	446	0
15:00:00	0	0	0	0	0
16:00:00	29	506	108	643	0
17:00:00	42	496	94	632	0
18:00:00	43	618	110	771	0
Totals:	202	3742	1056	5000	1

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	996	851	449	426	471	805	910	878

Ontario Traffic Inc

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:15:00
To: 8:15:00

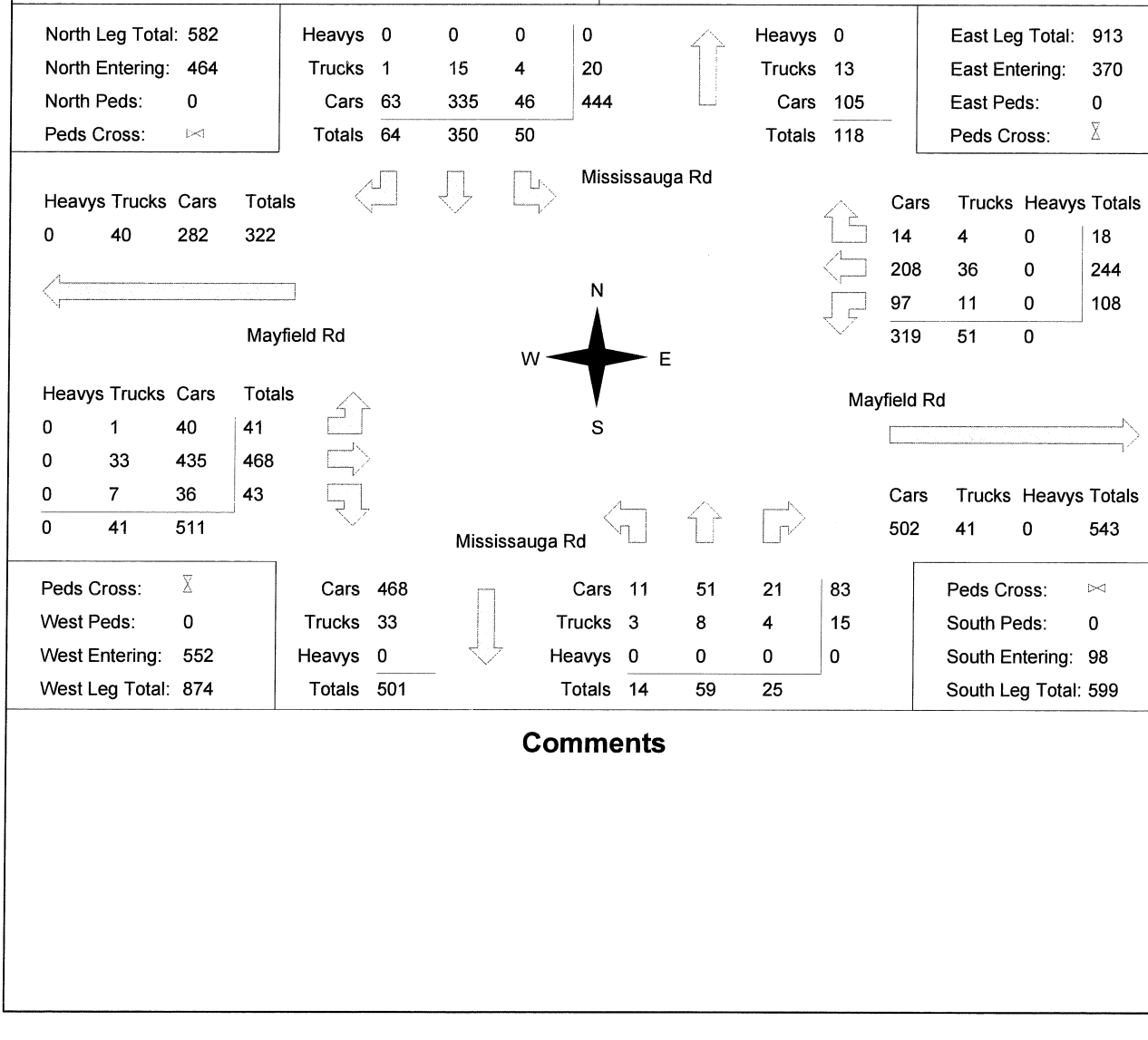
Municipality: Peel
Site #: 0012533700
Intersection: Mississauga Rd & Mayfield Rd
TFR File #: 4
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Mississauga Rd runs N/S



Comments

Ontario Traffic Inc

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

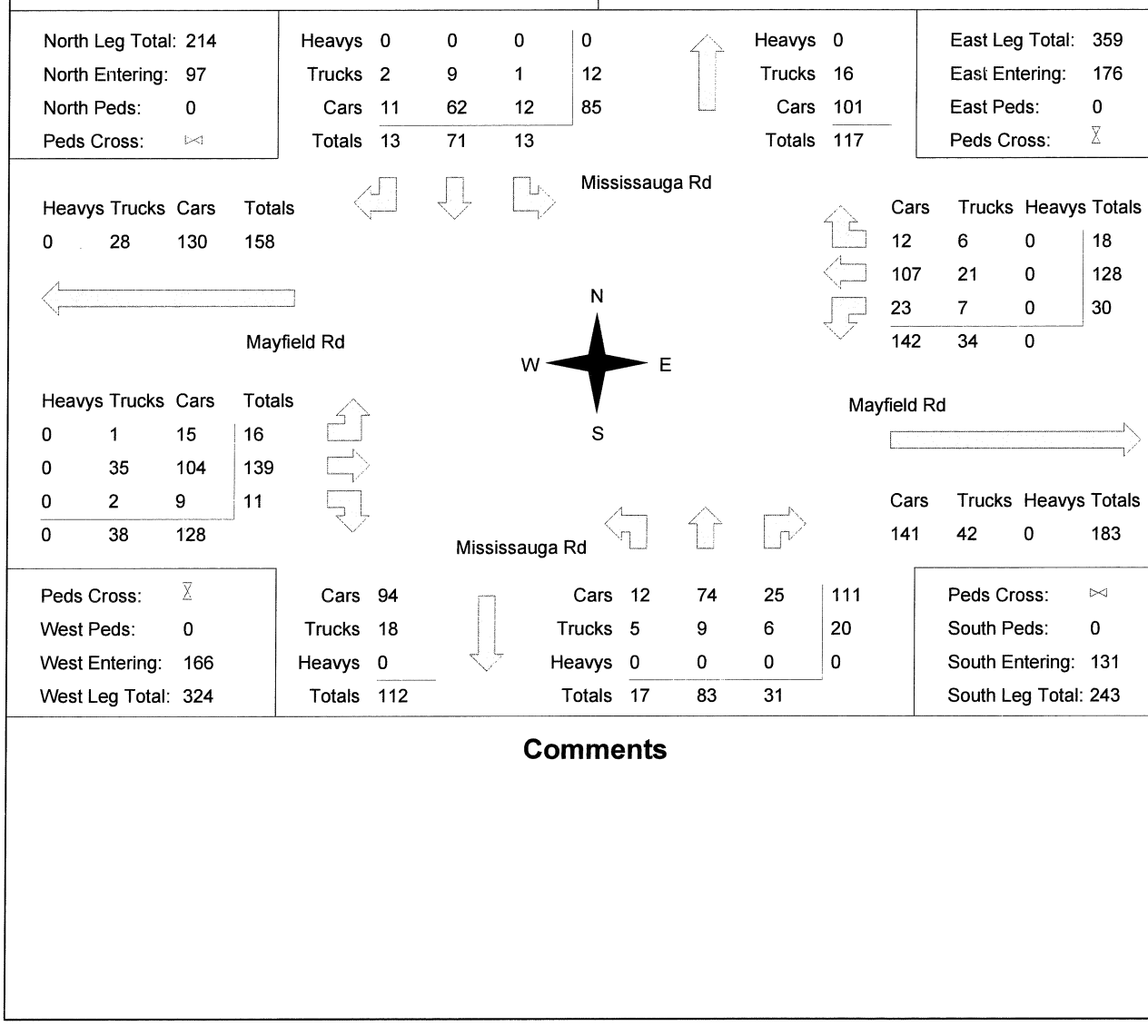
Municipality: Peel
Site #: 0012533700
Intersection: Mississauga Rd & Mayfield Rd
TFR File #: 4
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Mississauga Rd runs N/S



Comments

Ontario Traffic Inc

Afternoon Peak Diagram

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

One Hour Peak
From: 16:45:00
To: 17:45:00

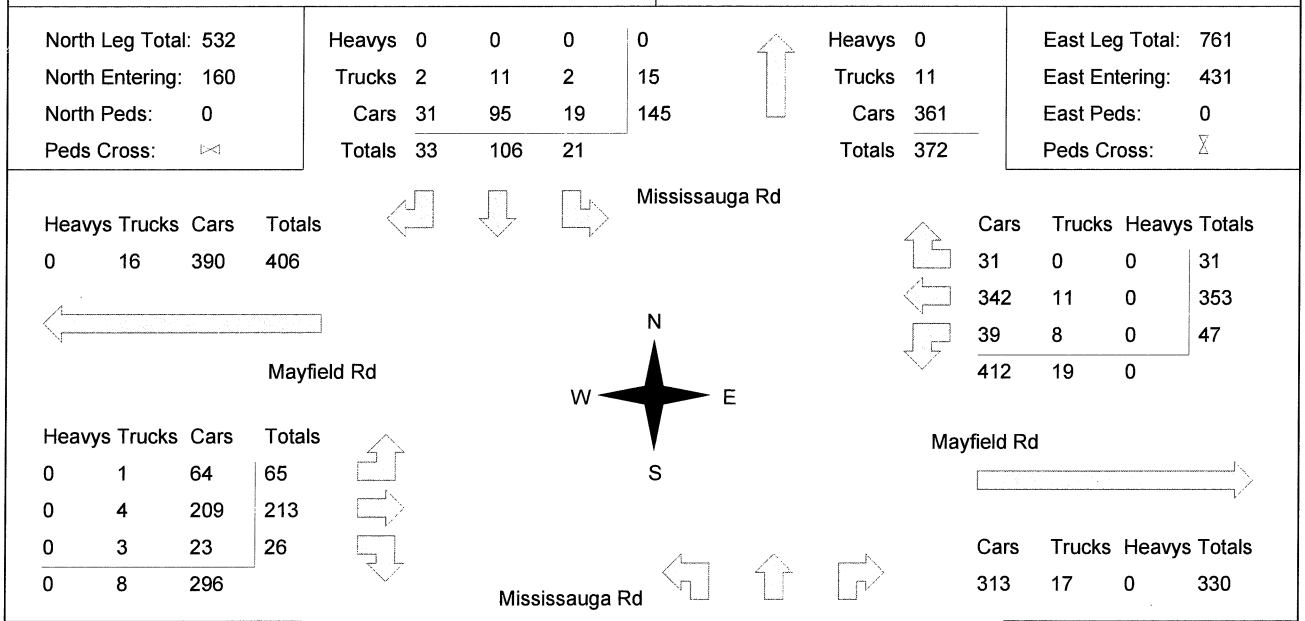
Municipality: Peel
Site #: 0012533700
Intersection: Mississauga Rd & Mayfield Rd
TFR File #: 4
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Mississauga Rd runs N/S



Comments

Ontario Traffic Inc

Total Count Diagram

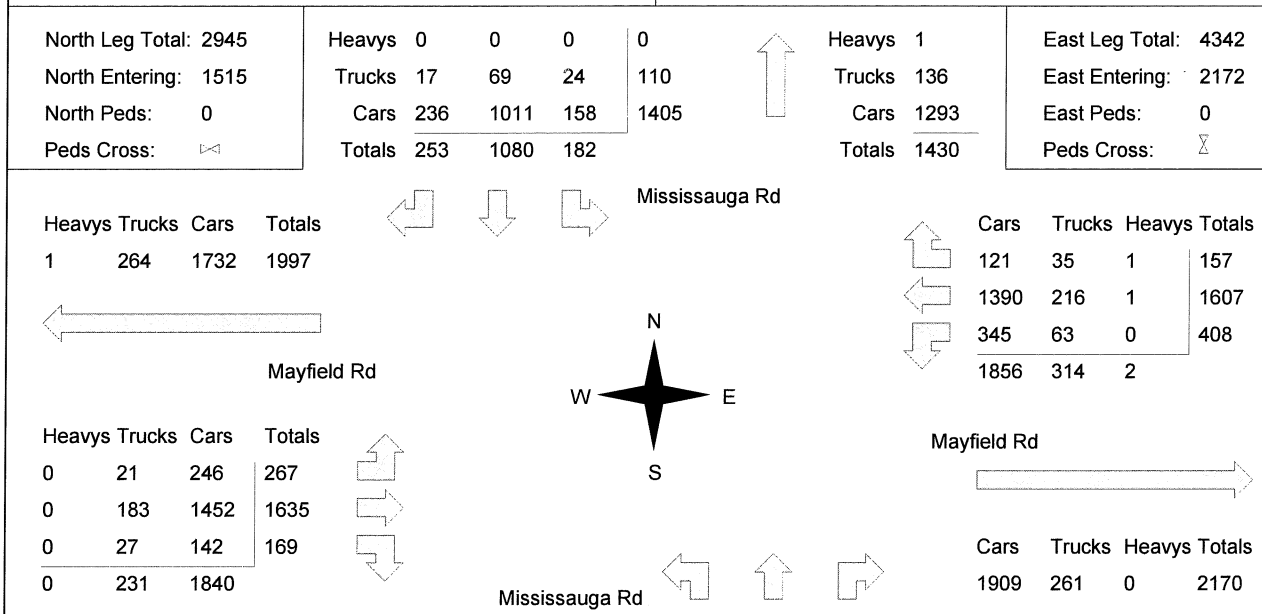
Municipality: Peel
Site #: 0012533700
Intersection: Mississauga Rd & Mayfield Rd
TFR File #: 4
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Mississauga Rd runs N/S



Comments

Ontario Traffic Inc
Traffic Count Summary

Intersection: Mississauga Rd & Mayfield Rd | **Count Date:** 30-Sep-08 | **Municipality:** Peel

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	1	8	0	9	0
8:00:00	42	364	67	473	0
9:00:00	32	261	49	342	0
11:00:00	0	3	0	3	0
12:00:00	15	68	23	106	0
13:00:00	26	60	14	100	0
14:00:00	13	71	13	97	0
15:00:00	0	2	0	2	0
16:00:00	12	67	21	100	0
17:00:00	19	95	30	144	0
18:00:00	22	81	36	139	0
Totals:	182	1080	253	1515	0

North/South Total Approaches: 3011

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	13	61	29	103	0
9:00:00	13	45	27	85	0
11:00:00	0	0	0	0	0
12:00:00	12	59	23	94	0
13:00:00	17	50	25	92	0
14:00:00	17	83	31	131	0
15:00:00	0	1	2	3	0
16:00:00	21	171	48	240	0
17:00:00	27	269	72	368	0
18:00:00	17	267	96	380	0
Totals:	137	1006	353	1496	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	3	0	1	4	0
8:00:00	91	233	13	337	0
9:00:00	93	188	13	294	0
11:00:00	2	5	1	8	0
12:00:00	20	110	12	142	0
13:00:00	29	87	17	133	0
14:00:00	30	128	18	176	0
15:00:00	0	3	1	4	0
16:00:00	39	204	23	266	0
17:00:00	42	309	21	372	0
18:00:00	57	332	37	426	0
Totals:	406	1599	157	2162	0

East/West Total Approaches: 4233

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	39	443	40	522	0
9:00:00	33	307	28	368	0
11:00:00	0	0	0	0	0
12:00:00	15	105	16	136	0
13:00:00	14	96	17	127	0
14:00:00	16	139	11	166	0
15:00:00	0	0	0	0	0
16:00:00	33	130	9	172	0
17:00:00	55	193	26	274	0
18:00:00	62	222	22	306	0
Totals:	267	1635	169	2071	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	573	433	145	139	185	276	406	451

Ontario Traffic Inc

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:15:00
To: 8:15:00

Municipality: Peel
Site #: 0012409352
Intersection: Mississauga Rd & Walness Dr
TFR File #: 5
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Mississauga Rd runs N/S

North Leg Total:	636			
North Entering:	507			
North Peds:	0			
Peds Cross:	⋈			
Heavys	0	16	0	16
Trucks	0	4	1	5
Cars	7	444	35	486
Totals	7	464	36	
Heavys	20			
Trucks	1			
Cars	108			
Totals	129			
East Leg Total:	353			
East Entering:	199			
East Peds:	0			
Peds Cross:	⋈			

Mississauga Rd

Heavys	Trucks	Cars	Totals
0	0	123	123

Walness Dr

Heavys	Trucks	Cars	Totals
0	0	1	1
1	1	87	89
0	0	1	1
1	1	89	

Cars	Trucks	Heavys	Totals
6	0	0	6
115	0	0	115
77	1	0	78
198	1	0	

N
W E
S

Walness Dr

Cars	Trucks	Heavys	Totals
150	3	1	154

Mississauga Rd

Peds Cross:	⋈			
West Peds:	0			
West Entering:	91			
West Leg Total:	214			
Cars	522			
Trucks	5			
Heavys	16			
Totals	543			
Cars	1	101	28	130
Trucks	0	1	1	2
Heavys	0	20	0	20
Totals	1	122	29	
Peds Cross:	⋈			
South Peds:	0			
South Entering:	152			
South Leg Total:	695			

Comments

Ontario Traffic Inc

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 11:45:00
To: 12:45:00

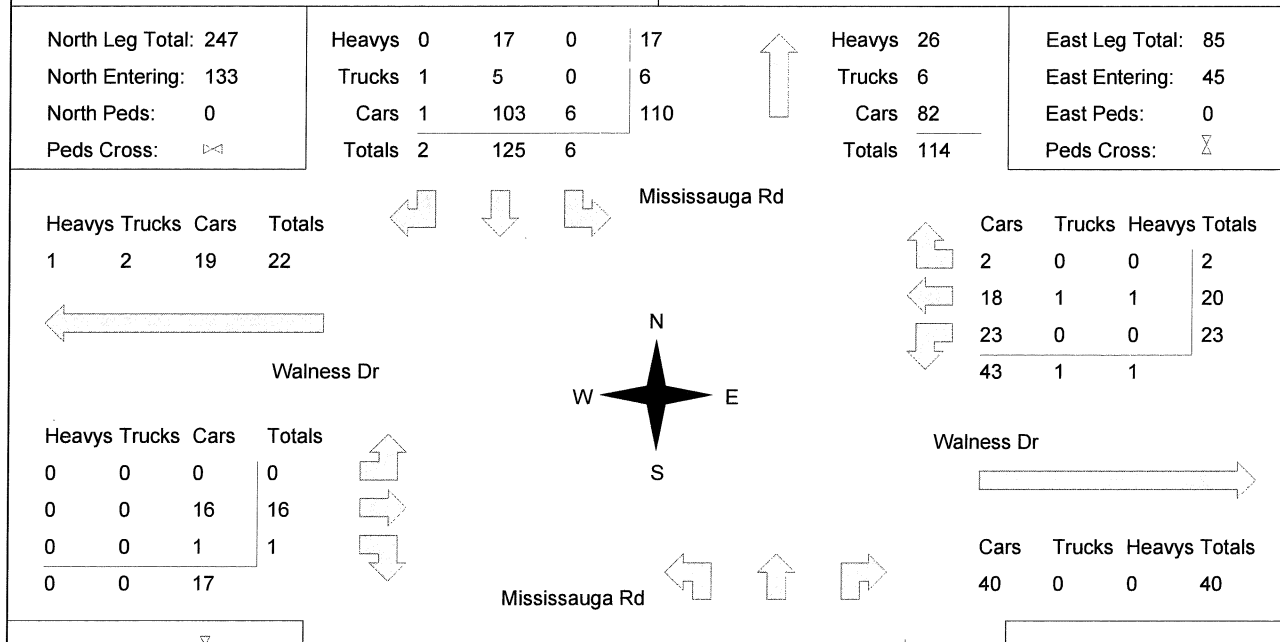
Municipality: Peel
Site #: 0012409352
Intersection: Mississauga Rd & Walness Dr
TFR File #: 5
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Mississauga Rd runs N/S



Comments

Ontario Traffic Inc

Afternoon Peak Diagram

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

One Hour Peak
From: 16:45:00
To: 17:45:00

Municipality: Peel
Site #: 0012409352
Intersection: Mississauga Rd & Walness Dr
TFR File #: 5
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Mississauga Rd runs N/S

North Leg Total: 595
North Entering: 190
North Peds: 0
Peds Cross:

Heavys	0	12	0	12
Trucks	0	4	0	4
Cars	6	163	5	174
Totals	6	179	5	

Heavys	16
Trucks	9
Cars	380
Totals	405

East Leg Total: 251
East Entering: 79
East Peds: 1
Peds Cross:

Mississauga Rd

Heavys	Trucks	Cars	Totals
0	0	56	56

Walness Dr

Heavys	Trucks	Cars	Totals
0	0	5	5
0	1	73	74
0	0	2	2
0	1	80	

N
W E
S

Cars	Trucks	Heavys	Totals
8	0	0	8
48	0	0	48
23	0	0	23
79	0	0	

Walness Dr

Cars	Trucks	Heavys	Totals
171	1	0	172

Mississauga Rd

Peds Cross:
West Peds: 0
West Entering: 81
West Leg Total: 137

Cars	188			
Trucks	4			
Heavys	12			
Totals	204			

Cars	2	367	93	462
Trucks	0	9	0	9
Heavys	0	16	0	16
Totals	2	392	93	

Peds Cross:
South Peds: 0
South Entering: 487
South Leg Total: 691

Comments

Ontario Traffic Inc

Total Count Diagram

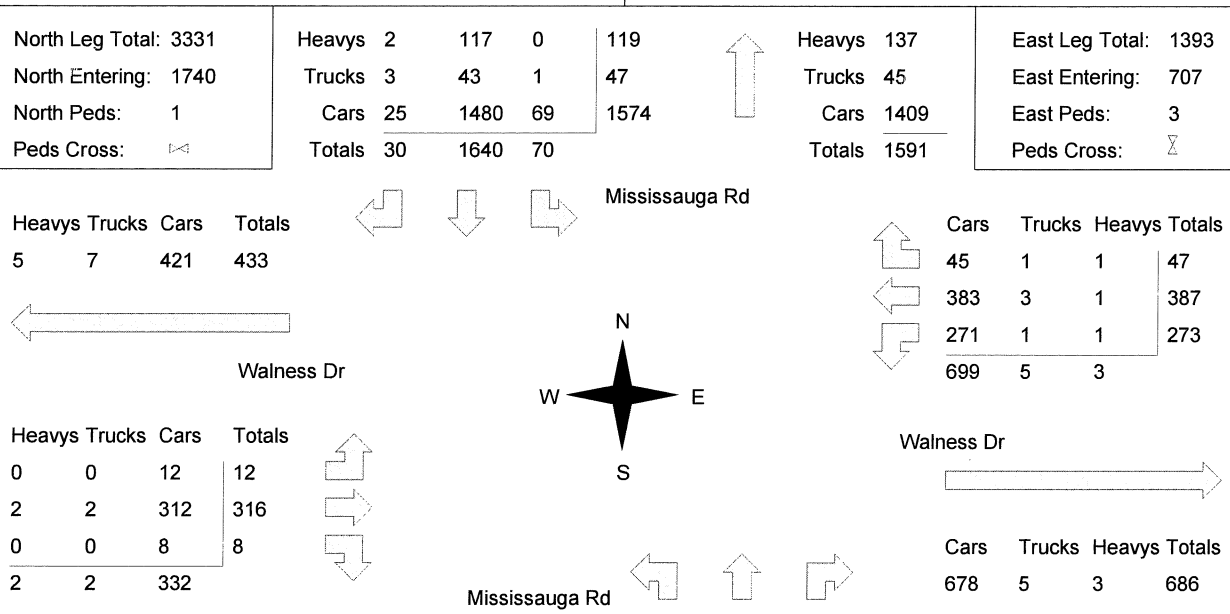
Municipality: Peel
Site #: 0012409352
Intersection: Mississauga Rd & Walness Dr
TFR File #: 5
Count date: 30-Sep-08

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Mississauga Rd runs N/S



Comments

Ontario Traffic Inc
Traffic Count Summary

Intersection: Mississauga Rd & Walness Dr | **Count Date:** 30-Sep-08 | **Municipality:** Peel

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	24	471	7	502	0	660
9:00:00	19	358	3	380	0	499
11:00:00	0	0	0	0	0	0
12:00:00	6	118	2	126	0	250
13:00:00	4	127	3	134	0	265
14:00:00	4	110	1	115	1	245
15:00:00	0	0	0	0	0	0
16:00:00	0	148	6	154	0	464
17:00:00	6	143	5	154	0	551
18:00:00	7	165	3	175	0	654
Totals:	70	1640	30	1740	1	3588

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	0	131	27	158	0
9:00:00	2	95	22	119	0
11:00:00	0	0	0	0	0
12:00:00	0	105	19	124	0
13:00:00	2	116	13	131	0
14:00:00	1	113	16	130	0
15:00:00	0	0	0	0	0
16:00:00	5	261	44	310	0
17:00:00	3	327	67	397	0
18:00:00	3	384	92	479	0
Totals:	16	1532	300	1848	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	86	115	7	208	0	275
9:00:00	62	64	3	129	1	180
11:00:00	0	0	0	0	0	0
12:00:00	12	17	3	32	0	50
13:00:00	24	15	0	39	0	56
14:00:00	18	22	3	43	0	60
15:00:00	0	0	0	0	0	0
16:00:00	25	54	10	89	1	124
17:00:00	26	50	11	87	0	134
18:00:00	20	50	10	80	1	164
Totals:	273	387	47	707	3	1043

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	0	65	2	67	0
9:00:00	4	46	1	51	0
11:00:00	0	0	0	0	0
12:00:00	1	16	1	18	0
13:00:00	0	16	1	17	0
14:00:00	0	17	0	17	0
15:00:00	0	0	0	0	0
16:00:00	1	34	0	35	0
17:00:00	4	42	1	47	0
18:00:00	2	80	2	84	0
Totals:	12	316	8	336	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	201	130	30	40	41	80	80	102

Ontario Traffic Inc

Count Date: 30-Sep-08
Intersection: Mississauga Rd & Walness Dr
Municipality: Peel
Major Road: Mississauga Rd
Major Road Runs: N/S one lane each way
Operating Speed of Major Road: km/hr
Operating under free flow conditions

Warrant #1: Minimum Vehicular Volumes.

A. All Approaches. **Not Satisfied**

No. of Lanes	Minimum Requirements					Hours Ending								Percentage Warrant
	1 Lane Each Way		2 Lanes Each Way		3 Lanes									
Flow Condition	1 Lane F. Flow (Code 1)	1 Lane R. Flow (Code 2)	2 Lane F. Flow (Code 3)	2 Lane R. Flow (Code 4)	or More R. Flow (Code 5)	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00	
100%	480	720	600	900	1125	935	679	300	321	305	588	685	818	100%
80%	385	575	480	720	900									Yes: No: X
All Approaches	100% Fulfilled					100	100				100	100	100	500
	80% Fulfilled													0
	Actual % if Below 80%							63	67	64				193
													Total:	693
													Actual Average (Total/8):	87%

B. Minor Street Both Approaches.

100%	120	170	120	170	170	275	180	50	56	60	124	134	164	100%
80%	95	135	95	135	135									Yes: No: X
Minor Street Both Approaches	100% Fulfilled					100	100				100	100	100	500
	80% Fulfilled													0
	Actual % if Below 80%							42	47	50				138
													Total:	638
													Actual Average (Total/8):	80%

Ontario Traffic Inc

Count Date: 30-Sep-08
Intersection: Mississauga Rd & Walness Dr **Municipality:** Peel
Major Road: Mississauga Rd **Major Road Runs:** N/S one lane each way
Operating Speed of Major Road: km/hr **Operating under free flow conditions**

Warrant #2: Delay to Cross Traffic.

A. Major Street Both Approaches. **Not Satisfied**

No. of Lanes	Minimum Requirements					Hours Ending								
	1 Lane Each Way		2 Lanes Each Way		3 Lanes									
Flow Condition	1 Lane F. Flow (Code 1)	1 Lane R. Flow (Code 2)	2 Lane F. Flow (Code 3)	2 Lane R. Flow (Code 4)	or More R. Flow (Code 5)	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00	Percentage Warrant
100%	480	720	600	900	1125	660	499	250	265	245	464	551	654	100%
80%	385	575	480	720	900									Yes: No: X
All Approaches	100% Fulfilled					100	100					100	100	400
	80% Fulfilled										80			80
	Actual % if Below 80%							52	55	51				158

Total:	638
Actual Average (Total/8):	80%

B. Traffic Crossing Major Street.

100%	50	75	50	75	75	201	130	30	40	41	80	80	102	100%
80%	40	60	40	60	60									Yes: No: X
All Approaches	100% Fulfilled					100	100				100	100	100	500
	80% Fulfilled								80	80				160
	Actual % if Below 80%							60						60

Total:	720
Actual Average (Total/8):	90%

Appendix B

Capacity and Level of Service Definitions

AECOM

LEVEL OF SERVICE

CAPACITY ANALYSIS AT UNSIGNALIZED INTERSECTIONS
Highway Capacity Manual Methodology

The level of service at an unsignalized intersection is determined on the basis of control delay for each critical lane. This method of analysis is taken from the Highway Capacity Manual, Special Report 209, by the Transportation Research Board, 2000.

The average control delay for any particular critical movement (control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay) is a function of the service rate or capacity of the approach and degree of saturation. The level of service criteria for unsignalized intersections is outlined below and is related to ranges in vehicle delay.

Level of Service	Expected Delay to Minor Street Traffic	Average Control Delay 'd' (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	$d > 50$

AECOM

LEVEL OF SERVICE

CAPACITY ANALYSIS AT SIGNALIZED INTERSECTIONS
Highway Capacity Manual Methodology

The capacity of signalized intersections has been determined in terms of delay taken from the Highway Capacity Manual, by the Transportation Research Board, 2000.

To assist in clarifying the arithmetic analysis associated with traffic engineering, it is often useful to refer to "Level of Service". 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:

Level of Service	Features	Control Delay (sec/veh)
A	Describes operations with very low control delay, up to 10 seconds/ vehicle. 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.	**≤ 10**
B	Describes operations with control delay greater than 10 seconds and up to 20 seconds/vehicle. 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 to 20**
C	Describes operations with control delay greater than 20 seconds and up to 35 seconds/vehicle. These higher delays may result from fair progression, longer cycle lengths, 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 to 35**
D	Describes operations with control delay greater than 35 seconds and up to 55 seconds/vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures become noticeable.	**> 35 to 55**
E	Describes operations with control delay greater than 55 seconds and up to 80 seconds/vehicle. 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 to 80**
F	Describes operations with control delay in excess of 80 seconds/vehicle. This *oversaturation*, considered to be unacceptable to most drivers, 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.	**> 80**

Appendix C

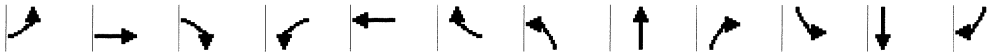
2008 Intersection Capacity Calculations AM/ PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	670	269	312	490	7	79	115	189	24	490	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	5.6	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	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.91		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	1824	1566	1716	1821		1750	1664		1716	1821	
Flt Permitted	0.48	1.00	1.00	0.08	1.00		0.12	1.00		0.51	1.00	
Satd. Flow (perm)	794	1824	1566	148	1821		214	1664		926	1821	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	670	269	312	490	7	79	115	189	24	490	8
RTOR Reduction (vph)	0	0	128	0	0	0	0	49	0	0	1	0
Lane Group Flow (vph)	14	670	141	312	497	0	79	255	0	24	497	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Perm	pm+pt			pm+pt			Perm		
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	45.7	45.7	45.7	66.7	66.7		40.1	40.1		31.4	31.4	
Effective Green, g (s)	49.3	49.3	46.7	66.7	70.3		40.1	43.7		35.0	35.0	
Actuated g/C Ratio	0.41	0.41	0.39	0.56	0.59		0.33	0.36		0.29	0.29	
Clearance Time (s)	6.6	6.6	6.6	3.0	6.6		3.0	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	326	749	609	317	1067		144	606		270	531	
v/s Ratio Prot		0.37		c0.15	0.27		c0.03	0.15			c0.27	
v/s Ratio Perm	0.02		0.09	c0.40			0.16			0.03		
v/c Ratio	0.04	0.89	0.23	0.98	0.47		0.55	0.42		0.09	0.94	
Uniform Delay, d1	21.2	32.9	24.6	38.2	14.2		31.9	28.6		30.9	41.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.73	0.85	
Incremental Delay, d2	0.1	14.0	0.4	46.2	0.7		14.2	2.1		0.6	25.1	
Delay (s)	21.3	46.9	25.0	84.4	14.8		46.1	30.8		23.3	60.2	
Level of Service	C	D	C	F	B		D	C		C	E	
Approach Delay (s)		40.4			41.7			33.9			58.5	
Approach LOS		D			D			C			E	

Intersection Summary			
HCM Average Control Delay	43.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		

Description: Bovaird Dr. W

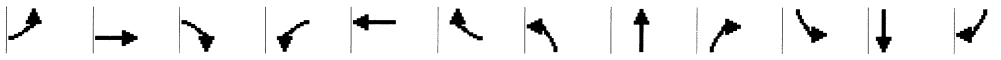
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	1	89	1	78	115	6	1	122	29	36	464	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	89	1	78	115	6	1	122	29	36	464	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	742	692	468	724	682	136	471			151		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	742	692	468	724	682	136	471			151		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	75	100	71	69	99	100			97		
cM capacity (veh/h)	246	357	600	271	365	917	1101			1424		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	91	199	152	507
Volume Left	1	78	1	36
Volume Right	1	6	29	7
cSH	357	327	1101	1424
Volume to Capacity	0.25	0.61	0.00	0.03
Queue Length 95th (m)	7.6	28.7	0.0	0.6
Control Delay (s)	18.5	31.8	0.1	0.8
Lane LOS	C	D	A	A
Approach Delay (s)	18.5	31.8	0.1	0.8
Approach LOS	C	D		

Intersection Summary				
Average Delay	8.9			
Intersection Capacity Utilization	62.5%	ICU Level of Service	B	
Analysis Period (min)	15			

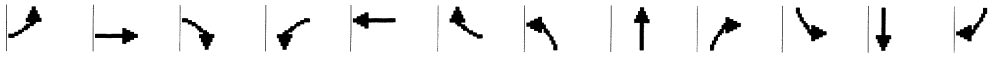


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	468	43	108	244	18	14	59	25	50	350	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		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		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1722		1623	1630		1750	1566		1653	1770	
Flt Permitted	0.49	1.00		0.25	1.00		0.41	1.00		0.70	1.00	
Satd. Flow (perm)	909	1722		419	1630		747	1566		1222	1770	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	41	468	43	108	244	18	14	59	25	50	350	64
RTOR Reduction (vph)	0	4	0	0	3	0	0	9	0	0	4	0
Lane Group Flow (vph)	41	507	0	108	259	0	14	75	0	50	410	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	47.0	47.0		47.0	47.0		59.8	59.8		59.8	59.8	
Effective Green, g (s)	50.6	50.6		50.6	50.6		63.4	63.4		63.4	63.4	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.53	0.53		0.53	0.53	
Clearance Time (s)	6.6	6.6		6.6	6.6		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	383	726		177	687		395	827		646	935	
v/s Ratio Prot		c0.29			0.16			0.05			c0.23	
v/s Ratio Perm	0.05			0.26			0.02			0.04		
v/c Ratio	0.11	0.70		0.61	0.38		0.04	0.09		0.08	0.44	
Uniform Delay, d1	21.0	28.4		27.0	23.9		13.6	14.0		13.9	17.4	
Progression Factor	1.00	1.00		1.00	1.00		0.62	0.55		1.00	1.00	
Incremental Delay, d2	0.3	3.7		8.7	0.7		0.2	0.2		0.2	1.5	
Delay (s)	21.3	32.2		35.7	24.6		8.6	7.9		14.2	18.9	
Level of Service	C	C		D	C		A	A		B	B	
Approach Delay (s)		31.4			27.8			8.0			18.4	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

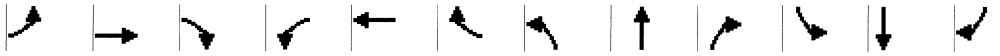


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	582	100	211	744	41	173	376	241	23	172	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	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	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1668	1842	1479	1716	1829		1750	1724		1785	1701	
Flt Permitted	0.17	1.00	1.00	0.09	1.00		0.47	1.00		0.21	1.00	
Satd. Flow (perm)	298	1842	1479	169	1829		865	1724		390	1701	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	582	100	211	744	41	173	376	241	23	172	25
RTOR Reduction (vph)	0	0	0	0	2	0	0	18	0	0	4	0
Lane Group Flow (vph)	45	582	100	211	783	0	173	599	0	23	193	0
Heavy Vehicles (%)	7%	2%	8%	4%	2%	0%	2%	3%	2%	0%	9%	4%
Turn Type	Perm		Free	pm+pt			pm+pt			Perm		
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		Free	8			2			6		
Actuated Green, G (s)	42.0	42.0	120.0	58.9	58.9		47.9	47.9		35.4	35.4	
Effective Green, g (s)	45.6	45.6	120.0	58.9	62.5		47.9	51.5		39.0	39.0	
Actuated g/C Ratio	0.38	0.38	1.00	0.49	0.52		0.40	0.43		0.32	0.32	
Clearance Time (s)	6.6	6.6		3.0	6.6		3.0	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		3.0	5.0		3.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	113	700	1479	262	953		415	740		127	553	
v/s Ratio Prot		0.32		0.09	c0.43		0.03	c0.35			0.11	
v/s Ratio Perm	0.15		0.07	0.30			0.13			0.06		
v/c Ratio	0.40	0.83	0.07	0.81	0.82		0.42	0.81		0.18	0.35	
Uniform Delay, d1	27.2	33.7	0.0	30.0	24.1		24.5	30.0		29.0	30.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.80	0.81	
Incremental Delay, d2	4.8	9.2	0.1	16.3	6.5		0.7	9.3		3.1	1.7	
Delay (s)	31.9	42.9	0.1	46.3	30.6		25.2	39.3		26.4	26.7	
Level of Service	C	D	A	D	C		C	D		C	C	
Approach Delay (s)		36.4			33.9			36.2			26.7	
Approach LOS		D			C			D			C	

Intersection Summary				
HCM Average Control Delay	34.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	107.0%	ICU Level of Service	G	
Analysis Period (min)	15			

Description: Bovaird Dr. W

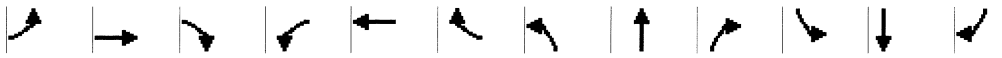
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	5	74	2	23	48	8	2	392	93	5	179	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	74	2	23	48	8	2	392	93	5	179	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	666	681	182	674	638	438	185			485		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	666	681	182	674	638	438	185			485		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	80	100	93	88	99	100			100		
cM capacity (veh/h)	335	372	866	312	395	623	1402			1088		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	81	79	487	190
Volume Left	5	23	2	5
Volume Right	2	8	93	6
cSH	374	380	1402	1088
Volume to Capacity	0.22	0.21	0.00	0.00
Queue Length 95th (m)	6.2	5.9	0.0	0.1
Control Delay (s)	17.3	17.0	0.0	0.3
Lane LOS	C	C	A	A
Approach Delay (s)	17.3	17.0	0.0	0.3
Approach LOS	C	C		

Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	44.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	213	26	47	353	31	20	276	96	21	106	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		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		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1814		1526	1806		1552	1707		1623	1662	
Flt Permitted	0.27	1.00		0.46	1.00		0.66	1.00		0.48	1.00	
Satd. Flow (perm)	490	1814		735	1806		1082	1707		819	1662	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	65	213	26	47	353	31	20	276	96	21	106	33
RTOR Reduction (vph)	0	5	0	0	4	0	0	6	0	0	6	0
Lane Group Flow (vph)	65	234	0	47	380	0	20	366	0	21	133	0
Heavy Vehicles (%)	2%	2%	1%	17%	3%	0%	15%	4%	11%	10%	10%	6%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	34.6	34.6		34.6	34.6		72.2	72.2		72.2	72.2	
Effective Green, g (s)	38.2	38.2		38.2	38.2		75.8	75.8		75.8	75.8	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.63	0.63		0.63	0.63	
Clearance Time (s)	6.6	6.6		6.6	6.6		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	156	577		234	575		683	1078		517	1050	
v/s Ratio Prot		0.13			c0.21			c0.21			0.08	
v/s Ratio Perm	0.13			0.06			0.02			0.03		
v/c Ratio	0.42	0.40		0.20	0.66		0.03	0.34		0.04	0.13	
Uniform Delay, d1	32.1	32.0		29.8	35.3		8.3	10.4		8.4	8.8	
Progression Factor	1.00	1.00		1.00	1.00		0.53	0.49		1.00	1.00	
Incremental Delay, d2	3.7	1.0		0.9	3.8		0.1	0.6		0.1	0.2	
Delay (s)	35.9	33.0		30.7	39.1		4.5	5.7		8.5	9.1	
Level of Service	D	C		C	D		A	A		A	A	
Approach Delay (s)		33.6			38.2			5.6			9.0	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

Appendix D

Collision Report Summary

Traffic Engineering Software

Region of Peel

7/7/2010

ACCIDENT ANALYSIS BY LOCATION REPORT

Consice Report

FROM: January 01, 2002 TO: December 31, 2009

INTERSECTION ID: INT_7352 MUNICIPALITY:BRAMPTON DESCRIPTIONBOVAIRD DR W @ MISSISSAUGA RD

Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
02164297	12-Sep-02 8:55a	Clear	Daylight	Dry	Rear end	Non-fatal injury
02168554	18-Sep-02 2:05a	Clear	Daylight	Dry	SMV - Other	P.D. only
03208957	31-Oct-03 7:39a	Clear	Dark	Dry	Rear end	P.D. only
03219377	15-Nov-03 5:46p	Clear	Dark	Dry	Turning movement	Non-fatal injury
03239344	13-Dec-03 7:00p	Rain	Dark	Wet	Rear end	P.D. only
04097947	24-May-04 12:50p	Clear	Daylight	Dry	Rear end	P.D. only
04152050	02-Aug-04 6:30p	Clear	Daylight	Dry	Rear end	P.D. only
04156462	08-Aug-04 4:32p	Clear	Daylight	Dry	Turning movement	Non-fatal injury
04232446	22-Nov-04 7:29p	Clear	Dark	Dry	Rear end	Non-fatal injury
05070549	19-Apr-05 3:22p	Clear	Daylight	Dry	Turning movement	P.D. only
05080910	05-May-05 8:20a	Clear	Daylight	Dry	Sideswipe	P.D. only
05160818	03-Aug-05 6:50a	Rain	Dark	Wet	Turning movement	P.D. only
05168983S	03-Aug-05 11:30a	Clear	Daylight	Dry	Rear end	P.D. only
05160539	18-Aug-05 8:00p	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
05176639	09-Sep-05 2:12a	Clear	Dark	Dry	SMV - Other	P.D. only
05219220	08-Nov-05 8:40a	Clear	Daylight	Dry	Rear end	Non-fatal injury
05243275	13-Dec-05 11:30a	Clear	Daylight	Dry	Rear end	P.D. only
05250364	23-Dec-05 1:06p	Clear	Daylight	Wet	Angle (t-bone)	P.D. only
06014529	25-Jan-06 6:01a	Rain	Dawn	Wet	SMV - Other	P.D. only
06082244S	07-May-06 7:25p	Clear	Daylight	Dry	Rear end	P.D. only
06098801S	29-May-06 9:30p	Clear	Dusk	Dry	Sideswipe	P.D. only
06128784S	07-Jul-06 3:45p	Clear	Daylight	Dry	Rear end	P.D. only
06154949S	10-Aug-06 9:40a	Clear	Daylight	Dry	Rear end	P.D. only
06193709	03-Oct-06 3:04a	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
06197432	08-Oct-06 3:20p	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
06197525S	08-Oct-06 4:45p	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
07022854	06-Feb-07 12:43p	Clear	Daylight	Dry	Turning movement	P.D. only
07028613	15-Feb-07 3:14p	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
07030842	19-Feb-07 7:30a	Clear	Daylight	Dry	Rear end	P.D. only
07039116	03-Mar-07 8:54a	Clear	Daylight	Wet	Sideswipe	P.D. only
07042560	08-Mar-07 11:50a	Clear	Daylight	Dry	Sideswipe	P.D. only
07050472	30-Mar-07 4:53p	Clear	Daylight	Dry	Angle (t-bone)	Non-fatal injury

INTERSECTION ID: INT_7352 **MUNICIPALITY:BRAMPTON** **DESCRIPTIONBOVAIRD DR W @ MISSISSAUGA RD**

Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
07068779	18-Apr-07 3:30p	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
07077982S	01-May-07 4:48a	Clear	Daylight	Dry	Sideswipe	P.D. only
07088537	16-May-07 3:34p	Rain	Daylight	Wet	Rear end	P.D. only
07088662	16-May-07 4:50p	Rain	Daylight	Wet	Rear end	P.D. only
07101696S	03-Jun-07 10:30a	Clear	Daylight	Dry	Rear end	P.D. only
07101724	03-Jun-07 12:18p	Clear	Daylight	Dry	Rear end	P.D. only
07102231	04-Jun-07 7:41a	Rain	Daylight	Wet	Rear end	P.D. only
07124808	03-Jul-07 11:04a	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
07133244	14-Jul-07 12:21p	Clear	Daylight	Dry	Angle (t-bone)	Non-fatal injury
07150054	05-Aug-07 6:30p	Clear	Daylight	Dry	Rear end	P.D. only
07166679	27-Aug-07 11:26a	Clear	Dark	Dry	SMV - Other	P.D. only
07167818	29-Aug-07 2:56p	Clear	Daylight	Dry	Turning movement	P.D. only
07221517S	13-Nov-07 6:00p	Clear	Dark	Dry	Rear end	P.D. only
07235569	06-Dec-07 10:20a	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
07244564	20-Dec-07 8:20a	Clear	Daylight	Wet	Angle (t-bone)	P.D. only
07248302	26-Dec-07 10:47a	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
08000720	02-Jan-08 9:45a	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
08024358	08-Feb-08 11:30a	Clear	Daylight	Wet	Rear end	P.D. only
08027941	13-Feb-08 4:28p	Clear	Daylight	Wet	Rear end	P.D. only
08037702	28-Feb-08 3:18p	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
08048172	15-Mar-08 12:45p	Clear	Daylight	Dry	Rear end	P.D. only
08049504	17-Mar-08 4:15p	Clear	Daylight	Dry	Sideswipe	P.D. only
08054809	26-Mar-08 1:30p	Clear	Daylight	Dry	Angle (t-bone)	Non-fatal injury
08079809	03-May-08 2:40a	Fog, mist, smoke, dust	Dark	Wet	Approaching (head on)	P.D. only
08084758	10-May-08 11:46a	Clear	Daylight	Dry	Turning movement	P.D. only
08092736	21-May-08 9:23p	Clear	Dark	Dry	Turning movement	P.D. only
08096584	27-May-08 7:30a	Clear	Daylight	Dry	Turning movement	Other
08107283	10-Jun-08 8:30a	Rain	Daylight	Wet	Sideswipe	P.D. only
08112426	17-Jun-08 8:58a	Clear	Daylight	Dry	Turning movement	Non-fatal injury
08112531	17-Jun-08 11:45a	Clear	Daylight	Dry	Rear end	P.D. only
08049446	17-Jun-08 3:51p	Clear	Daylight	Dry	Angle (t-bone)	Non-fatal injury
08120271	27-Jun-08 3:25p	Clear	Daylight	Dry	Rear end	P.D. only
08120318	27-Jun-08 4:20p	Clear	Daylight	Dry	Angle (t-bone)	Non-fatal injury
08138615	22-Jul-08 8:40a	Clear	Daylight	Dry	Rear end	P.D. only
08201358	27-Aug-08 5:20p	Clear	Daylight	Dry	Rear end	P.D. only
08192860	05-Oct-08 4:51p	Clear	Daylight	Dry	Rear end	P.D. only
08199407	15-Oct-08 6:00a	Clear	Dark	Dry	SMV - animal or pedestrian	P.D. only
08202134	18-Oct-08 3:35p	Clear	Daylight	Dry	Rear end	P.D. only

INTERSECTION ID: INT_7352 **MUNICIPALITY:BRAMPTON** **DESCRIPTIONBOVAIRD DR W @ MISSISSAUGA RD**

Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
08207271	27-Oct-08 4:19a	Clear	Dark	Dry	SMV - Other	P.D. only
08223316	19-Nov-08 8:31p	Snow	Dark	Ice	SMV - Other	P.D. only
09000291	01-Jan-09 11:27a	Clear	Daylight	Packed snow	Turning movement	P.D. only
09009688	17-Jan-09 10:15p	Snow	Dark	Loose snow	SMV - Other	P.D. only
09010577	19-Jan-09 8:00a	Other	Daylight	Slush	Turning movement	P.D. only
09010367	19-Jan-09 8:00a	Other	Daylight	Wet	Turning movement	P.D. only
09017016	28-Jan-09 12:00p	Other	Dawn	Packed snow	Rear end	P.D. only
09028506	18-Feb-09 1:25p	Snow	Daylight	Wet	Rear end	P.D. only
09033701	27-Feb-09 6:40a	Rain	Daylight	Wet	Turning movement	Non-fatal injury
09041155	11-Mar-09 3:30p	Clear	Daylight	Dry	Turning movement	P.D. only
09042423	13-Mar-09 5:08p	Clear	Daylight	Dry	Rear end	P.D. only
09078720	09-May-09 8:40a	Rain	Daylight	Wet	Other	P.D. only
09108955	22-Jun-09 12:01a	Clear	Dark	Dry	Rear end	P.D. only
09109037	22-Jun-09 7:52a	Clear	Daylight	Dry	Rear end	P.D. only
09124047	12-Jul-09 2:21p	Clear	Daylight	Dry	Rear end	Non-fatal injury
09148732	15-Aug-09 8:50p	Clear	Dark	Dry	SMV - Other	P.D. only
09151929	20-Aug-09 9:59a	Clear	Daylight	Dry	Rear end	P.D. only
09157369	27-Aug-09 2:53p	Clear	Daylight	Dry	Approaching (head on)	Non-fatal injury
09193186	18-Oct-09 7:41p	Clear	Dark, artificial	Dry	Angle (t-bone)	P.D. only
09206362	08-Nov-09 10:00a	Clear	Daylight	Dry	Rear end	P.D. only
09214390	21-Nov-09 3:17p	Other	Other	Other	Other	Other
09215270	23-Nov-09 8:45a	Fog, mist, smoke, dust	Other	Dry	Rear end	P.D. only
09232938	21-Dec-09 10:27p	Clear	Dark	Dry	SMV - Other	P.D. only

LOCATION TOTAL COLLISIONS: 93

INTERSECTION ID: INT_5888 **MUNICIPALITY:BRAMPTON** **DESCRIPTIONMAYFIELD RD @ MISSISSAUGA RD**

Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
020855	15-Aug-02 9:15a	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
03007694	13-Jan-03 4:50p	Clear	Dusk	Wet	Rear end	P.D. only
037694	13-Jan-03 5:30p	Snow	Dusk	Loose snow	Rear end	P.D. only
030873	24-Jul-03 9:45p	Other	Other	Other	Other	Other
05000804	22-Jul-05 11:15a	Clear	Daylight	Dry	Angle (t-bone)	P.D. only
06174379S	05-Sep-06 5:30p	Clear	Daylight	Dry	Rear end	P.D. only
08000020	07-Jan-08 4:51p	Fog, mist, smoke, dust	Dark	Wet	Rear end	P.D. only
08016264	26-Jan-08 7:10p	Snow	Dark, artificial	Wet	Rear end	Non-fatal injury
09000665	25-May-09 10:34a	Clear	Daylight	Dry	Other	P.D. only
09001319	19-Nov-09 1:50p	Fog, mist, smoke, dust	Daylight	Wet	Approaching (head on)	Non-fatal injury

LOCATION TOTAL COLLISIONS: 10

INTERSECTION ID: INT_6391 **MUNICIPALITY:BRAMPTON** **DESCRIPTIONMISSISSAUGA RD @ WANLESS DR**

Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
04213227	26-Oct-04 6:53a	Fog, mist, smoke, dust	Dark	Dry	SMV - Other	P.D. only
04233999	24-Nov-04 6:30a	Rain	Dark	Wet	SMV - Other	P.D. only
05007878	14-Jan-05 7:50a	Clear	Daylight	Dry	SMV - Other	P.D. only
05157281	14-Aug-05 2:50a	Clear	Dark	Dry	SMV - animal or pedestrian	P.D. only
07040280	05-Mar-07 8:15a	Rain	Daylight	Ice	Approaching (head on)	Non-fatal injury
08124863	03-Jul-08 5:45a	Clear	Daylight	Dry	Angle (t-bone)	Non-fatal injury
08135895	18-Jul-08 9:55a	Clear	Daylight	Dry	Turning movement	P.D. only
08183426	22-Sep-08 6:57a	Clear	Daylight	Dry	Rear end	P.D. only
08188026	28-Sep-08 5:27p	Clear	Daylight	Dry	Rear end	P.D. only
08198382	13-Oct-08 7:36p	Clear	Dark	Dry	Angle (t-bone)	P.D. only
08198576	14-Oct-08 7:06a	Clear	Daylight	Dry	Turning movement	P.D. only

LOCATION TOTAL COLLISIONS: 11

MIDBLOCK ID: 914 **MUNICIPALITY:BRAMPTON** **DESCRIPTIONMISSISSAUGA RD btwn BOVAIRD DR W & WANLESS DR**

Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
02003302	06-Jan-02 7:00p	Snow	Dark	Ice	SMV - Other	P.D. only
02027326	27-Feb-02 12:00p	Clear	Daylight	Loose sand or gravel	Sideswipe	P.D. only
02111768	30-Jun-02 12:20p	Clear	Daylight	Dry	Rear end	P.D. only
02227788	16-Dec-02 8:45a	Clear	Daylight	Ice	Approaching (head on)	Non-fatal injury
03003794	08-Jan-03 6:25a	Clear	Dark	Wet	Angle (t-bone)	P.D. only
04029685	13-Feb-04 9:07a	Clear	Daylight	Loose snow	SMV - Other	P.D. only
04224367	10-Nov-04 8:10a	Clear	Dark	Dry	Turning movement	P.D. only
05006839	12-Jan-05 2:16p	Rain	Daylight	Wet	SMV - Other	Non-fatal injury
05011653	20-Jan-05 12:15p	Clear	Daylight	Dry	Rear end	P.D. only
05052080	22-Mar-05 7:55a	Clear	Daylight	Dry	Rear end	P.D. only
05148177	27-Jul-05 9:20p	Clear	Dark	Dry	Rear end	P.D. only
05225702	17-Nov-05 6:33p	Clear	Dark	Wet	Rear end	P.D. only
05249793	22-Dec-05 5:35p	Snow	Dark	Loose snow	SMV - Other	P.D. only
06012799	07-Feb-06 9:30a	Clear	Daylight	Ice	Rear end	P.D. only
07040471	05-Mar-07 12:00p	Snow	Daylight	Loose snow	Rear end	Non-fatal injury
07043865	10-Mar-07 7:31a	Freezing rain	Daylight	Ice	SMV - Other	Non-fatal injury
07109139	13-Jun-07 8:25a	Clear	Daylight	Dry	Rear end	P.D. only
07157788	16-Aug-07 9:07a	Clear	Daylight	Dry	SMV - Other	P.D. only
07240766	14-Dec-07 7:30a	Snow	Daylight	Ice	Rear end	P.D. only
08009843	16-Jan-08 5:20p	Clear	Dark	Dry	Rear end	P.D. only
08027223	12-Feb-08 5:30p	Snow	Daylight	Ice	SMV - Other	P.D. only
08031271	18-Feb-08 9:04p	Snow	Dark	Ice	SMV - Other	P.D. only
08073896	24-Apr-08 8:00a	Clear	Daylight	Dry	Rear end	P.D. only
08193153	06-Oct-08 5:03a	Clear	Dark	Dry	Rear end	P.D. only
08213216	04-Nov-08 11:40a	Clear	Dusk	Dry	Rear end	Non-fatal injury
09048181	23-Mar-09 9:14a	Clear	Daylight	Dry	Rear end	P.D. only
09108663	21-Jun-09 5:15p	Clear	Daylight	Dry	Rear end	Non-fatal injury
09109461	22-Jun-09 5:21p	Clear	Daylight	Dry	Turning movement	Non-fatal injury
09127692	17-Jul-09 7:44a	Clear	Daylight	Dry	Rear end	P.D. only
09145741	11-Aug-09 9:02p	Clear	Dark	Dry	SMV - Other	P.D. only
09160296	31-Aug-09 5:50p	Clear	Daylight	Dry	Rear end	P.D. only

LOCATION TOTAL COLLISIONS: 31

MIDBLOCK ID: 375 **MUNICIPALITY:BRAMPTON** **DESCRIPTIONMISSISSAUGA RD btwn WANLESS DR & MAYFIELD RD**

Accident ID	Date & Time	Environment Condition 1	Light	Road 1 Surface Condition	Initial Impact Type	Classification of Accident
05123541	30-Jun-05 5:20p	Clear	Daylight	Dry	Rear end	P.D. only
06013127	22-Jan-06 7:41p	Clear	Dark	Dry	SMV - Other	P.D. only
07162887	23-Aug-07 2:24a	Rain	Dark	Wet	SMV - animal or pedestrian	P.D. only
09237041	29-Dec-09 10:05a	Clear	Daylight	Dry	Sideswipe	P.D. only

LOCATION TOTAL COLLISIONS: 4

Appendix E

Signal Warrant Analysis

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES

Location **East-West Collector Road** at **Mississauga Road**
Year **2018**

Free Flow or Restricted Flow Conditions? R (F / R)

WARRANT	DESCRIPTION	MINIMUM REQUIREMTENT FOR >2 LANE HIGHWAYS		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL NUMERICAL	SECTIONAL %	ENTIRE %
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	978	100	35
	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	89	35	
DELAY TO CROSS TRAFFIC	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	889	100	100
	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	91	100	

WARRANTED

Notes:

1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
4 The lowest sectional percentage governs the entire warrant.
5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
6 The crossing volumes is defined as:
(a) Left turns form both minor street approaches
(b) The heaviest through volume from the minor street
(c) 50% of the heavier left turn movement from major street when both of the following are met:
    (I) the left turn volume > 120 vph
    (ii) the left turn volume plus the opposing volume > 720 vph
(d) Pedestrian crossing the major street

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES

Location **Sandalwood Parkway** at **Mississauga Road**
Year **2018**

Free Flow or Restricted Flow Conditions? R (F / R)

WARRANT	DESCRIPTION	MINIMUM REQUIREMTENT FOR 2 LANE HIGHWAYS		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL NUMERICAL	SECTIONAL %	ENTIRE %
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	480	720	979	100	100
	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	269	100	
DELAY TO CROSS TRAFFIC	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	480	720	710	99	99
	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	177	100	

WARRANTED

Notes:

1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
4 The lowest sectional percentage governs the entire warrant.
5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
6 The crossing volumes is defined as:
(a) Left turns form both minor street approaches
(b) The heaviest through volume from the minor street
(c) 50% of the heavier left turn movement from major street when both of the following are met:
(I) the left turn volume > 120 vph
(ii) the left turn volume plus the opposing volume > 720 vph
(d) Pedestrian crossing the major street

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES

Location **Wanless Drive** at **Mississauga Road**
Year **2018**

Free Flow or Restricted Flow Conditions? R (F / R)

WARRANT	DESCRIPTION	MINIMUM REQUIREMTENT FOR 2 LANE HIGHWAYS		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL NUMERICAL	SECTIONAL %	ENTIRE %
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	480	720	806	100	87
	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	221	87	
DELAY TO CROSS TRAFFIC	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	480	720	585	81	81
	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	212	100	

WARRANTED

Notes:

1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
4 The lowest sectional percentage governs the entire warrant.
5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
6 The crossing volumes is defined as:
(a) Left turns form both minor street approaches
(b) The heaviest through volume from the minor street
(c) 50% of the heavier left turn movement from major street when both of the following are met:
(I) the left turn volume > 120 vph
(ii) the left turn volume plus the opposing volume > 720 vph
(d) Pedestrian crossing the major street

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES

Location **Buick Boulevard** at **Mississauga Road**
Year **2031**

Free Flow or Restricted Flow Conditions? R (F / R)

WARRANT	DESCRIPTION	MINIMUM REQUIREMTENT FOR >2 LANE HIGHWAYS		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL NUMERICAL	SECTIONAL %	ENTIRE %
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	1277	100	29
	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	74	29	
DELAY TO CROSS TRAFFIC	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	1203	100	83
	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	62	83	

NOT WARRANTED

Notes:

1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
4 The lowest sectional percentage governs the entire warrant.
5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
6 The crossing volumes is defined as:
(a) Left turns form both minor street approaches
(b) The heaviest through volume from the minor street
(c) 50% of the heavier left turn movement from major street when both of the following are met:
    (I) the left turn volume > 120 vph
    (ii) the left turn volume plus the opposing volume > 720 vph
(d) Pedestrian crossing the major street

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES

Location **Collector Road C** at **Mississauga Road**
Year **2031**

Free Flow or Restricted Flow Conditions? R (F / R)

WARRANT	DESCRIPTION	MINIMUM REQUIREMTENT FOR >2 LANE HIGHWAYS		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL NUMERICAL	SECTIONAL %	ENTIRE %
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	1422	100	21
	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	55	21	
DELAY TO CROSS TRAFFIC	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	1368	100	59
	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	45	59	

NOT WARRANTED

Notes:

1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
4 The lowest sectional percentage governs the entire warrant.
5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
6 The crossing volumes is defined as:
(a) Left turns form both minor street approaches
(b) The heaviest through volume from the minor street
(c) 50% of the heavier left turn movement from major street when both of the following are met:
    (I) the left turn volume > 120 vph
    (ii) the left turn volume plus the opposing volume > 720 vph
(d) Pedestrian crossing the major street

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES

Location **Collector Road D** at **Mississauga Road**
Year **2031**

Free Flow or Restricted Flow Conditions? R (F / R)

WARRANT	DESCRIPTION	MINIMUM REQUIREMTENT FOR >2 LANE HIGHWAYS		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL NUMERICAL	SECTIONAL %	ENTIRE %
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	945	100	19
	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	48	19	
DELAY TO CROSS TRAFFIC	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	896	100	57
	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	43	57	

NOT WARRANTED

Notes:

1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
4 The lowest sectional percentage governs the entire warrant.
5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
6 The crossing volumes is defined as:
(a) Left turns form both minor street approaches
(b) The heaviest through volume from the minor street
(c) 50% of the heavier left turn movement from major street when both of the following are met:
    (I) the left turn volume > 120 vph
    (ii) the left turn volume plus the opposing volume > 720 vph
(d) Pedestrian crossing the major street

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES

Location **Collector Road F** at **Mississauga Road**
Year **2031**

Free Flow or Restricted Flow Conditions? R (F / R)

WARRANT	DESCRIPTION	MINIMUM REQUIREMTENT FOR >2 LANE HIGHWAYS		COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	SECTIONAL NUMERICAL	SECTIONAL %	ENTIRE %
MINIMUM VEHICULAR VOLUME	1A. VEHICLE VOLUME, ALL APPROACHES (AVERAGE HOUR)	600	720	853	100	17
	1B. VEHCILE VOLUME, ALONG MINOR STREETS, (AVERAGE HOUR)	180	255	43	17	
DELAY TO CROSS TRAFFIC	2A. VEHICLE VOLUME, ALONG ARTERY, (AVERAGE HOUR)	600	720	809	100	46
	2B. COMBINED VEHICLE AND PEDESTRIAN VOLUME CROSSING ARTERY ROM MINOR STREETS, (AVERAGE HOUR)	50	75	34	46	

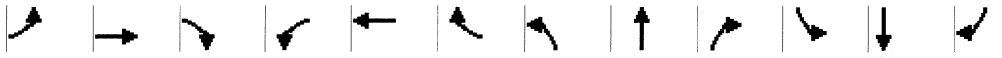
NOT WARRANTED

Notes:

1 Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one directions should be 25% higher than the values given above.
2 Warrant values for free flow apply when the 85% percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.
3 Warrant values for restricted flow apply to large urban communities when the 85 percentile speed of artery traffic does not exceed 70 km/h.
4 The lowest sectional percentage governs the entire warrant.
5 For 'T' intersections the warrant values for minor street should be increased by 50% (Warrant 1B only)
6 The crossing volumes is defined as:
(a) Left turns form both minor street approaches
(b) The heaviest through volume from the minor street
(c) 50% of the heavier left turn movement from major street when both of the following are met:
(I) the left turn volume > 120 vph
(ii) the left turn volume plus the opposing volume > 720 vph
(d) Pedestrian crossing the major street

Appendix F

2018 Intersection Capacity Calculations – Do Nothing Scenario



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	698	68	160	367	43	21	122	37	86	546	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	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	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	1824	1566	1716	1801		1750	1764		1716	1791	
Flt Permitted	0.50	1.00	1.00	0.09	1.00		0.09	1.00		0.66	1.00	
Satd. Flow (perm)	832	1824	1566	154	1801		157	1764		1186	1791	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	698	68	160	367	43	21	122	37	86	546	95
RTOR Reduction (vph)	0	0	0	0	3	0	0	9	0	0	5	0
Lane Group Flow (vph)	61	698	68	160	407	0	21	150	0	86	636	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	pm+pt			pm+pt			Perm		
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		Free	8			2			6		
Actuated Green, G (s)	44.0	44.0	120.0	57.0	57.0		49.8	49.8		44.0	44.0	
Effective Green, g (s)	47.6	47.6	120.0	57.0	60.6		49.8	53.4		47.6	47.6	
Actuated g/C Ratio	0.40	0.40	1.00	0.48	0.50		0.42	0.44		0.40	0.40	
Clearance Time (s)	6.6	6.6		3.0	6.6		3.0	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	330	724	1566	203	910		102	785		470	710	
v/s Ratio Prot		c0.38		c0.07	0.23		0.00	c0.09			c0.36	
v/s Ratio Perm	0.07		0.04	0.31			0.08			0.07		
v/c Ratio	0.18	0.96	0.04	0.79	0.45		0.21	0.19		0.18	0.90	
Uniform Delay, d1	23.6	35.4	0.0	27.8	19.0		27.6	20.2		23.5	33.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.89	0.87	
Incremental Delay, d2	0.6	25.1	0.1	20.6	0.7		2.1	0.5		0.1	1.9	
Delay (s)	24.1	60.5	0.1	48.4	19.7		29.7	20.7		21.1	31.5	
Level of Service	C	E	A	D	B		C	C		C	C	
Approach Delay (s)		52.8			27.8			21.8			30.2	
Approach LOS		D			C			C			C	

Intersection Summary					
HCM Average Control Delay	37.1	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.90				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	98.4%	ICU Level of Service		F	
Analysis Period (min)	15				
Description: Bovaird Dr. W					

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	105	10	349	24	7	1572
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	105	10	349	24	7	1572
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						306
pX, platoon unblocked	0.32					
vC, conflicting volume	1947	361			373	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2918	361			373	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	99			99	
cM capacity (veh/h)	5	684			1185	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	115	373	1579
Volume Left	105	0	7
Volume Right	10	24	0
cSH	6	1700	1185
Volume to Capacity	19.72	0.22	0.01
Queue Length 95th (m)	Err	0.0	0.1
Control Delay (s)	Err	0.0	0.7
Lane LOS	F		A
Approach Delay (s)	Err	0.0	0.7
Approach LOS	F		

Intersection Summary			
Average Delay	556.8		
Intersection Capacity Utilization	106.4%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	529	123	250	125	258	1110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frt	1.00	0.85	0.96			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	1750	1566	1759			1825
Flt Permitted	0.95	1.00	1.00			0.78
Satd. Flow (perm)	1750	1566	1759			1436
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	529	123	250	125	258	1110
RTOR Reduction (vph)	0	77	15	0	0	0
Lane Group Flow (vph)	529	46	360	0	0	1368
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	24.0	24.0	82.0			82.0
Effective Green, g (s)	28.0	28.0	86.0			86.0
Actuated g/C Ratio	0.23	0.23	0.72			0.72
Clearance Time (s)	7.0	7.0	7.0			7.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	408	365	1261			1029
v/s Ratio Prot	c0.30		0.20			
v/s Ratio Perm		0.03				c0.95
v/c Ratio	1.30	0.13	0.29			1.33
Uniform Delay, d1	46.0	36.3	6.1			17.0
Progression Factor	1.00	1.00	0.90			0.33
Incremental Delay, d2	150.6	0.2	0.6			150.7
Delay (s)	196.6	36.5	6.0			156.4
Level of Service	F	D	A			F
Approach Delay (s)	166.4		6.0			156.4
Approach LOS	F		A			F

Intersection Summary			
HCM Average Control Delay	135.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	132.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	203	17	318	70	14	1180
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	203	17	318	70	14	1180
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1561	353			388	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1561	353			388	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	98			99	
cM capacity (veh/h)	122	691			1170	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	220	388	1194
Volume Left	203	0	14
Volume Right	17	70	0
cSH	130	1700	1170
Volume to Capacity	1.69	0.23	0.01
Queue Length 95th (m)	123.9	0.0	0.3
Control Delay (s)	400.8	0.0	0.4
Lane LOS	F		A
Approach Delay (s)	400.8	0.0	0.4
Approach LOS	F		

Intersection Summary			
Average Delay	49.2		
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	9	178	7	231	223	13	10	243	81	58	955	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.85			1.00			1.00	
Frt		1.00			1.00			0.97			1.00	
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)		1832			1547			1739			1796	
Flt Permitted		0.98			0.68			0.97			0.96	
Satd. Flow (perm)		1792			1079			1681			1731	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	178	7	231	223	13	10	243	81	58	955	38
RTOR Reduction (vph)	0	1	0	0	1	0	0	9	0	0	1	0
Lane Group Flow (vph)	0	193	0	0	466	0	0	325	0	0	1050	0
Confl. Peds. (#/hr)				188		10						
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		44.0			44.0			62.0			62.0	
Effective Green, g (s)		48.0			48.0			66.0			66.0	
Actuated g/C Ratio		0.40			0.40			0.55			0.55	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		717			432			925			952	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.43			0.19			c0.61	
v/c Ratio		0.27			1.08			0.35			1.10	
Uniform Delay, d1		24.2			36.0			15.1			27.0	
Progression Factor		1.00			1.00			1.06			0.51	
Incremental Delay, d2		0.2			66.3			1.0			58.0	
Delay (s)		24.4			102.3			17.0			71.6	
Level of Service		C			F			B			E	
Approach Delay (s)		24.4			102.3			17.0			71.6	
Approach LOS		C			F			B			E	

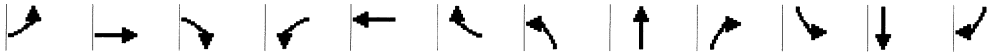
Intersection Summary			
HCM Average Control Delay	65.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	123.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	698	68	160	367	43	21	122	37	86	546	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.4	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1720		1623	1627		1750	1584		1653	1772	
Flt Permitted	0.52	1.00		0.07	1.00		0.12	1.00		0.50	1.00	
Satd. Flow (perm)	961	1720		124	1627		215	1584		878	1772	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	698	68	160	367	43	21	122	37	86	546	95
RTOR Reduction (vph)	0	3	0	0	3	0	0	9	0	0	5	0
Lane Group Flow (vph)	61	763	0	160	407	0	21	150	0	86	636	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			pm+pt			Perm			pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	52.0	52.0		65.9	65.9		30.7	30.7		40.9	40.9	
Effective Green, g (s)	55.6	55.6		65.9	69.5		34.3	34.3		44.5	44.5	
Actuated g/C Ratio	0.46	0.46		0.55	0.58		0.29	0.29		0.37	0.37	
Clearance Time (s)	6.6	6.6		3.0	6.6		6.6	6.6		7.0	6.6	
Vehicle Extension (s)	5.0	5.0		3.0	5.0		5.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	445	797		204	942		61	453		370	657	
v/s Ratio Prot		c0.44		c0.07	0.25			0.09		0.01	c0.36	
v/s Ratio Perm	0.06			0.36			0.10			0.07		
v/c Ratio	0.14	0.96		0.78	0.43		0.34	0.33		0.23	0.97	
Uniform Delay, d1	18.5	31.1		31.1	14.2		33.9	33.8		25.4	37.1	
Progression Factor	1.00	1.00		1.00	1.00		0.70	0.66		1.00	1.00	
Incremental Delay, d2	0.3	22.4		17.7	0.7		13.9	1.8		0.3	28.1	
Delay (s)	18.7	53.4		48.7	14.8		37.6	24.2		25.7	65.1	
Level of Service	B	D		D	B		D	C		C	E	
Approach Delay (s)		50.9			24.4			25.8			60.5	
Approach LOS		D			C			C			E	

Intersection Summary			
HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	105.1%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Mayfield Rd			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	1297	148	385	1500	147	256	1572	494	127	759	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	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	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	1824	1566	1716	1804		1750	1763		1716	1813	
Flt Permitted	0.09	1.00	1.00	0.09	1.00		0.08	1.00		0.08	1.00	
Satd. Flow (perm)	150	1824	1566	167	1804		146	1763		142	1813	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	70	1297	148	385	1500	147	256	1572	494	127	759	42
RTOR Reduction (vph)	0	0	0	0	3	0	0	9	0	0	2	0
Lane Group Flow (vph)	70	1297	148	385	1644	0	256	2057	0	127	799	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	pm+pt			pm+pt			Perm		
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		Free	8			2			6		
Actuated Green, G (s)	40.4	40.4	130.0	57.4	57.4		59.4	59.4		47.4	47.4	
Effective Green, g (s)	44.0	44.0	130.0	57.4	61.0		59.4	63.0		51.0	51.0	
Actuated g/C Ratio	0.34	0.34	1.00	0.44	0.47		0.46	0.48		0.39	0.39	
Clearance Time (s)	6.6	6.6		3.0	6.6		3.0	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	51	617	1566	241	846		178	854		56	711	
v/s Ratio Prot		c0.71		0.17	c0.91		0.10	c1.17			0.44	
v/s Ratio Perm	0.47		0.09	0.54			0.56			0.90		
v/c Ratio	1.37	2.10	0.09	1.60	1.94		1.44	2.41		2.27	1.12	
Uniform Delay, d1	43.0	43.0	0.0	39.2	34.5		36.0	33.5		39.5	39.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	253.6	501.5	0.1	287.6	429.0		226.1	637.6		623.2	73.3	
Delay (s)	296.6	544.5	0.1	326.7	463.5		262.1	671.1		662.7	112.8	
Level of Service	F	F	A	F	F		F	F		F	F	
Approach Delay (s)		479.8			437.6			626.0			188.0	
Approach LOS		F			F			F			F	

Intersection Summary				
HCM Average Control Delay	477.3	HCM Level of Service	F	
HCM Volume to Capacity ratio	2.25			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	229.0%	ICU Level of Service	H	
Analysis Period (min)	15			

Description: Bovaird Dr. W

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	40	12	1428	98	9	586
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	40	12	1428	98	9	586
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						315
pX, platoon unblocked						
vC, conflicting volume	2081	1477			1526	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2081	1477			1526	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	30	92			98	
cM capacity (veh/h)	57	155			437	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	52	1526	595
Volume Left	40	0	9
Volume Right	12	98	0
cSH	67	1700	437
Volume to Capacity	0.78	0.90	0.02
Queue Length 95th (m)	27.2	0.0	0.5
Control Delay (s)	154.0	0.0	0.6
Lane LOS	F		A
Approach Delay (s)	154.0	0.0	0.6
Approach LOS	F		

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	416	260	994	567	129	333
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0			3.0
Lane Util. Factor	1.00	1.00	1.00			1.00
Frt	1.00	0.85	0.95			1.00
Flt Protected	0.95	1.00	1.00			0.99
Satd. Flow (prot)	1750	1566	1752			1817
Flt Permitted	0.95	1.00	1.00			0.09
Satd. Flow (perm)	1750	1566	1752			170
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	416	260	994	567	129	333
RTOR Reduction (vph)	0	206	17	0	0	0
Lane Group Flow (vph)	416	54	1544	0	0	462
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	6.0	6.0	100.0			100.0
Effective Green, g (s)	10.0	10.0	104.0			104.0
Actuated g/C Ratio	0.08	0.08	0.87			0.87
Clearance Time (s)	7.0	7.0	7.0			7.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	146	131	1518			147
v/s Ratio Prot	c0.24		0.88			
v/s Ratio Perm		0.03				c2.71
v/c Ratio	2.85	0.41	1.02			3.14
Uniform Delay, d1	55.0	52.2	8.0			8.0
Progression Factor	1.00	1.00	1.00			1.99
Incremental Delay, d2	850.8	2.1	27.5			981.3
Delay (s)	905.8	54.3	35.5			997.3
Level of Service	F	D	D			F
Approach Delay (s)	578.3		35.5			997.3
Approach LOS	F		D			F

Intersection Summary			
HCM Average Control Delay	336.1	HCM Level of Service	F
HCM Volume to Capacity ratio	3.11		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	144.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	81	23	1083	256	16	455
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	81	23	1083	256	16	455
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1698	1211			1339	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1698	1211			1339	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	18	90			97	
cM capacity (veh/h)	98	222			515	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	104	1339	471
Volume Left	81	0	16
Volume Right	23	256	0
cSH	112	1700	515
Volume to Capacity	0.93	0.79	0.03
Queue Length 95th (m)	43.7	0.0	0.7
Control Delay (s)	137.5	0.0	0.9
Lane LOS	F		A
Approach Delay (s)	137.5	0.0	0.9
Approach LOS	F		

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	31	154	12	101	136	19	13	774	318	11	358	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			0.90			1.00			1.00	
Frt		0.99			0.99			0.96			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1820			1623			1732			1789	
Flt Permitted		0.92			0.71			0.99			0.97	
Satd. Flow (perm)		1682			1170			1723			1730	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	154	12	101	136	19	13	774	318	11	358	37
RTOR Reduction (vph)	0	3	0	0	4	0	0	7	0	0	2	0
Lane Group Flow (vph)	0	194	0	0	252	0	0	1098	0	0	404	0
Confl. Peds. (#/hr)				188		10						
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		29.5			29.5			76.5			76.5	
Effective Green, g (s)		33.5			33.5			80.5			80.5	
Actuated g/C Ratio		0.28			0.28			0.67			0.67	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		470			327			1156			1161	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.22			c0.64			0.23	
v/c Ratio		0.41			0.77			0.95			0.35	
Uniform Delay, d1		35.2			39.7			17.9			8.5	
Progression Factor		1.00			1.00			1.20			1.44	
Incremental Delay, d2		0.6			10.8			9.2			0.8	
Delay (s)		35.8			50.5			30.7			13.0	
Level of Service		D			D			C			B	
Approach Delay (s)		35.8			50.5			30.7			13.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	315	38	70	532	66	35	462	142	47	193	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		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		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1712		1623	1627		1750	1583		1653	1759	
Flt Permitted	0.18	1.00		0.41	1.00		0.55	1.00		0.25	1.00	
Satd. Flow (perm)	329	1712		694	1627		1012	1583		437	1759	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	96	315	38	70	532	66	35	462	142	47	193	49
RTOR Reduction (vph)	0	4	0	0	4	0	0	9	0	0	7	0
Lane Group Flow (vph)	96	349	0	70	594	0	35	595	0	47	235	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	48.4	48.4		48.4	48.4		58.4	58.4		58.4	58.4	
Effective Green, g (s)	52.0	52.0		52.0	52.0		62.0	62.0		62.0	62.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.52	0.52		0.52	0.52	
Clearance Time (s)	6.6	6.6		6.6	6.6		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	143	742		301	705		523	818		226	909	
v/s Ratio Prot		0.20			c0.37			c0.38			0.13	
v/s Ratio Perm	0.29			0.10			0.03			0.11		
v/c Ratio	0.67	0.47		0.23	0.84		0.07	0.73		0.21	0.26	
Uniform Delay, d1	27.2	24.2		21.4	30.3		14.5	22.5		15.7	16.2	
Progression Factor	1.00	1.00		1.00	1.00		1.52	1.41		1.00	1.00	
Incremental Delay, d2	15.0	1.0		0.8	9.9		0.1	2.3		2.1	0.7	
Delay (s)	42.2	25.2		22.3	40.3		22.2	33.9		17.8	16.9	
Level of Service	D	C		C	D		C	C		B	B	
Approach Delay (s)		28.8			38.4			33.3			17.0	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM Average Control Delay	31.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

Appendix G

2031 Intersection Capacity Calculations – Do Nothing Scenario

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	1992	663	894	1538	48	195	641	500	92	2292	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	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	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.93		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	1824	1566	1716	1817		1750	1712		1716	1822	
Flt Permitted	0.08	1.00	1.00	0.08	1.00		0.08	1.00		0.08	1.00	
Satd. Flow (perm)	132	1824	1566	146	1817		143	1712		139	1822	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	1992	663	894	1538	48	195	641	500	92	2292	23
RTOR Reduction (vph)	0	0	0	0	1	0	0	20	0	0	0	0
Lane Group Flow (vph)	38	1992	663	894	1585	0	195	1121	0	92	2315	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	pm+pt			pm+pt			Perm		
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		Free	8			2			6		
Actuated Green, G (s)	46.4	46.4	140.0	68.4	68.4		58.4	58.4		48.4	48.4	
Effective Green, g (s)	50.0	50.0	140.0	68.4	72.0		58.4	62.0		52.0	52.0	
Actuated g/C Ratio	0.36	0.36	1.00	0.49	0.51		0.42	0.44		0.37	0.37	
Clearance Time (s)	6.6	6.6		3.0	6.6		3.0	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	47	651	1566	284	934		140	758		52	677	
v/s Ratio Prot		1.09		c0.43	0.87		0.07	c0.65			c1.27	
v/s Ratio Perm	0.29		0.42	c1.11			0.51			0.66		
v/c Ratio	0.81	3.06	0.42	3.15	1.70		1.39	1.48		1.77	3.42	
Uniform Delay, d1	40.7	45.0	0.0	45.4	34.0		34.9	39.0		44.0	44.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	69.7	931.0	0.8	975.8	318.3		214.4	222.6		412.9	1092.5	
Delay (s)	110.4	976.0	0.8	1021.1	352.3		249.3	261.6		456.9	1136.5	
Level of Service	F	F	A	F	F		F	F		F	F	
Approach Delay (s)		723.7			593.4			259.8			1110.5	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	722.4	HCM Level of Service	F
HCM Volume to Capacity ratio	3.07		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	300.5%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Bovaird Dr. W			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	0	0	105	0	10	0	483	24	7	2086	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	105	0	10	0	483	24	7	2086	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											303	
pX, platoon unblocked	0.30	0.30	0.30	0.30	0.30		0.30					
vC, conflicting volume	2605	2607	2086	2595	2595	495	2086			507		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	5235	5242	3481	5201	5201	495	3481			507		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	98	100			99		
cM capacity (veh/h)	0	0	3	0	0	575	22			1058		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	115	507	2093
Volume Left	0	105	0	7
Volume Right	0	10	24	0
cSH	1700	0	22	1058
Volume to Capacity	0.00	2000.69	0.00	0.01
Queue Length 95th (m)	0.0	Err	0.0	0.2
Control Delay (s)	0.0	Err	0.0	0.0
Lane LOS	A	F		A
Approach Delay (s)	0.0	Err	0.0	0.0
Approach LOS	A	F		

Intersection Summary			
Average Delay	423.6		
Intersection Capacity Utilization	133.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	155	184	434	136	253	49	273	280	473	1350	99
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	0.92		1.00	0.90			0.94			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1750	1692		1750	1662			1719			1807	
Flt Permitted	0.36	1.00		0.41	1.00			0.81			0.63	
Satd. Flow (perm)	672	1692		764	1662			1400			1153	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	155	184	434	136	253	49	273	280	473	1350	99
RTOR Reduction (vph)	0	20	0	0	56	0	0	26	0	0	1	0
Lane Group Flow (vph)	21	319	0	434	333	0	0	576	0	0	1921	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	47.0	47.0		47.0	47.0			59.0			59.0	
Effective Green, g (s)	51.0	51.0		51.0	51.0			63.0			63.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.52			0.52	
Clearance Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	286	719		325	706			735			605	
v/s Ratio Prot		0.19			0.20							
v/s Ratio Perm	0.03			c0.57				0.41			c1.67	
v/c Ratio	0.07	0.44		1.34	0.47			0.78			3.17	
Uniform Delay, d1	20.5	24.5		34.5	24.8			23.0			28.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.32	
Incremental Delay, d2	0.1	0.4		170.4	0.5			8.2			978.9	
Delay (s)	20.6	24.9		204.9	25.3			31.2			1016.6	
Level of Service	C	C		F	C			C			F	
Approach Delay (s)		24.6			120.0			31.2			1016.6	
Approach LOS		C			F			C			F	

Intersection Summary			
HCM Average Control Delay	561.2	HCM Level of Service	F
HCM Volume to Capacity ratio	2.35		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	194.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	0	0	203	0	17	0	468	70	14	1714	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	203	0	17	0	468	70	14	1714	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2262	2280	1714	2245	2245	503	1714			538		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2262	2280	1714	2245	2245	503	1714			538		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	97	100			99		
cM capacity (veh/h)	28	39	112	29	41	569	370			1030		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	220	538	1728
Volume Left	0	203	0	14
Volume Right	0	17	70	0
cSH	1700	32	370	1030
Volume to Capacity	0.00	6.91	0.00	0.01
Queue Length 95th (m)	0.0	Err	0.0	0.3
Control Delay (s)	0.0	Err	0.0	0.1
Lane LOS	A	F		A
Approach Delay (s)	0.0	Err	0.0	0.1
Approach LOS	A	F		

Intersection Summary			
Average Delay	884.9		
Intersection Capacity Utilization	125.3%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	10	265	8	308	336	19	11	363	109	94	1412	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.97			1.00	
Flt Protected		1.00			0.98			1.00			1.00	
Satd. Flow (prot)		1834			1821			1741			1797	
Flt Permitted		0.98			0.60			0.95			0.93	
Satd. Flow (perm)		1794			1110			1661			1684	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	265	8	308	336	19	11	363	109	94	1412	45
RTOR Reduction (vph)	0	1	0	0	1	0	0	9	0	0	1	0
Lane Group Flow (vph)	0	282	0	0	662	0	0	474	0	0	1550	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		42.0			42.0			64.0			64.0	
Effective Green, g (s)		46.0			46.0			68.0			68.0	
Actuated g/C Ratio		0.38			0.38			0.57			0.57	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		688			426			941			954	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.60			0.29			c0.92	
v/c Ratio		0.41			1.55			0.50			1.62	
Uniform Delay, d1		27.1			37.0			15.8			26.0	
Progression Factor		1.00			1.00			1.13			1.00	
Incremental Delay, d2		0.4			261.0			1.5			286.0	
Delay (s)		27.5			298.0			19.3			312.0	
Level of Service		C			F			B			F	
Approach Delay (s)		27.5			298.0			19.3			312.0	
Approach LOS		C			F			B			F	

Intersection Summary			
HCM Average Control Delay	234.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	172.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	147	0	4	0	368	24	3	1404	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	147	0	4	0	368	24	3	1404	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								348				
pX, platoon unblocked	0.89	0.89		0.89	0.89	0.89				0.89		
vC, conflicting volume	1794	1802	1404	1790	1790	380	1404			392		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1831	1840	1404	1826	1826	241	1404			254		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	99	100			100		
cM capacity (veh/h)	52	67	171	53	68	710	486			1166		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	151	392	1407
Volume Left	0	147	0	3
Volume Right	0	4	24	0
cSH	1700	54	486	1166
Volume to Capacity	0.00	2.80	0.00	0.00
Queue Length 95th (m)	0.0	119.6	0.0	0.1
Control Delay (s)	0.0	974.9	0.0	0.1
Lane LOS	A	F		A
Approach Delay (s)	0.0	974.9	0.0	0.1
Approach LOS	A	F		

Intersection Summary			
Average Delay	75.6		
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	1	1	127	0	4	2	349	23	3	1264	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1	1	127	0	4	2	349	23	3	1264	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											350	
pX, platoon unblocked	0.56	0.56	0.56	0.56	0.56		0.56					
vC, conflicting volume	1638	1646	1264	1636	1634	360	1264			372		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1749	1763	1075	1745	1742	360	1075			372		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	99	0	100	99	99			100		
cM capacity (veh/h)	37	46	148	37	48	684	360			1186		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	2	131	374	1267
Volume Left	0	127	2	3
Volume Right	1	4	23	0
cSH	71	38	360	1186
Volume to Capacity	0.03	3.48	0.01	0.00
Queue Length 95th (m)	0.7	Err	0.1	0.1
Control Delay (s)	57.4	Err	0.2	0.1
Lane LOS	F	F	A	A
Approach Delay (s)	57.4	Err	0.2	0.1
Approach LOS	F	F		

Intersection Summary			
Average Delay	738.5		
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	101	1158	110	266	607	60	35	180	62	135	891	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.4	3.0		3.0	3.0		3.4	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1721		1623	1628		1750	1578		1653	1771	
Flt Permitted	0.30	1.00		0.06	1.00		0.10	1.00		0.40	1.00	
Satd. Flow (perm)	554	1721		103	1628		175	1578		694	1771	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	101	1158	110	266	607	60	35	180	62	135	891	158
RTOR Reduction (vph)	0	2	0	0	3	0	0	9	0	0	5	0
Lane Group Flow (vph)	101	1266	0	266	664	0	35	233	0	135	1044	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			pm+pt			Perm			pm+pt		
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	59.4	59.4		75.4	75.4		38.4	38.4		51.4	51.4	
Effective Green, g (s)	63.0	63.0		79.0	79.0		42.0	42.0		55.0	55.0	
Actuated g/C Ratio	0.45	0.45		0.56	0.56		0.30	0.30		0.39	0.39	
Clearance Time (s)	6.6	6.6		7.0	6.6		6.6	6.6		7.0	6.6	
Vehicle Extension (s)	5.0	5.0		3.0	5.0		5.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	249	774		195	919		53	473		338	696	
v/s Ratio Prot		c0.74		c0.12	0.41			0.15		0.03	c0.59	
v/s Ratio Perm	0.18			0.65			0.20			0.13		
v/c Ratio	0.41	1.64		1.36	0.72		0.66	0.49		0.40	1.50	
Uniform Delay, d1	25.9	38.5		46.4	22.4		42.8	40.2		29.1	42.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	291.8		193.2	3.5		49.8	3.6		0.8	232.6	
Delay (s)	28.2	330.3		239.5	25.9		92.6	43.9		29.9	275.1	
Level of Service	C	F		F	C		F	D		C	F	
Approach Delay (s)		308.0			86.8			50.0			247.1	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM Average Control Delay	215.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.55		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.4
Intersection Capacity Utilization	159.7%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	2127	246	593	2502	164	426	2092	731	118	1065	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	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	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	1824	1566	1716	1811		1750	1758		1716	1811	
Flt Permitted	0.07	1.00	1.00	0.07	1.00		0.10	1.00		0.10	1.00	
Satd. Flow (perm)	120	1824	1566	133	1811		182	1758		176	1811	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	114	2127	246	593	2502	164	426	2092	731	118	1065	67
RTOR Reduction (vph)	0	0	0	0	0	0	0	9	0	0	1	0
Lane Group Flow (vph)	114	2127	246	593	2666	0	426	2814	0	118	1131	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	pm+pt			pm+pt			Perm		
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		Free	8			2			6		
Actuated Green, G (s)	51.4	51.4	140.0	73.4	73.4		53.4	53.4		37.4	37.4	
Effective Green, g (s)	55.0	55.0	140.0	73.4	77.0		53.4	57.0		41.0	41.0	
Actuated g/C Ratio	0.39	0.39	1.00	0.52	0.55		0.38	0.41		0.29	0.29	
Clearance Time (s)	6.6	6.6		3.0	6.6		3.0	6.6		6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	47	717	1566	285	996		215	716		52	530	
v/s Ratio Prot		c1.17		0.28	c1.47		0.18	c1.60			0.62	
v/s Ratio Perm	0.95		0.16	0.81			0.57			0.67		
v/c Ratio	2.43	2.97	0.16	2.08	2.68		1.98	3.93		2.27	2.13	
Uniform Delay, d1	42.5	42.5	0.0	46.4	31.5		40.2	41.5		49.5	49.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	701.1	888.7	0.2	498.2	757.2		457.9	1322.0		627.5	516.2	
Delay (s)	743.6	931.2	0.2	544.6	788.7		498.1	1363.5		677.0	565.7	
Level of Service	F	F	A	F	F		F	F		F	F	
Approach Delay (s)		830.5			744.3			1250.0			576.2	
Approach LOS		F			F			F			F	

Intersection Summary				
HCM Average Control Delay	905.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	3.36			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	324.5%	ICU Level of Service	H	
Analysis Period (min)	15			

Description: Bovaird Dr. W

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	0	0	40	0	12	0	1883	98	9	802	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	40	0	12	0	1883	98	9	802	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											305	
pX, platoon unblocked	0.90	0.90	0.90	0.90	0.90		0.90					
vC, conflicting volume	2764	2801	802	2752	2752	1932	802			1981		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2910	2951	722	2896	2896	1932	722			1981		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	85	100			97		
cM capacity (veh/h)	7	13	383	9	14	83	789			291		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	52	1981	811
Volume Left	0	40	0	9
Volume Right	0	12	98	0
cSH	1700	11	789	291
Volume to Capacity	0.00	4.71	0.00	0.03
Queue Length 95th (m)	0.0	Err	0.0	0.7
Control Delay (s)	0.0	Err	0.0	1.2
Lane LOS	A	F		A
Approach Delay (s)	0.0	Err	0.0	1.2
Approach LOS	A	F		

Intersection Summary			
Average Delay	183.2		
Intersection Capacity Utilization	120.0%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	182	131	291	187	435	115	1153	817	234	433	68
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	0.94		1.00	0.90			0.95			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1750	1726		1750	1649			1740			1791	
Flt Permitted	0.12	1.00		0.43	1.00			0.91			0.21	
Satd. Flow (perm)	218	1726		786	1649			1591			379	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	182	131	291	187	435	115	1153	817	234	433	68
RTOR Reduction (vph)	0	22	0	0	36	0	0	19	0	0	3	0
Lane Group Flow (vph)	24	291	0	291	586	0	0	2066	0	0	732	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	44.2	44.2		44.2	44.2			61.8			61.8	
Effective Green, g (s)	48.2	48.2		48.2	48.2			65.8			65.8	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.55			0.55	
Clearance Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	88	693		316	662			872			208	
v/s Ratio Prot		0.17			0.36							
v/s Ratio Perm	0.11			c0.37				1.30			c1.93	
v/c Ratio	0.27	0.42		0.92	0.88			2.37			3.52	
Uniform Delay, d1	24.1	25.8		34.1	33.3			27.1			27.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.21	
Incremental Delay, d2	1.7	0.4		30.9	13.4			620.0			1143.4	
Delay (s)	25.8	26.2		65.0	46.7			647.1			1176.1	
Level of Service	C	C		E	D			F			F	
Approach Delay (s)		26.2			52.5			647.1			1176.1	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM Average Control Delay	557.8	HCM Level of Service	F
HCM Volume to Capacity ratio	2.42		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	170.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	0	0	81	0	23	0	1562	256	16	656	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	81	0	23	0	1562	256	16	656	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2401	2506	656	2378	2378	1690	656			1818		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2401	2506	656	2378	2378	1690	656			1818		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	80	100			95		
cM capacity (veh/h)	18	27	465	23	33	115	931			337		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	104	1818	672
Volume Left	0	81	0	16
Volume Right	0	23	256	0
cSH	1700	28	931	337
Volume to Capacity	0.00	3.72	0.00	0.05
Queue Length 95th (m)	0.0	Err	0.0	1.1
Control Delay (s)	0.0	Err	0.0	1.6
Lane LOS	A	F		A
Approach Delay (s)	0.0	Err	0.0	1.6
Approach LOS	A	F		

Intersection Summary			
Average Delay	401.3		
Intersection Capacity Utilization	115.3%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (vph)	36	226	14	124	183	27	15	1160	409	16	534	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1824			1818			1736			1792	
Flt Permitted		0.91			0.63			0.99			0.93	
Satd. Flow (perm)		1669			1169			1725			1677	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	36	226	14	124	183	27	15	1160	409	16	534	43
RTOR Reduction (vph)	0	1	0	0	3	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	275	0	0	331	0	0	1574	0	0	591	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.4			32.4			73.6			73.6	
Effective Green, g (s)		36.4			36.4			77.6			77.6	
Actuated g/C Ratio		0.30			0.30			0.65			0.65	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		506			355			1116			1084	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.28			c0.91			0.35	
v/c Ratio		0.54			0.93			1.41			0.54	
Uniform Delay, d1		34.9			40.6			21.2			11.6	
Progression Factor		1.00			1.00			1.12			1.00	
Incremental Delay, d2		1.2			30.9			185.1			2.0	
Delay (s)		36.1			71.6			208.8			13.5	
Level of Service		D			E			F			B	
Approach Delay (s)		36.1			71.6			208.8			13.5	
Approach LOS		D			E			F			B	

Intersection Summary			
HCM Average Control Delay	133.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	135.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	0	0	0	48	0	5	0	1134	89	4	545	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	48	0	5	0	1134	89	4	545	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								352				
pX, platoon unblocked	0.37	0.37		0.37	0.37	0.37				0.37		
vC, conflicting volume	1736	1776	545	1732	1732	1178	545			1223		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2141	2248	545	2128	2128	629	545			749		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	97	100			99		
cM capacity (veh/h)	13	15	538	13	18	178	1024			317		

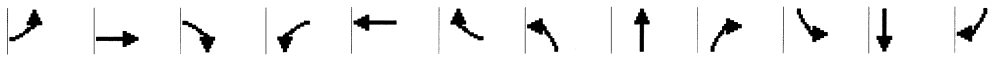
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	53	1223	549
Volume Left	0	48	0	4
Volume Right	0	5	89	0
cSH	1700	14	1024	317
Volume to Capacity	0.00	3.66	0.00	0.01
Queue Length 95th (m)	0.0	Err	0.0	0.3
Control Delay (s)	0.0	Err	0.0	0.4
Lane LOS	A	F		A
Approach Delay (s)	0.0	Err	0.0	0.4
Approach LOS	A	F		

Intersection Summary			
Average Delay	290.5		
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	2	2	47	1	6	1	1050	88	4	473	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	2	2	47	1	6	1	1050	88	4	473	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											341	
pX, platoon unblocked	0.89	0.89	0.89	0.89	0.89		0.89					
vC, conflicting volume	1584	1621	473	1580	1577	1094	473			1138		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1594	1636	344	1590	1587	1094	344			1138		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	98	100	37	99	98	100			99		
cM capacity (veh/h)	74	89	621	75	95	260	1079			614		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	4	54	1139	477
Volume Left	0	47	1	4
Volume Right	2	6	88	0
cSH	155	82	1079	614
Volume to Capacity	0.03	0.66	0.00	0.01
Queue Length 95th (m)	0.6	23.4	0.0	0.1
Control Delay (s)	28.8	109.8	0.0	0.2
Lane LOS	D	F	A	A
Approach Delay (s)	28.8	109.8	0.0	0.2
Approach LOS	D	F		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	525	64	116	879	96	54	733	237	68	297	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0		3.4	3.0		3.0	3.0		3.4	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1712		1623	1628		1750	1581		1653	1756	
Flt Permitted	0.08	1.00		0.11	1.00		0.49	1.00		0.07	1.00	
Satd. Flow (perm)	154	1712		186	1628		896	1581		126	1756	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	525	64	116	879	96	54	733	237	68	297	81
RTOR Reduction (vph)	0	3	0	0	3	0	0	9	0	0	7	0
Lane Group Flow (vph)	160	586	0	116	972	0	54	961	0	68	371	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	pm+pt			pm+pt			Perm			pm+pt		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.2	44.4		48.6	41.6		48.2	48.2		58.4	58.4	
Effective Green, g (s)	61.4	48.0		55.8	45.2		51.8	51.8		62.0	62.0	
Actuated g/C Ratio	0.47	0.37		0.43	0.35		0.40	0.40		0.48	0.48	
Clearance Time (s)	7.0	6.6		7.0	6.6		6.6	6.6		7.0	6.6	
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	237	632		197	566		357	630		140	837	
v/s Ratio Prot	c0.07	0.34		0.05	c0.60			c0.61		0.03	c0.21	
v/s Ratio Perm	0.25			0.20			0.06			0.21		
v/c Ratio	0.68	0.93		0.59	1.72		0.15	1.53		0.49	0.44	
Uniform Delay, d1	29.2	39.3		28.1	42.4		25.0	39.1		29.0	22.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.4	20.5		4.4	330.0		0.9	244.4		2.6	1.7	
Delay (s)	36.6	59.8		32.5	372.4		25.9	283.5		31.7	24.2	
Level of Service	D	E		C	F		C	F		C	C	
Approach Delay (s)		54.8			336.3			270.0			25.4	
Approach LOS		D			F			F			C	

Intersection Summary			
HCM Average Control Delay	210.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.8
Intersection Capacity Utilization	127.5%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

Appendix H

2018 Intersection Capacity Calculations – Proposed Improvements (recommended in TTMP)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	1095	398	587	853	40	117	405	314	55	1659	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1566	3466	1566	3330	3466	1597	1750	3466	1566	1716	3462	
Flt Permitted	0.33	1.00	1.00	0.95	1.00	1.00	0.07	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	546	3466	1566	3330	3466	1597	122	3466	1566	928	3462	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	1095	398	587	853	40	117	405	314	55	1659	15
RTOR Reduction (vph)	0	0	0	0	0	22	0	0	155	0	1	0
Lane Group Flow (vph)	24	1095	398	587	853	18	117	405	159	55	1673	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	Prot		Perm	pm+pt		Perm	Perm		
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		Free			8	2		2	6		
Actuated Green, G (s)	35.4	35.4	140.0	21.0	59.4	59.4	67.4	67.4	67.4	57.4	57.4	
Effective Green, g (s)	39.0	39.0	140.0	21.0	63.0	63.0	67.4	71.0	71.0	61.0	61.0	
Actuated g/C Ratio	0.28	0.28	1.00	0.15	0.45	0.45	0.48	0.51	0.51	0.44	0.44	
Clearance Time (s)	6.6	6.6		3.0	6.6	6.6	3.0	6.6	6.6	6.6	6.6	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	152	966	1566	500	1560	719	140	1758	794	404	1508	
v/s Ratio Prot		c0.32		c0.18	0.25		c0.04	0.12			c0.48	
v/s Ratio Perm	0.04		0.25			0.01	0.36		0.10	0.06		
v/c Ratio	0.16	1.13	0.25	1.17	0.55	0.03	0.84	0.23	0.20	0.14	1.11	
Uniform Delay, d1	38.1	50.5	0.0	59.5	28.1	21.4	32.3	19.3	18.9	23.7	39.5	
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	1.0	73.1	0.4	97.8	0.7	0.0	41.8	0.3	0.6	0.7	59.4	
Delay (s)	39.1	123.6	0.4	157.3	28.8	21.4	74.1	19.6	19.5	24.4	98.9	
Level of Service	D	F	A	F	C	C	E	B	B	C	F	
Approach Delay (s)		89.9			79.5			27.2			96.5	
Approach LOS		F			E			C			F	

Intersection Summary			
HCM Average Control Delay	79.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.2%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Bovaird Dr. W

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	105	10	349	24	7	1572
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	105	10	349	24	7	1572
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						300
pX, platoon unblocked	0.78					
vC, conflicting volume	1161	186			373	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	645	186			373	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	67	99			99	
cM capacity (veh/h)	314	824			1182	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	105	10	233	140	7	786	786
Volume Left	105	0	0	0	7	0	0
Volume Right	0	10	0	24	0	0	0
cSH	314	824	1700	1700	1182	1700	1700
Volume to Capacity	0.33	0.01	0.14	0.08	0.01	0.46	0.46
Queue Length 95th (m)	10.8	0.3	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	22.1	9.4	0.0	0.0	8.1	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	21.0		0.0		0.0		
Approach LOS	C						

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	60.9%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	529	123	250	125	258	1110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1566	3325		1750	3500
Flt Permitted	0.95	1.00	1.00		0.50	1.00
Satd. Flow (perm)	1750	1566	3325		913	3500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	529	123	250	125	258	1110
RTOR Reduction (vph)	0	71	36	0	0	0
Lane Group Flow (vph)	529	52	339	0	258	1110
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	46.8	46.8	59.2		59.2	59.2
Effective Green, g (s)	50.8	50.8	63.2		63.2	63.2
Actuated g/C Ratio	0.42	0.42	0.53		0.53	0.53
Clearance Time (s)	7.0	7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	741	663	1751		481	1843
v/s Ratio Prot	c0.30		0.10			c0.32
v/s Ratio Perm		0.03			0.28	
v/c Ratio	0.71	0.08	0.19		0.54	0.60
Uniform Delay, d1	28.6	20.6	15.0		18.7	19.7
Progression Factor	1.00	1.00	1.00		1.08	1.03
Incremental Delay, d2	3.3	0.1	0.2		4.0	1.4
Delay (s)	31.9	20.7	15.2		24.1	21.7
Level of Service	C	C	B		C	C
Approach Delay (s)	29.8		15.2			22.1
Approach LOS	C		B			C

Intersection Summary			
HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	203	17	318	70	14	1180
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	203	17	318	70	14	1180
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	971	194			388	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	971	194			388	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	18	98			99	
cM capacity (veh/h)	247	815			1167	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	203	17	212	176	14	590	590
Volume Left	203	0	0	0	14	0	0
Volume Right	0	17	0	70	0	0	0
cSH	247	815	1700	1700	1167	1700	1700
Volume to Capacity	0.82	0.02	0.12	0.10	0.01	0.35	0.35
Queue Length 95th (m)	48.5	0.5	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	62.9	9.5	0.0	0.0	8.1	0.0	0.0
Lane LOS	F	A			A		
Approach Delay (s)	58.8		0.0		0.1		
Approach LOS	F						

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	178	7	231	223	13	10	243	81	58	955	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3483		1767	3540		1785	3368	1597	1733	3418	
Flt Permitted	0.60	1.00		0.43	1.00		0.23	1.00	1.00	0.60	1.00	
Satd. Flow (perm)	1137	3483		802	3540		428	3368	1597	1089	3418	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	178	7	231	223	13	10	243	81	58	955	38
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	31	0	2	0
Lane Group Flow (vph)	9	182	0	231	232	0	10	243	50	58	991	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.6	11.6		35.7	35.7		70.3	70.3	70.3	70.3	70.3	
Effective Green, g (s)	15.6	15.6		39.7	39.7		74.3	74.3	74.3	74.3	74.3	
Actuated g/C Ratio	0.13	0.13		0.33	0.33		0.62	0.62	0.62	0.62	0.62	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	148	453		435	1171		265	2085	989	674	2116	
v/s Ratio Prot		0.05		c0.09	0.07			0.07			c0.29	
v/s Ratio Perm	0.01			c0.08			0.02		0.03	0.05		
v/c Ratio	0.06	0.40		0.53	0.20		0.04	0.12	0.05	0.09	0.47	
Uniform Delay, d1	45.8	47.9		31.1	28.8		8.9	9.4	9.0	9.2	12.3	
Progression Factor	1.00	1.00		1.00	1.00		1.55	1.42	2.86	1.10	1.20	
Incremental Delay, d2	0.2	0.6		1.2	0.1		0.3	0.1	0.1	0.2	0.7	
Delay (s)	45.9	48.5		32.3	28.8		14.1	13.4	25.8	10.3	15.4	
Level of Service	D	D		C	C		B	B	C	B	B	
Approach Delay (s)		48.4			30.6			16.5			15.1	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	698	68	160	367	43	21	122	37	86	546	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.4	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	3268		1623	3092		1750	1648	1377	1653	1807	1566
Flt Permitted	0.51	1.00		0.15	1.00		0.27	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	942	3268		248	3092		504	1648	1377	1151	1807	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	698	68	160	367	43	21	122	37	86	546	95
RTOR Reduction (vph)	0	6	0	0	8	0	0	0	19	0	0	49
Lane Group Flow (vph)	61	760	0	160	402	0	21	122	18	86	546	46
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm			pm+pt			Perm		Perm	Perm		Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	33.6	33.6		51.8	51.8		55.0	55.0	55.0	55.0	55.0	55.0
Effective Green, g (s)	37.2	37.2		55.4	55.4		58.6	58.6	58.6	58.6	58.6	58.6
Actuated g/C Ratio	0.31	0.31		0.46	0.46		0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	6.6	6.6		7.0	6.6		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	5.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	292	1013		284	1427		246	805	672	562	882	765
v/s Ratio Prot		c0.23		c0.07	0.13			0.07			c0.30	
v/s Ratio Perm	0.06			0.19			0.04		0.01	0.07		0.03
v/c Ratio	0.21	0.75		0.56	0.28		0.09	0.15	0.03	0.15	0.62	0.06
Uniform Delay, d1	30.5	37.2		22.6	20.0		16.4	17.0	15.9	17.0	22.5	16.2
Progression Factor	1.00	1.00		1.00	1.00		0.66	0.71	0.48	1.00	1.00	1.00
Incremental Delay, d2	0.7	3.8		2.6	0.2		0.7	0.4	0.1	0.6	3.3	0.2
Delay (s)	31.3	41.0		25.2	20.2		11.5	12.4	7.7	17.6	25.8	16.3
Level of Service	C	D		C	C		B	B	A	B	C	B
Approach Delay (s)		40.3			21.6			11.3			23.6	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.4
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	1297	148	385	1500	147	256	1572	494	127	759	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.4	3.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1566	3466	1566	3330	3466	1597	1750	3466	1566	1716	3444	
Flt Permitted	0.08	1.00	1.00	0.95	1.00	1.00	0.13	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	131	3466	1566	3330	3466	1597	244	3466	1566	155	3444	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	70	1297	148	385	1500	147	256	1572	494	127	759	42
RTOR Reduction (vph)	0	0	0	0	0	51	0	0	80	0	3	0
Lane Group Flow (vph)	70	1297	148	385	1500	96	256	1572	414	127	798	0
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	pm+pt		Free	Prot		Perm	pm+pt		Perm	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free			8	2		2	6		
Actuated Green, G (s)	50.0	46.8	140.0	13.0	52.6	52.6	64.0	53.0	53.0	47.0	43.0	
Effective Green, g (s)	57.2	50.4	140.0	13.0	56.2	56.2	64.0	56.6	56.6	54.2	46.6	
Actuated g/C Ratio	0.41	0.36	1.00	0.09	0.40	0.40	0.46	0.40	0.40	0.39	0.33	
Clearance Time (s)	7.0	6.6		3.0	6.6	6.6	3.0	6.6	6.6	7.0	6.6	
Vehicle Extension (s)	3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	123	1248	1566	309	1391	641	305	1401	633	145	1146	
v/s Ratio Prot	0.03	0.37		c0.12	c0.43		c0.11	c0.45		0.05	0.23	
v/s Ratio Perm	0.20		0.09			0.06	0.28		0.26	0.29		
v/c Ratio	0.57	1.04	0.09	1.25	1.08	0.15	0.84	1.12	0.65	0.88	0.70	
Uniform Delay, d1	33.7	44.8	0.0	63.5	41.9	26.7	30.4	41.7	33.8	35.4	40.6	
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	5.9	36.3	0.1	134.9	48.3	0.5	23.3	64.9	5.2	47.4	3.5	
Delay (s)	39.6	81.1	0.1	198.4	90.2	27.2	53.7	106.6	38.9	82.8	44.1	
Level of Service	D	F	A	F	F	C	D	F	D	F	D	
Approach Delay (s)		71.2			106.1			86.4			49.4	
Approach LOS		E			F			F			D	

Intersection Summary			
HCM Average Control Delay	83.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Bovaird Dr. W

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	40	12	1428	98	9	586
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	40	12	1428	98	9	586
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						307
pX, platoon unblocked						
vC, conflicting volume	1788	763			1526	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1788	763			1526	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	44	97			98	
cM capacity (veh/h)	71	347			433	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	40	12	952	574	9	293	293
Volume Left	40	0	0	0	9	0	0
Volume Right	0	12	0	98	0	0	0
cSH	71	347	1700	1700	433	1700	1700
Volume to Capacity	0.56	0.03	0.56	0.34	0.02	0.17	0.17
Queue Length 95th (m)	18.2	0.8	0.0	0.0	0.5	0.0	0.0
Control Delay (s)	107.6	15.7	0.0	0.0	13.5	0.0	0.0
Lane LOS	F	C			B		
Approach Delay (s)	86.4		0.0		0.2		
Approach LOS	F						

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	416	260	994	567	129	333
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0		3.0	3.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1566	3309		1750	3500
Flt Permitted	0.95	1.00	1.00		0.07	1.00
Satd. Flow (perm)	1750	1566	3309		122	3500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	416	260	994	567	129	333
RTOR Reduction (vph)	0	173	47	0	0	0
Lane Group Flow (vph)	416	87	1514	0	129	333
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	36.0	36.0	57.5		70.0	70.0
Effective Green, g (s)	40.0	40.0	61.5		70.0	74.0
Actuated g/C Ratio	0.33	0.33	0.51		0.58	0.62
Clearance Time (s)	7.0	7.0	7.0		3.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	583	522	1696		200	2158
v/s Ratio Prot	c0.24		c0.46		c0.05	0.10
v/s Ratio Perm		0.06			0.33	
v/c Ratio	0.71	0.17	0.89		0.64	0.15
Uniform Delay, d1	35.0	28.2	26.3		25.3	9.7
Progression Factor	1.00	1.00	0.83		1.18	1.40
Incremental Delay, d2	4.1	0.2	6.1		6.9	0.2
Delay (s)	39.1	28.4	27.8		36.7	13.8
Level of Service	D	C	C		D	B
Approach Delay (s)	35.0		27.8			20.2
Approach LOS	C		C			C

Intersection Summary			
HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	81	23	1083	256	16	455
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	81	23	1083	256	16	455
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1470	670			1339	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1470	670			1339	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	29	94			97	
cM capacity (veh/h)	114	400			511	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	81	23	722	617	16	228	228
Volume Left	81	0	0	0	16	0	0
Volume Right	0	23	0	256	0	0	0
cSH	114	400	1700	1700	511	1700	1700
Volume to Capacity	0.71	0.06	0.42	0.36	0.03	0.13	0.13
Queue Length 95th (m)	29.0	1.4	0.0	0.0	0.7	0.0	0.0
Control Delay (s)	90.7	14.6	0.0	0.0	12.3	0.0	0.0
Lane LOS	F	B			B		
Approach Delay (s)	73.9		0.0		0.4		
Approach LOS	F						

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	154	12	101	136	19	13	774	318	11	358	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3467		1767	3504		1785	3368	1597	1733	3397	
Flt Permitted	0.65	1.00		0.58	1.00		0.48	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	1228	3467		1073	3504		900	3368	1597	501	3397	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	154	12	101	136	19	13	774	318	11	358	37
RTOR Reduction (vph)	0	4	0	0	9	0	0	0	116	0	6	0
Lane Group Flow (vph)	31	162	0	101	146	0	13	774	202	11	389	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm			pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.4	32.4		49.0	49.0		57.0	57.0	57.0	57.0	57.0	
Effective Green, g (s)	36.4	36.4		53.0	53.0		61.0	61.0	61.0	61.0	61.0	
Actuated g/C Ratio	0.30	0.30		0.44	0.44		0.51	0.51	0.51	0.51	0.51	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	372	1052		553	1548		458	1712	812	255	1727	
v/s Ratio Prot		0.05		c0.02	0.04			c0.23			0.11	
v/s Ratio Perm	0.03			c0.06			0.01		0.13	0.02		
v/c Ratio	0.08	0.15		0.18	0.09		0.03	0.45	0.25	0.04	0.23	
Uniform Delay, d1	29.9	30.5		19.9	19.5		14.7	18.8	16.6	14.8	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.42	1.12	1.93	1.05	0.93	
Incremental Delay, d2	0.4	0.3		0.2	0.0		0.1	0.6	0.5	0.3	0.3	
Delay (s)	30.3	30.9		20.1	19.5		21.0	21.7	32.5	15.9	15.5	
Level of Service	C	C		C	B		C	C	C	B	B	
Approach Delay (s)		30.8			19.8			24.8			15.5	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	315	38	70	532	66	35	462	142	47	193	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	3253		1623	3091		1750	1648	1377	1653	1807	1566
Flt Permitted	0.22	1.00		0.54	1.00		0.59	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	398	3253		923	3091		1095	1648	1377	622	1807	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	96	315	38	70	532	66	35	462	142	47	193	49
RTOR Reduction (vph)	0	9	0	0	9	0	0	0	69	0	0	24
Lane Group Flow (vph)	96	344	0	70	589	0	35	462	73	47	193	25
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	pm+pt			Perm			Perm		Perm	Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	49.0	49.0		30.7	30.7		57.8	57.8	57.8	57.8	57.8	57.8
Effective Green, g (s)	52.6	52.6		34.3	34.3		61.4	61.4	61.4	61.4	61.4	61.4
Actuated g/C Ratio	0.44	0.44		0.29	0.29		0.51	0.51	0.51	0.51	0.51	0.51
Clearance Time (s)	7.0	6.6		6.6	6.6		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	342	1426		264	884		560	843	705	318	925	801
v/s Ratio Prot	c0.03	0.11			c0.19			c0.28			0.11	
v/s Ratio Perm	0.09			0.08			0.03		0.05	0.08		0.02
v/c Ratio	0.28	0.24		0.27	0.67		0.06	0.55	0.10	0.15	0.21	0.03
Uniform Delay, d1	21.7	21.2		33.1	37.8		14.8	19.9	15.1	15.5	16.0	14.5
Progression Factor	1.00	1.00		1.00	1.00		1.64	1.56	5.16	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2		1.1	2.5		0.2	2.4	0.3	1.0	0.5	0.1
Delay (s)	22.1	21.4		34.2	40.3		24.5	33.3	78.2	16.5	16.5	14.6
Level of Service	C	C		C	D		C	C	E	B	B	B
Approach Delay (s)		21.5			39.7			42.8			16.2	
Approach LOS		C			D			D			B	

Intersection Summary			
HCM Average Control Delay	33.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.4
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

Appendix I

2031 Intersection Capacity Calculations – Proposed Improvements (without NSTC in place)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	1992	663	894	1538	48	195	641	500	92	2292	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.4	3.0	3.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1566	4980	1566	3330	4962		3395	4980	1566	3330	4980	1597
Flt Permitted	0.10	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	163	4980	1566	3330	4962		3395	4980	1566	3330	4980	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	1992	663	894	1538	48	195	641	500	92	2292	23
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	212	0	0	4
Lane Group Flow (vph)	38	1992	663	894	1584	0	195	641	288	92	2292	19
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	pm+pt		Free	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free						2			6
Actuated Green, G (s)	44.0	40.8	140.0	26.0	59.6		7.0	46.0	46.0	4.0	47.0	47.0
Effective Green, g (s)	51.2	44.4	140.0	26.0	63.2		7.0	49.6	49.6	7.6	50.6	50.6
Actuated g/C Ratio	0.37	0.32	1.00	0.19	0.45		0.05	0.35	0.35	0.05	0.36	0.36
Clearance Time (s)	7.0	6.6		3.0	6.6		3.0	6.6	6.6	7.0	6.6	6.6
Vehicle Extension (s)	3.0	5.0		5.0	5.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	128	1579	1566	618	2240		170	1764	555	181	1800	577
v/s Ratio Prot	0.01	c0.40		c0.27	0.32		c0.06	0.13		0.03	c0.46	
v/s Ratio Perm	0.09		c0.42						0.18			0.01
v/c Ratio	0.30	1.26	0.42	1.45	0.71		1.15	0.36	0.52	0.51	1.27	0.03
Uniform Delay, d1	29.8	47.8	0.0	57.0	30.9		66.5	33.5	35.7	64.4	44.7	28.9
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	1.3	123.0	0.8	210.0	1.9		114.1	0.6	3.4	9.8	127.5	0.1
Delay (s)	31.1	170.8	0.8	267.0	32.9		180.6	34.1	39.2	74.2	172.2	29.0
Level of Service	C	F	A	F	C		F	C	D	E	F	C
Approach Delay (s)		127.0			117.3			57.4			167.1	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM Average Control Delay	124.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	127.2%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Bovaird Dr. W

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	105	0	10	0	483	24	7	2086	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	105	0	10	0	483	24	7	2086	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											303	
pX, platoon unblocked	0.73	0.73	0.73	0.73	0.73		0.73					
vC, conflicting volume	2271	2607	695	1204	2595	173	2086			507		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1452	1911	0	0	1895	173	1199			507		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	86	100	99	100			99		
cM capacity (veh/h)	66	49	793	744	50	840	423			1054		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	0	105	10	0	193	193	121	7	834	834	417
Volume Left	0	0	105	0	0	0	0	0	7	0	0	0
Volume Right	0	0	0	10	0	0	0	24	0	0	0	0
cSH	1700	1700	744	840	1700	1700	1700	1700	1054	1700	1700	1700
Volume to Capacity	0.00	0.00	0.14	0.01	0.00	0.11	0.11	0.07	0.01	0.49	0.49	0.25
Queue Length 95th (m)	0.0	0.0	3.7	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	10.6	9.3	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.0
Lane LOS	A	A	B	A					A			
Approach Delay (s)	0.0		10.5		0.0				0.0			
Approach LOS	A		B									

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	155	184	434	136	253	49	273	280	473	1350	99
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	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.92		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)	1750	3215		1750	3500	1566	1750	3500	1566	1750	3500	1566
Flt Permitted	0.67	1.00		0.25	1.00	1.00	0.11	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1226	3215		457	3500	1566	206	3500	1566	873	3500	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	155	184	434	136	253	49	273	280	473	1350	99
RTOR Reduction (vph)	0	105	0	0	0	152	0	0	196	0	0	15
Lane Group Flow (vph)	21	234	0	434	136	101	49	273	84	473	1350	84
Turn Type	Perm			pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	13.6	13.6		44.0	44.0	44.0	35.8	31.8	31.8	62.0	51.0	51.0
Effective Green, g (s)	17.6	17.6		48.0	48.0	48.0	43.8	35.8	35.8	66.0	55.0	55.0
Actuated g/C Ratio	0.15	0.15		0.40	0.40	0.40	0.36	0.30	0.30	0.55	0.46	0.46
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	180	472		478	1400	626	178	1044	467	679	1604	718
v/s Ratio Prot		0.07		c0.21	0.04		0.02	0.08		c0.16	c0.39	
v/s Ratio Perm	0.02			c0.16		0.06	0.08		0.05	0.23		0.05
v/c Ratio	0.12	0.50		0.91	0.10	0.16	0.28	0.26	0.18	0.70	0.84	0.12
Uniform Delay, d1	44.5	47.1		29.7	22.5	23.1	26.8	32.0	31.2	17.0	28.7	18.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.91	0.96	1.56	1.33	1.28	1.23
Incremental Delay, d2	0.3	0.8		20.8	0.0	0.1	0.8	0.6	0.8	2.4	4.3	0.3
Delay (s)	44.7	47.9		50.4	22.5	23.2	25.2	31.3	49.5	25.1	40.8	23.2
Level of Service	D	D		D	C	C	C	C	D	C	D	C
Approach Delay (s)		47.8			37.4			39.3			36.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	203	0	17	0	468	70	14	1714	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	203	0	17	0	468	70	14	1714	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1993	2280	857	1353	2210	234	1714			538		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1993	2280	857	1353	2210	234	1714			538		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	98	100			99		
cM capacity (veh/h)	35	39	301	107	43	768	366			1026		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	0	0	203	17	0	234	234	70	14	1143	571
Volume Left	0	0	203	0	0	0	0	0	14	0	0
Volume Right	0	0	0	17	0	0	0	70	0	0	0
cSH	1700	1700	107	768	1700	1700	1700	1700	1026	1700	1700
Volume to Capacity	0.00	0.00	1.89	0.02	0.00	0.14	0.14	0.04	0.01	0.67	0.34
Queue Length 95th (m)	0.0	0.0	125.9	0.5	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	0.0	0.0	501.6	9.8	0.0	0.0	0.0	0.0	8.6	0.0	0.0
Lane LOS	A	A	F	A					A		
Approach Delay (s)	0.0		463.6		0.0				0.1		
Approach LOS	A		F								

Intersection Summary			
Average Delay	41.1		
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	265	8	308	336	19	11	363	109	94	1412	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3500	1597	1767	3541		1785	3368	1597	1733	3421	
Flt Permitted	0.47	1.00	1.00	0.54	1.00		0.09	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	880	3500	1597	1010	3541		174	3368	1597	935	3421	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	265	8	308	336	19	11	363	109	94	1412	45
RTOR Reduction (vph)	0	0	5	0	4	0	0	0	45	0	2	0
Lane Group Flow (vph)	10	265	3	308	351	0	11	363	64	94	1455	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	40.0	40.0	40.0	40.0	40.0		66.0	66.0	66.0	66.0	66.0	
Effective Green, g (s)	44.0	44.0	44.0	44.0	44.0		70.0	70.0	70.0	70.0	70.0	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.58	0.58	0.58	0.58	0.58	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	323	1283	586	370	1298		102	1965	932	545	1996	
v/s Ratio Prot		0.08			0.10			0.11			c0.43	
v/s Ratio Perm	0.01		0.00	c0.30			0.06		0.04	0.10		
v/c Ratio	0.03	0.21	0.01	0.83	0.27		0.11	0.18	0.07	0.17	0.73	
Uniform Delay, d1	24.3	26.0	24.1	34.6	26.7		11.1	11.7	10.8	11.6	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.82	0.96	0.82	1.80	1.76	
Incremental Delay, d2	0.0	0.1	0.0	14.7	0.1		2.1	0.2	0.1	0.5	1.9	
Delay (s)	24.4	26.1	24.1	49.4	26.8		11.1	11.4	9.1	21.4	33.7	
Level of Service	C	C	C	D	C		B	B	A	C	C	
Approach Delay (s)		26.0			37.3			10.9			33.0	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	81.5%	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												
Volume (veh/h)	0	0	0	147	0	4	0	368	24	3	1404	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	147	0	4	0	368	24	3	1404	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								358				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	1598	1802	702	1088	1790	196	1404			392		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1582	1788	702	1066	1776	164	1404			363		
tC, single (s)	7.5	6.5	6.9	*6.7	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	34	100	100	100			100		
cM capacity (veh/h)	72	79	381	223	81	842	482			1179		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	0	0	147	4	184	208	705	702
Volume Left	0	0	147	0	0	0	3	0
Volume Right	0	0	0	4	0	24	0	0
cSH	1700	1700	223	842	482	1700	1179	1700
Volume to Capacity	0.00	0.00	0.66	0.00	0.00	0.12	0.00	0.41
Queue Length 95th (m)	0.0	0.0	30.8	0.1	0.0	0.0	0.1	0.0
Control Delay (s)	0.0	0.0	47.6	9.3	0.0	0.0	0.1	0.0
Lane LOS	A	A	E	A			A	
Approach Delay (s)	0.0		46.6		0.0		0.0	
Approach LOS	A		E					

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	60.7%	ICU Level of Service		B
Analysis Period (min)	15			

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1	1	127	0	4	2	349	23	3	1264	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1	1	127	0	4	2	349	23	3	1264	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											348	
pX, platoon unblocked	0.74	0.74	0.74	0.74	0.74		0.74					
vC, conflicting volume	1452	1646	632	1004	1634	186	1264			372		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	901	1163	0	292	1148	186	645			372		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	73	100	100	100			100		
cM capacity (veh/h)	170	142	799	465	145	824	690			1183		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	0	2	127	4	176	198	635	632
Volume Left	0	0	127	0	2	0	3	0
Volume Right	0	1	0	4	0	23	0	0
cSH	1700	241	465	824	690	1700	1183	1700
Volume to Capacity	0.00	0.01	0.27	0.00	0.00	0.12	0.00	0.37
Queue Length 95th (m)	0.0	0.2	8.4	0.1	0.1	0.0	0.1	0.0
Control Delay (s)	0.0	20.1	15.6	9.4	0.1	0.0	0.1	0.0
Lane LOS	A	C	C	A	A		A	
Approach Delay (s)	20.1		15.4		0.1		0.0	
Approach LOS	C		C					

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	101	1158	110	266	607	60	35	180	62	135	891	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1750	3336	1377	1623	3094		1750	3131	1377	1653	3365	
Flt Permitted	0.40	1.00	1.00	0.08	1.00		0.09	1.00	1.00	0.62	1.00	
Satd. Flow (perm)	733	3336	1377	139	3094		174	3131	1377	1076	3365	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	101	1158	110	266	607	60	35	180	62	135	891	158
RTOR Reduction (vph)	0	0	19	0	6	0	0	0	40	0	12	0
Lane Group Flow (vph)	101	1158	91	266	661	0	35	180	22	135	1037	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	46.0	46.0	46.0	68.0	68.0		38.8	38.8	38.8	38.8	38.8	
Effective Green, g (s)	49.6	49.6	49.6	68.0	71.6		42.4	42.4	42.4	42.4	42.4	
Actuated g/C Ratio	0.41	0.41	0.41	0.57	0.60		0.35	0.35	0.35	0.35	0.35	
Clearance Time (s)	6.6	6.6	6.6	3.0	6.6		6.6	6.6	6.6	6.6	6.6	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	303	1379	569	314	1846		61	1106	487	380	1189	
v/s Ratio Prot		c0.35		c0.13	0.21			0.06			c0.31	
v/s Ratio Perm	0.14		0.07	0.35			0.20		0.02	0.13		
v/c Ratio	0.33	0.84	0.16	0.85	0.36		0.57	0.16	0.04	0.36	0.87	
Uniform Delay, d1	24.0	31.6	22.1	34.6	12.4		31.5	26.6	25.5	28.7	36.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.22	1.14	2.36	1.00	1.00	
Incremental Delay, d2	1.4	5.2	0.3	18.6	0.2		33.6	0.3	0.2	2.6	9.0	
Delay (s)	25.3	36.8	22.4	53.2	12.7		72.0	30.5	60.4	31.3	45.2	
Level of Service	C	D	C	D	B		E	C	E	C	D	
Approach Delay (s)		34.8			24.2			42.4			43.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	35.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	2127	246	593	2502	164	426	2092	731	118	1065	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.4	3.0	3.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1566	4980	1566	3330	4943		3395	4980	1566	3330	4980	1597
Flt Permitted	0.08	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	135	4980	1566	3330	4943		3395	4980	1566	3330	4980	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	114	2127	246	593	2502	164	426	2092	731	118	1065	67
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	121	0	0	22
Lane Group Flow (vph)	114	2127	246	593	2661	0	426	2092	610	118	1065	45
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	pm+pt		Free	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free						2			6
Actuated Green, G (s)	49.4	45.4	140.0	20.0	57.4		20.7	47.4	47.4	4.0	34.7	34.7
Effective Green, g (s)	56.6	49.0	140.0	20.0	61.0		20.7	51.0	51.0	7.6	38.3	38.3
Actuated g/C Ratio	0.40	0.35	1.00	0.14	0.44		0.15	0.36	0.36	0.05	0.27	0.27
Clearance Time (s)	7.0	6.6		3.0	6.6		3.0	6.6	6.6	7.0	6.6	6.6
Vehicle Extension (s)	3.0	5.0		5.0	5.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	132	1743	1566	476	2154		502	1814	570	181	1362	437
v/s Ratio Prot	0.05	0.43		c0.18	c0.54		c0.13	c0.42		0.04	0.21	
v/s Ratio Perm	0.30		0.16						0.39			0.03
v/c Ratio	0.86	1.22	0.16	1.25	1.24		0.85	1.15	1.07	0.65	0.78	0.10
Uniform Delay, d1	34.6	45.5	0.0	60.0	39.5		58.1	44.5	44.5	64.9	47.0	38.0
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	40.4	104.6	0.2	127.3	110.1		13.8	75.8	57.6	8.1	4.5	0.5
Delay (s)	75.0	150.1	0.2	187.3	149.6		72.0	120.3	102.1	73.0	51.5	38.5
Level of Service	E	F	A	F	F		E	F	F	E	D	D
Approach Delay (s)		131.8			156.5			109.8			52.9	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM Average Control Delay	123.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	115.4%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Bovaird Dr. W

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	40	0	12	0	1883	98	9	802	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	40	0	12	0	1883	98	9	802	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											302	
pX, platoon unblocked												
vC, conflicting volume	1460	2801	267	2217	2752	677	802			1981		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1460	2801	267	2217	2752	677	802			1981		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	97	100			97		
cM capacity (veh/h)	85	18	731	24	19	395	817			288		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	0	40	12	0	753	753	475	9	321	321	160
Volume Left	0	0	40	0	0	0	0	0	9	0	0	0
Volume Right	0	0	0	12	0	0	0	98	0	0	0	0
cSH	1700	1700	24	395	1700	1700	1700	1700	288	1700	1700	1700
Volume to Capacity	0.00	0.00	1.70	0.03	0.00	0.44	0.44	0.28	0.03	0.19	0.19	0.09
Queue Length 95th (m)	0.0	0.0	38.3	0.7	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	693.1	14.4	0.0	0.0	0.0	0.0	17.9	0.0	0.0	0.0
Lane LOS	A	A	F	B					C			
Approach Delay (s)	0.0		536.5		0.0				0.2			
Approach LOS	A		F									

Intersection Summary				
Average Delay	9.9			
Intersection Capacity Utilization	48.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	182	131	291	187	435	115	1153	817	234	433	68
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	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.94		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)	1750	3280		1750	3500	1566	1750	3500	1566	1750	3500	1566
Flt Permitted	0.63	1.00		0.26	1.00	1.00	0.50	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	1168	3280		485	3500	1566	921	3500	1566	176	3500	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	182	131	291	187	435	115	1153	817	234	433	68
RTOR Reduction (vph)	0	113	0	0	0	190	0	0	268	0	0	25
Lane Group Flow (vph)	24	200	0	291	187	245	115	1153	549	234	433	43
Turn Type	Perm			pm+pt		Perm	Perm		Perm	pm+pt		Perm
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	12.6	12.6		33.6	33.6	33.6	51.0	51.0	51.0	72.4	72.4	72.4
Effective Green, g (s)	16.6	16.6		37.6	37.6	37.6	55.0	55.0	55.0	72.4	76.4	76.4
Actuated g/C Ratio	0.14	0.14		0.31	0.31	0.31	0.46	0.46	0.46	0.60	0.64	0.64
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	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	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	162	454		342	1097	491	422	1604	718	348	2228	997
v/s Ratio Prot		0.06		c0.13	0.05			0.33		c0.10	0.12	
v/s Ratio Perm	0.02			c0.14		0.16	0.12		c0.35	0.30		0.03
v/c Ratio	0.15	0.44		0.85	0.17	0.50	0.27	0.72	0.76	0.67	0.19	0.04
Uniform Delay, d1	45.5	47.4		34.6	29.9	33.5	20.1	26.3	27.1	25.8	9.0	8.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.19	1.28	1.86	1.01	1.31	2.06
Incremental Delay, d2	0.4	0.7		18.0	0.1	0.8	0.9	1.6	4.5	9.8	0.2	0.1
Delay (s)	45.9	48.1		52.6	30.0	34.3	24.9	35.3	54.8	35.7	12.1	16.8
Level of Service	D	D		D	C	C	C	D	D	D	B	B
Approach Delay (s)		48.0			39.3			42.4			20.0	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	38.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	81	0	23	0	1562	256	16	656	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	81	0	23	0	1562	256	16	656	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1492	2506	328	1922	2250	781	656			1818		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1492	2506	328	1922	2250	781	656			1818		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	93	100			95		
cM capacity (veh/h)	77	27	668	39	39	338	927			333		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	0	0	81	23	0	781	781	256	16	437	219
Volume Left	0	0	81	0	0	0	0	0	16	0	0
Volume Right	0	0	0	23	0	0	0	256	0	0	0
cSH	1700	1700	39	338	1700	1700	1700	1700	333	1700	1700
Volume to Capacity	0.00	0.00	2.08	0.07	0.00	0.46	0.46	0.15	0.05	0.26	0.13
Queue Length 95th (m)	0.0	0.0	66.3	1.7	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Control Delay (s)	0.0	0.0	720.0	16.4	0.0	0.0	0.0	0.0	16.3	0.0	0.0
Lane LOS	A	A	F	C					C		
Approach Delay (s)	0.0		564.4		0.0				0.4		
Approach LOS	A		F								

Intersection Summary			
Average Delay	22.7		
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	226	14	124	183	27	15	1160	409	16	534	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3500	1597	1767	3501		1785	3368	1597	1733	3404	
Flt Permitted	0.62	1.00	1.00	0.46	1.00		0.40	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	1165	3500	1597	854	3501		747	3368	1597	322	3404	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	36	226	14	124	183	27	15	1160	409	16	534	43
RTOR Reduction (vph)	0	0	11	0	9	0	0	0	157	0	5	0
Lane Group Flow (vph)	36	226	3	124	201	0	15	1160	252	16	572	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	20.3	20.3	20.3	36.0	36.0		70.0	70.0	70.0	70.0	70.0	
Effective Green, g (s)	24.3	24.3	24.3	40.0	40.0		74.0	74.0	74.0	74.0	74.0	
Actuated g/C Ratio	0.20	0.20	0.20	0.33	0.33		0.62	0.62	0.62	0.62	0.62	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	236	709	323	381	1167		461	2077	985	199	2099	
v/s Ratio Prot		0.06		c0.03	0.06			c0.34			0.17	
v/s Ratio Perm	0.03		0.00	c0.07			0.02		0.16	0.05		
v/c Ratio	0.15	0.32	0.01	0.33	0.17		0.03	0.56	0.26	0.08	0.27	
Uniform Delay, d1	39.4	40.8	38.2	28.9	28.3		9.0	13.4	10.5	9.3	10.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.50	1.30	4.94	0.84	0.86	
Incremental Delay, d2	1.4	1.2	0.0	0.5	0.1		0.1	0.9	0.5	0.8	0.3	
Delay (s)	40.7	42.0	38.3	29.4	28.4		13.6	18.3	52.3	8.6	9.5	
Level of Service	D	D	D	C	C		B	B	D	A	A	
Approach Delay (s)		41.6			28.7			27.0			9.4	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	48	0	5	0	1134	89	4	545	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	48	0	5	0	1134	89	4	545	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								350				
pX, platoon unblocked	0.80	0.80		0.80	0.80	0.80				0.80		
vC, conflicting volume	1125	1776	272	1459	1732	612	545			1223		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	646	1463	272	1065	1408	2	545			769		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	66	100	99	100			99		
cM capacity (veh/h)	281	101	725	140	109	862	1020			670		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	0	0	48	5	567	656	276	272
Volume Left	0	0	48	0	0	0	4	0
Volume Right	0	0	0	5	0	89	0	0
cSH	1700	1700	140	862	1020	1700	670	1700
Volume to Capacity	0.00	0.00	0.34	0.01	0.00	0.39	0.01	0.16
Queue Length 95th (m)	0.0	0.0	10.6	0.1	0.0	0.0	0.1	0.0
Control Delay (s)	0.0	0.0	43.5	9.2	0.0	0.0	0.2	0.0
Lane LOS	A	A	E	A			A	
Approach Delay (s)	0.0		40.3		0.0		0.1	
Approach LOS	A		E					

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	49.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	48	0	5	0	1134	89	4	545	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	48	0	5	0	1134	89	4	545	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											359	
pX, platoon unblocked	1.00	1.00	1.00	1.00	1.00		1.00					
vC, conflicting volume	1125	1776	272	1459	1732	612	545			1223		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1125	1776	272	1459	1731	612	544			1223		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	47	100	99	100			99		
cM capacity (veh/h)	157	81	726	90	87	436	1020			566		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	0	0	48	5	567	656	276	272
Volume Left	0	0	48	0	0	0	4	0
Volume Right	0	0	0	5	0	89	0	0
cSH	1700	1700	90	436	1020	1700	566	1700
Volume to Capacity	0.00	0.00	0.53	0.01	0.00	0.39	0.01	0.16
Queue Length 95th (m)	0.0	0.0	18.0	0.3	0.0	0.0	0.2	0.0
Control Delay (s)	0.0	0.0	83.7	13.3	0.0	0.0	0.3	0.0
Lane LOS	A	A	F	B			A	
Approach Delay (s)	0.0		77.0		0.0		0.1	
Approach LOS	A		F					

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	49.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	525	64	116	879	96	54	733	237	68	297	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1750	3336	1377	1623	3093		1750	3131	1377	1653	3336	
Flt Permitted	0.19	1.00	1.00	0.40	1.00		0.48	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	353	3336	1377	679	3093		878	3131	1377	468	3336	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	525	64	116	879	96	54	733	237	68	297	81
RTOR Reduction (vph)	0	0	31	0	8	0	0	0	57	0	18	0
Lane Group Flow (vph)	160	525	33	116	967	0	54	733	180	68	360	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	56.5	56.5	56.5	56.5	56.5		50.3	50.3	50.3	50.3	50.3	
Effective Green, g (s)	60.1	60.1	60.1	60.1	60.1		53.9	53.9	53.9	53.9	53.9	
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50		0.45	0.45	0.45	0.45	0.45	
Clearance Time (s)	6.6	6.6	6.6	6.6	6.6		6.6	6.6	6.6	6.6	6.6	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	177	1671	690	340	1549		394	1406	619	210	1498	
v/s Ratio Prot		0.16			0.31			c0.23			0.11	
v/s Ratio Perm	c0.45		0.02	0.17			0.06		0.13	0.15		
v/c Ratio	0.90	0.31	0.05	0.34	0.62		0.14	0.52	0.29	0.32	0.24	
Uniform Delay, d1	27.3	17.7	15.3	18.0	21.7		19.4	23.8	20.9	21.3	20.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.23	1.26	1.58	1.00	1.00	
Incremental Delay, d2	43.1	0.2	0.1	1.3	1.1		0.6	1.2	1.0	4.1	0.4	
Delay (s)	70.4	18.0	15.4	19.3	22.9		24.6	31.1	34.2	25.4	20.8	
Level of Service	E	B	B	B	C		C	C	C	C	C	
Approach Delay (s)		29.0			22.5			31.5			21.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

Appendix J

2031 Intersection Capacity Calculations – Proposed Improvements (with NSTC in place)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	2471	822	662	1138	36	117	385	300	59	1467	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	1.0	1.0	3.0	3.0	3.0		3.0	3.0	3.0	3.4	1.0	1.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1566	4980	1566	3330	4961		1750	4980	1566	1716	4980	1597
Flt Permitted	0.23	1.00	1.00	0.95	1.00		0.12	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	377	4980	1566	3330	4961		215	4980	1566	794	4980	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	47	2471	822	662	1138	36	117	385	300	59	1467	15
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	219	0	0	4
Lane Group Flow (vph)	47	2471	822	662	1172	0	117	385	81	59	1467	11
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	Perm		Free	Prot			pm+pt		Perm	pm+pt		Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		Free				2		2	6		6
Actuated Green, G (s)	57.4	57.4	140.0	24.0	82.4		41.2	34.2	34.2	39.6	36.4	36.4
Effective Green, g (s)	61.0	61.0	140.0	24.0	86.0		41.2	37.8	37.8	46.8	40.0	40.0
Actuated g/C Ratio	0.44	0.44	1.00	0.17	0.61		0.29	0.27	0.27	0.33	0.29	0.29
Clearance Time (s)	4.6	4.6		3.0	6.6		3.0	6.6	6.6	7.0	4.6	4.6
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	164	2170	1566	571	3047		140	1345	423	310	1423	456
v/s Ratio Prot		c0.50		c0.20	0.24		c0.04	0.08		0.01	c0.29	
v/s Ratio Perm	0.12		c0.52				0.20		0.05	0.05		0.01
v/c Ratio	0.29	1.14	0.52	1.16	0.38		0.84	0.29	0.19	0.19	1.03	0.03
Uniform Delay, d1	25.5	39.5	0.0	58.0	13.6		41.1	40.4	39.3	32.3	50.0	36.0
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	4.4	68.6	1.3	90.0	0.2		41.8	0.5	1.0	0.3	32.2	0.1
Delay (s)	29.8	108.1	1.3	148.0	13.8		82.9	41.0	40.3	32.6	82.2	36.1
Level of Service	C	F	A	F	B		F	D	D	C	F	D
Approach Delay (s)		80.7			62.2			46.8			79.8	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM Average Control Delay	72.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	114.8%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Bovaird Dr. W

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	14	14	81	7	9	17	328	14	4	1160	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	14	14	81	7	9	17	328	14	4	1160	18
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											381	
pX, platoon unblocked												
vC, conflicting volume	1333	1553	396	785	1555	116	1178			342		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1333	1553	396	785	1555	116	1178			342		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	87	98	67	94	99	97			100		
cM capacity (veh/h)	103	109	604	243	108	914	589			1214		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	14	28	81	16	17	131	131	80	4	464	464	250
Volume Left	14	0	81	0	17	0	0	0	4	0	0	0
Volume Right	0	14	0	9	0	0	0	14	0	0	0	18
cSH	103	184	243	215	589	1700	1700	1700	1214	1700	1700	1700
Volume to Capacity	0.14	0.15	0.33	0.07	0.03	0.08	0.08	0.05	0.00	0.27	0.27	0.15
Queue Length 95th (m)	3.4	4.0	10.6	1.8	0.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Control Delay (s)	45.3	28.0	27.0	23.1	11.3	0.0	0.0	0.0	8.0	0.0	0.0	0.0
Lane LOS	E	D	D	C	B				A			
Approach Delay (s)	33.8		26.4		0.5				0.0			
Approach LOS	D		D									

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	225	267	451	141	263	29	161	165	312	891	65
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	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.92		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)	1750	3215		1750	3500	1566	1750	3500	1566	1750	3500	1566
Flt Permitted	0.66	1.00		0.17	1.00	1.00	0.20	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	1220	3215		322	3500	1566	376	3500	1566	1193	3500	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	225	267	451	141	263	29	161	165	312	891	65
RTOR Reduction (vph)	0	104	0	0	0	134	0	0	89	0	0	14
Lane Group Flow (vph)	30	388	0	451	141	129	29	161	76	312	891	51
Turn Type	Perm			pm+pt		Perm	Perm		Perm	Perm		Perm
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	18.9	18.9		54.9	54.9	54.9	51.1	51.1	51.1	51.1	51.1	51.1
Effective Green, g (s)	22.9	22.9		58.9	58.9	58.9	55.1	55.1	55.1	55.1	55.1	55.1
Actuated g/C Ratio	0.19	0.19		0.49	0.49	0.49	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	233	614		551	1718	769	173	1607	719	548	1607	719
v/s Ratio Prot		0.12		c0.23	0.04			0.05			0.25	
v/s Ratio Perm	0.02			c0.18		0.08	0.08		0.05	c0.26		0.03
v/c Ratio	0.13	0.63		0.82	0.08	0.17	0.17	0.10	0.11	0.57	0.55	0.07
Uniform Delay, d1	40.3	44.7		28.2	16.2	17.0	19.0	18.4	18.4	23.8	23.5	18.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.92	0.90	0.96	1.49	1.48	1.84
Incremental Delay, d2	0.3	2.1		9.2	0.0	0.1	2.1	0.1	0.3	3.9	1.3	0.2
Delay (s)	40.5	46.8		37.4	16.2	17.1	19.7	16.7	18.1	39.4	36.2	33.6
Level of Service	D	D		D	B	B	B	B	B	D	D	C
Approach Delay (s)		46.5			27.6			17.6			36.8	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	81.1%	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												
Volume (veh/h)	14	14	14	99	16	15	16	290	47	8	1012	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	14	14	99	16	15	16	290	47	8	1012	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1234	1403	512	865	1362	145	1024			337		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1234	1403	512	865	1362	145	1024			337		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	90	97	54	89	98	98			99		
cM capacity (veh/h)	117	134	507	217	142	876	674			1219		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	14	28	99	31	16	145	145	47	8	675	349
Volume Left	14	0	99	0	16	0	0	0	8	0	0
Volume Right	0	14	0	15	0	0	0	47	0	0	12
cSH	117	213	217	239	674	1700	1700	1700	1219	1700	1700
Volume to Capacity	0.12	0.13	0.46	0.13	0.02	0.09	0.09	0.03	0.01	0.40	0.21
Queue Length 95th (m)	3.0	3.4	16.7	3.3	0.6	0.0	0.0	0.0	0.2	0.0	0.0
Control Delay (s)	40.0	24.5	34.9	22.3	10.5	0.0	0.0	0.0	8.0	0.0	0.0
Lane LOS	E	C	D	C	B				A		
Approach Delay (s)	29.7		31.9		0.5				0.1		
Approach LOS	D		D								

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	52.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	364	12	277	303	17	7	210	63	54	819	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3500	1597	1767	3541		1785	3368	1597	1733	3421	
Flt Permitted	0.56	1.00	1.00	0.33	1.00		0.22	1.00	1.00	0.61	1.00	
Satd. Flow (perm)	1048	3500	1597	611	3541		419	3368	1597	1106	3421	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	364	12	277	303	17	7	210	63	54	819	26
RTOR Reduction (vph)	0	0	9	0	4	0	0	0	34	0	2	0
Lane Group Flow (vph)	14	364	3	277	316	0	7	210	29	54	843	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	22.0	22.0	22.0	55.0	55.0		51.0	51.0	51.0	51.0	51.0	
Effective Green, g (s)	26.0	26.0	26.0	59.0	59.0		55.0	55.0	55.0	55.0	55.0	
Actuated g/C Ratio	0.22	0.22	0.22	0.49	0.49		0.46	0.46	0.46	0.46	0.46	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	227	758	346	589	1741		192	1544	732	507	1568	
v/s Ratio Prot		0.10		c0.12	0.09			0.06			c0.25	
v/s Ratio Perm	0.01		0.00	c0.11			0.02		0.02	0.05		
v/c Ratio	0.06	0.48	0.01	0.47	0.18		0.04	0.14	0.04	0.11	0.54	
Uniform Delay, d1	37.3	41.1	36.9	19.1	17.0		17.9	18.8	17.9	18.5	23.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.04	0.98	1.20	1.74	1.58	
Incremental Delay, d2	0.5	2.2	0.0	0.6	0.1		0.4	0.2	0.1	0.4	1.2	
Delay (s)	37.8	43.3	36.9	19.7	17.1		18.9	18.5	21.6	32.5	38.3	
Level of Service	D	D	D	B	B		B	B	C	C	D	
Approach Delay (s)		42.9			18.3			19.2			37.9	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	132	0	4	0	213	14	2	814	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	132	0	4	0	213	14	2	814	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								352				
pX, platoon unblocked												
vC, conflicting volume	928	1045	407	631	1038	114	814			227		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	928	1045	407	631	1038	114	814			227		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	64	100	100	100			100		
cM capacity (veh/h)	221	227	593	365	229	918	809			1339		

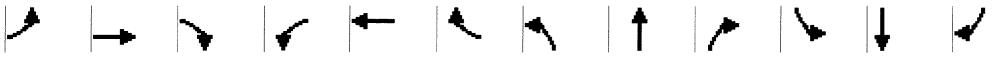
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	0	0	132	4	106	120	409	407
Volume Left	0	0	132	0	0	0	2	0
Volume Right	0	0	0	4	0	14	0	0
cSH	1700	1700	365	918	809	1700	1339	1700
Volume to Capacity	0.00	0.00	0.36	0.00	0.00	0.07	0.00	0.24
Queue Length 95th (m)	0.0	0.0	12.2	0.1	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	20.3	8.9	0.0	0.0	0.1	0.0
Lane LOS	A	A	C	A			A	
Approach Delay (s)	0.0		20.0		0.0		0.0	
Approach LOS	A		C					

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	42.9%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	14	14	51	9	9	17	188	17	29	696	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	14	14	51	9	9	17	188	17	29	696	25
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											347	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	908	1006	360	658	1010	102	721			205		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	714	820	115	440	825	102	509			205		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	95	98	88	97	99	98			98		
cM capacity (veh/h)	273	271	837	420	269	933	963			1364		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	14	28	51	18	111	111	377	373
Volume Left	14	0	51	0	17	0	29	0
Volume Right	0	14	0	9	0	17	0	25
cSH	273	410	420	418	963	1700	1364	1700
Volume to Capacity	0.05	0.07	0.12	0.04	0.02	0.07	0.02	0.22
Queue Length 95th (m)	1.2	1.7	3.1	1.0	0.4	0.0	0.5	0.0
Control Delay (s)	18.9	14.4	14.7	14.0	1.5	0.0	0.8	0.0
Lane LOS	C	B	B	B	A		A	
Approach Delay (s)	15.9		14.6		0.7		0.4	
Approach LOS	C		B					

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	54.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	117	1344	128	232	523	53	25	130	44	77	508	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1750	3336	1377	1623	3094		1750	3131	1377	1653	3365	
Flt Permitted	0.44	1.00	1.00	0.07	1.00		0.24	1.00	1.00	0.66	1.00	
Satd. Flow (perm)	802	3336	1377	118	3094		445	3131	1377	1153	3365	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	117	1344	128	232	523	53	25	130	44	77	508	90
RTOR Reduction (vph)	0	0	20	0	7	0	0	0	31	0	11	0
Lane Group Flow (vph)	117	1344	108	232	569	0	25	130	13	77	587	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	Perm		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	56.2	56.2	56.2	75.6	75.6		31.2	31.2	31.2	31.2	31.2	
Effective Green, g (s)	59.8	59.8	59.8	75.6	79.2		34.8	34.8	34.8	34.8	34.8	
Actuated g/C Ratio	0.50	0.50	0.50	0.63	0.66		0.29	0.29	0.29	0.29	0.29	
Clearance Time (s)	6.6	6.6	6.6	3.0	6.6		6.6	6.6	6.6	6.6	6.6	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	400	1662	686	280	2042		129	908	399	334	976	
v/s Ratio Prot		0.40		c0.11	0.18			0.04			c0.17	
v/s Ratio Perm	0.15		0.08	c0.41			0.06		0.01	0.07		
v/c Ratio	0.29	0.81	0.16	0.83	0.28		0.19	0.14	0.03	0.23	0.60	
Uniform Delay, d1	17.7	25.3	16.4	34.7	8.5		32.0	31.6	30.5	32.4	36.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.26	1.27	2.43	1.00	1.00	
Incremental Delay, d2	0.9	3.4	0.2	17.9	0.2		3.3	0.3	0.1	1.6	2.7	
Delay (s)	18.5	28.7	16.6	52.7	8.7		43.6	40.3	74.4	34.0	39.4	
Level of Service	B	C	B	D	A		D	D	E	C	D	
Approach Delay (s)		27.0			21.3			48.3			38.8	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Mayfield Rd			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	2637	306	486	2051	135	273	1339	468	71	639	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.4	3.0	3.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1566	4980	1566	3330	4943		1750	4980	1566	1716	4980	1597
Flt Permitted	0.06	1.00	1.00	0.95	1.00		0.17	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	100	4980	1566	3330	4943		305	4980	1566	249	4980	1597
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	2637	306	486	2051	135	273	1339	468	71	639	40
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	118	0	0	21
Lane Group Flow (vph)	141	2637	306	486	2181	0	273	1339	350	71	639	19
Heavy Vehicles (%)	14%	3%	2%	4%	3%	0%	2%	3%	2%	4%	3%	0%
Turn Type	pm+pt		Free	Prot			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free				2		2	6		6
Actuated Green, G (s)	71.4	62.4	140.0	17.0	66.4		44.4	34.2	34.2	28.6	25.4	25.4
Effective Green, g (s)	78.6	66.0	140.0	17.0	70.0		44.4	37.8	37.8	35.8	29.0	29.0
Actuated g/C Ratio	0.56	0.47	1.00	0.12	0.50		0.32	0.27	0.27	0.26	0.21	0.21
Clearance Time (s)	7.0	6.6		3.0	6.6		3.0	6.6	6.6	7.0	6.6	6.6
Vehicle Extension (s)	3.0	5.0		5.0	5.0		5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	188	2348	1566	404	2472		262	1345	423	135	1032	331
v/s Ratio Prot	0.07	c0.53		c0.15	0.44		c0.12	c0.27		0.03	0.13	
v/s Ratio Perm	0.35		0.20				0.21		0.22	0.11		0.01
v/c Ratio	0.75	1.12	0.20	1.20	0.88		1.04	1.00	0.83	0.53	0.62	0.06
Uniform Delay, d1	36.9	37.0	0.0	61.5	31.3		40.8	51.0	48.0	42.8	50.5	44.5
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	23.7	61.7	0.3	112.7	5.0		67.0	23.5	16.7	3.7	2.8	0.3
Delay (s)	60.7	98.7	0.3	174.2	36.3		107.8	74.5	64.7	46.4	53.3	44.8
Level of Service	E	F	A	F	D		F	E	E	D	D	D
Approach Delay (s)		87.2			61.4			76.7			52.2	
Approach LOS		F			E			E			D	

Intersection Summary			
HCM Average Control Delay	73.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	108.0%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Bovaird Dr. W			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	14	14	29	10	12	12	1081	57	5	464	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	14	14	29	10	12	12	1081	57	5	464	1
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											308	
pX, platoon unblocked												
vC, conflicting volume	876	1636	155	1319	1608	389	465			1138		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	876	1636	155	1319	1608	389	465			1138		
tC, single (s)	7.5	6.5	6.9	*7.3	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	86	98	73	90	98	99			99		
cM capacity (veh/h)	217	98	863	108	102	610	1093			610		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	14	28	29	22	12	432	432	273	5	186	186	94
Volume Left	14	0	29	0	12	0	0	0	5	0	0	0
Volume Right	0	14	0	12	0	0	0	57	0	0	0	1
cSH	217	176	108	187	1093	1700	1700	1700	610	1700	1700	1700
Volume to Capacity	0.06	0.16	0.27	0.12	0.01	0.25	0.25	0.16	0.01	0.11	0.11	0.06
Queue Length 95th (m)	1.6	4.2	7.6	3.0	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Control Delay (s)	22.7	29.3	50.0	26.9	8.3	0.0	0.0	0.0	11.0	0.0	0.0	0.0
Lane LOS	C	D	E	D	A				B			
Approach Delay (s)	27.1		40.0		0.1				0.1			
Approach LOS	D		E									

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	37.1%	ICU Level of Service	A	
Analysis Period (min)	15			

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	238	172	303	194	452	76	761	539	138	256	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.94		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)	1750	3280		1750	3500	1566	1750	3500	1566	1750	3500	1566
Flt Permitted	0.63	1.00		0.31	1.00	1.00	0.58	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1160	3280		580	3500	1566	1068	3500	1566	448	3500	1566
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	238	172	303	194	452	76	761	539	138	256	40
RTOR Reduction (vph)	0	104	0	0	0	124	0	0	305	0	0	22
Lane Group Flow (vph)	31	306	0	303	194	328	76	761	234	138	256	18
Turn Type	Perm			pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	22.8	22.8		47.0	47.0	47.0	52.8	48.0	48.0	55.2	49.2	49.2
Effective Green, g (s)	26.8	26.8		51.0	51.0	51.0	60.8	52.0	52.0	63.0	53.2	53.2
Actuated g/C Ratio	0.22	0.22		0.42	0.42	0.42	0.51	0.43	0.43	0.52	0.44	0.44
Clearance Time (s)	7.0	7.0		5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	259	733		473	1488	666	591	1517	679	344	1552	694
v/s Ratio Prot		0.09		c0.12	0.06		0.01	c0.22		c0.03	0.07	
v/s Ratio Perm	0.03			0.15		c0.21	0.06		0.15	0.18		0.01
v/c Ratio	0.12	0.42		0.64	0.13	0.49	0.13	0.50	0.34	0.40	0.16	0.03
Uniform Delay, d1	37.2	39.9		24.7	21.0	25.1	15.3	24.6	22.6	16.3	20.1	18.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.61	1.64	2.70
Incremental Delay, d2	0.9	1.7		3.0	0.0	0.6	0.1	1.2	1.4	0.8	0.2	0.1
Delay (s)	38.1	41.7		27.7	21.0	25.7	15.4	25.8	24.0	27.0	33.0	50.8
Level of Service	D	D		C	C	C	B	C	C	C	C	D
Approach Delay (s)		41.4			25.4			24.5			32.8	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	14	14	62	15	22	15	928	148	9	357	23
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	14	14	62	15	22	15	928	148	9	357	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	910	1492	190	1176	1356	464	380			1076		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	910	1492	190	1176	1356	464	380			1076		
tC, single (s)	7.5	6.5	6.9	*7.2	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	88	98	57	90	96	99			99		
cM capacity (veh/h)	199	119	820	144	144	545	1175			644		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	14	28	62	37	15	464	464	148	9	238	142
Volume Left	14	0	62	0	15	0	0	0	9	0	0
Volume Right	0	14	0	22	0	0	0	148	0	0	23
cSH	199	208	144	256	1175	1700	1700	1700	644	1700	1700
Volume to Capacity	0.07	0.13	0.43	0.14	0.01	0.27	0.27	0.09	0.01	0.14	0.08
Queue Length 95th (m)	1.7	3.5	14.6	3.8	0.3	0.0	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	24.5	25.0	47.8	21.4	8.1	0.0	0.0	0.0	10.7	0.0	0.0
Lane LOS	C	C	E	C	A				B		
Approach Delay (s)	24.8		38.0		0.1				0.2		
Approach LOS	C		E								

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	47.4%	ICU Level of Service	A	
Analysis Period (min)	15			

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	310	19	119	176	26	9	673	237	9	310	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1785	3500	1597	1767	3501		1785	3368	1597	1733	3404	
Flt Permitted	0.62	1.00	1.00	0.45	1.00		0.52	1.00	1.00	0.32	1.00	
Satd. Flow (perm)	1174	3500	1597	829	3501		973	3368	1597	581	3404	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	310	19	119	176	26	9	673	237	9	310	25
RTOR Reduction (vph)	0	0	13	0	10	0	0	0	119	0	5	0
Lane Group Flow (vph)	50	310	6	119	192	0	9	673	119	9	330	0
Heavy Vehicles (%)	0%	2%	0%	1%	0%	0%	0%	6%	0%	3%	4%	0%
Turn Type	Perm		Perm	pm+pt			Perm		Perm	Perm		
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	32.7	32.7	32.7	50.0	50.0		56.0	56.0	56.0	56.0	56.0	
Effective Green, g (s)	36.7	36.7	36.7	54.0	54.0		60.0	60.0	60.0	60.0	60.0	
Actuated g/C Ratio	0.31	0.31	0.31	0.45	0.45		0.50	0.50	0.50	0.50	0.50	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	359	1070	488	485	1575		487	1684	799	291	1702	
v/s Ratio Prot		c0.09		c0.03	0.05			c0.20			0.10	
v/s Ratio Perm	0.04		0.00	0.08			0.01		0.07	0.02		
v/c Ratio	0.14	0.29	0.01	0.25	0.12		0.02	0.40	0.15	0.03	0.19	
Uniform Delay, d1	30.2	31.7	29.0	19.8	19.2		15.1	18.7	16.2	15.2	16.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.54	1.47	4.24	0.90	0.84	
Incremental Delay, d2	0.8	0.7	0.0	0.3	0.0		0.1	0.6	0.3	0.2	0.3	
Delay (s)	31.0	32.4	29.1	20.0	19.2		23.3	28.2	69.0	13.9	14.3	
Level of Service	C	C	C	C	B		C	C	E	B	B	
Approach Delay (s)		32.1			19.5			38.7			14.3	
Approach LOS		C			B			D			B	

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	46	0	5	0	658	52	2	316	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	46	0	5	0	658	52	2	316	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								356				
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		
vC, conflicting volume	654	1030	158	846	1004	355	316			710		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	385	804	158	599	775	52	316			448		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	87	100	99	100			100		
cM capacity (veh/h)	488	282	859	345	293	901	1241			995		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	0	0	46	5	329	381	160	158
Volume Left	0	0	46	0	0	0	2	0
Volume Right	0	0	0	5	0	52	0	0
cSH	1700	1700	345	901	1241	1700	995	1700
Volume to Capacity	0.00	0.00	0.13	0.01	0.00	0.22	0.00	0.09
Queue Length 95th (m)	0.0	0.0	3.5	0.1	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	17.0	9.0	0.0	0.0	0.1	0.0
Lane LOS	A	A	C	A			A	
Approach Delay (s)	0.0		16.2		0.0		0.1	
Approach LOS	A		C					

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	34.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	14	14	24	5	5	32	580	45	10	232	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	14	14	24	5	5	32	580	45	10	232	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											357	
pX, platoon unblocked												
vC, conflicting volume	616	944	119	824	924	312	238			625		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	616	944	119	824	924	312	238			625		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	94	98	90	98	99	98			99		
cM capacity (veh/h)	357	252	910	244	259	683	1326			952		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	14	28	24	10	322	335	126	122
Volume Left	14	0	24	0	32	0	10	0
Volume Right	0	14	0	5	0	45	0	6
cSH	357	394	244	375	1326	1700	952	1700
Volume to Capacity	0.04	0.07	0.10	0.03	0.02	0.20	0.01	0.07
Queue Length 95th (m)	0.9	1.7	2.5	0.6	0.6	0.0	0.2	0.0
Control Delay (s)	15.5	14.8	21.4	14.9	1.0	0.0	0.8	0.0
Lane LOS	C	B	C	B	A		A	
Approach Delay (s)	15.1		19.5		0.5		0.4	
Approach LOS	C		C					

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	50.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	186	609	74	100	756	83	31	418	135	49	214	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.4	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1750	3336	1377	1623	3093		1750	3131	1377	1653	3335	
Flt Permitted	0.17	1.00	1.00	0.42	1.00		0.54	1.00	1.00	0.42	1.00	
Satd. Flow (perm)	320	3336	1377	720	3093		992	3131	1377	737	3335	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	186	609	74	100	756	83	31	418	135	49	214	59
RTOR Reduction (vph)	0	0	32	0	8	0	0	0	59	0	18	0
Lane Group Flow (vph)	186	609	42	100	831	0	31	418	76	49	255	0
Heavy Vehicles (%)	2%	7%	16%	10%	15%	2%	2%	14%	16%	8%	4%	2%
Turn Type	pm+pt		Perm	Perm			Perm		Perm	Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	65.3	65.3	65.3	43.1	43.1		41.5	41.5	41.5	41.5	41.5	
Effective Green, g (s)	68.9	68.9	68.9	46.7	46.7		45.1	45.1	45.1	45.1	45.1	
Actuated g/C Ratio	0.57	0.57	0.57	0.39	0.39		0.38	0.38	0.38	0.38	0.38	
Clearance Time (s)	7.0	6.6	6.6	6.6	6.6		6.6	6.6	6.6	6.6	6.6	
Vehicle Extension (s)	3.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	408	1915	791	280	1204		373	1177	518	277	1253	
v/s Ratio Prot	c0.07	0.18			c0.27			c0.13			0.08	
v/s Ratio Perm	0.19		0.03	0.14			0.03		0.06	0.07		
v/c Ratio	0.46	0.32	0.05	0.36	0.69		0.08	0.36	0.15	0.18	0.20	
Uniform Delay, d1	15.7	13.3	11.2	26.0	30.6		24.1	27.0	24.7	25.0	25.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.19	1.13	2.10	1.00	1.00	
Incremental Delay, d2	0.8	0.2	0.1	1.6	2.2		0.4	0.8	0.6	1.4	0.4	
Delay (s)	16.5	13.5	11.3	27.6	32.8		29.1	31.3	52.6	26.4	25.7	
Level of Service	B	B	B	C	C		C	C	D	C	C	
Approach Delay (s)		14.0			32.3			36.1			25.8	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.4
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

Description: Mayfield Rd

c Critical Lane Group

Appendix K

Roundabout Analysis Outputs

SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Mayfield Road 2018 AM

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Mayfield Road W							
	South	2R	Right	59	11	1.00	1.00
	East	2T	Thru	660	50	1.00	1.00
	North	5L	Left	64	1	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	29	1	1.00	1.00
	East	8R	Right	38	7	1.00	1.00
	North	8T	Thru	77	13	1.00	1.00
East: Mayfield Road E							
	West	6T	Thru	494	26	1.00	1.00
	South	1L	Left	171	19	1.00	1.00
	North	6R	Right	29	1	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	98	2	1.00	1.00
	South	4T	Thru	509	21	1.00	1.00
	East	7L	Left	69	6	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Mov ID	Left		Through		Right	
	LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program						
West: Mayfield Road W						
5L L	64	1	0	0	0	0
2T T	0	0	660	50	0	0
2R R	0	0	0	0	59	11
South: Mississauga Road S						
3L L	29	1	0	0	0	0
8T T	0	0	77	13	0	0
8R R	0	0	0	0	38	7
East: Mayfield Road E						
1L L	171	19	0	0	0	0
6T T	0	0	494	26	0	0
6R R	0	0	0	0	29	1
North: Mississauga Road N						
7L L	69	6	0	0	0	0
4T T	0	0	509	21	0	0
4R R	0	0	0	0	98	2

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Mov ID	Left		Through		Right	
	Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program						
West: Mayfield Road W						
5L L	65	1.5	0	0.0	0	0.0
2T T	0	0.0	710	7.0	0	0.0
2R R	0	0.0	0	0.0	70	15.7
South: Mississauga Road S						
3L L	30	3.3	0	0.0	0	0.0
8T T	0	0.0	90	14.4	0	0.0
8R R	0	0.0	0	0.0	45	15.6
East: Mayfield Road E						
1L L	190	10.0	0	0.0	0	0.0
6T T	0	0.0	520	5.0	0	0.0
6R R	0	0.0	0	0.0	30	3.3
North: Mississauga Road N						
7L L	75	8.0	0	0.0	0	0.0
4T T	0	0.0	530	4.0	0	0.0
4R R	0	0.0	0	0.0	100	2.0

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl. Constr. Effect	Cap.	O-D Factor
West: Mayfield Road W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	795	5.8	807	0	N	0.889
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	850	6.7	867	0	N	0.834
East: Mayfield Road E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	185	7.8	193	0	N	0.977
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	740	6.2	751	0	N	0.928

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Critical Gap Dist (m)	Foll-up Headway (s)
West: Mayfield Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Dominant	807	34.6	42.9	1.33	0.484	3.66	35.2	2.54
Thru	1	Dominant	807	34.6	42.9	1.33	0.484	3.73	35.9	2.60
	2	Subdominant	807	34.6	42.9	1.33	0.484	3.83	36.9	2.66
Right	2	Subdominant	807	34.6	42.9	1.33	0.484	4.16	40.0	2.89
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Dominant	867	36.9	42.6	1.17	0.465	3.59	36.8	2.52
Thru	1	Dominant	867	36.9	42.6	1.17	0.465	3.93	40.3	2.76
	2	Subdominant	867	36.9	42.6	1.17	0.465	4.09	41.9	2.87
Right	2	Subdominant	867	36.9	42.6	1.17	0.465	4.13	42.3	2.90
East: Mayfield Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	193	32.2	166.9	1.55	0.166	4.56	40.8	2.83D
Thru	1	Subdominant	193	32.2	166.9	1.55	0.166	4.35	38.9	2.70D
	2	Dominant	193	32.2	166.9	1.55	0.166	4.35	38.9	2.70
Right	2	Dominant	193	32.2	166.9	1.55	0.166	4.33	38.8	2.69

North: Mississauga Road N									
Environment Factor: 1.20		Entry/Circulating Flow Adjustment: Medium							
Left	1 Subdominant	751	35.1	46.8	1.07	0.387	3.90	38.0	2.69
Thru	1 Subdominant	751	35.1	46.8	1.07	0.387	3.79	36.9	2.61
	2 Dominant	751	35.1	46.8	1.07	0.387	3.72	36.3	2.57
Right	2 Dominant	751	35.1	46.8	1.07	0.387	3.72	36.3	2.56

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Mayfield Road W										
5L L	65	1.5	795	5.8	807	106	0.85	39	100	0.613
2T T	710	7.0	795	5.8	807	1156	0.85	38	100	0.614*
2R R	70	15.7	795	5.8	807	114	0.85	38	100	0.614*
South: Mississauga Road S										
3L L	30	3.3	850	6.7	867	214	0.85	506	100	0.140
8T T	90	14.4	850	6.7	867	641	0.85	505	100	0.140
8R R	45	15.6	850	6.7	867	320	0.85	504	100	0.141
East: Mayfield Road E										
1L L	190	10.0	185	7.8	193	562	0.85	151	100	0.338
6T T	520	5.0	185	7.8	193	1539	0.85	152	100	0.338
6R R	30	3.3	185	7.8	193	89	0.85	152	100	0.337
North: Mississauga Road N										
7L L	75	8.0	740	6.2	751	166	0.85	88	100	0.452
4T T	530	4.0	740	6.2	751	1171	0.85	88	100	0.453
4R R	100	2.0	740	6.2	751	221	0.85	88	100	0.452

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Intersection Level of Service	=	B
Worst movement Level of Service	=	B
Average intersection delay (s/pers)	=	10.5
Largest average movement delay (s)	=	18.6
Largest back of queue, 95% (m)	=	43
Performance Index	=	49.40

```
Degree of saturation (highest)            =     0.614
Practical Spare Capacity (lowest)         =        38 %
Effective intersection capacity, (veh/h)  =      3997
Total vehicle flow (veh/h)                =      2455
Total person flow (pers/h)                =      2946
Total vehicle delay (veh-h/h)             =      7.14
Total person delay (pers-h/h)             =      8.57
Total effective vehicle stops (veh/h)     =      1956
Total effective person stops (pers/h)     =      2348
Total vehicle travel (veh-km/h)           =    1559.9
Total cost ($/h)                          =    690.54
Total fuel (L/h)                          =     211.2
Total CO2 (kg/h)                          =    529.34
```

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W										
5L	L	0.34	0.40	18.6	0.80	1.03	5.4	43	1.65	43.4
2T	T	2.36	2.83	12.0	0.80	0.98	5.4	43	16.03	48.6
2R	R	0.27	0.32	13.7	0.80	0.99	5.3	43	1.62	47.1
South: Mississauga Road S										
3L	L	0.13	0.16	15.6	0.65	0.87	0.8	7	0.67	45.9
8T	T	0.23	0.27	9.1	0.65	0.73	0.8	7	1.73	50.9
8R	R	0.13	0.16	10.7	0.65	0.82	0.8	7	0.91	50.1
East: Mayfield Road E										
1L	L	0.72	0.86	13.7	0.40	0.70	2.3	19	3.81	47.0
6T	T	0.93	1.12	6.4	0.40	0.53	2.3	18	8.52	52.9
6R	R	0.06	0.08	7.5	0.40	0.58	2.3	18	0.51	51.8
North: Mississauga Road N										
7L	L	0.34	0.41	16.4	0.67	0.94	3.0	24	1.72	45.4
4T	T	1.35	1.62	9.2	0.67	0.79	3.0	24	10.26	50.8
4R	R	0.28	0.34	10.2	0.67	0.85	3.0	24	1.99	50.0

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W									
845	0.614	2.96	3.55	12.6	0.80	0.98	43	19.29	48.0
South: Mississauga Road S									
165	0.141	0.49	0.59	10.7	0.65	0.78	7	3.31	49.7
East: Mayfield Road E									
740	0.338	1.71	2.06	8.3	0.40	0.57	19	12.84	51.1
North: Mississauga Road N									
705	0.453	1.98	2.37	10.1	0.67	0.81	24	13.96	50.0
ALL VEHICLES:									
2455	0.614	7.14	8.57	10.5	0.63	0.80	43	49.40	49.6

INTERSECTION (persons):

2946	0.614	8.57	10.5	0.63	0.80	49.40	49.6

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Mayfield Road W								
1 LT	436	709	0.614	12.8	0.98	5.4	43.4	500.0
2 TR	409	666	0.614	12.4	0.98	5.3	43.3	500.0
South: Mississauga Road S								
1 LT	87	620	0.140	11.2	0.77	0.8	6.5	500.0
2 TR	78	555	0.140	10.1	0.79	0.8	6.6	500.0
East: Mayfield Road E								
1 LT	365	1079	0.338	10.2	0.62	2.3	18.6	500.0
2 TR	375	1111	0.338	6.5	0.53	2.3	18.3	500.0
North: Mississauga Road N								
1 LT	346	765	0.453	10.8	0.83	3.0	23.7	500.0
2 TR	359	792	0.453	9.4	0.80	3.0	23.6	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Mayfield Road W								
1 LT	65	371	0	436	150	709	0.614	100
2 TR	0	339	70	409	150	666	0.614	100
South: Mississauga Road S								
1 LT	30	57	0	87	87	620	0.140	100
2 TR	0	33	45	78	78	555	0.140	100
East: Mayfield Road E								
1 LT	190	175	0	365	150	1079	0.338	100
2 TR	0	345	30	375	150	1111	0.338	100
North: Mississauga Road N								
1 LT	75	271	0	346	150	765	0.453	100
2 TR	0	259	100	359	150	792	0.453	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle

effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Mayfield Road W									
5L	L	65	106	100	0.613	18.6	1.03	5.4	1.65
2T	T	710	1156	100	0.614*	12.0	0.98	5.4	16.03
2R	R	70	114	100	0.614*	13.7	0.99	5.3	1.62
South: Mississauga Road S									
3L	L	30	214	100	0.140	15.6	0.87	0.8	0.67
8T	T	90	641	100	0.140	9.1	0.73	0.8	1.73
8R	R	45	320	100	0.141	10.7	0.82	0.8	0.91
East: Mayfield Road E									
1L	L	190	562	100	0.338	13.7	0.70	2.3	3.81
6T	T	520	1539	100	0.338	6.4	0.53	2.3	8.52
6R	R	30	89	100	0.337	7.5	0.58	2.3	0.51
North: Mississauga Road N									
7L	L	75	166	100	0.452	16.4	0.94	3.0	1.72
4T	T	530	1171	100	0.453	9.2	0.79	3.0	10.26
4R	R	100	221	100	0.452	10.2	0.85	3.0	1.99

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Mov ID		Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Mayfield Road W							
5L	L	5.6	19.79	0.024	1.18	0.035	13.9
2T	T	63.1	204.74	0.246	13.28	0.412	158.1
2R	R	7.8	23.58	0.029	1.72	0.053	19.6
		76.4	248.11	0.299	16.18	0.500	191.6
South: Mississauga Road S							
3L	L	2.5	8.76	0.011	0.52	0.016	6.3
8T	T	9.1	27.64	0.033	1.89	0.060	22.8
8R	R	4.8	14.47	0.018	1.05	0.033	12.2
		16.4	50.86	0.061	3.47	0.108	41.2
East: Mayfield Road E							
1L	L	19.0	61.23	0.073	4.02	0.122	47.7
6T	T	40.2	133.10	0.155	7.83	0.253	100.7
6R	R	2.2	7.49	0.009	0.45	0.014	5.5

	61.4	201.81	0.238	12.31	0.389	154.0
North: Mississauga Road N						
7L L	7.3	24.21	0.029	1.57	0.047	18.4
4T T	41.9	139.72	0.167	8.53	0.268	105.0
4R R	7.6	25.84	0.032	1.60	0.049	19.1
	56.9	189.76	0.228	11.70	0.365	142.5
INTERSECTION:	211.2	690.54	0.825	43.65	1.362	529.3

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Mayfield Road W						
5L L	12.7	0.45	0.543	26.81	0.791	317.6
2T T	14.1	0.46	0.551	29.73	0.923	353.8
2R R	17.9	0.54	0.658	39.40	1.211	449.7
	14.3	0.46	0.559	30.28	0.935	358.7
South: Mississauga Road S						
3L L	12.3	0.43	0.523	25.86	0.770	308.9
8T T	16.0	0.49	0.578	33.42	1.057	402.8
8R R	17.3	0.52	0.626	37.40	1.160	434.0
	15.6	0.48	0.580	33.02	1.029	393.1
East: Mayfield Road E						
1L L	14.8	0.48	0.572	31.39	0.953	372.1
6T T	12.3	0.41	0.474	23.93	0.774	307.9
6R R	11.8	0.40	0.485	24.09	0.750	295.7
	13.0	0.43	0.501	25.95	0.821	324.7
North: Mississauga Road N						
7L L	14.5	0.48	0.577	31.04	0.933	364.0
4T T	12.6	0.42	0.501	25.59	0.805	314.8
4R R	12.2	0.41	0.509	25.60	0.784	305.9
	12.7	0.42	0.510	26.21	0.816	319.1
INTERSECTION:	13.5	0.44	0.529	27.98	0.873	339.3

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Mayfield Road W												
1 LT	65	371		436	6				0.614	12.8	43	500
2 TR		339	70	409	9				0.614	12.4	43	500
	65	710	70	845	7				0.614	12.6	43	
South: Mississauga Road S												
1 LT	30	57		87	11				0.140	11.2	7	500
2 TR		33	45	78	15				0.140	10.1	7	500
	30	90	45	165	13				0.140	10.7	7	
East: Mayfield Road E												
1 LT	190	175		365	8				0.338	10.2	19	500
2 TR		345	30	375	5				0.338	6.5	18	500
	190	520	30	740	6				0.338	8.3	19	
North: Mississauga Road N												
1 LT	75	271		346	5				0.453	10.8	24	500
2 TR		259	100	359	3				0.453	9.4	24	500
	75	530	100	705	4				0.453	10.1	24	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	2455	6	0.614	10.5	43

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Mayfield Road W								
5L	L	65	106	0.613	18.6	B	5.4	43
2T	T	710	1156	0.614*	12.0	B	5.4	43
2R	R	70	114	0.614*	13.7	B	5.3	43
South: Mississauga Road S								
3L	L	30	214	0.140	15.6	B	0.8	7
8T	T	90	641	0.140	9.1	A	0.8	7
8R	R	45	320	0.141	10.7	B	0.8	7
East: Mayfield Road E								
1L	L	190	562	0.338	13.7	B	2.3	19
6T	T	520	1539	0.338	6.4	A	2.3	18
6R	R	30	89	0.337	7.5	A	2.3	18

North: Mississauga Road N								
7L	L	75	166	0.452	16.4	B	3.0	24
4T	T	530	1171	0.453	9.2	A	3.0	24
4R	R	100	221	0.452	10.2	B	3.0	24
ALL VEHICLES:		2455		0.614	10.5	B	5.4	43

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.
* Maximum v/c ratio, or critical green periods

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Dist. (m)	Distance User Spec?
West: Mayfield Road W								
	South	Right	35.0	32.5	19.4	500	140	No
	East	Thru	57.3	39.1	47.1	500	136	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: Mayfield Road E								
	West	Thru	57.3	39.1	47.1	500	134	No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

		Delay (seconds/veh)								
Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Mayfield Road W										
1 LT	0.614	4.3	2.0	6.2	5.1	1.1	1.0	0.1	6.5	12.8

2 TR	0.614	4.6	2.1	6.7	5.2	1.5	1.4	0.1	5.8	12.4
South: Mississauga Road S										
1 LT	0.140	3.2	0.0	3.2	3.9	0.0	0.0	0.0	8.0	11.2
2 TR	0.140	3.6	0.0	3.6	4.0	0.0	0.0	0.0	6.5	10.1
East: Mayfield Road E										
1 LT	0.338	1.0	0.0	1.0	2.3	0.0	0.0	0.0	9.2	10.2
2 TR	0.338	1.0	0.0	1.0	2.6	0.0	0.0	0.0	5.6	6.5
North: Mississauga Road N										
1 LT	0.453	3.3	0.5	3.8	4.2	0.1	0.1	0.0	7.0	10.8
2 TR	0.453	3.1	0.5	3.6	4.3	0.0	0.0	0.0	5.8	9.4

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Mayfield Road W							
1 LT	0.614	0.80	0.08	0.10	0.98	0.800	0.24
2 TR	0.614	0.80	0.09	0.09	0.98	0.801	0.25
South: Mississauga Road S							
1 LT	0.140	0.58	0.00	0.19	0.77	0.650	0.00
2 TR	0.140	0.62	0.00	0.17	0.79	0.654	0.00
East: Mayfield Road E							
1 LT	0.338	0.27	0.00	0.35	0.62	0.404	0.00
2 TR	0.338	0.26	0.00	0.27	0.53	0.400	0.00
North: Mississauga Road N							
1 LT	0.453	0.63	0.03	0.17	0.83	0.669	0.09
2 TR	0.453	0.62	0.03	0.16	0.80	0.667	0.09

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Mayfield Road W											
1 LT	0.614	0.3	1.4	0.3	1.8	3.1	3.8	4.4	5.4	6.3	0.09
2 TR	0.614	0.3	1.4	0.3	1.7	3.1	3.8	4.3	5.3	6.2	0.09
South: Mississauga Road S											
1 LT	0.140	0.0	0.2	0.0	0.2	0.5	0.6	0.6	0.8	0.9	0.01
2 TR	0.140	0.0	0.2	0.0	0.2	0.5	0.5	0.6	0.8	0.9	0.01

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
East: Mayfield Road E											
1 LT	0.338	0.0	0.7	0.0	0.7	1.3	1.6	1.9	2.3	2.7	0.04
2 TR	0.338	0.0	0.7	0.0	0.7	1.4	1.6	1.9	2.3	2.7	0.04
North: Mississauga Road N											
1 LT	0.453	0.1	0.9	0.1	1.0	1.7	2.1	2.4	3.0	3.5	0.05
2 TR	0.453	0.1	0.9	0.1	1.0	1.8	2.1	2.4	3.0	3.5	0.05

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Mayfield Road W											
1 LT	0.614	2.4	11.4	2.7	14.2	25.0	30.6	34.9	43.4	50.5	0.09
2 TR	0.614	2.4	11.4	2.7	14.1	24.9	30.6	34.8	43.3	50.4	0.09
South: Mississauga Road S											
1 LT	0.140	0.0	2.1	0.0	2.1	3.9	4.7	5.3	6.5	7.6	0.01
2 TR	0.140	0.0	2.1	0.0	2.1	3.9	4.7	5.3	6.6	7.6	0.01
East: Mayfield Road E											
1 LT	0.338	0.0	5.9	0.0	5.9	10.9	13.3	15.0	18.6	21.5	0.04
2 TR	0.338	0.0	5.8	0.0	5.8	10.7	13.0	14.8	18.3	21.2	0.04
North: Mississauga Road N											
1 LT	0.453	0.6	6.9	0.7	7.6	13.8	16.9	19.1	23.7	27.5	0.05
2 TR	0.453	0.6	6.9	0.7	7.5	13.7	16.8	19.0	23.6	27.3	0.05

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 AM
Intersection ID: 1
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Mayfield Road W									
5L L	65.0	25.7	25.7	65.0	18.6		44.0	43.4	12.4
2T T	65.0	39.1	39.1	65.0	18.5		48.6	48.6	5.5
2R R	65.0	32.5	32.5	65.0	17.8		47.5	47.1	7.1
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0			45.9	45.9	12.4
8T T	65.0	39.1	39.1	65.0			50.9	50.9	5.7
8R R	65.0	32.5	32.5	65.0			50.1	50.1	7.1
East: Mayfield Road E									
1L L	65.0	25.7	25.7	65.0			47.0	47.0	12.6

6T	T	65.0	39.1	39.1	65.0		52.9	52.9	5.5
6R	R	65.0	32.5	32.5	65.0		51.8	51.8	6.6
North: Mississauga Road N									
7L	L	65.0	25.7	25.7	65.0	18.1	45.4	45.4	12.6
4T	T	65.0	39.1	39.1	65.0	18.4	50.8	50.8	5.4
4R	R	65.0	32.5	32.5	65.0	18.4	50.0	50.0	6.6

"Running Speed" is the average speed excluding stopped periods.

Site: Mississauga and Mayfield 2018 AM
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Processed Aug 14, 2009 03:57:26PM

A1492, AECOM, Small Office
Produced by SIDRA Intersection 3.2.2.1563

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SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Mayfield Road 2018 PM

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Mayfield Road W							
	South	2R	Right	34	6	1.00	1.00
	East	2T	Thru	298	22	1.00	1.00
	North	5L	Left	103	2	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	59	1	1.00	1.00
	East	8R	Right	185	35	1.00	1.00
	North	8T	Thru	370	60	1.00	1.00
East: Mayfield Road E							
	West	6T	Thru	694	36	1.00	1.00
	South	1L	Left	95	10	1.00	1.00
	North	6R	Right	44	1	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	49	1	1.00	1.00
	South	4T	Thru	154	6	1.00	1.00
	East	7L	Left	32	3	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	103	2	0	0	0	0
2T	T	0	0	298	22	0	0
2R	R	0	0	0	0	34	6
South: Mississauga Road S							
3L	L	59	1	0	0	0	0
8T	T	0	0	370	60	0	0
8R	R	0	0	0	0	185	35
East: Mayfield Road E							
1L	L	95	11	0	0	0	0
6T	T	0	0	694	37	0	0
6R	R	0	0	0	0	44	1
North: Mississauga Road N							
7L	L	32	3	0	0	0	0
4T	T	0	0	154	6	0	0
4R	R	0	0	0	0	49	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	105	1.9	0	0.0	0	0.0
2T	T	0	0.0	320	6.9	0	0.0
2R	R	0	0.0	0	0.0	40	15.0
South: Mississauga Road S							
3L	L	60	1.7	0	0.0	0	0.0
8T	T	0	0.0	430	14.0	0	0.0
8R	R	0	0.0	0	0.0	220	15.9
East: Mayfield Road E							
1L	L	106	10.4	0	0.0	0	0.0
6T	T	0	0.0	731	5.1	0	0.0
6R	R	0	0.0	0	0.0	45	2.2
North: Mississauga Road N							
7L	L	35	8.6	0	0.0	0	0.0
4T	T	0	0.0	160	3.8	0	0.0
4R	R	0	0.0	0	0.0	50	2.0

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl. Constr. Effect	Cap.	O-D Factor
West: Mayfield Road W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	300	6.6	307	0	N	0.968
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	460	5.9	468	0	N	0.954
East: Mayfield Road E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	595	10.7	634	0	N	0.921
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	895	5.4	903	0	N	0.836

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Mayfield Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Dominant	307	32.9	107.2	1.46	0.239	4.29	39.2	2.73
Thru	1	Dominant	307	32.9	107.2	1.46	0.239	4.38	40.0	2.78
	2	Subdominant	307	32.9	107.2	1.46	0.239	4.38	40.0	2.78D
Right	2	Subdominant	307	32.9	107.2	1.46	0.239	4.72	43.1	3.00D
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Dominant	468	35.0	74.9	1.15	0.279	4.07	39.6	2.67
Thru	1	Dominant	468	35.0	74.9	1.15	0.279	4.43	43.2	2.91
	2	Subdominant	468	35.0	74.9	1.15	0.279	4.43	43.2	2.91D
Right	2	Subdominant	468	35.0	74.9	1.15	0.279	4.51	43.9	2.96D
East: Mayfield Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	634	35.4	55.8	1.44	0.429	4.10	40.3	2.77
Thru	1	Subdominant	634	35.4	55.8	1.44	0.429	3.90	38.4	2.64
	2	Dominant	634	35.4	55.8	1.44	0.429	3.87	38.1	2.62
Right	2	Dominant	634	35.4	55.8	1.44	0.429	3.86	37.9	2.61

North: Mississauga Road N									
Environment Factor: 1.20		Entry/Circulating Flow Adjustment: Medium							
Left	1 Subdominant	903	36.6	40.6	1.10	0.456	3.81	38.7	2.68
Thru	1 Subdominant	903	36.6	40.6	1.10	0.456	3.68	37.4	2.59
	2 Dominant	903	36.6	40.6	1.10	0.456	3.56	36.2	2.51
Right	2 Dominant	903	36.6	40.6	1.10	0.456	3.56	36.2	2.51

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Mayfield Road W										
5L L	105	1.9	300	6.6	307	439	0.85	255	100	0.239
2T T	320	6.9	300	6.6	307	1337	0.85	255	100	0.239
2R R	40	15.0	300	6.6	307	167	0.85	255	100	0.240
South: Mississauga Road S										
3L L	60	1.7	460	5.9	468	137	0.85	94	100	0.438
8T T	430	14.0	460	5.9	468	984	0.85	95	100	0.437
8R R	220	15.9	460	5.9	468	504	0.85	95	100	0.437
East: Mayfield Road E										
1L L	106	10.4	595	10.7	634	190	0.85	52	100	0.558*
6T T	731	5.1	595	10.7	634	1310	0.85	52	100	0.558*
6R R	45	2.2	595	10.7	634	81	0.85	53	100	0.556
North: Mississauga Road N										
7L L	35	8.6	895	5.4	903	187	0.85	354	100	0.187
4T T	160	3.7	895	5.4	903	856	0.85	355	100	0.187
4R R	50	2.0	895	5.4	903	267	0.85	354	100	0.187

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Intersection Level of Service	=	A
Worst movement Level of Service	=	B
Average intersection delay (s/pers)	=	9.9
Largest average movement delay (s)	=	17.4
Largest back of queue, 95% (m)	=	38
Performance Index	=	45.25

Degree of saturation (highest)	=	0.558
Practical Spare Capacity (lowest)	=	52 %
Effective intersection capacity, (veh/h)	=	4125
Total vehicle flow (veh/h)	=	2302
Total person flow (pers/h)	=	2762
Total vehicle delay (veh-h/h)	=	6.36
Total person delay (pers-h/h)	=	7.63
Total effective vehicle stops (veh/h)	=	1782
Total effective person stops (pers/h)	=	2139
Total vehicle travel (veh-km/h)	=	1460.5
Total cost ($/h)	=	658.55
Total fuel (L/h)	=	205.1
Total CO2 (kg/h)	=	514.46

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W										
5L	L	0.40	0.48	13.8	0.45	0.73	1.4	11	2.12	46.8
2T	T	0.62	0.74	6.9	0.45	0.56	1.4	11	5.34	52.5
2R	R	0.09	0.11	8.5	0.45	0.64	1.4	12	0.70	51.4
South: Mississauga Road S										
3L	L	0.25	0.30	15.2	0.60	0.85	2.9	24	1.31	46.1
8T	T	1.02	1.22	8.5	0.60	0.69	2.9	24	7.95	51.3
8R	R	0.61	0.73	10.0	0.61	0.78	2.9	25	4.25	50.4
East: Mayfield Road E										
1L	L	0.51	0.61	17.4	0.74	0.98	4.7	38	2.56	44.6
6T	T	2.05	2.47	10.1	0.74	0.89	4.8	38	15.31	50.3
6R	R	0.14	0.17	11.1	0.74	0.93	4.8	38	0.96	49.2
North: Mississauga Road N										
7L	L	0.15	0.18	15.8	0.66	0.90	1.0	8	0.79	45.9
4T	T	0.38	0.45	8.5	0.66	0.70	1.1	8	2.99	50.9
4R	R	0.13	0.16	9.5	0.66	0.77	1.1	8	0.96	50.1

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W									
465	0.240	1.11	1.34	8.6	0.45	0.61	12	8.17	50.9
South: Mississauga Road S									
710	0.438	1.88	2.26	9.5	0.60	0.73	25	13.52	50.5
East: Mayfield Road E									
882	0.558	2.71	3.25	11.0	0.74	0.90	38	18.83	49.4
North: Mississauga Road N									
245	0.187	0.66	0.80	9.7	0.66	0.74	8	4.74	49.9
ALL VEHICLES:									
2302	0.558	6.36	7.63	9.9	0.63	0.77	38	45.25	50.1

INTERSECTION (persons):								
2762	0.558		7.63	9.9	0.63	0.77	45.25	50.1

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Mayfield Road W								
1 LT	236	985	0.239	10.0	0.64	1.4	11.3	500.0
2 TR	229	958	0.239	7.2	0.58	1.4	11.6	500.0
South: Mississauga Road S								
1 LT	361	826	0.437	9.6	0.72	2.9	24.2	500.0
2 TR	349	799	0.437	9.5	0.75	2.9	24.8	500.0
East: Mayfield Road E								
1 LT	435	779	0.558	12.0	0.92	4.7	37.9	500.0
2 TR	447	802	0.558	10.2	0.89	4.8	37.7	500.0
North: Mississauga Road N								
1 LT	119	634	0.187	10.7	0.77	1.0	8.3	500.0
2 TR	126	677	0.187	8.8	0.72	1.1	8.3	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Mayfield Road W								
1 LT	105	131	0	236	150	985	0.239	100
2 TR	0	189	40	229	150	958	0.239	100
South: Mississauga Road S								
1 LT	60	301	0	361	150	826	0.437	100
2 TR	0	129	220	349	150	799	0.437	100
East: Mayfield Road E								
1 LT	106	329	0	435	150	779	0.558	100
2 TR	0	402	45	447	150	802	0.558	100
North: Mississauga Road N								
1 LT	35	84	0	119	119	634	0.187	100
2 TR	0	76	50	126	126	677	0.187	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle

effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Mayfield Road W									
5L	L	105	439	100	0.239	13.8	0.73	1.4	2.12
2T	T	320	1337	100	0.239	6.9	0.56	1.4	5.34
2R	R	40	167	100	0.240	8.5	0.64	1.4	0.70
South: Mississauga Road S									
3L	L	60	137	100	0.438	15.2	0.85	2.9	1.31
8T	T	430	984	100	0.437	8.5	0.69	2.9	7.95
8R	R	220	504	100	0.437	10.0	0.78	2.9	4.25
East: Mayfield Road E									
1L	L	106	190	100	0.558*	17.4	0.98	4.7	2.56
6T	T	731	1310	100	0.558*	10.1	0.89	4.8	15.31
6R	R	45	81	100	0.556	11.1	0.93	4.8	0.96
North: Mississauga Road N									
7L	L	35	187	100	0.187	15.8	0.90	1.0	0.79
4T	T	160	856	100	0.187	8.5	0.70	1.1	2.99
4R	R	50	267	100	0.187	9.5	0.77	1.1	0.96

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Mov ID		Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Mayfield Road W							
5L	L	8.6	30.12	0.036	1.79	0.054	21.5
2T	T	26.3	85.29	0.100	5.20	0.167	66.0
2R	R	4.2	12.51	0.015	0.89	0.028	10.5
		39.1	127.91	0.151	7.88	0.249	98.0
South: Mississauga Road S							
3L	L	5.0	17.44	0.021	1.04	0.031	12.5
8T	T	43.0	130.93	0.154	8.88	0.282	108.0
8R	R	23.5	70.26	0.085	5.07	0.158	59.2
		71.4	218.64	0.261	15.00	0.471	179.6
East: Mayfield Road E							
1L	L	11.0	35.70	0.043	2.37	0.071	27.6
6T	T	60.2	198.31	0.238	12.44	0.389	150.8
6R	R	3.5	11.79	0.015	0.73	0.022	8.7

	74.7	245.80	0.296	15.55	0.483	187.1
North: Mississauga Road N						
7L L	3.4	11.20	0.014	0.73	0.022	8.5
4T T	12.6	42.10	0.050	2.57	0.081	31.6
4R R	3.8	12.90	0.016	0.80	0.024	9.5
	19.8	66.20	0.080	4.09	0.127	49.7
INTERSECTION:	205.1	658.55	0.787	42.51	1.329	514.5

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Mayfield Road W						
5L L	12.1	0.43	0.512	25.21	0.756	303.9
2T T	13.1	0.42	0.495	25.83	0.831	327.6
2R R	16.8	0.50	0.602	35.62	1.115	422.2
	13.2	0.43	0.508	26.50	0.837	329.9
South: Mississauga Road S						
3L L	12.3	0.43	0.520	25.70	0.767	307.6
8T T	15.9	0.48	0.570	32.83	1.042	399.0
8R R	17.1	0.51	0.620	36.98	1.150	431.3
	15.9	0.49	0.581	33.45	1.050	400.6
East: Mayfield Road E						
1L L	15.4	0.50	0.602	33.20	0.997	385.9
6T T	13.1	0.43	0.518	27.05	0.846	327.9
6R R	12.4	0.42	0.517	26.10	0.795	309.6
	13.3	0.44	0.529	27.79	0.863	334.4
North: Mississauga Road N						
7L L	14.4	0.47	0.572	30.81	0.927	362.0
4T T	12.5	0.42	0.499	25.49	0.803	314.1
4R R	12.2	0.41	0.508	25.54	0.782	305.5
	12.8	0.43	0.512	26.31	0.818	319.7
INTERSECTION:	14.0	0.45	0.539	29.11	0.910	352.2

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Mayfield Road W												
1 LT	105	131		236	5				0.239	10.0	11	500
2 TR		189	40	229	8				0.239	7.2	12	500
	105	320	40	465	6				0.239	8.6	12	
South: Mississauga Road S												
1 LT	60	301		361	12				0.437	9.6	24	500
2 TR		129	220	349	15				0.437	9.5	25	500
	60	430	220	710	14				0.437	9.5	25	
East: Mayfield Road E												
1 LT	106	329		435	6				0.558	12.0	38	500
2 TR		402	45	447	5				0.558	10.2	38	500
	106	731	45	882	6				0.558	11.0	38	
North: Mississauga Road N												
1 LT	35	84		119	5				0.187	10.7	8	500
2 TR		76	50	126	3				0.187	8.8	8	500
	35	160	50	245	4				0.187	9.7	8	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	2302	8	0.558	9.9	38

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Mayfield Road W								
5L	L	105	439	0.239	13.8	B	1.4	11
2T	T	320	1337	0.239	6.9	A	1.4	11
2R	R	40	167	0.240	8.5	A	1.4	12
South: Mississauga Road S								
3L	L	60	137	0.438	15.2	B	2.9	24
8T	T	430	984	0.437	8.5	A	2.9	24
8R	R	220	504	0.437	10.0	A	2.9	25
East: Mayfield Road E								
1L	L	106	190	0.558*	17.4	B	4.7	38
6T	T	731	1310	0.558*	10.1	B	4.8	38
6R	R	45	81	0.556	11.1	B	4.8	38

North: Mississauga Road N								
7L	L	35	187	0.187	15.8	B	1.0	8
4T	T	160	856	0.187	8.5	A	1.1	8
4R	R	50	267	0.187	9.5	A	1.1	8
ALL VEHICLES:		2302		0.558	9.9	A	4.8	38

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Mayfield Road W								
	South	Right	35.0	32.5	19.4	500	140	No
	East	Thru	57.3	39.1	47.1	500	136	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: Mayfield Road E								
	West	Thru	57.3	39.1	47.1	500	134	No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
		Delay (seconds/veh)								

Lane No.										
West: Mayfield Road W										
1 LT	0.239	1.4	0.0	1.4	2.6	0.0	0.0	0.0	8.6	10.0
2 TR	0.239	1.4	0.0	1.4	2.9	0.0	0.0	0.0	5.8	7.2
South: Mississauga Road S										
1 LT	0.437	2.6	0.2	2.8	3.8	0.0	0.0	0.0	6.8	9.6
2 TR	0.437	2.7	0.2	2.9	3.7	0.0	0.0	0.0	6.6	9.5
East: Mayfield Road E										
1 LT	0.558	3.6	1.2	4.7	4.6	0.3	0.2	0.0	7.2	12.0
2 TR	0.558	3.5	1.1	4.6	4.8	0.0	0.0	0.0	5.6	10.2
North: Mississauga Road N										
1 LT	0.187	3.2	0.0	3.2	4.0	0.0	0.0	0.0	7.5	10.7
2 TR	0.187	2.9	0.0	2.9	4.1	0.0	0.0	0.0	5.9	8.8

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Mayfield Road W							
1 LT	0.239	0.33	0.00	0.31	0.64	0.446	0.00
2 TR	0.239	0.33	0.00	0.25	0.58	0.450	0.00
South: Mississauga Road S							
1 LT	0.437	0.51	0.01	0.19	0.72	0.602	0.03
2 TR	0.437	0.54	0.01	0.20	0.75	0.606	0.03
East: Mayfield Road E							
1 LT	0.558	0.73	0.06	0.13	0.92	0.740	0.15
2 TR	0.558	0.72	0.05	0.12	0.89	0.738	0.14
North: Mississauga Road N							
1 LT	0.187	0.59	0.00	0.18	0.77	0.658	0.00
2 TR	0.187	0.56	0.00	0.16	0.72	0.656	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Mayfield Road W											
1 LT	0.239	0.0	0.5	0.0	0.5	0.8	1.0	1.2	1.4	1.7	0.02
2 TR	0.239	0.0	0.5	0.0	0.5	0.8	1.0	1.2	1.4	1.7	0.02
South: Mississauga Road S											

1 LT	0.437	0.0	0.9	0.0	0.9	1.7	2.1	2.3	2.9	3.4	0.05
2 TR	0.437	0.0	0.9	0.0	0.9	1.7	2.1	2.3	2.9	3.4	0.05
East: Mayfield Road E											
1 LT	0.558	0.2	1.3	0.2	1.5	2.7	3.4	3.8	4.7	5.5	0.08
2 TR	0.558	0.2	1.3	0.2	1.5	2.8	3.4	3.8	4.8	5.5	0.08
North: Mississauga Road N											
1 LT	0.187	0.0	0.3	0.0	0.3	0.6	0.8	0.9	1.0	1.2	0.02
2 TR	0.187	0.0	0.3	0.0	0.3	0.6	0.8	0.9	1.1	1.2	0.02

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Mayfield Road W											
1 LT	0.239	0.0	3.6	0.0	3.6	6.7	8.1	9.2	11.3	13.1	0.02
2 TR	0.239	0.0	3.7	0.0	3.7	6.8	8.3	9.4	11.6	13.5	0.02
South: Mississauga Road S											
1 LT	0.437	0.3	7.4	0.3	7.8	14.1	17.2	19.6	24.2	28.1	0.05
2 TR	0.437	0.3	7.6	0.4	7.9	14.5	17.6	20.0	24.8	28.7	0.05
East: Mayfield Road E											
1 LT	0.558	1.5	10.5	1.8	12.3	21.9	26.8	30.5	37.9	44.1	0.08
2 TR	0.558	1.5	10.4	1.8	12.3	21.8	26.7	30.3	37.7	43.8	0.08
North: Mississauga Road N											
1 LT	0.187	0.0	2.6	0.0	2.6	4.9	6.0	6.7	8.3	9.6	0.02
2 TR	0.187	0.0	2.6	0.0	2.6	4.9	6.0	6.7	8.3	9.6	0.02

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Mayfield Road 2018 PM
Intersection ID: 1
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Mayfield Road W									
5L L	65.0	25.7	25.7	65.0			46.8	46.8	12.4
2T T	65.0	39.1	39.1	65.0			52.5	52.5	5.5
2R R	65.0	32.5	32.5	65.0			51.4	51.4	7.1
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0	22.2		46.1	46.1	12.4
8T T	65.0	39.1	39.1	65.0	21.4		51.3	51.3	5.7
8R R	65.0	32.5	32.5	65.0	21.5		50.4	50.4	7.1

East: Mayfield Road E									
1L	L	65.0	25.7	25.7	65.0	19.6	44.7	44.6	12.6
6T	T	65.0	39.1	39.1	65.0	19.9	50.3	50.3	5.5
6R	R	65.0	32.5	32.5	65.0	19.9	49.2	49.2	6.6
North: Mississauga Road N									
7L	L	65.0	25.7	25.7	65.0		45.9	45.9	12.6
4T	T	65.0	39.1	39.1	65.0		50.9	50.9	5.4
4R	R	65.0	32.5	32.5	65.0		50.1	50.1	6.6

"Running Speed" is the average speed excluding stopped periods.

SIDRA SOLUTIONS

Site: Mississauga and Mayfield 2018 PM
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Processed Aug 14, 2009 03:57:26PM

A1492, AECOM, Small Office
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SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Sandalwood Parkway 2018 AM

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
South: Mississauga Road S							
	East	8R	Right	108	2	1.00	1.00
	North	8T	Thru	249	51	1.00	1.00
East: Sandalwood Parkway E							
	South	1L	Left	270	5	1.00	1.00
	North	6R	Right	113	2	1.00	1.00
North: Mississauga Road N							
	South	4T	Thru	749	31	1.00	1.00
	East	7L	Left	245	5	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
South: Mississauga Road S							
8T	T	0	0	249	51	0	0
8R	R	0	0	0	0	108	2
East: Sandalwood Parkway E							
1L	L	270	6	0	0	0	0
6R	R	0	0	0	0	113	2
North: Mississauga Road N							
7L	L	245	5	0	0	0	0
4T	T	0	0	749	31	0	0

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
South: Mississauga Road S							
8T	T	0	0.0	300	17.0	0	0.0
8R	R	0	0.0	0	0.0	110	1.8
East: Sandalwood Parkway E							
1L	L	276	2.2	0	0.0	0	0.0
6R	R	0	0.0	0	0.0	115	1.7
North: Mississauga Road N							
7L	L	250	2.0	0	0.0	0	0.0
4T	T	0	0.0	780	4.0	0	0.0

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Cent	Circ	Insc	No.of	No.of	Av.Ent	Circulating/Exiting Stream

Island Diam (m)	Width Diam. (m)	Circ. Lanes	Entry Lanes	Lane Width (m)	Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
South: Mississauga Road S										
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	250	2.0	250	0	N	0.968
East: Sandalwood Parkway E										
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	300	17.0	336	0	N	0.963
North: Mississauga Road N										
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	275	2.0	275	0	N	0.970

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Critical Gap Dist (m)	Foll-up Headway (s)
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Thru	1	Subdominant	250	25.7	102.9	2.00	0.262	4.90	35.1	3.08D
	2	Dominant	250	25.7	102.9	2.00	0.262	4.90	35.1	3.08
Right	2	Dominant	250	25.7	102.9	2.00	0.262	4.38	31.3	2.75
East: Sandalwood Parkway E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Dominant	336	39.1	116.3	1.23	0.223	4.25	46.2	2.72
Right	2	Subdominant	336	39.1	116.3	1.23	0.223	5.32	57.8	3.40
North: Mississauga Road N										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	275	25.7	93.6	2.00	0.284	4.23	30.2	2.67D
Thru	1	Subdominant	275	25.7	93.6	2.00	0.284	4.23	30.2	2.67D
	2	Dominant	275	25.7	93.6	2.00	0.284	4.23	30.2	2.67

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Mov	Opposing Movement	Total	Prac.	Prac.	Lane	Deg.

ID	Demand Flow (veh/h)	HV (%)	Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Cap. (veh /h)	Deg. Satn xp	Spare Cap. (%)	Util (%)	Satn x
South: Mississauga Road S										
8T T	300	17.0	250	2.0	250	1354	0.85	284	100	0.222
8R R	110	1.8	250	2.0	250	497	0.85	284	100	0.221
East: Sandalwood Parkway E										
1L L	276	2.2	300	17.0	336	979	0.85	202	100	0.282
6R R	115	1.7	300	17.0	336	734	0.85	443	100	0.157
North: Mississauga Road N										
7L L	250	2.0	275	2.0	275	506	0.85	72	100	0.494*
4T T	780	4.0	275	2.0	275	1578	0.85	72	100	0.494*

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Intersection Level of Service	=	A
Worst movement Level of Service	=	B
Average intersection delay (s/pers)	=	9.3
Largest average movement delay (s)	=	14.2
Largest back of queue, 95% (m)	=	31
Performance Index	=	33.58
Degree of saturation (highest)	=	0.494
Practical Spare Capacity (lowest)	=	72 %
Effective intersection capacity, (veh/h)	=	3704
Total vehicle flow (veh/h)	=	1831
Total person flow (pers/h)	=	2197
Total vehicle delay (veh-h/h)	=	4.73
Total person delay (pers-h/h)	=	5.67
Total effective vehicle stops (veh/h)	=	1168
Total effective person stops (pers/h)	=	1402
Total vehicle travel (veh-km/h)	=	1174.9
Total cost ($/h)	=	502.57
Total fuel (L/h)	=	151.4
Total CO2 (kg/h)	=	379.41

Table S.5 - Movement Performance

Mov ID	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
South: Mississauga Road S									
8T T	0.60	0.72	7.2	0.44	0.56	1.4	12	5.10	52.6
8R R	0.24	0.29	7.9	0.43	0.60	1.4	12	1.89	51.6
East: Sandalwood Parkway E									
1L L	1.06	1.28	13.9	0.47	0.75	1.7	13	5.63	46.7
6R R	0.27	0.33	8.6	0.46	0.66	0.8	6	2.06	51.3
North: Mississauga Road N									
7L L	0.98	1.18	14.2	0.56	0.74	4.0	31	5.24	46.3
4T T	1.56	1.87	7.2	0.56	0.59	4.0	31	13.66	51.6

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
South: Mississauga Road S									
410	0.222	0.84	1.01	7.4	0.44	0.57	12	6.99	52.3
East: Sandalwood Parkway E									
391	0.282	1.34	1.61	12.3	0.47	0.73	13	7.68	47.9
North: Mississauga Road N									
1030	0.494	2.54	3.05	8.9	0.56	0.63	31	18.90	50.2
ALL VEHICLES:									
1831	0.494	4.73	5.67	9.3	0.51	0.64	31	33.58	50.1
INTERSECTION (persons):									
2197	0.494		5.67	9.3	0.51	0.64		33.58	50.1

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
South: Mississauga Road S								
1 T	198	894	0.222	7.3	0.57	1.4	12.1	500.0
2 TR	212	957	0.222	7.5	0.58	1.4	11.5	500.0
East: Sandalwood Parkway E								
1 L	276	979	0.282	13.9	0.75	1.7	13.2	500.0
2 R	115	734	0.157	8.6	0.66	0.8	6.4	500.0
North: Mississauga Road N								
1 LT	515	1042	0.494	10.6	0.67	4.0	31.4	500.0
2 T	515	1042	0.494	7.2	0.59	4.0	31.6	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

	Min	Tot

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Cap (veh /h)	Cap (veh /h)	Deg. Satn x	Lane Util %
South: Mississauga Road S								
1 T	0	198	0	198	150	894	0.222	100
2 TR	0	102	110	212	150	957	0.222	100
East: Sandalwood Parkway E								
1 L	276	0	0	276	150	979	0.282	100
2 R	0	0	115	115	115	734	0.157	100
North: Mississauga Road N								
1 LT	250	265	0	515	150	1042	0.494	100
2 T	0	515	0	515	150	1042	0.494	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
South: Mississauga Road S									
8T	T	300	1354	100	0.222	7.2	0.56	1.4	5.10
8R	R	110	497	100	0.221	7.9	0.60	1.4	1.89
East: Sandalwood Parkway E									
1L	L	276	979	100	0.282	13.9	0.75	1.7	5.63
6R	R	115	734	100	0.157	8.6	0.66	0.8	2.06
North: Mississauga Road N									
7L	L	250	506	100	0.494*	14.2	0.74	4.0	5.24
4T	T	780	1578	100	0.494*	7.2	0.59	4.0	13.66

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Mov ID	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
South: Mississauga Road S						
8T T	30.9	92.44	0.107	6.23	0.201	77.8
8R R	8.1	27.57	0.033	1.67	0.052	20.4
	39.0	120.01	0.140	7.90	0.252	98.1
East: Sandalwood Parkway E						

1L L	22.7	79.35	0.096	4.71	0.141	56.7
6R R	8.5	28.94	0.035	1.75	0.054	21.4
	31.2	108.29	0.131	6.46	0.195	78.1
North: Mississauga Road N						
7L L	20.7	72.40	0.087	4.31	0.129	51.7
4T T	60.5	201.87	0.239	12.09	0.384	151.5
	81.2	274.28	0.326	16.40	0.513	203.2
INTERSECTION:	151.4	502.57	0.598	30.76	0.961	379.4

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
South: Mississauga Road S						
8T T	16.4	0.49	0.566	33.02	1.062	411.9
8R R	11.9	0.40	0.488	24.28	0.754	296.9
	15.2	0.47	0.545	30.69	0.980	381.3
East: Sandalwood Parkway E						
1L L	12.2	0.43	0.514	25.29	0.757	304.6
6R R	11.9	0.40	0.491	24.45	0.758	298.1
	12.1	0.42	0.507	25.06	0.758	302.8
North: Mississauga Road N						
7L L	12.3	0.43	0.518	25.57	0.764	306.6
4T T	12.3	0.41	0.487	24.62	0.783	308.6
	12.3	0.42	0.495	24.87	0.778	308.1
INTERSECTION:	12.9	0.43	0.509	26.18	0.818	322.9

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
South: Mississauga Road S												
1 T		198		198	17				0.222	7.3	12	500
2 TR		102	110	212	9				0.222	7.5	12	500
	0	300	110	410	13				0.222	7.4	12	
East: Sandalwood Parkway E												
1 L	276			276	2				0.282	13.9	13	500
2 R			115	115	2				0.157	8.6	6	500
	276	0	115	391	2				0.282	12.3	13	
North: Mississauga Road N												
1 LT	250	265		515	3				0.494	10.6	31	500
2 T		515		515	4				0.494	7.2	32	500
	250	780	0	1030	3				0.494	8.9	32	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	1831	5	0.494	9.3	31

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
South: Mississauga Road S								
8T	T	300	1354	0.222	7.2	A	1.4	12
8R	R	110	497	0.221	7.9	A	1.4	12
East: Sandalwood Parkway E								
1L	L	276	979	0.282	13.9	B	1.7	13
6R	R	115	734	0.157	8.6	A	0.8	6
North: Mississauga Road N								
7L	L	250	506	0.494*	14.2	B	4.0	31
4T	T	780	1578	0.494*	7.2	A	4.0	31
ALL VEHICLES:		1831		0.494	9.3	A	4.0	31

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Dist. (m)	Distance User Spec?
South: Mississauga Road S								
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Sandalwood Parkway E								
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
South: Mississauga Road S										
1 T	0.222	1.5	0.0	1.5	2.9	0.0	0.0	0.0	5.8	7.3
2 TR	0.222	1.3	0.0	1.3	2.7	0.0	0.0	0.0	6.2	7.5
East: Sandalwood Parkway E										
1 L	0.282	1.5	0.0	1.5	2.3	0.0	0.0	0.0	12.4	13.9
2 R	0.157	2.0	0.0	2.0	2.7	0.0	0.0	0.0	6.6	8.6
North: Mississauga Road N										
1 LT	0.494	1.8	0.0	1.8	3.2	0.0	0.0	0.0	8.8	10.6
2 T	0.494	1.8	0.0	1.8	3.7	0.0	0.0	0.0	5.4	7.2

Delay (seconds/veh)

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Queue

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Move-up Rate hqm
South: Mississauga Road S							
1 T	0.222	0.32	0.00	0.25	0.57	0.440	0.00
2 TR	0.222	0.30	0.00	0.28	0.58	0.433	0.00
East: Sandalwood Parkway E							
1 L	0.282	0.38	0.00	0.38	0.75	0.473	0.00
2 R	0.157	0.38	0.00	0.28	0.66	0.464	0.00
North: Mississauga Road N							
1 LT	0.494	0.41	0.00	0.25	0.67	0.560	0.00
2 T	0.494	0.40	0.00	0.20	0.59	0.560	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
South: Mississauga Road S											
1 T	0.222	0.0	0.4	0.0	0.4	0.8	1.0	1.1	1.4	1.6	0.02
2 TR	0.222	0.0	0.4	0.0	0.4	0.8	1.0	1.1	1.4	1.6	0.02
East: Sandalwood Parkway E											
1 L	0.282	0.0	0.5	0.0	0.5	1.0	1.2	1.4	1.7	2.0	0.03
2 R	0.157	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.8	1.0	0.01
North: Mississauga Road N											
1 LT	0.494	0.0	1.3	0.0	1.3	2.3	2.9	3.2	4.0	4.7	0.06
2 T	0.494	0.0	1.3	0.0	1.3	2.3	2.9	3.2	4.0	4.7	0.06

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
South: Mississauga Road S											
1 T	0.222	0.0	3.8	0.0	3.8	7.1	8.6	9.8	12.1	14.0	0.02
2 TR	0.222	0.0	3.6	0.0	3.6	6.8	8.3	9.4	11.5	13.4	0.02
East: Sandalwood Parkway E											
1 L	0.282	0.0	4.2	0.0	4.2	7.8	9.4	10.7	13.2	15.3	0.03
2 R	0.157	0.0	2.0	0.0	2.0	3.8	4.6	5.2	6.4	7.4	0.01
North: Mississauga Road N											

1 LT	0.494	0.0	10.1	0.0	10.1	18.2	22.3	25.3	31.4	36.5	0.06
2 T	0.494	0.0	10.2	0.0	10.2	18.3	22.4	25.5	31.6	36.7	0.06

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 AM
Intersection ID: 3
Roundabout

Mov ID	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall	Geom Delay (sec)
South: Mississauga Road S									
8T T	65.0	39.1	39.1	65.0			52.6	52.6	5.8
8R R	65.0	32.5	32.5	65.0			51.6	51.6	6.6
East: Sandalwood Parkway E									
1L L	65.0	25.7	25.7	65.0			46.7	46.7	12.4
6R R	65.0	32.5	32.5	65.0			51.3	51.3	6.6
North: Mississauga Road N									
7L L	65.0	25.7	25.7	65.0			46.3	46.3	12.4
4T T	65.0	39.1	39.1	65.0			51.6	51.6	5.4

"Running Speed" is the average speed excluding stopped periods.

SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Sandalwood Parkway 2018 PM

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
South: Mississauga Road S							
	East	8R	Right	397	8	1.00	1.00
	North	8T	Thru	664	136	1.00	1.00
East: Sandalwood Parkway E							
	South	1L	Left	328	7	1.00	1.00
	North	6R	Right	240	5	1.00	1.00
North: Mississauga Road N							
	South	4T	Thru	346	14	1.00	1.00
	East	7L	Left	118	2	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Mov ID		Left LV	Left HV	Through LV	Through HV	Right LV	Right HV
Demand flows in veh/hour as used by the program							
South: Mississauga Road S							
8T	T	0	0	664	136	0	0
8R	R	0	0	0	0	397	8
East: Sandalwood Parkway E							
1L	L	328	7	0	0	0	0
6R	R	0	0	0	0	240	5
North: Mississauga Road N							
7L	L	118	2	0	0	0	0
4T	T	0	0	346	14	0	0

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Mov ID		Left Total	Left %HV	Through Total	Through %HV	Right Total	Right %HV
Demand flows in veh/hour as used by the program							
South: Mississauga Road S							
8T	T	0	0.0	800	17.0	0	0.0
8R	R	0	0.0	0	0.0	405	2.0
East: Sandalwood Parkway E							
1L	L	335	2.1	0	0.0	0	0.0
6R	R	0	0.0	0	0.0	245	2.0
North: Mississauga Road N							
7L	L	120	1.7	0	0.0	0	0.0
4T	T	0	0.0	360	3.9	0	0.0

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Cent	Circ	Insc	No.of Lanes	No.of Exits	Av.Ent	Circulating/Exiting Stream

Island Diam (m)	Width Diam. (m)	Circ. Lanes	Entry Lanes	Lane Width (m)	Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
South: Mississauga Road S										
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	120	2.0	120	0	N	0.984
East: Sandalwood Parkway E										
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	800	17.0	896	0	N	0.903
North: Mississauga Road N										
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	335	2.0	335	0	N	0.942

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Critical Gap Dist (m)	Foll-up Headway (s)
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Thru	1	Subdominant	120	25.7	214.5	2.00	0.136	4.84	34.6	2.96
	2	Dominant	120	25.7	214.5	2.00	0.136	4.67	33.4	2.86
Right	2	Dominant	120	25.7	214.5	2.00	0.136	4.18	29.9	2.55
East: Sandalwood Parkway E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Dominant	896	39.1	43.6	1.30	0.513	3.56	38.7	2.51
Right	2	Subdominant	896	39.1	43.6	1.30	0.513	3.86	41.9	2.72
North: Mississauga Road N										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	335	25.7	76.8	2.00	0.335	4.25	30.4	2.72D
Thru	1	Subdominant	335	25.7	76.8	2.00	0.335	4.26	30.4	2.72D
	2	Dominant	335	25.7	76.8	2.00	0.335	4.26	30.4	2.72

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Mov	Opposing Movement	Total Prac.	Prac.	Lane	Deg.

ID	Demand Flow (veh/h)	HV (%)	Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Cap. (veh /h)	Deg. Satn xp	Spare Cap. (%)	Util (%)	Satn x
South: Mississauga Road S										
8T T	800	17.0	120	2.0	120	1509	0.85	60	100	0.530*
8R R	405	2.0	120	2.0	120	764	0.85	60	100	0.530*
East: Sandalwood Parkway E										
1L L	335	2.1	800	17.0	896	715	0.85	81	100	0.469
6R R	245	2.0	800	17.0	896	636	0.85	121	100	0.385
North: Mississauga Road N										
7L L	120	1.7	335	2.0	335	472	0.85	234	100	0.254
4T T	360	3.9	335	2.0	335	1415	0.85	234	100	0.254

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Intersection Level of Service	=	A
Worst movement Level of Service	=	B
Average intersection delay (s/pers)	=	9.4
Largest average movement delay (s)	=	17.3
Largest back of queue, 95% (m)	=	39
Performance Index	=	42.35
Degree of saturation (highest)	=	0.530
Practical Spare Capacity (lowest)	=	60 %
Effective intersection capacity, (veh/h)	=	4272
Total vehicle flow (veh/h)	=	2265
Total person flow (pers/h)	=	2718
Total vehicle delay (veh-h/h)	=	5.89
Total person delay (pers-h/h)	=	7.07
Total effective vehicle stops (veh/h)	=	1472
Total effective person stops (pers/h)	=	1767
Total vehicle travel (veh-km/h)	=	1442.3
Total cost ($/h)	=	638.60
Total fuel (L/h)	=	196.9
Total CO2 (kg/h)	=	493.82

Table S.5 - Movement Performance

Mov ID	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
South: Mississauga Road S									
8T T	1.50	1.80	6.8	0.43	0.51	4.8	39	13.64	52.7
8R R	0.83	1.00	7.4	0.41	0.55	4.8	39	6.95	51.7
East: Sandalwood Parkway E									
1L L	1.61	1.93	17.3	0.73	0.97	3.4	26	7.97	44.5
6R R	0.77	0.92	11.3	0.70	0.88	2.4	19	5.10	49.1
North: Mississauga Road N									
7L L	0.47	0.56	14.1	0.52	0.74	1.8	14	2.49	46.5
4T T	0.71	0.86	7.1	0.52	0.59	1.8	14	6.21	51.9

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
South: Mississauga Road S									
1205	0.530	2.33	2.80	7.0	0.42	0.52	39	20.58	52.4
East: Sandalwood Parkway E									
580	0.469	2.37	2.85	14.7	0.72	0.93	26	13.07	46.2
North: Mississauga Road N									
480	0.254	1.18	1.42	8.9	0.52	0.63	14	8.70	50.4
ALL VEHICLES:									
2265	0.530	5.89	7.07	9.4	0.52	0.65	39	42.35	50.2
INTERSECTION (persons):									
2718	0.530		7.07	9.4	0.52	0.65		42.35	50.2

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
South: Mississauga Road S								
1 T	568	1072	0.530	6.8	0.51	4.7	41.2	500.0
2 TR	637	1202	0.530	7.1	0.53	4.8	39.0	500.0
East: Sandalwood Parkway E								
1 L	335	715	0.468	17.3	0.97	3.4	26.1	500.0
2 R	245	636	0.385	11.3	0.88	2.4	18.9	500.0
North: Mississauga Road N								
1 LT	240	944	0.254	10.6	0.66	1.8	13.7	500.0
2 T	240	943	0.254	7.1	0.59	1.8	13.8	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

	Min	Tot

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Cap (veh /h)	Cap (veh /h)	Deg. Satn x	Lane Util %
South: Mississauga Road S								
1 T	0	568	0	568	150	1072	0.530	100
2 TR	0	232	405	637	150	1202	0.530	100
East: Sandalwood Parkway E								
1 L	335	0	0	335	150	715	0.468	100
2 R	0	0	245	245	150	636	0.385	100
North: Mississauga Road N								
1 LT	120	120	0	240	150	944	0.254	100
2 T	0	240	0	240	150	943	0.254	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
South: Mississauga Road S									
8T	T	800	1509	100	0.530*	6.8	0.51	4.8	13.64
8R	R	405	764	100	0.530*	7.4	0.55	4.8	6.95
East: Sandalwood Parkway E									
1L	L	335	715	100	0.469	17.3	0.97	3.4	7.97
6R	R	245	636	100	0.385	11.3	0.88	2.4	5.10
North: Mississauga Road N									
7L	L	120	472	100	0.254	14.1	0.74	1.8	2.49
4T	T	360	1415	100	0.254	7.1	0.59	1.8	6.21

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Mov ID	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
South: Mississauga Road S						
8T T	82.2	245.92	0.284	16.54	0.533	206.9
8R R	29.9	101.24	0.123	6.10	0.190	74.8
	112.1	347.16	0.407	22.64	0.723	281.6
East: Sandalwood Parkway E						

1L L	28.3	100.06	0.121	5.96	0.177	70.9
6R R	18.9	64.21	0.079	3.96	0.121	47.2
	47.2	164.27	0.199	9.92	0.297	118.1
North: Mississauga Road N						
7L L	9.9	34.64	0.042	2.06	0.062	24.7
4T T	27.7	92.54	0.109	5.50	0.176	69.4
	37.6	127.17	0.151	7.56	0.237	94.1
INTERSECTION:	196.9	638.60	0.757	40.12	1.257	493.8

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
South: Mississauga Road S						
8T T	16.3	0.49	0.564	32.86	1.058	410.9
8R R	11.8	0.40	0.487	24.16	0.751	296.1
	14.8	0.46	0.538	29.95	0.956	372.5
East: Sandalwood Parkway E						
1L L	12.5	0.44	0.534	26.35	0.781	313.5
6R R	12.3	0.42	0.515	25.94	0.791	308.9
	12.5	0.43	0.526	26.19	0.785	311.7
North: Mississauga Road N						
7L L	12.2	0.43	0.516	25.44	0.761	305.7
4T T	12.2	0.41	0.482	24.27	0.775	306.3
	12.2	0.41	0.491	24.58	0.771	306.1
INTERSECTION:	13.6	0.44	0.525	27.82	0.872	342.4

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
South: Mississauga Road S												
1 T		568		568	17				0.530	6.8	41	500
2 TR		232	405	637	7				0.530	7.1	39	500
	0	800	405	1205	12				0.530	7.0	41	
East: Sandalwood Parkway E												
1 L	335			335	2				0.468	17.3	26	500
2 R			245	245	2				0.385	11.3	19	500
	335	0	245	580	2				0.468	14.7	26	
North: Mississauga Road N												
1 LT	120	120		240	3				0.254	10.6	14	500
2 T		240		240	4				0.254	7.1	14	500
	120	360	0	480	3				0.254	8.9	14	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	2265	8	0.530	9.4	39

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
South: Mississauga Road S								
8T	T	800	1509	0.530*	6.8	A	4.8	39
8R	R	405	764	0.530*	7.4	A	4.8	39
East: Sandalwood Parkway E								
1L	L	335	715	0.469	17.3	B	3.4	26
6R	R	245	636	0.385	11.3	B	2.4	19
North: Mississauga Road N								
7L	L	120	472	0.254	14.1	B	1.8	14
4T	T	360	1415	0.254	7.1	A	1.8	14
ALL VEHICLES:		2265		0.530	9.4	A	4.8	39

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
South: Mississauga Road S								
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Sandalwood Parkway E								
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
		---------- Delay (seconds/veh) ----------								
South: Mississauga Road S										
1 T	0.530	1.0	0.0	1.0	2.8	0.0	0.0	0.0	5.8	6.8
2 TR	0.530	0.8	0.0	0.8	2.5	0.0	0.0	0.0	6.3	7.1
East: Sandalwood Parkway E										
1 L	0.468	4.0	0.8	4.9	3.6	1.3	0.8	0.5	12.4	17.3
2 R	0.385	4.3	0.4	4.7	4.1	0.6	0.4	0.2	6.6	11.3
North: Mississauga Road N										
1 LT	0.254	1.7	0.0	1.7	3.0	0.0	0.0	0.0	8.9	10.6
2 T	0.254	1.7	0.0	1.7	3.4	0.0	0.0	0.0	5.4	7.1

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

	Queue

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Move-up Rate hqm
South: Mississauga Road S							
1 T	0.530	0.26	0.00	0.25	0.51	0.431	0.00
2 TR	0.530	0.24	0.00	0.29	0.53	0.412	0.00
East: Sandalwood Parkway E							
1 L	0.468	0.73	0.04	0.19	0.97	0.732	0.13
2 R	0.385	0.70	0.02	0.16	0.88	0.704	0.07
North: Mississauga Road N							
1 LT	0.254	0.39	0.00	0.28	0.66	0.520	0.00
2 T	0.254	0.37	0.00	0.21	0.59	0.520	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
South: Mississauga Road S											
1 T	0.530	0.0	1.5	0.0	1.5	2.7	3.4	3.8	4.7	5.5	0.08
2 TR	0.530	0.0	1.6	0.0	1.6	2.8	3.4	3.9	4.8	5.6	0.08
East: Sandalwood Parkway E											
1 L	0.468	0.1	1.0	0.1	1.1	2.0	2.4	2.7	3.4	3.9	0.05
2 R	0.385	0.0	0.7	0.0	0.8	1.4	1.7	2.0	2.4	2.8	0.04
North: Mississauga Road N											
1 LT	0.254	0.0	0.6	0.0	0.6	1.0	1.3	1.4	1.8	2.0	0.03
2 T	0.254	0.0	0.6	0.0	0.6	1.0	1.3	1.4	1.8	2.0	0.03

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
South: Mississauga Road S											
1 T	0.530	0.0	13.4	0.0	13.4	23.8	29.2	33.2	41.2	47.9	0.08
2 TR	0.530	0.0	12.7	0.0	12.7	22.5	27.6	31.4	39.0	45.3	0.08
East: Sandalwood Parkway E											
1 L	0.468	0.9	7.5	0.9	8.4	15.2	18.6	21.1	26.1	30.3	0.05
2 R	0.385	0.4	5.7	0.3	6.0	11.0	13.5	15.3	18.9	21.9	0.04
North: Mississauga Road N											

1 LT	0.254	0.0	4.3	0.0	4.3	8.0	9.8	11.1	13.7	15.9	0.03
2 T	0.254	0.0	4.4	0.0	4.4	8.1	9.9	11.2	13.8	16.0	0.03

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2018 PM
Intersection ID: 3
Roundabout

Mov ID	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall	Geom Delay (sec)
South: Mississauga Road S									
8T T	65.0	39.1	39.1	65.0			52.7	52.7	5.8
8R R	65.0	32.5	32.5	65.0			51.7	51.7	6.6
East: Sandalwood Parkway E									
1L L	65.0	25.7	25.7	65.0	17.8		44.9	44.5	12.4
6R R	65.0	32.5	32.5	65.0	17.2		49.3	49.1	6.6
North: Mississauga Road N									
7L L	65.0	25.7	25.7	65.0			46.5	46.5	12.4
4T T	65.0	39.1	39.1	65.0			51.9	51.9	5.4

"Running Speed" is the average speed excluding stopped periods.

SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Wanless Road 2018 AM

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Wanless Road W							
	South	2R	Right	5	0	1.00	1.00
	East	2T	Thru	137	3	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	10	0	1.00	1.00
	East	8R	Right	73	2	1.00	1.00
	North	8T	Thru	158	32	1.00	1.00
East: Wanless Road E							
	West	6T	Thru	368	7	1.00	1.00
	South	1L	Left	309	6	1.00	1.00
	North	6R	Right	10	0	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	34	1	1.00	1.00
	South	4T	Thru	749	31	1.00	1.00
	East	7L	Left	150	5	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Mov ID	Left		Through		Right	
	LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program						
West: Wanless Road W						
5L L	5	1	0	0	0	0
2T T	0	0	137	3	0	0
2R R	0	0	0	0	5	1
South: Mississauga Road S						
3L L	10	1	0	0	0	0
8T T	0	0	158	32	0	0
8R R	0	0	0	0	73	2
East: Wanless Road E						
1L L	309	6	0	0	0	0
6T T	0	0	368	7	0	0
6R R	0	0	0	0	10	1
North: Mississauga Road N						
7L L	150	5	0	0	0	0
4T T	0	0	749	31	0	0
4R R	0	0	0	0	34	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Mov ID	Left		Through		Right	
	Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program						
West: Wanless Road W						
5L L	6	16.7	0	0.0	0	0.0
2T T	0	0.0	140	2.1	0	0.0
2R R	0	0.0	0	0.0	6	16.7
South: Mississauga Road S						
3L L	11	9.1	0	0.0	0	0.0
8T T	0	0.0	190	16.8	0	0.0
8R R	0	0.0	0	0.0	75	2.7
East: Wanless Road E						
1L L	315	1.9	0	0.0	0	0.0
6T T	0	0.0	375	1.9	0	0.0
6R R	0	0.0	0	0.0	11	9.1
North: Mississauga Road N						
7L L	155	3.2	0	0.0	0	0.0
4T T	0	0.0	780	4.0	0	0.0
4R R	0	0.0	0	0.0	35	2.9

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl. Constr. Effect	Cap.	O-D Factor
West: Wanless Road W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1250	3.4	1251	0	N	0.793
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	300	2.5	300	0	N	0.972
East: Wanless Road E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	205	15.9	228	0	N	0.974
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	700	2.0	700	0	N	0.930

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Wanless Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1251	34.1	27.2	1.27	0.635	3.85	36.4	2.83
Thru	1	Subdominant	1251	34.1	27.2	1.27	0.635	3.45	32.6	2.53
	2	Dominant	1251	34.1	27.2	1.27	0.635	3.23	30.6	2.38
Right	2	Dominant	1251	34.1	27.2	1.27	0.635	3.61	34.2	2.65
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	300	32.0	106.6	1.52	0.242	4.48	39.8	2.85D
Thru	1	Subdominant	300	32.0	106.6	1.52	0.242	4.81	42.8	3.06D
	2	Dominant	300	32.0	106.6	1.52	0.242	4.81	42.8	3.06
Right	2	Dominant	300	32.0	106.6	1.52	0.242	4.30	38.2	2.73
East: Wanless Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	228	38.1	167.3	1.25	0.159	4.34	46.0	2.72D
Thru	1	Subdominant	228	38.1	167.3	1.25	0.159	4.34	46.0	2.72D
	2	Dominant	228	38.1	167.3	1.25	0.159	4.34	46.0	2.72
Right	2	Dominant	228	38.1	167.3	1.25	0.159	4.52	47.9	2.83

North: Mississauga Road N									
Environment Factor: 1.20		Entry/Circulating Flow Adjustment: Medium							
Left	1 Subdominant	700	32.9	47.0	1.03	0.355	3.82	34.9	2.61
Thru	1 Subdominant	700	32.9	47.0	1.03	0.355	3.82	34.9	2.61
	2 Dominant	700	32.9	47.0	1.03	0.355	3.78	34.6	2.58
Right	2 Dominant	700	32.9	47.0	1.03	0.355	3.78	34.5	2.58

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Wanless Road W										
5L L	6	16.7	1250	3.4	1251	40	0.85	467	100	0.150
2T T	140	2.1	1250	3.4	1251	944	0.85	473	100	0.148
2R R	6	16.7	1250	3.4	1251	40	0.85	467	100	0.150
South: Mississauga Road S										
3L L	11	9.1	300	2.5	300	73	0.85	464	100	0.151
8T T	190	16.8	300	2.5	300	1253	0.85	461	100	0.152
8R R	75	2.7	300	2.5	300	495	0.85	461	100	0.152
East: Wanless Road E										
1L L	315	1.9	205	15.9	228	962	0.85	160	100	0.327
6T T	375	1.9	205	15.9	228	1145	0.85	160	100	0.328
6R R	11	9.1	205	15.9	228	34	0.85	163	100	0.324
North: Mississauga Road N										
7L L	155	3.2	700	2.0	700	257	0.85	41	100	0.603
4T T	780	4.0	700	2.0	700	1292	0.85	41	100	0.604*
4R R	35	2.9	700	2.0	700	58	0.85	41	100	0.603

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Intersection Level of Service	= B
Worst movement Level of Service	= B
Average intersection delay (s/pers)	= 10.2
Largest average movement delay (s)	= 17.5
Largest back of queue, 95% (m)	= 39
Performance Index	= 41.28

Degree of saturation (highest)	=	0.604
Practical Spare Capacity (lowest)	=	41 %
Effective intersection capacity, (veh/h)	=	3477
Total vehicle flow (veh/h)	=	2099
Total person flow (pers/h)	=	2519
Total vehicle delay (veh-h/h)	=	5.98
Total person delay (pers-h/h)	=	7.17
Total effective vehicle stops (veh/h)	=	1621
Total effective person stops (pers/h)	=	1945
Total vehicle travel (veh-km/h)	=	1342.3
Total cost ($/h)	=	568.55
Total fuel (L/h)	=	169.6
Total CO2 (kg/h)	=	424.74

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W										
5L	L	0.03	0.03	17.5	0.73	0.92	0.9	7	0.14	44.3
2T	T	0.40	0.48	10.3	0.74	0.84	0.9	7	2.92	50.1
2R	R	0.02	0.02	11.1	0.74	0.88	0.9	7	0.13	49.1
South: Mississauga Road S										
3L	L	0.04	0.05	13.9	0.42	0.72	0.8	7	0.22	46.9
8T	T	0.38	0.46	7.2	0.42	0.57	0.8	7	3.18	52.7
8R	R	0.17	0.20	8.0	0.42	0.61	0.8	7	1.28	51.7
East: Wanless Road E										
1L	L	1.18	1.42	13.5	0.42	0.71	2.1	16	6.31	46.9
6T	T	0.67	0.81	6.5	0.42	0.54	2.1	16	6.15	52.7
6R	R	0.02	0.03	7.7	0.42	0.61	2.1	17	0.19	51.6
North: Mississauga Road N										
7L	L	0.74	0.89	17.2	0.73	0.99	4.9	39	3.72	44.6
4T	T	2.21	2.65	10.2	0.73	0.91	4.9	39	16.30	50.3
4R	R	0.11	0.13	11.3	0.73	0.94	4.9	39	0.74	49.1

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W									
152	0.150	0.45	0.54	10.6	0.74	0.85	7	3.19	49.8
South: Mississauga Road S									
276	0.152	0.59	0.71	7.7	0.42	0.58	7	4.68	52.2
East: Wanless Road E									
701	0.328	1.88	2.25	9.6	0.42	0.62	17	12.65	49.8
North: Mississauga Road N									
970	0.604	3.06	3.67	11.4	0.73	0.93	39	20.76	49.2
ALL VEHICLES:									
2099	0.604	5.98	7.17	10.2	0.59	0.77	39	41.28	49.8

INTERSECTION (persons):								
2519	0.604		7.17	10.2	0.59	0.77	41.28	49.8

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Wanless Road W								
1 LT	72	487	0.148	11.1	0.86	0.9	6.7	500.0
2 TR	80	538	0.148	10.1	0.84	0.9	6.9	500.0
South: Mississauga Road S								
1 LT	134	881	0.152	7.8	0.58	0.8	7.2	500.0
2 TR	142	939	0.152	7.6	0.58	0.8	6.9	500.0
East: Wanless Road E								
1 LT	351	1071	0.327	12.8	0.70	2.1	16.5	500.0
2 TR	350	1070	0.327	6.5	0.54	2.1	16.5	500.0
North: Mississauga Road N								
1 LT	482	798	0.604	12.5	0.94	4.9	38.6	500.0
2 TR	488	809	0.604	10.2	0.91	4.9	38.8	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Wanless Road W								
1 LT	6	66	0	72	72	487	0.148	100
2 TR	0	74	6	80	80	538	0.148	100
South: Mississauga Road S								
1 LT	11	123	0	134	134	881	0.152	100
2 TR	0	67	75	142	142	939	0.152	100
East: Wanless Road E								
1 LT	315	36	0	351	150	1071	0.327	100
2 TR	0	339	11	350	150	1070	0.327	100
North: Mississauga Road N								
1 LT	155	327	0	482	150	798	0.604	100
2 TR	0	453	35	488	150	809	0.604	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle

effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Wanless Road W									
5L	L	6	40	100	0.150	17.5	0.92	0.9	0.14
2T	T	140	944	100	0.148	10.3	0.84	0.9	2.92
2R	R	6	40	100	0.150	11.1	0.88	0.9	0.13
South: Mississauga Road S									
3L	L	11	73	100	0.151	13.9	0.72	0.8	0.22
8T	T	190	1253	100	0.152	7.2	0.57	0.8	3.18
8R	R	75	495	100	0.152	8.0	0.61	0.8	1.28
East: Wanless Road E									
1L	L	315	962	100	0.327	13.5	0.71	2.1	6.31
6T	T	375	1145	100	0.328	6.5	0.54	2.1	6.15
6R	R	11	34	100	0.324	7.7	0.61	2.1	0.19
North: Mississauga Road N									
7L	L	155	257	100	0.603	17.2	0.99	4.9	3.72
4T	T	780	1292	100	0.604*	10.2	0.91	4.9	16.30
4R	R	35	58	100	0.603	11.3	0.94	4.9	0.74

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Mov ID		Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Wanless Road W							
5L	L	0.5	1.74	0.002	0.10	0.003	1.2
2T	T	10.6	36.12	0.043	2.16	0.067	26.5
2R	R	0.4	1.52	0.002	0.09	0.003	1.1
		11.5	39.38	0.047	2.35	0.073	28.8
South: Mississauga Road S							
3L	L	0.9	3.15	0.004	0.19	0.006	2.3
8T	T	19.5	58.36	0.067	3.92	0.126	49.1
8R	R	5.7	19.09	0.023	1.17	0.036	14.3
		26.1	80.60	0.094	5.28	0.168	65.6
East: Wanless Road E							
1L	L	25.8	90.15	0.109	5.34	0.160	64.5
6T	T	26.8	91.60	0.107	5.18	0.167	67.0
6R	R	0.8	2.75	0.003	0.17	0.005	2.0

	53.3	184.51	0.219	10.68	0.332	133.5
North: Mississauga Road N						
7L L	13.5	47.07	0.057	2.86	0.085	33.8
4T T	62.4	207.81	0.250	12.84	0.401	156.3
4R R	2.7	9.19	0.011	0.57	0.017	6.8
	78.6	264.07	0.318	16.26	0.504	196.8
INTERSECTION:	169.6	568.55	0.679	34.58	1.078	424.7

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Wanless Road W						
5L L	11.8	0.43	0.516	24.50	0.725	297.1
2T T	12.0	0.41	0.493	24.54	0.766	300.8
2R R	11.6	0.41	0.499	24.27	0.738	292.6
	12.0	0.41	0.494	24.53	0.763	300.4
South: Mississauga Road S						
3L L	12.1	0.42	0.511	25.13	0.754	304.2
8T T	16.3	0.49	0.563	32.81	1.057	410.5
8R R	12.2	0.41	0.495	24.98	0.777	305.0
	15.0	0.46	0.543	30.37	0.969	377.6
East: Wanless Road E						
1L L	12.1	0.42	0.511	25.12	0.754	303.3
6T T	11.3	0.39	0.455	21.94	0.708	283.8
6R R	11.8	0.40	0.487	24.20	0.752	297.2
	11.7	0.41	0.482	23.46	0.730	293.1
North: Mississauga Road N						
7L L	12.9	0.45	0.544	27.32	0.810	323.1
4T T	12.7	0.42	0.509	26.15	0.818	318.4
4R R	12.4	0.42	0.517	26.11	0.795	309.9
	12.7	0.43	0.515	26.35	0.816	318.9
INTERSECTION:	12.6	0.42	0.506	25.76	0.803	316.4

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Wanless Road W												
1 LT	6	66		72	3				0.148	11.1	7	500
2 TR		74	6	80	3				0.148	10.1	7	500
	6	140	6	152	3				0.148	10.6	7	
South: Mississauga Road S												
1 LT	11	123		134	16				0.152	7.8	7	500
2 TR		67	75	142	9				0.152	7.6	7	500
	11	190	75	276	13				0.152	7.7	7	
East: Wanless Road E												
1 LT	315	36		351	2				0.327	12.8	16	500
2 TR		339	11	350	2				0.327	6.5	17	500
	315	375	11	701	2				0.327	9.6	17	
North: Mississauga Road N												
1 LT	155	327		482	4				0.604	12.5	39	500
2 TR		453	35	488	4				0.604	10.2	39	500
	155	780	35	970	4				0.604	11.4	39	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	2099	4	0.604	10.2	39

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Wanless Road W								
5L L		6	40	0.150	17.5	B	0.9	7
2T T		140	944	0.148	10.3	B	0.9	7
2R R		6	40	0.150	11.1	B	0.9	7
South: Mississauga Road S								
3L L		11	73	0.151	13.9	B	0.8	7
8T T		190	1253	0.152	7.2	A	0.8	7
8R R		75	495	0.152	8.0	A	0.8	7
East: Wanless Road E								
1L L		315	962	0.327	13.5	B	2.1	16
6T T		375	1145	0.328	6.5	A	2.1	16
6R R		11	34	0.324	7.7	A	2.1	17

North: Mississauga Road N								
7L	L	155	257	0.603	17.2	B	4.9	39
4T	T	780	1292	0.604*	10.2	B	4.9	39
4R	R	35	58	0.603	11.3	B	4.9	39
ALL VEHICLES:		2099		0.604	10.2	B	4.9	39

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Wanless Road W								
	South	Right	35.0	32.5	19.4	500	123	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	175	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	127	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Wanless Road E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
		---------- Delay (seconds/veh) ----------								

West: Wanless Road W										
1 LT	0.148	5.1	0.0	5.1	4.7	0.4	0.0	0.4	6.0	11.1
2 TR	0.148	4.7	0.0	4.7	4.8	0.0	0.0	0.0	5.5	10.1
South: Mississauga Road S										
1 LT	0.152	1.5	0.0	1.5	2.7	0.0	0.0	0.0	6.3	7.8
2 TR	0.152	1.4	0.0	1.4	2.6	0.0	0.0	0.0	6.2	7.6
East: Wanless Road E										
1 LT	0.327	1.1	0.0	1.1	2.1	0.0	0.0	0.0	11.7	12.8
2 TR	0.327	1.1	0.0	1.1	2.8	0.0	0.0	0.0	5.4	6.5
North: Mississauga Road N										
1 LT	0.604	3.4	1.4	4.8	4.4	0.4	0.4	0.0	7.7	12.5
2 TR	0.604	3.4	1.3	4.7	4.8	0.0	0.0	0.0	5.5	10.2

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Wanless Road W							
1 LT	0.148	0.73	0.00	0.12	0.86	0.734	0.00
2 TR	0.148	0.72	0.00	0.12	0.84	0.736	0.00
South: Mississauga Road S							
1 LT	0.152	0.31	0.00	0.27	0.58	0.424	0.00
2 TR	0.152	0.30	0.00	0.28	0.58	0.417	0.00
East: Wanless Road E							
1 LT	0.327	0.30	0.00	0.40	0.70	0.421	0.00
2 TR	0.327	0.28	0.00	0.26	0.54	0.421	0.00
North: Mississauga Road N							
1 LT	0.604	0.73	0.07	0.14	0.94	0.732	0.19
2 TR	0.604	0.72	0.07	0.12	0.91	0.731	0.19

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.148	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.9	1.0	0.01
2 TR	0.148	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.9	1.0	0.01
South: Mississauga Road S											

1 LT	0.152	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.8	1.0	0.01
2 TR	0.152	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.8	1.0	0.01
East: Wanless Road E											
1 LT	0.327	0.0	0.7	0.0	0.7	1.3	1.5	1.7	2.1	2.5	0.03
2 TR	0.327	0.0	0.7	0.0	0.7	1.3	1.5	1.7	2.1	2.5	0.03
North: Mississauga Road N											
1 LT	0.604	0.2	1.3	0.3	1.6	2.8	3.5	4.0	4.9	5.7	0.08
2 TR	0.604	0.2	1.3	0.3	1.6	2.9	3.5	4.0	4.9	5.7	0.08

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.148	0.0	2.1	0.0	2.1	4.0	4.8	5.4	6.7	7.8	0.01
2 TR	0.148	0.0	2.2	0.0	2.2	4.1	5.0	5.6	6.9	8.0	0.01
South: Mississauga Road S											
1 LT	0.152	0.0	2.3	0.0	2.3	4.3	5.2	5.8	7.2	8.3	0.01
2 TR	0.152	0.0	2.2	0.0	2.2	4.1	4.9	5.6	6.9	8.0	0.01
East: Wanless Road E											
1 LT	0.327	0.0	5.2	0.0	5.2	9.7	11.8	13.3	16.5	19.1	0.03
2 TR	0.327	0.0	5.3	0.0	5.3	9.7	11.8	13.4	16.5	19.1	0.03
North: Mississauga Road N											
1 LT	0.604	1.9	10.3	2.3	12.6	22.3	27.3	31.1	38.6	44.9	0.08
2 TR	0.604	1.9	10.4	2.3	12.6	22.4	27.4	31.2	38.8	45.1	0.08

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Wanless Road 2018 AM
Intersection ID: 2
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Wanless Road W									
5L L	65.0	25.7	25.7	65.0			45.6	44.3	12.3
2T T	65.0	39.1	39.1	65.0			50.3	50.1	5.4
2R R	65.0	32.5	32.5	65.0			49.5	49.1	6.5
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0			46.9	46.9	12.4
8T T	65.0	39.1	39.1	65.0			52.7	52.7	5.8
8R R	65.0	32.5	32.5	65.0			51.7	51.7	6.6

East: Wanless Road E									
1L	L	65.0	25.7	25.7	65.0		46.9	46.9	12.4
6T	T	65.0	39.1	39.1	65.0		52.7	52.7	5.4
6R	R	65.0	32.5	32.5	65.0		51.6	51.6	6.6
North: Mississauga Road N									
7L	L	65.0	25.7	25.7	65.0	18.6	44.6	44.6	12.4
4T	T	65.0	39.1	39.1	65.0	18.7	50.3	50.3	5.4
4R	R	65.0	32.5	32.5	65.0	18.7	49.1	49.1	6.6

"Running Speed" is the average speed excluding stopped periods.

SIDRA SOLUTIONS

Site: Mississauga and Wanless 2018 AM
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Processed Aug 14, 2009 03:57:26PM

A1492, AECOM, Small Office
Produced by SIDRA Intersection 3.2.2.1563

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SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Wanless Road 2018 PM

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Wanless Road W							
	South	2R	Right	5	0	1.00	1.00
	East	2T	Thru	113	2	1.00	1.00
	North	5L	Left	10	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	39	1	1.00	1.00
	East	8R	Right	276	9	1.00	1.00
	North	8T	Thru	506	104	1.00	1.00
East: Wanless Road E							
	West	6T	Thru	328	7	1.00	1.00
	South	1L	Left	279	6	1.00	1.00
	North	6R	Right	20	0	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	20	0	1.00	1.00
	South	4T	Thru	278	12	1.00	1.00
	East	7L	Left	29	1	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	10	1	0	0	0	0
2T	T	0	0	113	2	0	0
2R	R	0	0	0	0	5	1
South: Mississauga Road S							
3L	L	39	1	0	0	0	0
8T	T	0	0	506	104	0	0
8R	R	0	0	0	0	276	9
East: Wanless Road E							
1L	L	279	6	0	0	0	0
6T	T	0	0	328	7	0	0
6R	R	0	0	0	0	20	1
North: Mississauga Road N							
7L	L	29	1	0	0	0	0
4T	T	0	0	278	12	0	0
4R	R	0	0	0	0	20	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	11	9.1	0	0.0	0	0.0
2T	T	0	0.0	115	1.7	0	0.0
2R	R	0	0.0	0	0.0	6	16.7
South: Mississauga Road S							
3L	L	40	2.5	0	0.0	0	0.0
8T	T	0	0.0	610	17.0	0	0.0
8R	R	0	0.0	0	0.0	285	3.2
East: Wanless Road E							
1L	L	285	2.1	0	0.0	0	0.0
6T	T	0	0.0	335	2.1	0	0.0
6R	R	0	0.0	0	0.0	21	4.8
North: Mississauga Road N							
7L	L	30	3.3	0	0.0	0	0.0
4T	T	0	0.0	290	4.1	0	0.0
4R	R	0	0.0	0	0.0	21	4.8

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl. Constr. Effect	Cap.	O-D Factor
West: Wanless Road W Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium											
30	10	50	2	2	4.00	605	3.0	605	0	N	0.950
South: Mississauga Road S Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium											
30	10	50	2	2	4.00	155	2.2	155	0	N	0.980
East: Wanless Road E Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium											
30	10	50	2	2	4.00	660	15.9	733	0	N	0.927
North: Mississauga Road N Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium											
30	10	50	2	2	4.00	660	2.0	660	0	N	0.900

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Wanless Road W Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	605	32.1	53.1	1.50	0.425	4.06	36.2	2.73
Thru	1	Subdominant	605	32.1	53.1	1.50	0.425	3.89	34.8	2.62
	2	Dominant	605	32.1	53.1	1.50	0.425	3.89	34.8	2.62
Right	2	Dominant	605	32.1	53.1	1.50	0.425	4.35	38.8	2.92
South: Mississauga Road S Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	155	35.7	230.0	1.23	0.109	4.33	42.9	2.67
Thru	1	Subdominant	155	35.7	230.0	1.23	0.109	4.84	47.9	2.98
	2	Dominant	155	35.7	230.0	1.23	0.109	4.77	47.2	2.94
Right	2	Dominant	155	35.7	230.0	1.23	0.109	4.27	42.2	2.63
East: Wanless Road E Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	733	38.1	51.9	1.28	0.438	3.79	40.1	2.60
Thru	1	Subdominant	733	38.1	51.9	1.28	0.438	3.79	40.1	2.60
	2	Dominant	733	38.1	51.9	1.28	0.438	3.74	39.6	2.57
Right	2	Dominant	733	38.1	51.9	1.28	0.438	3.75	39.7	2.58

North: Mississauga Road N									
Environment Factor: 1.20		Entry/Circulating Flow Adjustment: Medium							
Left	1	Subdominant	660	32.5	49.3	1.08	0.352	3.85	34.8	2.61
Thru	1	Subdominant	660	32.5	49.3	1.08	0.352	3.85	34.8	2.62
	2	Dominant	660	32.5	49.3	1.08	0.352	3.83	34.6	2.60
Right	2	Dominant	660	32.5	49.3	1.08	0.352	3.83	34.6	2.60

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Wanless Road W										
5L L	11	9.1	605	3.0	605	138	0.85	966	100	0.080
2T T	115	1.7	605	3.0	605	1443	0.85	967	100	0.080
2R R	6	16.7	605	3.0	605	75	0.85	963	100	0.080
South: Mississauga Road S										
3L L	40	2.5	155	2.2	155	92	0.85	96	100	0.435*
8T T	610	17.0	155	2.2	155	1409	0.85	96	100	0.433
8R R	285	3.2	155	2.2	155	658	0.85	96	100	0.433
East: Wanless Road E										
1L L	285	2.1	660	15.9	733	693	0.85	107	100	0.411
6T T	335	2.1	660	15.9	733	814	0.85	107	100	0.412
6R R	21	4.8	660	15.9	733	51	0.85	106	100	0.412
North: Mississauga Road N										
7L L	30	3.3	660	2.0	660	139	0.85	294	100	0.216
4T T	290	4.1	660	2.0	660	1343	0.85	294	100	0.216
4R R	21	4.8	660	2.0	660	97	0.85	293	100	0.216

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Intersection Level of Service	=	A
Worst movement Level of Service	=	B
Average intersection delay (s/pers)	=	9.1
Largest average movement delay (s)	=	16.0
Largest back of queue, 95% (m)	=	28
Performance Index	=	37.63
Degree of saturation (highest)	=	0.435
Practical Spare Capacity (lowest)	=	96 %

Effective intersection capacity, (veh/h)	=	4713
Total vehicle flow (veh/h)	=	2049
Total person flow (pers/h)	=	2459
Total vehicle delay (veh-h/h)	=	5.16
Total person delay (pers-h/h)	=	6.19
Total effective vehicle stops (veh/h)	=	1360
Total effective person stops (pers/h)	=	1632
Total vehicle travel (veh-km/h)	=	1304.2
Total cost ($/h)	=	568.13
Total fuel (L/h)	=	174.3
Total CO2 (kg/h)	=	437.06

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W										
5L	L	0.04	0.05	14.7	0.52	0.77	0.4	3	0.23	46.5
2T	T	0.24	0.29	7.6	0.52	0.64	0.4	3	2.00	51.9
2R	R	0.01	0.02	8.8	0.52	0.69	0.4	3	0.11	50.9
South: Mississauga Road S										
3L	L	0.15	0.18	13.4	0.41	0.68	3.2	28	0.81	46.9
8T	T	1.15	1.38	6.8	0.41	0.53	3.3	27	10.22	52.8
8R	R	0.59	0.71	7.5	0.40	0.57	3.3	27	4.84	51.8
East: Wanless Road E										
1L	L	1.27	1.52	16.0	0.67	0.92	2.7	21	6.47	45.6
6T	T	0.83	1.00	8.9	0.67	0.76	2.7	21	6.39	50.8
6R	R	0.06	0.07	10.1	0.67	0.83	2.7	21	0.41	50.0
North: Mississauga Road N										
7L	L	0.12	0.15	14.8	0.59	0.85	1.2	10	0.64	46.2
4T	T	0.63	0.75	7.8	0.59	0.64	1.2	10	5.12	51.4
4R	R	0.05	0.06	8.9	0.59	0.72	1.2	10	0.38	50.5

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

	Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W	132	0.080	0.30	0.36	8.3	0.52	0.65	3	2.33	51.3
South: Mississauga Road S	935	0.435	1.89	2.27	7.3	0.41	0.55	28	15.87	52.2
East: Wanless Road E	641	0.412	2.16	2.59	12.1	0.67	0.84	21	13.27	48.2
North: Mississauga Road N	341	0.216	0.80	0.96	8.5	0.59	0.66	10	6.15	50.8
ALL VEHICLES:	2049	0.435	5.16	6.19	9.1	0.53	0.66	28	37.63	50.6

INTERSECTION (persons):

2459	0.435		6.19	9.1	0.53	0.66	37.63	50.6

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Wanless Road W								
1 LT	66	830	0.080	8.8	0.66	0.4	3.3	500.0
2 TR	66	826	0.080	7.8	0.64	0.4	3.3	500.0
South: Mississauga Road S								
1 LT	449	1038	0.433	7.4	0.54	3.2	27.7	500.0
2 TR	486	1123	0.433	7.2	0.55	3.3	26.6	500.0
East: Wanless Road E								
1 LT	318	772	0.411	15.3	0.91	2.7	21.0	500.0
2 TR	323	786	0.411	9.0	0.77	2.7	21.1	500.0
North: Mississauga Road N								
1 LT	170	786	0.216	9.0	0.68	1.2	9.6	500.0
2 TR	171	793	0.216	7.9	0.65	1.2	9.6	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Wanless Road W								
1 LT	11	55	0	66	66	830	0.080	100
2 TR	0	60	6	66	66	826	0.080	100
South: Mississauga Road S								
1 LT	40	409	0	449	150	1038	0.433	100
2 TR	0	201	285	486	150	1123	0.433	100
East: Wanless Road E								
1 LT	285	33	0	318	150	772	0.411	100
2 TR	0	302	21	323	150	786	0.411	100
North: Mississauga Road N								
1 LT	30	140	0	170	150	786	0.216	100
2 TR	0	150	21	171	150	793	0.216	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Wanless Road W									
5L	L	11	138	100	0.080	14.7	0.77	0.4	0.23
2T	T	115	1443	100	0.080	7.6	0.64	0.4	2.00
2R	R	6	75	100	0.080	8.8	0.69	0.4	0.11
South: Mississauga Road S									
3L	L	40	92	100	0.435*	13.4	0.68	3.2	0.81
8T	T	610	1409	100	0.433	6.8	0.53	3.3	10.22
8R	R	285	658	100	0.433	7.5	0.57	3.3	4.84
East: Wanless Road E									
1L	L	285	693	100	0.411	16.0	0.92	2.7	6.47
6T	T	335	814	100	0.412	8.9	0.76	2.7	6.39
6R	R	21	51	100	0.412	10.1	0.83	2.7	0.41
North: Mississauga Road N									
7L	L	30	139	100	0.216	14.8	0.85	1.2	0.64
4T	T	290	1343	100	0.216	7.8	0.64	1.2	5.12
4R	R	21	97	100	0.216	8.9	0.72	1.2	0.38

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Mov ID		Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Wanless Road W							
5L	L	0.9	3.18	0.004	0.19	0.006	2.3
2T	T	8.4	28.59	0.034	1.65	0.053	20.9
2R	R	0.4	1.47	0.002	0.09	0.003	1.1
		9.7	33.23	0.039	1.92	0.061	24.3
South: Mississauga Road S							
3L	L	3.3	11.44	0.014	0.68	0.020	8.2
8T	T	62.5	187.01	0.216	12.54	0.404	157.3
8R	R	21.6	72.40	0.088	4.42	0.138	54.1
		87.4	270.85	0.317	17.64	0.563	219.6
East: Wanless Road E							
1L	L	23.8	83.69	0.101	5.00	0.149	59.6
6T	T	25.0	85.30	0.102	5.05	0.159	62.6
6R	R	1.6	5.43	0.007	0.34	0.010	4.0
		50.5	174.42	0.210	10.39	0.318	126.2

North: Mississauga Road N						
7L L	2.6	8.85	0.011	0.54	0.016	6.4
4T T	22.6	75.41	0.090	4.54	0.144	56.6
4R R	1.6	5.37	0.007	0.33	0.010	4.0
	26.7	89.63	0.107	5.40	0.170	67.0
INTERSECTION:	174.3	568.13	0.673	35.36	1.111	437.1

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Wanless Road W						
5L L	12.2	0.43	0.516	25.44	0.761	306.5
2T T	11.6	0.39	0.467	22.78	0.727	289.2
2R R	11.3	0.39	0.480	23.15	0.713	284.3
	11.6	0.40	0.472	23.03	0.729	290.5
South: Mississauga Road S						
3L L	12.1	0.42	0.510	25.10	0.753	303.2
8T T	16.3	0.49	0.562	32.67	1.054	409.7
8R R	12.2	0.41	0.494	24.90	0.776	304.6
	14.8	0.46	0.539	29.98	0.956	373.1
East: Wanless Road E						
1L L	12.4	0.44	0.526	26.01	0.774	310.1
6T T	11.9	0.40	0.484	23.97	0.753	296.9
6R R	12.2	0.41	0.508	25.59	0.784	306.2
	12.1	0.42	0.504	24.96	0.764	303.3
North: Mississauga Road N						
7L L	12.6	0.44	0.528	26.47	0.792	316.1
4T T	12.4	0.41	0.491	24.87	0.789	310.2
4R R	12.1	0.41	0.502	25.15	0.774	303.1
	12.4	0.42	0.495	25.03	0.788	310.3
INTERSECTION:	13.4	0.44	0.516	27.11	0.852	335.1

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Wanless Road W												
1 LT	11	55		66	3				0.080	8.8	3	500
2 TR		60	6	66	3				0.080	7.8	3	500
	11	115	6	132	3				0.080	8.3	3	
South: Mississauga Road S												
1 LT	40	409		449	16				0.433	7.4	28	500
2 TR		201	285	486	9				0.433	7.2	27	500
	40	610	285	935	12				0.433	7.3	28	
East: Wanless Road E												
1 LT	285	33		318	2				0.411	15.3	21	500
2 TR		302	21	323	2				0.411	9.0	21	500
	285	335	21	641	2				0.411	12.1	21	
North: Mississauga Road N												
1 LT	30	140		170	4				0.216	9.0	10	500
2 TR		150	21	171	4				0.216	7.9	10	500
	30	290	21	341	4				0.216	8.5	10	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	2049	7	0.435	9.1	28

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Wanless Road W								
5L	L	11	138	0.080	14.7	B	0.4	3
2T	T	115	1443	0.080	7.6	A	0.4	3
2R	R	6	75	0.080	8.8	A	0.4	3
South: Mississauga Road S								
3L	L	40	92	0.435*	13.4	B	3.2	28
8T	T	610	1409	0.433	6.8	A	3.3	27
8R	R	285	658	0.433	7.5	A	3.3	27
East: Wanless Road E								
1L	L	285	693	0.411	16.0	B	2.7	21
6T	T	335	814	0.412	8.9	A	2.7	21
6R	R	21	51	0.412	10.1	B	2.7	21
North: Mississauga Road N								
7L	L	30	139	0.216	14.8	B	1.2	10
4T	T	290	1343	0.216	7.8	A	1.2	10

4R	R	21	97	0.216	8.9	A	1.2	10
ALL VEHICLES:		2049		0.435	9.1	A	3.3	28

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Wanless Road W								
	South	Right	35.0	32.5	19.4	500	123	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	127	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Wanless Road E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Delay (seconds/veh) Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Wanless Road W										
1 LT	0.080	2.3	0.0	2.3	3.3	0.0	0.0	0.0	6.5	8.8
2 TR	0.080	2.3	0.0	2.3	3.4	0.0	0.0	0.0	5.5	7.8

Lane No.	Deg. Satn x	Effective Stop Rate hel	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Wanless Road W							
1 LT	0.080	0.42	0.00	0.23	0.66	0.522	0.00
2 TR	0.080	0.43	0.00	0.22	0.64	0.523	0.00
South: Mississauga Road S							
1 LT	0.433	0.27	0.00	0.27	0.54	0.415	0.00
2 TR	0.433	0.26	0.00	0.29	0.55	0.403	0.00
East: Wanless Road E							
1 LT	0.411	0.66	0.02	0.23	0.91	0.667	0.05
2 TR	0.411	0.60	0.02	0.15	0.77	0.666	0.05
North: Mississauga Road N							
1 LT	0.216	0.48	0.00	0.20	0.68	0.587	0.00
2 TR	0.216	0.46	0.00	0.19	0.65	0.587	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.080	0.0	0.1	0.0	0.1	0.3	0.3	0.3	0.4	0.5	0.01
2 TR	0.080	0.0	0.1	0.0	0.1	0.3	0.3	0.3	0.4	0.5	0.01
South: Mississauga Road S											
1 LT	0.433	0.0	1.0	0.0	1.0	1.9	2.3	2.6	3.2	3.7	0.06
2 TR	0.433	0.0	1.0	0.0	1.0	1.9	2.3	2.6	3.3	3.8	0.05
East: Wanless Road E											
1 LT	0.411	0.0	3.6	0.3	3.4	0.3	0.3	0.0	11.7	15.3	0.00
2 TR	0.411	0.0	3.5	0.3	4.4	0.0	0.0	0.0	5.5	9.0	0.00
North: Mississauga Road N											
1 LT	0.216	0.0	2.4	0.0	3.7	0.0	0.0	0.0	6.7	9.0	0.00
2 TR	0.216	0.0	2.3	0.0	3.8	0.0	0.0	0.0	5.6	7.9	0.00

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Effective Stop Rate hel	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Wanless Road W							
1 LT	0.080	0.42	0.00	0.23	0.66	0.522	0.00
2 TR	0.080	0.43	0.00	0.22	0.64	0.523	0.00
South: Mississauga Road S							
1 LT	0.433	0.27	0.00	0.27	0.54	0.415	0.00
2 TR	0.433	0.26	0.00	0.29	0.55	0.403	0.00
East: Wanless Road E							
1 LT	0.411	0.66	0.02	0.23	0.91	0.667	0.05
2 TR	0.411	0.60	0.02	0.15	0.77	0.666	0.05
North: Mississauga Road N							
1 LT	0.216	0.48	0.00	0.20	0.68	0.587	0.00
2 TR	0.216	0.46	0.00	0.19	0.65	0.587	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.080	0.0	0.1	0.0	0.1	0.3	0.3	0.3	0.4	0.5	0.01
2 TR	0.080	0.0	0.1	0.0	0.1	0.3	0.3	0.3	0.4	0.5	0.01
South: Mississauga Road S											
1 LT	0.433	0.0	1.0	0.0	1.0	1.9	2.3	2.6	3.2	3.7	0.06
2 TR	0.433	0.0	1.0	0.0	1.0	1.9	2.3	2.6	3.3	3.8	0.05

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
East: Wanless Road E											
1 LT	0.411	0.0	0.8	0.0	0.9	1.6	1.9	2.2	2.7	3.1	0.04
2 TR	0.411	0.0	0.8	0.0	0.9	1.6	1.9	2.2	2.7	3.2	0.04
North: Mississauga Road N											
1 LT	0.216	0.0	0.4	0.0	0.4	0.7	0.9	1.0	1.2	1.4	0.02
2 TR	0.216	0.0	0.4	0.0	0.4	0.7	0.9	1.0	1.2	1.4	0.02

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.080	0.0	1.0	0.0	1.0	2.0	2.4	2.7	3.3	3.9	0.01
2 TR	0.080	0.0	1.0	0.0	1.0	2.0	2.4	2.7	3.3	3.9	0.01
South: Mississauga Road S											
1 LT	0.433	0.0	8.9	0.0	8.9	16.2	19.7	22.4	27.7	32.2	0.06
2 TR	0.433	0.0	8.5	0.0	8.5	15.5	18.9	21.5	26.6	30.9	0.05
East: Wanless Road E											
1 LT	0.411	0.4	6.3	0.4	6.7	12.3	14.9	16.9	21.0	24.3	0.04
2 TR	0.411	0.4	6.4	0.4	6.7	12.3	15.0	17.0	21.1	24.4	0.04
North: Mississauga Road N											
1 LT	0.216	0.0	3.0	0.0	3.0	5.6	6.9	7.8	9.6	11.1	0.02
2 TR	0.216	0.0	3.0	0.0	3.0	5.7	6.9	7.8	9.6	11.1	0.02

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Wanless Road 2018 PM
Intersection ID: 2
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Wanless Road W									
5L L	65.0	25.7	25.7	65.0			46.5	46.5	12.4
2T T	65.0	39.1	39.1	65.0			51.9	51.9	5.4
2R R	65.0	32.5	32.5	65.0			50.9	50.9	6.5
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0			46.9	46.9	12.4
8T T	65.0	39.1	39.1	65.0			52.8	52.8	5.8
8R R	65.0	32.5	32.5	65.0			51.8	51.8	6.6
East: Wanless Road E									
1L L	65.0	25.7	25.7	65.0	18.6		45.6	45.6	12.4
6T T	65.0	39.1	39.1	65.0	18.7		50.8	50.8	5.4

6R	R	65.0	32.5	32.5	65.0	18.7	50.0	50.0	6.6
North: Mississauga Road N									
7L	L	65.0	25.7	25.7	65.0		46.2	46.2	12.4
4T	T	65.0	39.1	39.1	65.0		51.4	51.4	5.4
4R	R	65.0	32.5	32.5	65.0		50.5	50.5	6.6

"Running Speed" is the average speed excluding stopped periods.

SIDRA SOLUTIONS

Site: Mississauga and Wanless 2018 PM
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Processed Aug 14, 2009 03:57:26PM

A1492, AECOM, Small Office
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SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Mayfield Road 2031 AM TTMP

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Mayfield Road W							
	South	2R	Right	76	14	1.00	1.00
	East	2T	Thru	1172	88	1.00	1.00
	North	5L	Left	64	1	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	25	0	1.00	1.00
	East	8R	Right	59	11	1.00	1.00
	North	8T	Thru	86	14	1.00	1.00
East: Mayfield Road E							
	West	6T	Thru	527	93	1.00	1.00
	South	1L	Left	176	19	1.00	1.00
	North	6R	Right	29	1	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	98	2	1.00	1.00
	South	4T	Thru	538	22	1.00	1.00
	East	7L	Left	74	6	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Mov ID		Left LV	Left HV	Through LV	Through HV	Right LV	Right HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	64	1	0	0	0	0
2T	T	0	0	1172	88	0	0
2R	R	0	0	0	0	76	14
South: Mississauga Road S							
3L	L	25	1	0	0	0	0
8T	T	0	0	86	14	0	0
8R	R	0	0	0	0	59	11
East: Mayfield Road E							
1L	L	176	19	0	0	0	0
6T	T	0	0	527	93	0	0
6R	R	0	0	0	0	29	1
North: Mississauga Road N							
7L	L	74	6	0	0	0	0
4T	T	0	0	538	22	0	0
4R	R	0	0	0	0	98	2

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Mov ID		Left Total	Left %HV	Through Total	Through %HV	Right Total	Right %HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	65	1.5	0	0.0	0	0.0
2T	T	0	0.0	1260	7.0	0	0.0
2R	R	0	0.0	0	0.0	90	15.6
South: Mississauga Road S							
3L	L	26	3.8	0	0.0	0	0.0
8T	T	0	0.0	100	14.0	0	0.0
8R	R	0	0.0	0	0.0	70	15.7
East: Mayfield Road E							
1L	L	195	9.7	0	0.0	0	0.0
6T	T	0	0.0	620	15.0	0	0.0
6R	R	0	0.0	0	0.0	30	3.3
North: Mississauga Road N							
7L	L	80	7.5	0	0.0	0	0.0
4T	T	0	0.0	560	3.9	0	0.0
4R	R	0	0.0	0	0.0	100	2.0

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Mayfield Road W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	835	5.8	848	0	N	0.869
Exclusive Slip lane (exiting flow):						755	5.5	765	0	N	0.889
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1405	6.8	1434	0	N	0.617
East: Mayfield Road E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	190	8.3	199	0	N	0.970
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	840	13.5	912	0	N	0.893

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Critical Gap Dist (m)	Foll-up Headway (s)
West: Mayfield Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	848	34.7	40.9	1.32	0.497	3.70	35.6	2.59
Thru	1	Subdominant	848	34.7	40.9	1.32	0.497	3.77	36.4	2.64
	2	Dominant	848	34.7	40.9	1.32	0.497	3.69	35.5	2.58
Right	3	Excl. Slip	765E	35.7	46.6	1.27	0.448	3.69	36.5	2.58
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1434	37.7	26.3	1.07	0.620	3.33	34.9	2.48
Thru	1	Subdominant	1434	37.7	26.3	1.07	0.620	3.63	38.0	2.71
	2	Dominant	1434	37.7	26.3	1.07	0.620	3.37	35.4	2.52
Right	2	Dominant	1434	37.7	26.3	1.07	0.620	3.43	35.9	2.56
East: Mayfield Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Dominant	199	32.8	164.6	1.56	0.172	4.50	41.0	2.80
Thru	1	Dominant	199	32.8	164.6	1.56	0.172	4.71	42.9	2.93
	2	Subdominant	199	32.8	164.6	1.56	0.172	4.71	42.9	2.93D

Right	2	Subdominant	199	32.8	164.6	1.56	0.172	4.30	39.2	2.68D
North: Mississauga Road N										
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	912	35.6	39.0	1.05	0.445	3.76	37.1	2.65
Thru	1	Subdominant	912	35.6	39.0	1.05	0.445	3.66	36.2	2.59
	2	Dominant	912	35.6	39.0	1.05	0.445	3.55	35.1	2.51
Right	2	Dominant	912	35.6	39.0	1.05	0.445	3.55	35.1	2.50

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic
D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Mov ID		Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Mayfield Road W											
5L	L	65	1.5	835	5.8	848	66	0.85	-14	100	0.985
2T	T	1260	7.0	835	5.8	848	1275	0.85	-14	100	0.988*
2R	R	90	15.6	755	5.5	765	741	0.85	600	100	0.121
South: Mississauga Road S											
3L	L	26	3.8	1405	6.8	1434	93	0.85	204	100	0.280
8T	T	100	14.0	1405	6.8	1434	357	0.85	203	100	0.280
8R	R	70	15.7	1405	6.8	1434	250	0.85	204	100	0.280
East: Mayfield Road E											
1L	L	195	9.7	190	8.3	199	468	0.85	104	100	0.417
6T	T	620	15.0	190	8.3	199	1489	0.85	104	100	0.416
6R	R	30	3.3	190	8.3	199	72	0.85	104	100	0.417
North: Mississauga Road N											
7L	L	80	7.5	840	13.5	912	152	0.85	62	100	0.526
4T	T	560	3.9	840	13.5	912	1065	0.85	62	100	0.526
4R	R	100	2.0	840	13.5	912	190	0.85	62	100	0.526

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Intersection Level of Service	=	C
Worst movement Level of Service	=	D
Average intersection delay (s/pers)	=	20.7
Largest average movement delay (s)	=	42.3

Largest back of queue, 95% (m)	=	177
Performance Index	=	91.07
Degree of saturation (highest)	=	0.988
Practical Spare Capacity (lowest)	=	-14 %
Effective intersection capacity, (veh/h)	=	3234
Total vehicle flow (veh/h)	=	3196
Total person flow (pers/h)	=	3835
Total vehicle delay (veh-h/h)	=	18.38
Total person delay (pers-h/h)	=	22.06
Total effective vehicle stops (veh/h)	=	3607
Total effective person stops (pers/h)	=	4329
Total vehicle travel (veh-km/h)	=	2026.4
Total cost ($/h)	=	1057.91
Total fuel (L/h)	=	313.1
Total CO2 (kg/h)	=	785.42

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W										
5L	L	0.76	0.92	42.3	1.00	1.65	21.6	173	2.81	30.5
2T	T	12.31	14.77	35.2	1.00	1.65	21.9	177	51.05	32.4
2R	R	0.23	0.28	9.3	0.59	0.72	0.7	6	1.67	50.7
South: Mississauga Road S										
3L	L	0.14	0.16	18.8	0.81	0.95	1.7	14	0.69	43.3
8T	T	0.33	0.40	12.0	0.81	0.90	1.7	14	2.35	48.8
8R	R	0.25	0.30	13.1	0.82	0.92	1.7	14	1.65	47.7
East: Mayfield Road E										
1L	L	0.75	0.90	13.9	0.46	0.71	3.1	26	4.00	46.7
6T	T	1.20	1.44	7.0	0.46	0.55	3.1	26	10.57	52.4
6R	R	0.07	0.08	7.8	0.46	0.60	3.1	26	0.52	51.3
North: Mississauga Road N										
7L	L	0.39	0.47	17.7	0.74	0.98	3.8	30	1.93	44.3
4T	T	1.62	1.95	10.4	0.74	0.91	3.8	30	11.72	50.1
4R	R	0.32	0.38	11.4	0.74	0.93	3.8	30	2.12	49.0

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W									
1415	0.988	13.30	15.97	33.8	0.97	1.59	177	55.53	33.1
South: Mississauga Road S									
196	0.280	0.72	0.87	13.3	0.81	0.91	14	4.68	47.6
East: Mayfield Road E									
845	0.417	2.02	2.42	8.6	0.46	0.59	26	15.09	50.9
North: Mississauga Road N									
740	0.526	2.33	2.80	11.4	0.74	0.92	30	15.76	49.2

ALL VEHICLES:									
3196	0.988	18.38	22.06	20.7	0.77	1.13	177	91.07	40.7
INTERSECTION (persons):									
3835	0.988		22.06	20.7	0.77	1.13		91.07	40.7

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Mayfield Road W								
1 LT	652	660	0.989	36.1	1.65	21.6	173.0	500.0
2 T	673	681	0.989	34.9	1.65	21.9	176.6	500.0
3 R	90	741	0.121	9.3	0.72	0.7	5.8	75.0
South: Mississauga Road S								
1 LT	95	338	0.280	13.9	0.91	1.7	13.8	500.0
2 TR	101	361	0.280	12.6	0.91	1.7	14.5	500.0
East: Mayfield Road E								
1 LT	426	1023	0.416	10.1	0.62	3.1	26.2	500.0
2 TR	419	1006	0.416	7.1	0.55	3.1	26.4	500.0
North: Mississauga Road N								
1 LT	360	683	0.526	12.2	0.93	3.8	29.7	500.0
2 TR	380	723	0.526	10.6	0.91	3.8	29.8	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Mayfield Road W								
1 LT	65	587	0	652	150	660	0.989	100
2 T	0	673	0	673	150	681	0.989	100
3 R	0	0	90	90	90	741	0.121	100
South: Mississauga Road S								
1 LT	26	69	0	95	95	338	0.280	100
2 TR	0	31	70	101	101	361	0.280	100
East: Mayfield Road E								
1 LT	195	231	0	426	150	1023	0.416	100
2 TR	0	389	30	419	150	1006	0.416	100
North: Mississauga Road N								
1 LT	80	280	0	360	150	683	0.526	100
2 TR	0	280	100	380	150	723	0.526	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Mayfield Road W									
5L	L	65	66	100	0.985	42.3	1.65	21.6	2.81
2T	T	1260	1275	100	0.988*	35.2	1.65	21.9	51.05
2R	R (Slp)	90	741	100	0.121	9.3	0.72	0.7	1.67
South: Mississauga Road S									
3L	L	26	93	100	0.280	18.8	0.95	1.7	0.69
8T	T	100	357	100	0.280	12.0	0.90	1.7	2.35
8R	R	70	250	100	0.280	13.1	0.92	1.7	1.65
East: Mayfield Road E									
1L	L	195	468	100	0.417	13.9	0.71	3.1	4.00
6T	T	620	1489	100	0.416	7.0	0.55	3.1	10.57
6R	R	30	72	100	0.417	7.8	0.60	3.1	0.52
North: Mississauga Road N									
7L	L	80	152	100	0.526	17.7	0.98	3.8	1.93
4T	T	560	1065	100	0.526	10.4	0.91	3.8	11.72
4R	R	100	190	100	0.526	11.4	0.93	3.8	2.12

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Mov ID		Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Mayfield Road W							
5L	L	6.5	25.53	0.029	1.34	0.038	16.1
2T	T	132.7	481.13	0.552	28.39	0.845	332.8
2R	R	9.5	28.52	0.034	2.03	0.064	24.0
		148.7	535.17	0.616	31.77	0.947	372.9
South: Mississauga Road S							
3L	L	2.2	7.89	0.009	0.46	0.014	5.5
8T	T	10.4	31.89	0.038	2.23	0.070	26.2
8R	R	7.7	23.28	0.028	1.70	0.052	19.4
		20.4	63.07	0.076	4.39	0.136	51.2

East: Mayfield Road E						
1L L	19.6	63.16	0.076	4.16	0.126	49.2
6T T	61.6	186.71	0.217	12.44	0.399	154.9
6R R	2.2	7.55	0.009	0.46	0.014	5.6
	83.4	257.42	0.302	17.06	0.540	209.6
North: Mississauga Road N						
7L L	7.9	26.28	0.032	1.70	0.051	19.9
4T T	44.9	149.67	0.180	9.25	0.289	112.5
4R R	7.7	26.30	0.032	1.63	0.050	19.3
	60.6	202.25	0.244	12.58	0.389	151.7
INTERSECTION:	313.1	1057.91	1.237	65.79	2.012	785.4

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Mayfield Road W						
5L L	14.7	0.58	0.660	30.65	0.876	368.1
2T T	16.7	0.61	0.697	35.81	1.065	419.7
2R R	17.0	0.51	0.609	36.12	1.131	426.4
	16.7	0.60	0.689	35.57	1.060	417.6
South: Mississauga Road S						
3L L	12.6	0.45	0.540	26.44	0.784	316.2
8T T	16.6	0.51	0.607	35.41	1.107	416.7
8R R	17.7	0.53	0.650	38.85	1.198	445.5
	16.4	0.51	0.612	35.35	1.094	412.6
East: Mayfield Road E						
1L L	14.9	0.48	0.576	31.63	0.959	373.8
6T T	15.8	0.48	0.556	31.88	1.024	396.9
6R R	11.9	0.40	0.491	24.46	0.758	298.3
	15.4	0.48	0.559	31.57	0.999	387.9
North: Mississauga Road N						
7L L	14.7	0.49	0.586	31.48	0.943	368.1
4T T	12.7	0.42	0.510	26.24	0.820	319.1
4R R	12.4	0.42	0.518	26.15	0.796	310.2
	12.9	0.43	0.520	26.83	0.831	323.6
INTERSECTION:	15.4	0.52	0.611	32.47	0.993	387.6

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Mayfield Road W												
1 LT	65	587		652	6				0.989	36.1	173	500
2 T		673		673	7				0.989	34.9	177	500
3 R			90	90	16				0.121	9.3	6	75
	65	1260	90	1415	7				0.989	33.8	177	
South: Mississauga Road S												
1 LT	26	69		95	11				0.280	13.9	14	500
2 TR		31	70	101	15				0.280	12.6	14	500
	26	100	70	196	13				0.280	13.3	14	
East: Mayfield Road E												
1 LT	195	231		426	13				0.416	10.1	26	500
2 TR		389	30	419	14				0.416	7.1	26	500
	195	620	30	845	13				0.416	8.6	26	
North: Mississauga Road N												
1 LT	80	280		360	5				0.526	12.2	30	500
2 TR		280	100	380	3				0.526	10.6	30	500
	80	560	100	740	4				0.526	11.4	30	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	3196	9	0.988	20.7	177

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Mayfield Road W								
5L L		65	66	0.985	42.3	D	21.6	173
2T T		1260	1275	0.988*	35.2	D	21.9	177
2R R	(Slp)	90	741	0.121	9.3	A	0.7	6
South: Mississauga Road S								
3L L		26	93	0.280	18.8	B	1.7	14
8T T		100	357	0.280	12.0	B	1.7	14
8R R		70	250	0.280	13.1	B	1.7	14
East: Mayfield Road E								

1L	L	195	468	0.417	13.9	B	3.1	26
6T	T	620	1489	0.416	7.0	A	3.1	26
6R	R	30	72	0.417	7.8	A	3.1	26
North: Mississauga Road N								
7L	L	80	152	0.526	17.7	B	3.8	30
4T	T	560	1065	0.526	10.4	B	3.8	30
4R	R	100	190	0.526	11.4	B	3.8	30
ALL VEHICLES:		3196		0.988	20.7	C	21.9	177

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Mayfield Road W								
	South	Right	41.0	34.5	19.3	500	141	No
	East	Thru	57.3	39.1	47.1	500	136	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: Mayfield Road E								
	West	Thru	57.3	39.1	47.1	500	144	No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

	Delay (seconds/veh)

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Mayfield Road W										
1 LT	0.989	6.2	23.7	29.9	6.4	23.5	11.8	11.7	6.2	36.1
2 T	0.989	6.0	23.4	29.4	6.6	22.8	11.8	11.0	5.5	34.9
3 R	0.121	2.6	0.0	2.6	3.6	0.0	0.0	0.0	6.7	9.3
South: Mississauga Road S										
1 LT	0.280	6.3	0.1	6.4	5.0	1.4	0.1	1.3	7.5	13.9
2 TR	0.280	5.9	0.1	6.0	4.9	1.1	0.0	1.0	6.6	12.6
East: Mayfield Road E										
1 LT	0.416	1.2	0.0	1.2	2.7	0.0	0.0	0.0	8.9	10.1
2 TR	0.416	1.3	0.0	1.3	3.0	0.0	0.0	0.0	5.8	7.1
North: Mississauga Road N										
1 LT	0.526	4.0	1.2	5.2	4.6	0.6	0.5	0.1	7.0	12.2
2 TR	0.526	3.7	1.1	4.8	4.7	0.1	0.1	0.0	5.7	10.6

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Mayfield Road W							
1 LT	0.989	1.00	0.65	0.00	1.65	1.000	1.86
2 T	0.989	1.00	0.65	0.00	1.65	1.000	1.86
3 R	0.121	0.51	0.00	0.20	0.72	0.594	0.00
South: Mississauga Road S							
1 LT	0.280	0.81	0.00	0.10	0.91	0.812	0.01
2 TR	0.280	0.82	0.00	0.09	0.91	0.816	0.01
East: Mayfield Road E							
1 LT	0.416	0.32	0.00	0.30	0.62	0.463	0.00
2 TR	0.416	0.31	0.00	0.24	0.55	0.465	0.00
North: Mississauga Road N							
1 LT	0.526	0.74	0.06	0.13	0.93	0.738	0.17
2 TR	0.526	0.73	0.06	0.12	0.91	0.735	0.16

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Mayfield Road W											
1 LT	0.989	4.1	3.0	4.9	7.8	11.4	14.6	16.9	21.6	25.5	0.35
2 T	0.989	4.2	3.0	5.0	8.0	11.6	14.8	17.2	21.9	25.9	0.35
3 R	0.121	0.0	0.2	0.0	0.2	0.4	0.5	0.5	0.7	0.8	0.08
South: Mississauga Road S											
1 LT	0.280	0.0	0.5	0.0	0.5	1.0	1.2	1.3	1.7	1.9	0.03
2 TR	0.280	0.0	0.5	0.0	0.5	1.0	1.2	1.4	1.7	2.0	0.03
East: Mayfield Road E											
1 LT	0.416	0.0	1.0	0.0	1.0	1.8	2.2	2.5	3.1	3.6	0.05
2 TR	0.416	0.0	1.0	0.0	1.0	1.8	2.2	2.5	3.1	3.6	0.05
North: Mississauga Road N											
1 LT	0.526	0.2	1.0	0.2	1.2	2.2	2.7	3.0	3.8	4.4	0.06
2 TR	0.526	0.2	1.1	0.2	1.2	2.2	2.7	3.1	3.8	4.4	0.06

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Mayfield Road W											
1 LT	0.989	33.2	23.7	38.9	62.6	91.6	116.6	135.4	173.0	204.3	0.35
2 T	0.989	33.9	24.1	39.9	64.0	93.4	119.0	138.2	176.6	208.6	0.35
3 R	0.121	0.0	1.8	0.0	1.8	3.4	4.1	4.7	5.8	6.7	0.08
South: Mississauga Road S											
1 LT	0.280	0.0	4.3	0.0	4.4	8.1	9.8	11.1	13.8	15.9	0.03
2 TR	0.280	0.0	4.6	0.0	4.6	8.5	10.3	11.7	14.5	16.8	0.03
East: Mayfield Road E											
1 LT	0.416	0.0	8.4	0.0	8.4	15.3	18.6	21.2	26.2	30.4	0.05
2 TR	0.416	0.0	8.5	0.0	8.5	15.4	18.8	21.3	26.4	30.7	0.05
North: Mississauga Road N											
1 LT	0.526	1.3	8.3	1.3	9.6	17.2	21.0	23.9	29.7	34.4	0.06
2 TR	0.526	1.2	8.3	1.3	9.6	17.3	21.1	24.0	29.8	34.6	0.06

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP
Intersection ID: 1
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Mayfield Road W									
5L L	65.0	25.7	25.7	65.0	18.2		36.6	30.5	12.4

2T T	65.0	39.1	39.1	65.0	18.2	38.7	32.4	5.5
2R R	65.0	34.5	34.5	65.0		50.7	50.7	6.7
South: Mississauga Road S								
3L L	65.0	25.7	25.7	65.0	15.9	45.2	43.3	12.4
8T T	65.0	39.1	39.1	65.0	15.6	49.7	48.8	5.7
8R R	65.0	32.5	32.5	65.0	16.0	49.0	47.7	7.1
East: Mayfield Road E								
1L L	65.0	25.7	25.7	65.0		46.7	46.7	12.6
6T T	65.0	39.1	39.1	65.0		52.4	52.4	5.7
6R R	65.0	32.5	32.5	65.0		51.3	51.3	6.6
North: Mississauga Road N								
7L L	65.0	25.7	25.7	65.0	17.1	44.7	44.3	12.6
4T T	65.0	39.1	39.1	65.0	17.4	50.1	50.1	5.4
4R R	65.0	32.5	32.5	65.0	17.4	49.0	49.0	6.6

"Running Speed" is the average speed excluding stopped periods.

Site: Mayfield 2031 AM TTMP
C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap
Processed Jan 12, 2010 11:59:18AM

A1492, AECOM, Small Office

SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Mayfield Road 2031 PM TTMP

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Mayfield Road W							
	South	2R	Right	55	10	1.00	1.00
	East	2T	Thru	921	69	1.00	1.00
	North	5L	Left	103	2	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	74	1	1.00	1.00
	East	8R	Right	294	56	1.00	1.00
	North	8T	Thru	400	65	1.00	1.00
East: Mayfield Road E							
	West	6T	Thru	727	128	1.00	1.00
	South	1L	Left	95	10	1.00	1.00
	North	6R	Right	49	1	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	54	1	1.00	1.00
	South	4T	Thru	163	7	1.00	1.00
	East	7L	Left	32	3	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	103	2	0	0	0	0
2T	T	0	0	921	69	0	0
2R	R	0	0	0	0	55	10
South: Mississauga Road S							
3L	L	74	2	0	0	0	0
8T	T	0	0	400	65	0	0
8R	R	0	0	0	0	294	56
East: Mayfield Road E							
1L	L	95	11	0	0	0	0
6T	T	0	0	727	128	0	0
6R	R	0	0	0	0	49	1
North: Mississauga Road N							
7L	L	32	3	0	0	0	0
4T	T	0	0	163	7	0	0
4R	R	0	0	0	0	54	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	105	1.9	0	0.0	0	0.0
2T	T	0	0.0	990	7.0	0	0.0
2R	R	0	0.0	0	0.0	65	15.4
South: Mississauga Road S							
3L	L	76	2.6	0	0.0	0	0.0
8T	T	0	0.0	465	14.0	0	0.0
8R	R	0	0.0	0	0.0	350	16.0
East: Mayfield Road E							
1L	L	106	10.4	0	0.0	0	0.0
6T	T	0	0.0	855	15.0	0	0.0
6R	R	0	0.0	0	0.0	50	2.0
North: Mississauga Road N							
7L	L	35	8.6	0	0.0	0	0.0
4T	T	0	0.0	170	4.1	0	0.0
4R	R	0	0.0	0	0.0	55	1.8

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Mayfield Road W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	310	6.5	317	0	N	0.961
Exclusive Slip lane (exiting flow):						275	6.3	280	0	N	0.968
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1130	6.6	1152	0	N	0.812
East: Mayfield Road E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	645	10.7	687	0	N	0.865
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1035	13.6	1126	0	N	0.729

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Mayfield Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Dominant	317	33.1	104.5	1.45	0.243	4.19	38.5	2.67
Thru	1	Dominant	317	33.1	104.5	1.45	0.243	4.27	39.2	2.72
	2	Subdominant	317	33.1	104.5	1.45	0.243	4.27	39.2	2.72D
Right	3	Excl. Slip	280E	34.0	121.2	1.41	0.214	4.19	39.6	2.67
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1152	37.4	32.5	1.03	0.520	3.47	36.1	2.53
Thru	1	Subdominant	1152	37.4	32.5	1.03	0.520	3.78	39.4	2.75
	2	Dominant	1152	37.4	32.5	1.03	0.520	3.62	37.6	2.63
Right	2	Dominant	1152	37.4	32.5	1.03	0.520	3.68	38.3	2.68
East: Mayfield Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	687	35.4	51.5	1.53	0.475	4.03	39.6	2.75
Thru	1	Subdominant	687	35.4	51.5	1.53	0.475	4.21	41.4	2.87
	2	Dominant	687	35.4	51.5	1.53	0.475	4.17	41.0	2.85

Right	2	Dominant	687	35.4	51.5	1.53	0.475	3.79	37.3	2.59
North: Mississauga Road N										
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	1126	36.8	32.7	1.10	0.535	3.66	37.4	2.65
Thru	1	Subdominant	1126	36.8	32.7	1.10	0.535	3.53	36.1	2.56
	2	Dominant	1126	36.8	32.7	1.10	0.535	3.34	34.2	2.43
Right	2	Dominant	1126	36.8	32.7	1.10	0.535	3.34	34.1	2.42

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic
D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Total Adjust. Flow (pcu/h)	Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Mayfield Road W										
5L L	105	1.9	310	6.5	317	190	0.85	54	100	0.553
2T T	990	7.0	310	6.5	317	1791	0.85	54	100	0.553
2R R	65	15.4	275	6.3	280	1048	0.85	1270	100	0.062
South: Mississauga Road S										
3L L	76	2.6	1130	6.6	1152	88	0.85	-2	100	0.864*
8T T	465	14.0	1130	6.6	1152	539	0.85	-1	100	0.863
8R R	350	16.0	1130	6.6	1152	406	0.85	-1	100	0.862
East: Mayfield Road E										
1L L	106	10.4	645	10.7	687	135	0.85	8	100	0.785
6T T	855	15.0	645	10.7	687	1091	0.85	8	100	0.784
6R R	50	2.0	645	10.7	687	64	0.85	9	100	0.781
North: Mississauga Road N										
7L L	35	8.6	1035	13.6	1126	141	0.85	242	100	0.248
4T T	170	4.1	1035	13.6	1126	683	0.85	242	100	0.249
4R R	55	1.8	1035	13.6	1126	221	0.85	242	100	0.249

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Intersection Level of Service	=	B
Worst movement Level of Service	=	C
Average intersection delay (s/pers)	=	15.0
Largest average movement delay (s)	=	28.4

Largest back of queue, 95% (m)	=	82
Performance Index	=	81.03
Degree of saturation (highest)	=	0.864
Practical Spare Capacity (lowest)	=	-2 %
Effective intersection capacity, (veh/h)	=	3847
Total vehicle flow (veh/h)	=	3322
Total person flow (pers/h)	=	3986
Total vehicle delay (veh-h/h)	=	13.87
Total person delay (pers-h/h)	=	16.64
Total effective vehicle stops (veh/h)	=	3225
Total effective person stops (pers/h)	=	3870
Total vehicle travel (veh-km/h)	=	2102.3
Total cost ($/h)	=	1066.94
Total fuel (L/h)	=	333.0
Total CO2 (kg/h)	=	836.28

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W										
5L	L	0.43	0.51	14.7	0.61	0.80	4.7	38	2.28	46.1
2T	T	2.15	2.58	7.8	0.61	0.65	4.7	38	18.09	51.2
2R	R	0.14	0.16	7.6	0.37	0.55	0.3	3	1.06	52.3
South: Mississauga Road S										
3L	L	0.60	0.72	28.4	0.92	1.26	9.4	79	2.47	36.9
8T	T	2.80	3.36	21.7	0.92	1.23	9.5	82	13.81	40.4
8R	R	2.21	2.65	22.7	0.92	1.24	9.5	82	10.45	39.6
East: Mayfield Road E										
1L	L	0.68	0.82	23.2	0.93	1.16	9.5	81	3.14	40.3
6T	T	3.86	4.64	16.3	0.93	1.14	9.5	81	22.96	44.7
6R	R	0.24	0.28	17.0	0.93	1.15	9.5	81	1.35	43.6
North: Mississauga Road N										
7L	L	0.16	0.19	16.7	0.75	0.93	1.5	12	0.84	45.1
4T	T	0.44	0.53	9.3	0.75	0.77	1.5	12	3.44	50.2
4R	R	0.16	0.19	10.2	0.75	0.83	1.5	12	1.13	49.4

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

	Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W	1160	0.553	2.71	3.26	8.4	0.60	0.66	38	21.43	50.8
South: Mississauga Road S	891	0.864	5.61	6.73	22.7	0.92	1.23	82	26.72	39.7
East: Mayfield Road E	1011	0.785	4.78	5.74	17.0	0.93	1.14	81	27.46	44.1
North: Mississauga Road N	260	0.249	0.76	0.91	10.5	0.75	0.80	12	5.41	49.2

```
ALL VEHICLES:
 3322   0.864   13.87    16.64    15.0   0.80  0.97    82   81.03    45.2
--------------------------------------------------------------------------
INTERSECTION (persons):
 3986   0.864            16.64    15.0   0.80  0.97         81.03    45.2
--------------------------------------------------------------------------
Queue values in this table are 95% back of queue (metres).
```

Table S.7 - Lane Performance

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

-------------------------------------------------------------
          Dem                                  Q u e u e
         Flow   Cap  Deg.  Aver.  Eff.   95% Back       Lane
 Lane    (veh  (veh  Satn  Delay  Stop  ------------   Length
 No.      /h)   /h)   x    (sec)  Rate  (vehs)  (m)      (m)
-------------------------------------------------------------
 West: Mayfield Road W
 1 LT      549   993 0.553   9.1  0.68    4.7   37.7    500.0
 2 T       546   988 0.553   7.8  0.65    4.7   38.0    500.0
 3 R        65  1048 0.062   7.6  0.55    0.3    2.8     75.0
-------------------------------------------------------------
 South: Mississauga Road S
 1 LT      439   509 0.862  22.9  1.23    9.4   78.6    500.0
 2 TR      452   524 0.862  22.4  1.24    9.5   81.6    500.0
-------------------------------------------------------------
 East: Mayfield Road E
 1 LT      502   641 0.784  17.8  1.14    9.5   80.8    500.0
 2 TR      509   649 0.784  16.3  1.14    9.5   80.9    500.0
-------------------------------------------------------------
 North: Mississauga Road N
 1 LT      123   496 0.249  11.6  0.83    1.5   11.8    500.0
 2 TR      137   548 0.249   9.6  0.78    1.5   11.9    500.0
-------------------------------------------------------------
```

Table S.8 - Lane Flow and Capacity Information

```
Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

-------------------------------------------------
                                 Min  Tot
 Lane      Dem Flow (veh/h)      Cap  Cap  Deg.  Lane
 No.    -------------------    (veh (veh  Satn  Util
         Lef Thru  Rig  Tot     /h)  /h)   x     %
-------------------------------------------------
 West: Mayfield Road W
 1 LT    105  444    0  549    150  993  0.553  100
 2 T       0  546    0  546    150  988  0.553  100
 3 R       0    0   65   65     65 1048  0.062  100
-------------------------------------------------
 South: Mississauga Road S
 1 LT     76  363    0  439    150  509  0.862  100
 2 TR      0  102  350  452    150  524  0.862  100
-------------------------------------------------
 East: Mayfield Road E
 1 LT    106  396    0  502    150  641  0.784  100
 2 TR      0  459   50  509    150  649  0.784  100
-------------------------------------------------
 North: Mississauga Road N
 1 LT     35   88    0  123    123  496  0.249  100
 2 TR      0   82   55  137    137  548  0.249  100
```

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Mayfield Road W									
5L	L	105	190	100	0.553	14.7	0.80	4.7	2.28
2T	T	990	1791	100	0.553	7.8	0.65	4.7	18.09
2R	R (Slp)	65	1048	100	0.062	7.6	0.55	0.3	1.06
South: Mississauga Road S									
3L	L	76	88	100	0.864*	28.4	1.26	9.4	2.47
8T	T	465	539	100	0.863	21.7	1.23	9.5	13.81
8R	R	350	406	100	0.862	22.7	1.24	9.5	10.45
East: Mayfield Road E									
1L	L	106	135	100	0.785	23.2	1.16	9.5	3.14
6T	T	855	1091	100	0.784	16.3	1.14	9.5	22.96
6R	R	50	64	100	0.781	17.0	1.15	9.5	1.35
North: Mississauga Road N									
7L	L	35	141	100	0.248	16.7	0.93	1.5	0.84
4T	T	170	683	100	0.249	9.3	0.77	1.5	3.44
4R	R	55	221	100	0.249	10.2	0.83	1.5	1.13

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Mov ID	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Mayfield Road W						
5L L	8.7	30.54	0.037	1.82	0.054	21.8
2T T	84.0	271.47	0.322	17.09	0.541	210.5
2R R	6.7	19.91	0.024	1.38	0.044	16.7
	99.3	321.92	0.382	20.29	0.639	249.0
South: Mississauga Road S						
3L L	6.9	25.86	0.030	1.45	0.042	17.3
8T T	52.3	167.89	0.198	11.33	0.348	131.6
8R R	41.4	130.98	0.156	9.15	0.279	104.2
	100.7	324.73	0.384	21.92	0.669	253.1

East: Mayfield Road E						
1L L	11.5	38.32	0.046	2.50	0.074	28.9
6T T	96.1	296.46	0.356	21.10	0.650	241.6
6R R	4.1	14.35	0.018	0.88	0.026	10.3
	111.7	349.13	0.420	24.49	0.751	280.7
North: Mississauga Road N						
7L L	3.4	11.34	0.014	0.74	0.022	8.6
4T T	13.7	45.45	0.055	2.82	0.088	34.2
4R R	4.2	14.37	0.018	0.89	0.027	10.6
	21.3	71.16	0.086	4.45	0.137	53.4
INTERSECTION:	333.0	1066.94	1.273	71.15	2.196	836.3

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Mayfield Road W						
5L L	12.3	0.43	0.521	25.73	0.767	307.8
2T T	13.5	0.44	0.517	27.43	0.869	337.8
2R R	16.4	0.49	0.580	33.92	1.075	412.0
	13.5	0.44	0.521	27.62	0.870	339.0
South: Mississauga Road S						
3L L	13.5	0.50	0.589	28.18	0.823	337.6
8T T	17.9	0.57	0.676	38.71	1.190	449.6
8R R	19.0	0.60	0.717	41.94	1.276	477.7
	17.9	0.58	0.684	39.00	1.190	450.3
East: Mayfield Road E						
1L L	16.1	0.54	0.640	34.97	1.040	403.5
6T T	17.9	0.55	0.663	39.22	1.208	449.0
6R R	13.2	0.46	0.562	28.27	0.842	329.2
	17.4	0.54	0.655	38.21	1.172	438.1
North: Mississauga Road N						
7L L	14.6	0.48	0.579	31.19	0.937	365.3
4T T	12.8	0.42	0.511	26.34	0.822	319.6
4R R	12.4	0.42	0.516	26.09	0.795	309.2
	12.9	0.43	0.522	26.98	0.833	324.0
INTERSECTION:	15.8	0.51	0.605	33.84	1.045	397.8

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Mayfield Road W												
1 LT	105	444		549	6				0.553	9.1	38	500
2 T		546		546	7				0.553	7.8	38	500
3 R			65	65	15				0.062	7.6	3	75
	105	990	65	1160	7				0.553	8.4	38	
South: Mississauga Road S												
1 LT	76	363		439	12				0.862	22.9	79	500
2 TR		102	350	452	16				0.862	22.4	82	500
	76	465	350	891	14				0.862	22.7	82	
East: Mayfield Road E												
1 LT	106	396		502	14				0.784	17.8	81	500
2 TR		459	50	509	14				0.784	16.3	81	500
	106	855	50	1011	14				0.784	17.0	81	
North: Mississauga Road N												
1 LT	35	88		123	5				0.249	11.6	12	500
2 TR		82	55	137	3				0.249	9.6	12	500
	35	170	55	260	4				0.249	10.5	12	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	3322	11	0.864	15.0	82

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Mayfield Road W								
5L L		105	190	0.553	14.7	B	4.7	38
2T T		990	1791	0.553	7.8	A	4.7	38
2R R	(Slp)	65	1048	0.062	7.6	A	0.3	3
South: Mississauga Road S								
3L L		76	88	0.864*	28.4	C	9.4	79
8T T		465	539	0.863	21.7	C	9.5	82
8R R		350	406	0.862	22.7	C	9.5	82
East: Mayfield Road E								

1L	L	106	135	0.785	23.2	C	9.5	81
6T	T	855	1091	0.784	16.3	B	9.5	81
6R	R	50	64	0.781	17.0	B	9.5	81
North: Mississauga Road N								
7L	L	35	141	0.248	16.7	B	1.5	12
4T	T	170	683	0.249	9.3	A	1.5	12
4R	R	55	221	0.249	10.2	B	1.5	12
ALL VEHICLES:		3322		0.864	15.0	B	9.5	82

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Mayfield Road W								
	South	Right	41.0	34.5	19.3	500	141	No
	East	Thru	57.3	39.1	47.1	500	136	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: Mayfield Road E								
	West	Thru	57.3	39.1	47.1	500	144	No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

	Delay (seconds/veh)

Lane No.	Deg. Satn x	Stop-line 1st d1	Stop-line 2nd d2	Delay Total dSL	Acc. Dec. dn	Queuing Total dq	Queuing MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Mayfield Road W										
1 LT	0.553	2.0	0.3	2.3	3.8	0.0	0.0	0.0	6.8	9.1
2 T	0.553	2.0	0.3	2.3	4.0	0.0	0.0	0.0	5.5	7.8
3 R	0.062	1.0	0.0	1.0	2.2	0.0	0.0	0.0	6.7	7.6
South: Mississauga Road S										
1 LT	0.862	6.3	9.7	16.1	5.8	10.2	5.0	5.2	6.9	22.9
2 TR	0.862	6.2	9.5	15.7	5.5	10.1	5.1	5.1	6.8	22.4
East: Mayfield Road E										
1 LT	0.784	5.2	5.4	10.6	5.8	4.8	3.2	1.6	7.2	17.8
2 TR	0.784	5.1	5.3	10.5	6.1	4.4	3.2	1.3	5.8	16.3
North: Mississauga Road N										
1 LT	0.249	4.1	0.0	4.1	4.6	0.1	0.0	0.1	7.5	11.6
2 TR	0.249	3.7	0.0	3.7	4.7	0.0	0.0	0.0	5.9	9.6

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Mayfield Road W							
1 LT	0.553	0.47	0.01	0.19	0.68	0.610	0.03
2 T	0.553	0.47	0.01	0.17	0.65	0.611	0.03
3 R	0.062	0.24	0.00	0.32	0.55	0.371	0.00
South: Mississauga Road S							
1 LT	0.862	0.92	0.27	0.04	1.23	0.921	0.85
2 TR	0.862	0.92	0.27	0.04	1.24	0.920	0.85
East: Mayfield Road E							
1 LT	0.784	0.93	0.18	0.04	1.14	0.926	0.48
2 TR	0.784	0.93	0.18	0.03	1.14	0.927	0.47
North: Mississauga Road N							
1 LT	0.249	0.70	0.00	0.13	0.83	0.752	0.00
2 TR	0.249	0.66	0.00	0.12	0.78	0.753	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio

West: Mayfield Road W											
1 LT	0.553	0.1	1.4	0.1	1.5	2.7	3.3	3.8	4.7	5.5	0.08
2 T	0.553	0.1	1.4	0.1	1.5	2.7	3.3	3.8	4.7	5.5	0.08
3 R	0.062	0.0	0.1	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.04
South: Mississauga Road S											
1 LT	0.862	1.2	1.9	1.2	3.2	5.3	6.5	7.5	9.4	11.0	0.16
2 TR	0.862	1.2	1.9	1.3	3.2	5.3	6.6	7.6	9.5	11.1	0.16
East: Mayfield Road E											
1 LT	0.784	0.8	2.2	1.0	3.2	5.3	6.6	7.6	9.5	11.1	0.16
2 TR	0.784	0.8	2.2	1.0	3.2	5.4	6.7	7.6	9.5	11.2	0.16
North: Mississauga Road N											
1 LT	0.249	0.0	0.5	0.0	0.5	0.9	1.1	1.2	1.5	1.7	0.02
2 TR	0.249	0.0	0.5	0.0	0.5	0.9	1.1	1.2	1.5	1.8	0.02

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Mayfield Road W											
1 LT	0.553	0.5	11.5	0.8	12.2	21.8	26.7	30.3	37.7	43.8	0.08
2 T	0.553	0.5	11.6	0.8	12.3	21.9	26.9	30.6	38.0	44.1	0.08
3 R	0.062	0.0	0.9	0.0	0.9	1.7	2.0	2.3	2.8	3.3	0.04
South: Mississauga Road S											
1 LT	0.862	9.7	16.1	10.4	26.5	44.2	54.8	62.7	78.6	91.8	0.16
2 TR	0.862	10.1	16.7	10.8	27.5	45.9	56.9	65.1	81.6	95.3	0.16
East: Mayfield Road E											
1 LT	0.784	6.9	18.5	8.7	27.2	45.4	56.3	64.4	80.8	94.4	0.16
2 TR	0.784	6.8	18.6	8.7	27.3	45.5	56.4	64.6	80.9	94.6	0.16
North: Mississauga Road N											
1 LT	0.249	0.0	3.7	0.0	3.7	6.9	8.4	9.5	11.8	13.6	0.02
2 TR	0.249	0.0	3.8	0.0	3.8	7.0	8.5	9.7	11.9	13.8	0.02

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP
Intersection ID: 1
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Mayfield Road W									
5L L	65.0	25.7	25.7	65.0	25.5		46.1	46.1	12.4

2T T	65.0	39.1	39.1	65.0	25.3	51.2	51.2	5.5
2R R	65.0	34.5	34.5	65.0		52.3	52.3	6.7
South: Mississauga Road S								
3L L	65.0	25.7	25.7	65.0	16.8	40.9	36.9	12.4
8T T	65.0	39.1	39.1	65.0	16.3	44.2	40.4	5.7
8R R	65.0	32.5	32.5	65.0	16.6	43.6	39.6	7.1
East: Mayfield Road E								
1L L	65.0	25.7	25.7	65.0	19.8	42.3	40.3	12.6
6T T	65.0	39.1	39.1	65.0	19.5	45.8	44.7	5.7
6R R	65.0	32.5	32.5	65.0	20.3	45.2	43.6	6.6
North: Mississauga Road N								
7L L	65.0	25.7	25.7	65.0		45.5	45.1	12.6
4T T	65.0	39.1	39.1	65.0		50.2	50.2	5.4
4R R	65.0	32.5	32.5	65.0		49.4	49.4	6.6

"Running Speed" is the average speed excluding stopped periods.

Site: Mayfield 2031 PM TTMP
C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap
Processed Jan 12, 2010 12:03:55PM

A1492, AECOM, Small Office

SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Sandalwood Parkway 2031 AM TTMP

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Sandalwood Parkway W							
	South	2R	Right	176	4	1.00	1.00
	East	2T	Thru	98	2	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	44	1	1.00	1.00
	East	8R	Right	260	5	1.00	1.00
	North	8T	Thru	274	56	1.00	1.00
East: Sandalwood Parkway E							
	West	6T	Thru	78	2	1.00	1.00
	South	1L	Left	176	4	1.00	1.00
	North	6R	Right	240	5	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	74	1	1.00	1.00
	South	4T	Thru	1037	43	1.00	1.00
	East	7L	Left	456	9	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Mov ID		Left LV	Left HV	Through LV	Through HV	Right LV	Right HV
Demand flows in veh/hour as used by the program							
West: Sandalwood Parkway W							
5L	L	5	1	0	0	0	0
2T	T	0	0	98	2	0	0
2R	R	0	0	0	0	176	4
South: Mississauga Road S							
3L	L	44	1	0	0	0	0
8T	T	0	0	274	56	0	0
8R	R	0	0	0	0	260	5
East: Sandalwood Parkway E							
1L	L	176	4	0	0	0	0
6T	T	0	0	78	2	0	0
6R	R	0	0	0	0	240	5
North: Mississauga Road N							
7L	L	456	9	0	0	0	0
4T	T	0	0	1037	43	0	0
4R	R	0	0	0	0	74	2

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Mov ID		Left Total	Left %HV	Through Total	Through %HV	Right Total	Right %HV
Demand flows in veh/hour as used by the program							
West: Sandalwood Parkway W							
5L	L	6	16.7	0	0.0	0	0.0
2T	T	0	0.0	100	2.0	0	0.0
2R	R	0	0.0	0	0.0	180	2.2
South: Mississauga Road S							
3L	L	45	2.2	0	0.0	0	0.0
8T	T	0	0.0	330	17.0	0	0.0
8R	R	0	0.0	0	0.0	265	1.9
East: Sandalwood Parkway E							
1L	L	180	2.2	0	0.0	0	0.0
6T	T	0	0.0	80	2.5	0	0.0
6R	R	0	0.0	0	0.0	245	2.0
North: Mississauga Road N							
7L	L	465	1.9	0	0.0	0	0.0
4T	T	0	0.0	1080	4.0	0	0.0
4R	R	0	0.0	0	0.0	76	2.6

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl. Constr. Effect	Cap.	O-D Factor
West: Sandalwood Parkway W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1725	3.3	1726	0	N	0.652
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	570	2.0	570	0	N	0.892
East: Sandalwood Parkway E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	380	15.0	420	0	N	0.924
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	305	2.0	305	0	N	0.963

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Sandalwood Parkway W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1726	34.1	19.8	1.14	0.725	3.81	36.1	2.88
Thru	1	Subdominant	1726	34.1	19.8	1.14	0.725	3.41	32.4	2.58
Right	2	Dominant	1726	34.1	19.8	1.14	0.725	2.91	27.5	2.20
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	570	28.1	49.3	2.00	0.505	4.02	31.4	2.69
Thru	1	Subdominant	570	28.1	49.3	2.00	0.505	4.51	35.2	3.01
	2	Dominant	570	28.1	49.3	2.00	0.505	4.41	34.4	2.95
Right	2	Dominant	570	28.1	49.3	2.00	0.505	3.94	30.7	2.63
East: Sandalwood Parkway E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	420	37.3	89.0	1.43	0.305	4.13	42.9	2.69D
Thru	1	Subdominant	420	37.3	89.0	1.43	0.305	4.13	42.9	2.69D
	2	Dominant	420	37.3	89.0	1.43	0.305	4.13	42.9	2.69
Right	2	Dominant	420	37.3	89.0	1.43	0.305	4.13	42.9	2.69

```
North: Mississauga Road N
  Environment Factor: 1.20   Entry/Circulating Flow Adjustment: Medium
Left  1 Subdominant  305   29.2     95.9  1.79   0.282     4.12     33.4     2.62
Thru  1 Subdominant  305   29.2     95.9  1.79   0.282     4.12     33.5     2.62
      2 Dominant     305   29.2     95.9  1.79   0.282     4.11     33.3     2.61
Right 2 Dominant     305   29.2     95.9  1.79   0.282     4.10     33.3     2.61
-------------------------------------------------------------------------------

  Priority sharing is implied for some movements (Follow-up Headway plus
  Intra-bunch Headway is larger than the Critical Gap).  The O-D Factor
  (Table R.0) allows for priority sharing and priority emphasis.

  D  Subdominant lane follow-up headway was calculated as less than
     the dominant lane value and was set to the dominant lane value

  Dist (Distance): Spacing, i.e. distance between the front ends of two
                   successive vehicles across all lanes in the circulating
                   or exiting stream
```

Table S.2 - Movement Capacity Parameters

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

-------------------------------------------------------------------------------
 Mov                    Opposing Movement  Total Prac. Prac.  Lane  Deg.
 ID      Demand                    Adjust.  Cap. Deg.  Spare  Util  Satn
         Flow     HV   Flow   HV   Flow     (veh  Satn  Cap.
         (veh/h)  (%) (veh/h) (%)  (pcu/h)  /h)   xp    (%)    (%)   x
-------------------------------------------------------------------------------
West: Sandalwood Parkway W
  5L L       6   16.7  1725   3.3   1726     16  0.85   127    78  0.375
  2T T     100    2.0  1725   3.3   1726    273  0.85   132    78  0.366
  2R R     180    2.2  1725   3.3   1726    383  0.85    81   100  0.470
-------------------------------------------------------------------------------
South: Mississauga Road S
  3L L      45    2.2   570   2.0    570     98  0.85    85   100  0.459
  8T T     330   17.0   570   2.0    570    720  0.85    85   100  0.458
  8R R     265    1.9   570   2.0    570    578  0.85    85   100  0.458
-------------------------------------------------------------------------------
East: Sandalwood Parkway E
  1L L     180    2.2   380  15.0    420    639  0.85   202   100  0.282
  6T T      80    2.5   380  15.0    420    284  0.85   202   100  0.282
  6R R     245    2.0   380  15.0    420    870  0.85   202   100  0.282
-------------------------------------------------------------------------------
North: Mississauga Road N
  7L L     465    1.9   305   2.0    305    598  0.85     9   100  0.778*
  4T T    1080    4.0   305   2.0    305   1389  0.85     9   100  0.778*
  4R R      76    2.6   305   2.0    305     98  0.85    10   100  0.776
-------------------------------------------------------------------------------
```

Table S.3 - Intersection Parameters

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

-------------------------------------------------------------------------------
   Intersection Level of Service              =          B
   Worst movement Level of Service            =          C
   Average intersection delay (s/pers)        =       12.2
   Largest average movement delay (s)         =       22.5
   Largest back of queue, 95% (m)             =         90
   Performance Index                          =      67.81
   Degree of saturation (highest)             =      0.778
```

Practical Spare Capacity (lowest)	=	9 %
Effective intersection capacity, (veh/h)	=	3925
Total vehicle flow (veh/h)	=	3052
Total person flow (pers/h)	=	3662
Total vehicle delay (veh-h/h)	=	10.31
Total person delay (pers-h/h)	=	12.37
Total effective vehicle stops (veh/h)	=	2579
Total effective person stops (pers/h)	=	3094
Total vehicle travel (veh-km/h)	=	1947.8
Total cost ($/h)	=	856.89
Total fuel (L/h)	=	255.8
Total CO2 (kg/h)	=	640.75

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Sandalwood Parkway W										
5L	L	0.04	0.04	22.5	0.86	0.99	2.2	17	0.17	40.6
2T	T	0.43	0.52	15.5	0.86	0.95	2.2	17	2.60	45.0
2R	R	0.80	0.95	15.9	0.88	1.00	3.4	26	4.60	44.6
South: Mississauga Road S										
3L	L	0.22	0.26	17.4	0.76	0.91	3.8	32	1.09	44.4
8T	T	0.97	1.17	10.6	0.76	0.86	3.9	31	7.06	50.2
8R	R	0.80	0.96	10.8	0.75	0.85	3.9	31	5.57	49.4
East: Sandalwood Parkway E										
1L	L	0.71	0.85	14.2	0.55	0.79	1.8	14	3.78	46.3
6T	T	0.16	0.19	7.2	0.55	0.60	1.8	14	1.39	51.7
6R	R	0.57	0.69	8.4	0.55	0.68	1.8	14	4.41	50.7
North: Mississauga Road N										
7L	L	2.25	2.69	17.4	0.82	0.89	11.4	89	11.61	44.4
4T	T	3.12	3.75	10.4	0.82	0.84	11.4	90	23.82	49.7
4R	R	0.24	0.29	11.5	0.82	0.86	11.4	90	1.70	48.8

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Sandalwood Parkway W									
286	0.470	1.26	1.52	15.9	0.87	0.98	26	7.37	44.6
South: Mississauga Road S									
640	0.459	1.98	2.38	11.2	0.75	0.86	32	13.72	49.4
East: Sandalwood Parkway E									
505	0.282	1.44	1.73	10.3	0.55	0.70	14	9.57	49.1
North: Mississauga Road N									
1621	0.778	5.61	6.74	12.5	0.82	0.86	90	37.13	47.9
ALL VEHICLES:									
3052	0.778	10.31	12.37	12.2	0.77	0.84	90	67.81	48.1

```
INTERSECTION (persons):
 3662   0.778            12.37    12.2   0.77  0.84         67.81    48.1
-------------------------------------------------------------------------
Queue values in this table are 95% back of queue (metres).
```

Table S.7 - Lane Performance

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

-------------------------------------------------------------
          Dem                                  Q u e u e
         Flow   Cap  Deg.  Aver.  Eff.   95% Back       Lane
 Lane    (veh  (veh  Satn  Delay  Stop  ------------   Length
 No.      /h)   /h)   x    (sec)  Rate  (vehs)  (m)      (m)
-------------------------------------------------------------
 West: Sandalwood Parkway W
 1 LT      106   290 0.366  15.9  0.95    2.2   17.4    500.0
 2 R       180   383 0.470  15.9  1.00    3.4   26.0    500.0
-------------------------------------------------------------
 South: Mississauga Road S
 1 LT      300   655 0.458  11.7  0.88    3.8   32.2    500.0
 2 TR      340   742 0.458  10.6  0.85    3.9   30.8    500.0
-------------------------------------------------------------
 East: Sandalwood Parkway E
 1 LT      252   897 0.281  12.2  0.73    1.8   14.2    500.0
 2 TR      253   897 0.281   8.4  0.67    1.8   14.2    500.0
-------------------------------------------------------------
 North: Mississauga Road N
 1 LT      809  1040 0.778  14.4  0.87   11.4   88.7    500.0
 2 TR      812  1044 0.778  10.5  0.84   11.4   89.6    500.0
-------------------------------------------------------------
```

Table S.8 - Lane Flow and Capacity Information

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

-------------------------------------------------
                                 Min  Tot
 Lane      Dem Flow (veh/h)      Cap  Cap  Deg.  Lane
 No.    ------------------     (veh (veh  Satn  Util
         Lef Thru  Rig  Tot      /h)  /h)   x     %
-------------------------------------------------
 West: Sandalwood Parkway W
 1 LT      6  100    0  106     106  290  0.366   78P
 2 R       0    0  180  180     150  383  0.470  100
-------------------------------------------------
 South: Mississauga Road S
 1 LT     45  255    0  300     150  655  0.458  100
 2 TR      0   75  265  340     150  742  0.458  100
-------------------------------------------------
 East: Sandalwood Parkway E
 1 LT    180   72    0  252     150  897  0.281  100
 2 TR      0    8  245  253     150  897  0.281  100
-------------------------------------------------
 North: Mississauga Road N
 1 LT    465  344    0  809     150 1040  0.778  100
 2 TR      0  736   76  812     150 1044  0.778  100
-------------------------------------------------
  P  Lane under-utilisation found by the "Program".  This includes cases where
     the value of lane under-utilisation due to downstream effects has been
     modified by the program during lane flow calculations (e.g. a de facto
     exclusive lane has been found).
```

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Sandalwood Parkway W									
5L	L	6	16	78	0.375	22.5	0.99	2.2	0.17
2T	T	100	273	78	0.366	15.5	0.95	2.2	2.60
2R	R	180	383	100	0.470	15.9	1.00	3.4	4.60
South: Mississauga Road S									
3L	L	45	98	100	0.459	17.4	0.91	3.8	1.09
8T	T	330	720	100	0.458	10.6	0.86	3.9	7.06
8R	R	265	578	100	0.458	10.8	0.85	3.9	5.57
East: Sandalwood Parkway E									
1L	L	180	639	100	0.282	14.2	0.79	1.8	3.78
6T	T	80	284	100	0.282	7.2	0.60	1.8	1.39
6R	R	245	870	100	0.282	8.4	0.68	1.8	4.41
North: Mississauga Road N									
7L	L	465	598	100	0.778*	17.4	0.89	11.4	11.61
4T	T	1080	1389	100	0.778*	10.4	0.84	11.4	23.82
4R	R	76	98	100	0.776	11.5	0.86	11.4	1.70

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Mov ID	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Sandalwood Parkway W						
5L L	0.5	1.84	0.002	0.10	0.003	1.2
2T T	7.9	27.77	0.033	1.62	0.050	19.8
2R R	14.4	50.40	0.061	3.05	0.092	36.1
	22.8	80.01	0.096	4.77	0.145	57.2
South: Mississauga Road S						
3L L	3.8	13.46	0.016	0.80	0.024	9.5
8T T	36.2	107.71	0.129	7.72	0.243	91.0
8R R	20.4	69.24	0.085	4.31	0.131	51.1
	60.4	190.41	0.230	12.83	0.398	151.6
East: Sandalwood Parkway E						

1L L	14.9	52.11	0.063	3.10	0.093	37.2
6T T	5.9	19.99	0.024	1.16	0.037	14.7
6R R	18.4	62.40	0.076	3.81	0.118	46.1
	39.1	134.50	0.163	8.08	0.247	97.9
North: Mississauga Road N						
7L L	39.7	139.78	0.170	8.43	0.248	99.2
4T T	87.8	292.09	0.354	18.33	0.568	220.0
4R R	5.9	20.10	0.025	1.26	0.038	14.8
	133.4	451.97	0.548	28.01	0.855	334.0
INTERSECTION:	255.8	856.89	1.037	53.69	1.645	640.8

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Sandalwood Parkway W						
5L L	12.2	0.45	0.538	25.05	0.738	306.5
2T T	12.6	0.44	0.525	25.77	0.794	314.5
2R R	12.9	0.45	0.545	27.15	0.819	321.9
	12.7	0.45	0.538	26.62	0.809	318.9
South: Mississauga Road S						
3L L	12.5	0.44	0.535	26.40	0.782	313.9
8T T	17.4	0.52	0.619	37.16	1.168	438.1
8R R	12.4	0.42	0.516	26.10	0.795	309.3
	15.0	0.47	0.571	31.82	0.986	376.0
East: Sandalwood Parkway E						
1L L	12.3	0.43	0.518	25.55	0.763	306.5
6T T	11.6	0.40	0.471	23.04	0.733	291.0
6R R	12.1	0.41	0.499	24.97	0.770	301.6
	12.1	0.41	0.502	24.89	0.762	301.8
North: Mississauga Road N						
7L L	12.6	0.45	0.540	26.87	0.792	316.4
4T T	12.9	0.43	0.520	26.96	0.836	323.6
4R R	12.5	0.42	0.524	26.57	0.805	312.7
	12.8	0.43	0.526	26.91	0.821	320.9
INTERSECTION:	13.1	0.44	0.532	27.56	0.844	329.0

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Sandalwood Parkway W												
1 LT	6	100		106	3				0.366	15.9	17	500
2 R			180	180	2				0.470	15.9	26	500
	6	100	180	286	2				0.470	15.9	26	
South: Mississauga Road S												
1 LT	45	255		300	15				0.458	11.7	32	500
2 TR		75	265	340	5				0.458	10.6	31	500
	45	330	265	640	10				0.458	11.2	32	
East: Sandalwood Parkway E												
1 LT	180	72		252	2				0.281	12.2	14	500
2 TR		8	245	253	2				0.281	8.4	14	500
	180	80	245	505	2				0.281	10.3	14	
North: Mississauga Road N												
1 LT	465	344		809	3				0.778	14.4	89	500
2 TR		736	76	812	4				0.778	10.5	90	500
	465	1080	76	1621	3				0.778	12.5	90	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	3052	4	0.778	12.2	90

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Sandalwood Parkway W								
5L	L	6	16	0.375	22.5	C	2.2	17
2T	T	100	273	0.366	15.5	B	2.2	17
2R	R	180	383	0.470	15.9	B	3.4	26
South: Mississauga Road S								
3L	L	45	98	0.459	17.4	B	3.8	32
8T	T	330	720	0.458	10.6	B	3.9	31
8R	R	265	578	0.458	10.8	B	3.9	31
East: Sandalwood Parkway E								
1L	L	180	639	0.282	14.2	B	1.8	14

6T	T	80	284	0.282	7.2	A	1.8	14
6R	R	245	870	0.282	8.4	A	1.8	14
North: Mississauga Road N								
7L	L	465	598	0.778*	17.4	B	11.4	89
4T	T	1080	1389	0.778*	10.4	B	11.4	90
4R	R	76	98	0.776	11.5	B	11.4	90
ALL VEHICLES:		3052		0.778	12.2	B	11.4	90

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Sandalwood Parkway W								
	South	Right	35.0	32.5	19.4	500	126	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	175	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Sandalwood Parkway E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

		Delay (seconds/veh)			
	Deg.	Stop-line Delay	Acc.	Queuing	Stopd

Lane No.	Satn x	1st d1	2nd d2	Total dSL	Dec. dn	Total dq	MvUp dqm	(Idle) di	Geom dig	Control dic
West: Sandalwood Parkway W										
1 LT	0.366	8.7	1.4	10.1	5.6	4.6	0.6	4.0	5.8	15.9
2 R	0.470	7.1	2.3	9.3	5.1	4.2	1.1	3.2	6.6	15.9
South: Mississauga Road S										
1 LT	0.458	4.3	0.7	5.0	4.8	0.2	0.1	0.1	6.8	11.7
2 TR	0.458	3.8	0.5	4.3	4.5	0.0	0.0	0.0	6.4	10.6
East: Sandalwood Parkway E										
1 LT	0.281	1.8	0.0	1.8	3.0	0.0	0.0	0.0	10.4	12.2
2 TR	0.281	1.8	0.0	1.8	3.2	0.0	0.0	0.0	6.5	8.4
North: Mississauga Road N										
1 LT	0.778	2.8	2.2	5.0	4.6	0.5	0.5	0.0	9.4	14.4
2 TR	0.778	2.8	2.2	5.0	5.4	0.0	0.0	0.0	5.5	10.5

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Sandalwood Parkway W							
1 LT	0.366	0.86	0.03	0.07	0.95	0.856	0.11
2 R	0.470	0.88	0.06	0.06	1.00	0.881	0.19
South: Mississauga Road S							
1 LT	0.458	0.73	0.03	0.12	0.88	0.756	0.07
2 TR	0.458	0.70	0.02	0.13	0.85	0.754	0.05
East: Sandalwood Parkway E							
1 LT	0.281	0.45	0.00	0.28	0.73	0.555	0.00
2 TR	0.281	0.44	0.00	0.23	0.67	0.555	0.00
North: Mississauga Road N							
1 LT	0.778	0.68	0.08	0.11	0.87	0.822	0.17
2 TR	0.778	0.68	0.08	0.08	0.84	0.822	0.17

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Sandalwood Parkway W											
1 LT	0.366	0.1	0.7	0.0	0.7	1.3	1.6	1.8	2.2	2.6	0.03

2 R	0.470	0.1	1.0	0.1	1.1	2.0	2.4	2.7	3.4	3.9	0.05
South: Mississauga Road S											
1 LT	0.458	0.1	1.1	0.1	1.2	2.2	2.7	3.0	3.8	4.4	0.06
2 TR	0.458	0.1	1.2	0.1	1.3	2.3	2.8	3.1	3.9	4.5	0.06
East: Sandalwood Parkway E											
1 LT	0.281	0.0	0.6	0.0	0.6	1.1	1.3	1.5	1.8	2.1	0.03
2 TR	0.281	0.0	0.6	0.0	0.6	1.1	1.3	1.5	1.8	2.1	0.03
North: Mississauga Road N											
1 LT	0.778	0.5	2.9	1.0	3.9	6.3	7.9	9.1	11.4	13.4	0.18
2 TR	0.778	0.5	2.9	1.0	3.9	6.3	7.9	9.1	11.4	13.4	0.18

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Sandalwood Parkway W											
1 LT	0.366	0.4	5.3	0.2	5.5	10.2	12.4	14.1	17.4	20.1	0.03
2 R	0.470	1.0	7.7	0.7	8.4	15.1	18.5	21.0	26.0	30.2	0.05
South: Mississauga Road S											
1 LT	0.458	0.7	9.6	0.8	10.4	18.7	22.8	25.9	32.2	37.3	0.06
2 TR	0.458	0.5	9.4	0.6	10.0	17.9	21.9	24.9	30.8	35.8	0.06
East: Sandalwood Parkway E											
1 LT	0.281	0.0	4.5	0.0	4.5	8.3	10.1	11.5	14.2	16.5	0.03
2 TR	0.281	0.0	4.5	0.0	4.5	8.3	10.1	11.5	14.2	16.4	0.03
North: Mississauga Road N											
1 LT	0.778	4.3	22.6	7.7	30.3	49.4	61.5	70.6	88.7	103.9	0.18
2 TR	0.778	4.3	22.8	7.7	30.6	49.8	62.0	71.2	89.6	104.8	0.18

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP
Intersection ID: 3
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Sandalwood Parkway W									
5L L	65.0	25.7	25.7	65.0	14.1		44.6	40.6	12.3
2T T	65.0	39.1	39.1	65.0	14.7		48.8	45.0	5.4
2R R	65.0	32.5	32.5	65.0	15.5		47.5	44.6	6.6
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0	21.9		45.0	44.4	12.4

8T	T	65.0	39.1	39.1	65.0	20.8	50.2	50.2	5.8
8R	R	65.0	32.5	32.5	65.0	21.3	49.4	49.4	6.6
East: Sandalwood Parkway E									
1L	L	65.0	25.7	25.7	65.0		46.3	46.3	12.4
6T	T	65.0	39.1	39.1	65.0		51.7	51.7	5.4
6R	R	65.0	32.5	32.5	65.0		50.7	50.7	6.6
North: Mississauga Road N									
7L	L	65.0	25.7	25.7	65.0	26.1	44.4	44.4	12.4
4T	T	65.0	39.1	39.1	65.0	26.2	49.7	49.7	5.4
4R	R	65.0	32.5	32.5	65.0	26.3	48.8	48.8	6.6

"Running Speed" is the average speed excluding stopped periods.

Site: Mississauga and Sandalwood 2031 AM TTMP
G:\PROJECTS\105163 Mississagua Road Class EA\Sidra\Mississauga Rd EA Dec 9 Update.aap
Processed Dec 10, 2009 11:46:00AM

A1492, AECOM, Small Office
Produced by SIDRA Intersection 3.2.2.1563

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SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Sandalwood Parkway 2031 PM TTMP

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Sandalwood Parkway W							
	South	2R	Right	123	2	1.00	1.00
	East	2T	Thru	123	2	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	103	2	1.00	1.00
	East	8R	Right	642	13	1.00	1.00
	North	8T	Thru	681	139	1.00	1.00
East: Sandalwood Parkway E							
	West	6T	Thru	103	2	1.00	1.00
	South	1L	Left	206	4	1.00	1.00
	North	6R	Right	412	8	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	25	0	1.00	1.00
	South	4T	Thru	442	18	1.00	1.00
	East	7L	Left	221	4	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Sandalwood Parkway W							
5L	L	5	1	0	0	0	0
2T	T	0	0	123	2	0	0
2R	R	0	0	0	0	123	2
South: Mississauga Road S							
3L	L	103	2	0	0	0	0
8T	T	0	0	681	139	0	0
8R	R	0	0	0	0	642	13
East: Sandalwood Parkway E							
1L	L	206	4	0	0	0	0
6T	T	0	0	103	2	0	0
6R	R	0	0	0	0	412	8
North: Mississauga Road N							
7L	L	221	5	0	0	0	0
4T	T	0	0	442	18	0	0
4R	R	0	0	0	0	25	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Sandalwood Parkway W							
5L	L	6	16.7	0	0.0	0	0.0
2T	T	0	0.0	125	1.6	0	0.0
2R	R	0	0.0	0	0.0	125	1.6
South: Mississauga Road S							
3L	L	105	1.9	0	0.0	0	0.0
8T	T	0	0.0	820	17.0	0	0.0
8R	R	0	0.0	0	0.0	655	2.0
East: Sandalwood Parkway E							
1L	L	210	1.9	0	0.0	0	0.0
6T	T	0	0.0	105	1.9	0	0.0
6R	R	0	0.0	0	0.0	420	1.9
North: Mississauga Road N							
7L	L	226	2.2	0	0.0	0	0.0
4T	T	0	0.0	460	3.9	0	0.0
4R	R	0	0.0	0	0.0	26	3.8

Unit Time for Volumes = 60 minutes

```
Peak Flow Period =  15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor
```

Table R.0 - Roundabout Basic Parameters

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout
```

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Sandalwood Parkway W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	895	3.0	895	0	N	0.877
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	355	2.0	355	0	N	0.965
East: Sandalwood Parkway E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	930	15.2	1029	0	N	0.736
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	420	2.0	420	0	N	0.929

Table R.1 - Roundabout Gap Acceptance Parameters

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout
```

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Critical Gap Dist (m)	Foll-up Headway (s)
West: Sandalwood Parkway W										
Environment Factor: 1.20						Entry/Circulating Flow Adjustment: Medium				
Left	1	Subdominant	895	32.6	36.4	1.26	0.500	4.10	37.2	2.89
Thru	1	Subdominant	895	32.6	36.4	1.26	0.500	3.67	33.3	2.59
	2	Dominant	895	32.6	36.4	1.26	0.500	3.56	32.3	2.51
Right	2	Dominant	895	32.6	36.4	1.26	0.500	3.56	32.3	2.51
South: Mississauga Road S										
Environment Factor: 1.20						Entry/Circulating Flow Adjustment: Medium				
Left	1	Subdominant	355	30.4	85.7	1.89	0.335	4.19	35.4	2.69
Thru	1	Subdominant	355	30.4	85.7	1.89	0.335	4.67	39.5	3.00
	2	Dominant	355	30.4	85.7	1.89	0.335	4.55	38.5	2.92
Right	2	Dominant	355	30.4	85.7	1.89	0.335	4.06	34.4	2.61
East: Sandalwood Parkway E										
Environment Factor: 1.20						Entry/Circulating Flow Adjustment: Medium				
Left	1	Subdominant	1029	37.5	36.5	1.43	0.602	3.72	38.8	2.67
Thru	1	Subdominant	1029	37.5	36.5	1.43	0.602	3.72	38.8	2.67
Right	2	Dominant	1029	37.5	36.5	1.43	0.602	3.43	35.8	2.46

```
North: Mississauga Road N
  Environment Factor: 1.20   Entry/Circulating Flow Adjustment: Medium
Left  1 Subdominant  420   29.1    69.2  2.00   0.401    4.13    33.4    2.69D
Thru  1 Subdominant  420   29.1    69.2  2.00   0.401    4.14    33.4    2.69D
      2 Dominant     420   29.1    69.2  2.00   0.401    4.14    33.4    2.69
Right 2 Dominant     420   29.1    69.2  2.00   0.401    4.14    33.4    2.69
-------------------------------------------------------------------------------

  Priority sharing is implied for some movements (Follow-up Headway plus
  Intra-bunch Headway is larger than the Critical Gap).  The O-D Factor
  (Table R.0) allows for priority sharing and priority emphasis.

  D  Subdominant lane follow-up headway was calculated as less than
     the dominant lane value and was set to the dominant lane value

  Dist (Distance): Spacing, i.e. distance between the front ends of two
                   successive vehicles across all lanes in the circulating
                   or exiting stream
```

Table S.2 - Movement Capacity Parameters

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

-------------------------------------------------------------------------------
 Mov                    Opposing Movement  Total Prac. Prac.  Lane  Deg.
 ID      Demand                    Adjust.  Cap. Deg.  Spare  Util  Satn
         Flow     HV   Flow   HV   Flow    (veh  Satn  Cap.
         (veh/h)  (%) (veh/h) (%)  (pcu/h) /h)   xp    (%)    (%)   x
-------------------------------------------------------------------------------
West: Sandalwood Parkway W
  5L L       6   16.7   895   3.0    895     32  0.85   353   100  0.188
  2T T     125    1.6   895   3.0    895    665  0.85   352   100  0.188
  2R R     125    1.6   895   3.0    895    665  0.85   352   100  0.188
-------------------------------------------------------------------------------
South: Mississauga Road S
  3L L     105    1.9   355   2.0    355    122  0.85    -1   100  0.861
  8T T     820   17.0   355   2.0    355    951  0.85    -1   100  0.862*
  8R R     655    2.0   355   2.0    355    760  0.85    -1   100  0.862*
-------------------------------------------------------------------------------
East: Sandalwood Parkway E
  1L L     210    1.9   930  15.2   1029    317  0.85    28    85  0.662
  6T T     105    1.9   930  15.2   1029    159  0.85    29    85  0.660
  6R R     420    1.9   930  15.2   1029    537  0.85     9   100  0.782
-------------------------------------------------------------------------------
North: Mississauga Road N
  7L L     226    2.2   420   2.0    420    560  0.85   111   100  0.404
  4T T     460    3.9   420   2.0    420   1139  0.85   110   100  0.404
  4R R      26    3.8   420   2.0    420     64  0.85   109   100  0.406
-------------------------------------------------------------------------------
```

Table S.3 - Intersection Parameters

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

-------------------------------------------------------------------------------
   Intersection Level of Service              =         B
   Worst movement Level of Service            =         C
   Average intersection delay (s/pers)        =      15.2
   Largest average movement delay (s)         =      22.8
   Largest back of queue, 95% (m)             =       134
   Performance Index                          =     82.64
   Degree of saturation (highest)             =     0.862
```

Practical Spare Capacity (lowest)	=	-1 %
Effective intersection capacity, (veh/h)	=	3807
Total vehicle flow (veh/h)	=	3283
Total person flow (pers/h)	=	3940
Total vehicle delay (veh-h/h)	=	13.87
Total person delay (pers-h/h)	=	16.64
Total effective vehicle stops (veh/h)	=	3226
Total effective person stops (pers/h)	=	3872
Total vehicle travel (veh-km/h)	=	2083.7
Total cost ($/h)	=	993.28
Total fuel (L/h)	=	298.5
Total CO2 (kg/h)	=	748.48

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Sandalwood Parkway W										
5L	L	0.03	0.03	15.7	0.65	0.90	1.1	8	0.13	45.7
2T	T	0.30	0.37	8.8	0.65	0.73	1.1	8	2.36	51.0
2R	R	0.34	0.41	9.8	0.65	0.79	1.1	8	2.41	50.1
South: Mississauga Road S										
3L	L	0.67	0.80	22.8	0.97	1.09	15.7	134	3.17	40.4
8T	T	3.63	4.36	15.9	0.97	1.10	16.1	128	22.53	45.0
8R	R	2.85	3.42	15.7	0.96	1.05	16.1	128	17.37	44.8
East: Sandalwood Parkway E										
1L	L	1.32	1.58	22.6	0.91	1.08	6.0	47	6.09	40.5
6T	T	0.45	0.55	15.6	0.91	1.06	6.0	47	2.75	45.0
6R	R	2.26	2.71	19.4	0.97	1.17	8.8	68	11.98	41.7
North: Mississauga Road N										
7L	L	0.93	1.12	14.9	0.64	0.80	3.1	24	4.92	46.0
4T	T	1.01	1.22	7.9	0.64	0.65	3.1	24	8.43	51.0
4R	R	0.07	0.08	9.0	0.64	0.73	3.1	24	0.49	50.2

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Sandalwood Parkway W									
256	0.188	0.67	0.80	9.4	0.65	0.76	8	4.90	50.4
South: Mississauga Road S									
1580	0.862	7.15	8.58	16.3	0.97	1.08	134	43.07	44.6
East: Sandalwood Parkway E									
735	0.782	4.03	4.84	19.8	0.94	1.13	68	20.82	41.8
North: Mississauga Road N									
712	0.406	2.01	2.42	10.2	0.64	0.70	24	13.85	49.2
ALL VEHICLES:									
3283	0.862	13.87	16.64	15.2	0.87	0.98	134	82.64	45.2

```
INTERSECTION (persons):
 3940   0.862            16.64    15.2   0.87  0.98         82.64    45.2
-------------------------------------------------------------------------
Queue values in this table are 95% back of queue (metres).
```

Table S.7 - Lane Performance

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

-------------------------------------------------------------
          Dem                                  Q u e u e
         Flow   Cap  Deg.  Aver.  Eff.   95% Back       Lane
 Lane    (veh  (veh  Satn  Delay  Stop  ------------   Length
 No.      /h)   /h)   x    (sec)  Rate  (vehs)  (m)     (m)
-------------------------------------------------------------
 West: Sandalwood Parkway W
 1 LT      125   663 0.188   9.1  0.74    1.1    8.2    500.0
 2 TR      131   699 0.188   9.7  0.78    1.1    8.3    500.0
-------------------------------------------------------------
 South: Mississauga Road S
 1 LT      741   860 0.862  17.2  1.10   15.7  133.9    500.0
 2 TR      839   973 0.862  15.5  1.05   16.1  128.1    500.0
-------------------------------------------------------------
 East: Sandalwood Parkway E
 1 LT      315   476 0.662  20.3  1.08    6.0   46.7    500.0
 2 R       420   537 0.782  19.4  1.17    8.8   68.3    500.0
-------------------------------------------------------------
 North: Mississauga Road N
 1 LT      356   882 0.404  12.3  0.75    3.1   24.2    500.0
 2 TR      356   881 0.404   8.0  0.66    3.1   24.4    500.0
-------------------------------------------------------------
```

Table S.8 - Lane Flow and Capacity Information

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

-------------------------------------------------
                                 Min  Tot
 Lane      Dem Flow (veh/h)      Cap  Cap  Deg.  Lane
 No.    -------------------    (veh (veh  Satn  Util
         Lef Thru  Rig  Tot     /h)  /h)   x     %
-------------------------------------------------
 West: Sandalwood Parkway W
 1 LT      6  119    0  125    125  663  0.188  100
 2 TR      0    6  125  131    131  699  0.188  100
-------------------------------------------------
 South: Mississauga Road S
 1 LT    105  636    0  741    150  860  0.862  100
 2 TR      0  184  655  839    150  973  0.862  100
-------------------------------------------------
 East: Sandalwood Parkway E
 1 LT    210  105    0  315    150  476  0.662   85P
 2 R       0    0  420  420    150  537  0.782  100
-------------------------------------------------
 North: Mississauga Road N
 1 LT    226  130    0  356    150  882  0.404  100
 2 TR      0  330   26  356    150  881  0.404  100
-------------------------------------------------
  P  Lane under-utilisation found by the "Program".  This includes cases where
     the value of lane under-utilisation due to downstream effects has been
     modified by the program during lane flow calculations (e.g. a de facto
     exclusive lane has been found).
```

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Sandalwood Parkway W									
5L	L	6	32	100	0.188	15.7	0.90	1.1	0.13
2T	T	125	665	100	0.188	8.8	0.73	1.1	2.36
2R	R	125	665	100	0.188	9.8	0.79	1.1	2.41
South: Mississauga Road S									
3L	L	105	122	100	0.861	22.8	1.09	15.7	3.17
8T	T	820	951	100	0.862*	15.9	1.10	16.1	22.53
8R	R	655	760	100	0.862*	15.7	1.05	16.1	17.37
East: Sandalwood Parkway E									
1L	L	210	317	85	0.662	22.6	1.08	6.0	6.09
6T	T	105	159	85	0.660	15.6	1.06	6.0	2.75
6R	R	420	537	100	0.782	19.4	1.17	8.8	11.98
North: Mississauga Road N									
7L	L	226	560	100	0.404	14.9	0.80	3.1	4.92
4T	T	460	1139	100	0.404	7.9	0.65	3.1	8.43
4R	R	26	64	100	0.406	9.0	0.73	3.1	0.49

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Mov ID		Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Sandalwood Parkway W							
5L	L	0.5	1.70	0.002	0.10	0.003	1.2
2T	T	9.3	31.74	0.038	1.87	0.059	23.3
2R	R	9.5	32.21	0.039	1.99	0.061	23.8
		19.3	65.65	0.079	3.96	0.123	48.2
South: Mississauga Road S							
3L	L	9.4	33.94	0.041	2.02	0.059	23.5
8T	T	97.3	294.31	0.358	21.82	0.669	245.0
8R	R	53.8	185.98	0.230	11.75	0.348	134.7
		160.6	514.23	0.628	35.59	1.076	403.2
East: Sandalwood Parkway E							

1L L	18.4	66.91	0.080	3.87	0.114	46.1
6T T	8.4	29.44	0.035	1.76	0.054	21.1
6R R	34.9	123.77	0.149	7.43	0.221	87.2
	61.7	220.12	0.264	13.05	0.389	154.4
North: Mississauga Road N						
7L L	18.8	65.90	0.080	3.94	0.117	47.0
4T T	36.2	120.69	0.144	7.33	0.231	90.7
4R R	2.0	6.69	0.008	0.41	0.013	4.9
	57.0	193.28	0.232	11.68	0.361	142.6
INTERSECTION:	298.5	993.28	1.204	64.29	1.949	748.5

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Sandalwood Parkway W						
5L L	11.7	0.42	0.507	24.22	0.718	293.4
2T T	11.8	0.40	0.482	23.82	0.750	295.9
2R R	12.2	0.41	0.507	25.49	0.781	305.1
	12.0	0.41	0.495	24.64	0.764	300.3
South: Mississauga Road S						
3L L	13.3	0.48	0.576	28.54	0.827	332.0
8T T	18.9	0.57	0.693	42.29	1.297	474.7
8R R	13.2	0.46	0.563	28.77	0.851	329.8
	16.1	0.52	0.631	35.76	1.081	405.1
East: Sandalwood Parkway E						
1L L	13.0	0.47	0.561	27.30	0.803	325.5
6T T	12.7	0.45	0.534	26.60	0.811	318.9
6R R	13.3	0.47	0.571	28.37	0.846	333.1
	13.1	0.47	0.563	27.80	0.828	328.8
North: Mississauga Road N						
7L L	12.3	0.43	0.522	25.83	0.770	308.6
4T T	12.5	0.42	0.497	25.34	0.799	313.1
4R R	12.2	0.41	0.506	25.44	0.780	305.1
	12.4	0.42	0.506	25.50	0.789	311.3
INTERSECTION:	14.3	0.48	0.578	30.85	0.935	359.2

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Sandalwood Parkway W											
1 LT	6	119		125	2			0.188	9.1	8	500
2 TR		6	125	131	2			0.188	9.7	8	500
	6	125	125	256	2			0.188	9.4	8	
South: Mississauga Road S											
1 LT	105	636		741	15			0.862	17.2	134	500
2 TR		184	655	839	5			0.862	15.5	128	500
	105	820	655	1580	10			0.862	16.3	134	
East: Sandalwood Parkway E											
1 LT	210	105		315	2			0.662	20.3	47	500
2 R			420	420	2			0.782	19.4	68	500
	210	105	420	735	2			0.782	19.8	68	
North: Mississauga Road N											
1 LT	226	130		356	3			0.404	12.3	24	500
2 TR		330	26	356	4			0.404	8.0	24	500
	226	460	26	712	3			0.404	10.2	24	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	3283	6	0.862	15.2	134

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Sandalwood Parkway W								
5L	L	6	32	0.188	15.7	B	1.1	8
2T	T	125	665	0.188	8.8	A	1.1	8
2R	R	125	665	0.188	9.8	A	1.1	8
South: Mississauga Road S								
3L	L	105	122	0.861	22.8	C	15.7	134
8T	T	820	951	0.862*	15.9	B	16.1	128
8R	R	655	760	0.862*	15.7	B	16.1	128
East: Sandalwood Parkway E								
1L	L	210	317	0.662	22.6	C	6.0	47

6T	T	105	159	0.660	15.6	B	6.0	47
6R	R	420	537	0.782	19.4	B	8.8	68
North: Mississauga Road N								
7L	L	226	560	0.404	14.9	B	3.1	24
4T	T	460	1139	0.404	7.9	A	3.1	24
4R	R	26	64	0.406	9.0	A	3.1	24
ALL VEHICLES:		3283		0.862	15.2	B	16.1	134

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Sandalwood Parkway W								
	South	Right	35.0	32.5	19.4	500	126	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	175	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Sandalwood Parkway E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

		Delay (seconds/veh)			
	Deg.	Stop-line Delay	Acc.	Queuing	Stopd

Lane No.	Satn x	1st d1	2nd d2	Total dSL	Dec. dn	Total dq	MvUp dqm	(Idle) di	Geom dig	Control dic
West: Sandalwood Parkway W										
1 LT	0.188	3.4	0.0	3.4	4.2	0.0	0.0	0.0	5.7	9.1
2 TR	0.188	3.2	0.0	3.2	3.8	0.0	0.0	0.0	6.5	9.7
South: Mississauga Road S										
1 LT	0.862	4.4	6.0	10.5	6.2	4.3	3.4	0.9	6.7	17.2
2 TR	0.862	3.9	5.2	9.1	5.8	3.3	3.0	0.3	6.4	15.5
East: Sandalwood Parkway E										
1 LT	0.662	6.0	4.2	10.2	5.0	5.2	2.0	3.2	10.1	20.3
2 R	0.782	5.7	7.1	12.8	5.6	7.2	3.4	3.8	6.6	19.4
North: Mississauga Road N										
1 LT	0.404	2.5	0.0	2.5	3.5	0.0	0.0	0.0	9.9	12.3
2 TR	0.404	2.5	0.0	2.5	4.2	0.0	0.0	0.0	5.5	8.0

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Sandalwood Parkway W							
1 LT	0.188	0.58	0.00	0.16	0.74	0.648	0.00
2 TR	0.188	0.60	0.00	0.19	0.78	0.646	0.00
South: Mississauga Road S							
1 LT	0.862	0.89	0.20	0.01	1.10	0.973	0.45
2 TR	0.862	0.85	0.18	0.02	1.05	0.962	0.40
East: Sandalwood Parkway E							
1 LT	0.662	0.91	0.11	0.06	1.08	0.909	0.34
2 R	0.782	0.97	0.18	0.02	1.17	0.967	0.54
North: Mississauga Road N							
1 LT	0.404	0.53	0.00	0.22	0.75	0.640	0.00
2 TR	0.404	0.50	0.00	0.16	0.66	0.640	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Sandalwood Parkway W											
1 LT	0.188	0.0	0.3	0.0	0.3	0.6	0.8	0.9	1.1	1.2	0.02

2 TR	0.188	0.0	0.3	0.0	0.3	0.6	0.8	0.9	1.1	1.2	0.02
South: Mississauga Road S											
1 LT	0.862	1.3	3.3	2.2	5.5	8.5	10.7	12.4	15.7	18.4	0.27
2 TR	0.862	1.3	3.5	2.2	5.7	8.8	11.0	12.7	16.1	19.0	0.26
East: Sandalwood Parkway E											
1 LT	0.662	0.4	1.6	0.4	2.0	3.5	4.3	4.9	6.0	7.0	0.09
2 R	0.782	0.8	2.1	0.9	3.0	5.0	6.2	7.1	8.8	10.3	0.14
North: Mississauga Road N											
1 LT	0.404	0.0	1.0	0.0	1.0	1.8	2.2	2.5	3.1	3.6	0.05
2 TR	0.404	0.0	1.0	0.0	1.0	1.8	2.2	2.5	3.1	3.6	0.05

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Sandalwood Parkway W											
1 LT	0.188	0.0	2.6	0.0	2.6	4.9	5.9	6.7	8.2	9.5	0.02
2 TR	0.188	0.0	2.6	0.0	2.6	4.9	6.0	6.7	8.3	9.6	0.02
South: Mississauga Road S											
1 LT	0.862	11.2	28.5	18.4	46.9	72.9	91.6	105.7	133.9	157.4	0.27
2 TR	0.862	10.1	27.7	17.3	45.1	69.6	87.6	101.1	128.1	150.7	0.26
East: Sandalwood Parkway E											
1 LT	0.662	3.0	12.3	3.0	15.3	26.8	32.9	37.5	46.7	54.3	0.09
2 R	0.782	6.3	16.2	6.7	22.9	38.5	47.7	54.6	68.3	79.8	0.14
North: Mississauga Road N											
1 LT	0.404	0.0	7.8	0.0	7.8	14.1	17.2	19.6	24.2	28.1	0.05
2 TR	0.404	0.0	7.8	0.0	7.8	14.3	17.4	19.7	24.4	28.4	0.05

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP
Intersection ID: 3
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Sandalwood Parkway W									
5L L	65.0	25.7	25.7	65.0			45.9	45.7	12.3
2T T	65.0	39.1	39.1	65.0			51.0	51.0	5.4
2R R	65.0	32.5	32.5	65.0			50.1	50.1	6.6
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0	25.7		41.9	40.4	12.4

8T	T	65.0	39.1	39.1	65.0	24.3	45.5	45.0	5.8
8R	R	65.0	32.5	32.5	65.0	25.1	45.2	44.8	6.6
East: Sandalwood Parkway E									
1L	L	65.0	25.7	25.7	65.0	16.9	43.2	40.5	12.4
6T	T	65.0	39.1	39.1	65.0	16.9	47.0	45.0	5.4
6R	R	65.0	32.5	32.5	65.0	17.4	44.9	41.7	6.6
North: Mississauga Road N									
7L	L	65.0	25.7	25.7	65.0		46.0	46.0	12.4
4T	T	65.0	39.1	39.1	65.0		51.0	51.0	5.4
4R	R	65.0	32.5	32.5	65.0		50.2	50.2	6.6

"Running Speed" is the average speed excluding stopped periods.

SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Wanless Road 2031 AM TTMP

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Wanless Road W							
	South	2R	Right	221	4	1.00	1.00
	East	2T	Thru	730	15	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	25	0	1.00	1.00
	East	8R	Right	150	5	1.00	1.00
	North	8T	Thru	174	36	1.00	1.00
East: Wanless Road E							
	West	6T	Thru	485	10	1.00	1.00
	South	1L	Left	392	8	1.00	1.00
	North	6R	Right	10	0	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	59	1	1.00	1.00
	South	4T	Thru	883	37	1.00	1.00
	East	7L	Left	403	12	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	5	1	0	0	0	0
2T	T	0	0	730	15	0	0
2R	R	0	0	0	0	221	5
South: Mississauga Road S							
3L	L	25	1	0	0	0	0
8T	T	0	0	174	36	0	0
8R	R	0	0	0	0	150	5
East: Wanless Road E							
1L	L	392	8	0	0	0	0
6T	T	0	0	485	10	0	0
6R	R	0	0	0	0	10	1
North: Mississauga Road N							
7L	L	403	12	0	0	0	0
4T	T	0	0	883	37	0	0
4R	R	0	0	0	0	59	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	6	16.7	0	0.0	0	0.0
2T	T	0	0.0	745	2.0	0	0.0
2R	R	0	0.0	0	0.0	226	2.2
South: Mississauga Road S							
3L	L	26	3.8	0	0.0	0	0.0
8T	T	0	0.0	210	17.1	0	0.0
8R	R	0	0.0	0	0.0	155	3.2
East: Wanless Road E							
1L	L	400	2.0	0	0.0	0	0.0
6T	T	0	0.0	495	2.0	0	0.0
6R	R	0	0.0	0	0.0	11	9.1
North: Mississauga Road N							
7L	L	415	2.9	0	0.0	0	0.0
4T	T	0	0.0	920	4.0	0	0.0
4R	R	0	0.0	0	0.0	60	1.7

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl. Constr. Effect	Cap.	O-D Factor
West: Wanless Road W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1735	3.3	1736	0	N	0.630
Exclusive Slip lane (exiting flow):						1320	3.4	1321	0	N	0.720
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1037	2.4	1037	0	Y	0.806
Exclusive Slip lane (exiting flow):						1032	2.4	1033	0	Y	0.807
East: Wanless Road E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	239	15.2	264	0	Y	0.947
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	920	2.0	920	0	N	0.877
Exclusive Slip lane (exiting flow):						520	2.0	520	0	N	0.938

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Wanless Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1736	32.8	18.9	1.24	0.768	3.62	33.0	2.74
Thru	1	Subdominant	1736	32.8	18.9	1.24	0.768	3.24	29.6	2.45
	2	Dominant	1736	32.8	18.9	1.24	0.768	2.90	26.5	2.20
Right	3	Excl. Slip	1321E	35.1	26.5	1.54	0.742	2.90	28.2	2.20
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1037	33.7	32.5	1.44	0.610	3.55	33.2	2.55
Thru	1	Subdominant	1037	33.7	32.5	1.44	0.610	3.98	37.2	2.85
	2	Dominant	1037	33.7	32.5	1.44	0.610	3.84	35.9	2.76
Right	3	Excl. Slip	1033E	33.7	32.7	1.45	0.610	3.84	36.0	2.75
East: Wanless Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	264	37.5	141.7	1.03	0.153	4.26	44.4	2.69D

Thru	1 Subdominant	264	37.5	141.7	1.03	0.153	4.26	44.4	2.69D
	2 Dominant	264	37.5	141.7	1.03	0.153	4.26	44.4	2.69
Right	2 Dominant	264	37.5	141.7	1.03	0.153	4.44	46.2	2.80
North: Mississauga Road N									
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium									
Left	1 Subdominant	920	32.9	35.8	1.04	0.442	3.65	33.4	2.58
Thru	1 Subdominant	920	32.9	35.8	1.04	0.442	3.65	33.4	2.58
	2 Dominant	920	32.9	35.8	1.04	0.442	3.54	32.4	2.50
Right	3 Excl. Slip	520E	38.5	73.9	1.59	0.396	3.54	37.8	2.50

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic
D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Wanless Road W										
5L L	6	16.7	1735	3.3	1736	5	0.85	-29	100	1.200
2T T	745	2.0	1735	3.3	1736	618	0.85	-29	100	1.206*
2R R	226	2.2	1320	3.4	1321	472	0.85	78	100	0.479
South: Mississauga Road S										
3L L	26	3.8	1037	2.4	1037	107	0.85	250	100	0.243
8T T	210	17.1	1037	2.4	1037	866	0.85	251	100	0.242
8R R	155	3.2	1032	2.4	1033	493	0.85	170	100	0.314
East: Wanless Road E										
1L L	400	2.0	239	15.2	264	908	0.85	93	100	0.441
6T T	495	2.0	239	15.2	264	1124	0.85	93	100	0.440
6R R	11	9.1	239	15.2	264	25	0.85	93	100	0.440
North: Mississauga Road N										
7L L	415	2.9	920	2.0	920	431	0.85	-12	100	0.963
4T T	920	4.0	920	2.0	920	955	0.85	-12	100	0.963
4R R	60	1.7	520	2.0	520	951	0.85	1247	100	0.063

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Intersection Level of Service	=	D
Worst movement Level of Service	=	F

Average intersection delay (s/pers)	=	42.4
Largest average movement delay (s)	=	139.3
Largest back of queue, 95% (m)	=	269
Performance Index	=	148.60
Degree of saturation (highest)	=	1.206
Practical Spare Capacity (lowest)	=	-29 %
Effective intersection capacity, (veh/h)	=	3044
Total vehicle flow (veh/h)	=	3669
Total person flow (pers/h)	=	4403
Total vehicle delay (veh-h/h)	=	43.16
Total person delay (pers-h/h)	=	51.80
Total effective vehicle stops (veh/h)	=	4896
Total effective person stops (pers/h)	=	5876
Total vehicle travel (veh-km/h)	=	2345.3
Total cost ($/h)	=	1406.89
Total fuel (L/h)	=	354.7
Total CO2 (kg/h)	=	888.01

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W										
5L	L	0.23	0.28	139.3	1.00	2.11	30.2	234	0.56	13.7
2T	T	27.01	32.41	130.5	1.00	2.23	34.8	269	67.79	13.7
2R	R	1.00	1.19	15.8	0.92	1.03	4.2	32	5.80	44.6
South: Mississauga Road S										
3L	L	0.13	0.15	17.8	0.75	0.93	1.5	13	0.64	44.1
8T	T	0.65	0.78	11.1	0.75	0.86	1.5	13	4.52	49.8
8R	R	0.51	0.61	11.8	0.77	0.89	2.0	16	3.40	48.6
East: Wanless Road E										
1L	L	1.53	1.83	13.8	0.53	0.74	3.3	26	8.28	46.4
6T	T	0.93	1.11	6.8	0.53	0.56	3.3	26	8.43	51.9
6R	R	0.02	0.03	7.9	0.53	0.64	3.3	26	0.19	50.9
North: Mississauga Road N										
7L	L	4.03	4.83	34.9	0.99	1.52	17.4	136	15.76	33.6
4T	T	7.00	8.40	27.4	0.99	1.52	17.8	140	32.21	36.5
4R	R	0.13	0.16	7.8	0.48	0.62	0.3	3	1.02	51.6

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W									
977	1.206	28.24	33.88	104.0	0.98	1.95	269	74.15	16.3
South: Mississauga Road S									
391	0.314	1.28	1.54	11.8	0.76	0.88	16	8.56	48.9
East: Wanless Road E									
906	0.441	2.48	2.98	9.9	0.53	0.64	26	16.90	49.2
North: Mississauga Road N									

1395	0.963	11.16	13.39	28.8	0.97	1.48	140	48.99	36.0
ALL VEHICLES:									
3669	1.206	43.16	51.80	42.4	0.84	1.33	269	148.60	29.5
INTERSECTION (persons):									
4403	1.206		51.80	42.4	0.84	1.33		148.60	29.5

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Wanless Road W								
1 LT	341	283	1.206	132.5	2.15	30.2	233.8	500.0
2 T	410	340	1.206	129.0	2.30	34.8	269.0	500.0
3 R	226	472	0.479	15.8	1.03	4.2	32.2	75.0
South: Mississauga Road S								
1 LT	117	482	0.242	12.6	0.88	1.5	12.6	500.0
2 T	119	491	0.242	11.1	0.86	1.5	13.0	500.0
3 R	155	493	0.314	11.8	0.89	2.0	15.6	75.0
East: Wanless Road E								
1 LT	453	1029	0.440	12.9	0.72	3.3	25.7	500.0
2 TR	453	1028	0.440	6.8	0.56	3.3	25.7	500.0
North: Mississauga Road N								
1 LT	652	677	0.963	32.4	1.52	17.4	136.0	500.0
2 T	683	709	0.963	27.2	1.52	17.8	139.6	500.0
3 R	60	951	0.063	7.8	0.62	0.3	2.6	75.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Wanless Road W								
1 LT	6	335	0	341	150	283	1.206	100
2 T	0	410	0	410	150	340	1.206	100
3 R	0	0	226	226	150	472	0.479	100
South: Mississauga Road S								
1 LT	26	91	0	117	117	482	0.242	100
2 T	0	119	0	119	119	491	0.242	100
3 R	0	0	155	155	150	493	0.314	100
East: Wanless Road E								
1 LT	400	53	0	453	150	1029	0.440	100

2 TR	0	442	11	453	150	1028	0.440	100
North: Mississauga Road N								
1 LT	415	237	0	652	150	677	0.963	100
2 T	0	683	0	683	150	709	0.963	100
3 R	0	0	60	60	60	951	0.063	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Wanless Road W									
5L L		6	5	100	1.200	139.3	2.11	30.2	0.56
2T T		745	618	100	1.206*	130.5	2.23	34.8	67.79
2R R	(Slp)	226	472	100	0.479	15.8	1.03	4.2	5.80
South: Mississauga Road S									
3L L		26	107	100	0.243	17.8	0.93	1.5	0.64
8T T		210	866	100	0.242	11.1	0.86	1.5	4.52
8R R	(Slp)	155	493	100	0.314	11.8	0.89	2.0	3.40
East: Wanless Road E									
1L L		400	908	100	0.441	13.8	0.74	3.3	8.28
6T T		495	1124	100	0.440	6.8	0.56	3.3	8.43
6R R		11	25	100	0.440	7.9	0.64	3.3	0.19
North: Mississauga Road N									
7L L		415	431	100	0.963	34.9	1.52	17.4	15.76
4T T		920	955	100	0.963	27.4	1.52	17.8	32.21
4R R	(Slp)	60	951	100	0.063	7.8	0.62	0.3	1.02

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Mov ID	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Wanless Road W						
5L L	0.8	4.20	0.004	0.13	0.004	2.0
2T T	97.4	500.12	0.470	16.22	0.478	243.7
2R R	18.2	63.38	0.077	3.83	0.116	45.5
	116.4	567.70	0.551	20.18	0.597	291.2
South: Mississauga Road S						

3L L	2.2	7.79	0.009	0.46	0.014	5.5
8T T	23.0	68.73	0.082	4.90	0.154	57.9
8R R	12.3	41.58	0.051	2.58	0.079	30.8
	37.5	118.11	0.142	7.94	0.247	94.3
East: Wanless Road E						
1L L	33.0	115.55	0.139	6.87	0.206	82.6
6T T	36.1	123.20	0.146	7.12	0.227	90.2
6R R	0.8	2.79	0.003	0.17	0.005	2.1
	69.9	241.54	0.289	14.16	0.438	174.9
North: Mississauga Road N						
7L L	40.6	154.04	0.178	8.57	0.248	101.7
4T T	85.8	310.48	0.363	18.28	0.544	214.9
4R R	4.4	15.02	0.018	0.90	0.028	11.1
	130.9	479.54	0.559	27.75	0.820	327.7
INTERSECTION:	354.7	1406.89	1.541	70.03	2.102	888.0

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Wanless Road W						
5L L	19.5	1.04	0.969	31.51	0.909	490.2
2T T	20.8	1.07	1.003	34.59	1.019	519.9
2R R	12.9	0.45	0.544	27.14	0.821	322.0
	19.0	0.92	0.897	32.86	0.973	474.2
South: Mississauga Road S						
3L L	12.5	0.44	0.534	26.21	0.779	313.7
8T T	17.4	0.52	0.620	37.09	1.167	438.3
8R R	12.7	0.43	0.523	26.67	0.818	318.4
	15.2	0.48	0.576	32.22	1.002	382.3
East: Wanless Road E						
1L L	12.2	0.43	0.517	25.47	0.762	305.9
6T T	11.6	0.40	0.468	22.84	0.728	289.6
6R R	12.0	0.41	0.497	24.82	0.766	301.4
	11.9	0.41	0.491	24.07	0.744	297.2
North: Mississauga Road N						
7L L	14.5	0.55	0.636	30.61	0.884	363.3
4T T	14.8	0.54	0.627	31.58	0.940	371.2
4R R	11.8	0.40	0.483	23.91	0.748	295.2
	14.6	0.53	0.624	30.95	0.914	365.6

INTERSECTION:	15.1	0.60	0.657	29.86	0.896	378.6

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Wanless Road W											
1 LT	6	335		341	2			1.206	132.5	234	500
2 T		410		410	2			1.206	129.0	269	500
3 R			226	226	2			0.479	15.8	32	75
	6	745	226	977	2			1.206	104.0	269	
South: Mississauga Road S											
1 LT	26	91		117	14			0.242	12.6	13	500
2 T		119		119	17			0.242	11.1	13	500
3 R			155	155	3			0.314	11.8	16	75
	26	210	155	391	11			0.314	11.8	16	
East: Wanless Road E											
1 LT	400	53		453	2			0.440	12.9	26	500
2 TR		442	11	453	2			0.440	6.8	26	500
	400	495	11	906	2			0.440	9.9	26	
North: Mississauga Road N											
1 LT	415	237		652	3			0.963	32.4	136	500
2 T		683		683	4			0.963	27.2	140	500
3 R			60	60	2			0.063	7.8	3	75
	415	920	60	1395	4			0.963	28.8	140	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	3669	4	1.206	42.4	269

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Wanless Road W								

5L	L	6	5	1.200	139.3	F	30.2	234
2T	T	745	618	1.206*	130.5	F	34.8	269
2R	R (Slp)	226	472	0.479	15.8	B	4.2	32
South: Mississauga Road S								
3L	L	26	107	0.243	17.8	B	1.5	13
8T	T	210	866	0.242	11.1	B	1.5	13
8R	R (Slp)	155	493	0.314	11.8	B	2.0	16
East: Wanless Road E								
1L	L	400	908	0.441	13.8	B	3.3	26
6T	T	495	1124	0.440	6.8	A	3.3	26
6R	R	11	25	0.440	7.9	A	3.3	26
North: Mississauga Road N								
7L	L	415	431	0.963	34.9	C	17.4	136
4T	T	920	955	0.963	27.4	C	17.8	140
4R	R (Slp)	60	951	0.063	7.8	A	0.3	3
ALL VEHICLES:		3669		1.206	42.4	D	34.8	269

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Wanless Road W								
	South	Right	41.0	34.5	19.3	500	127	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	175	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	41.0	34.5	19.3	500	128	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Wanless Road E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	41.0	34.5	19.3	500	127	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Wanless Road W										
1 LT	1.206	11.4	115.6	127.0	6.6	120.4	21.6	98.7	5.5	132.5
2 T	1.206	9.9	113.7	123.6	6.6	117.0	24.2	92.8	5.4	129.0
3 R	0.479	7.3	2.4	9.7	5.6	4.1	1.2	2.9	6.2	15.8
South: Mississauga Road S										
1 LT	0.242	5.4	0.0	5.4	4.7	0.7	0.0	0.7	7.3	12.6
2 T	0.242	5.3	0.0	5.3	4.9	0.3	0.0	0.3	5.8	11.1
3 R	0.314	5.5	0.1	5.6	4.7	0.9	0.1	0.8	6.2	11.8
East: Wanless Road E										
1 LT	0.440	1.4	0.0	1.4	2.7	0.0	0.0	0.0	11.6	12.9
2 TR	0.440	1.4	0.0	1.4	3.5	0.0	0.0	0.0	5.4	6.8
North: Mississauga Road N										
1 LT	0.963	5.6	16.9	22.5	5.5	17.0	9.5	7.5	9.9	32.4
2 T	0.963	5.4	16.4	21.8	6.6	15.2	9.5	5.7	5.4	27.2
3 R	0.063	1.6	0.0	1.6	2.9	0.0	0.0	0.0	6.2	7.8

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Effective Stop Rate hel	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Wanless Road W							
1 LT	1.206	1.00	1.15	0.00	2.15	1.000	3.86
2 T	1.206	1.00	1.30	0.00	2.30	1.000	4.20
3 R	0.479	0.92	0.07	0.04	1.03	0.919	0.20
South: Mississauga Road S							
1 LT	0.242	0.75	0.00	0.13	0.88	0.749	0.00
2 T	0.242	0.75	0.00	0.11	0.86	0.749	0.00
3 R	0.314	0.77	0.00	0.12	0.89	0.769	0.01
East: Wanless Road E							
1 LT	0.440	0.40	0.00	0.32	0.72	0.530	0.00
2 TR	0.440	0.35	0.00	0.21	0.56	0.530	0.00
North: Mississauga Road N							
1 LT	0.963	0.99	0.52	0.01	1.52	0.992	1.56
2 T	0.963	0.99	0.52	0.00	1.52	0.994	1.55
3 R	0.063	0.36	0.00	0.26	0.62	0.479	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	1.206	8.7	2.8	8.6	11.3	15.5	20.0	23.4	30.2	35.8	0.47
2 T	1.206	10.3	3.0	10.2	13.2	17.6	22.9	26.9	34.8	41.4	0.54
3 R	0.479	0.2	1.2	0.1	1.3	2.4	2.9	3.3	4.2	4.8	0.43
South: Mississauga Road S											
1 LT	0.242	0.0	0.5	0.0	0.5	0.9	1.1	1.2	1.5	1.7	0.03
2 T	0.242	0.0	0.5	0.0	0.5	0.9	1.1	1.2	1.5	1.7	0.03
3 R	0.314	0.0	0.6	0.0	0.6	1.2	1.4	1.6	2.0	2.3	0.21
East: Wanless Road E											
1 LT	0.440	0.0	1.1	0.0	1.1	1.9	2.4	2.7	3.3	3.9	0.05
2 TR	0.440	0.0	1.1	0.0	1.1	1.9	2.4	2.7	3.3	3.9	0.05
North: Mississauga Road N											
1 LT	0.963	3.0	2.6	3.6	6.2	9.4	11.9	13.7	17.4	20.5	0.27
2 T	0.963	3.1	2.6	3.7	6.3	9.6	12.1	14.0	17.8	20.9	0.28
3 R	0.063	0.0	0.1	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.04

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	1.206	67.1	21.3	66.3	87.6	120.0	155.0	181.3	233.8	277.6	0.47
2 T	1.206	79.5	23.0	79.1	102.1	136.2	177.1	207.7	269.0	320.0	0.54
3 R	0.479	1.4	9.3	1.1	10.4	18.6	22.8	25.9	32.2	37.4	0.43
South: Mississauga Road S											
1 LT	0.242	0.0	4.0	0.0	4.0	7.4	9.0	10.2	12.6	14.6	0.03
2 T	0.242	0.0	4.1	0.0	4.1	7.6	9.3	10.5	13.0	15.0	0.03
3 R	0.314	0.0	4.9	0.0	5.0	9.1	11.1	12.6	15.6	18.1	0.21
East: Wanless Road E											
1 LT	0.440	0.0	8.2	0.0	8.2	14.9	18.2	20.7	25.7	29.8	0.05
2 TR	0.440	0.0	8.3	0.0	8.3	15.0	18.3	20.7	25.7	29.8	0.05
North: Mississauga Road N											
1 LT	0.963	23.5	20.3	27.9	48.2	73.4	92.7	107.1	136.0	160.1	0.27
2 T	0.963	24.0	20.8	28.8	49.5	75.2	95.0	109.9	139.6	164.4	0.28
3 R	0.063	0.0	0.8	0.0	0.8	1.6	1.9	2.1	2.6	3.1	0.04

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP
Intersection ID: 2
Roundabout

Mov ID	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall	Geom Delay (sec)
West: Wanless Road W									
5L L	65.0	25.7	25.7	65.0	14.5		32.1	13.7	12.3
2T T	65.0	39.1	39.1	65.0	15.4		32.4	13.7	5.4
2R R	65.0	34.5	34.5	65.0	17.4		47.3	44.6	6.2
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0			45.5	44.1	12.4
8T T	65.0	39.1	39.1	65.0			50.2	49.8	5.8
8R R	65.0	34.5	34.5	65.0	16.8		49.5	48.6	6.2
East: Wanless Road E									
1L L	65.0	25.7	25.7	65.0			46.4	46.4	12.4
6T T	65.0	39.1	39.1	65.0			51.9	51.9	5.4
6R R	65.0	32.5	32.5	65.0			50.9	50.9	6.6
North: Mississauga Road N									
7L L	65.0	25.7	25.7	65.0	17.1		37.9	33.6	12.4
4T T	65.0	39.1	39.1	65.0	17.3		40.3	36.5	5.4
4R R	65.0	34.5	34.5	65.0			51.6	51.6	6.2

"Running Speed" is the average speed excluding stopped periods.

Site: Wanless 2031 AM TTMP
C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap
Processed Jan 12, 2010 12:00:55PM

A1492, AECOM, Small Office
Produced by SIDRA Intersection 3.2.2.1563

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SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Wanless Road 2031 PM TTMP

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Wanless Road W							
	South	2R	Right	289	6	1.00	1.00
	East	2T	Thru	877	18	1.00	1.00
	North	5L	Left	10	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	78	2	1.00	1.00
	East	8R	Right	466	14	1.00	1.00
	North	8T	Thru	552	113	1.00	1.00
East: Wanless Road E							
	West	6T	Thru	461	9	1.00	1.00
	South	1L	Left	382	8	1.00	1.00
	North	6R	Right	15	0	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	25	0	1.00	1.00
	South	4T	Thru	317	13	1.00	1.00
	East	7L	Left	63	2	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	10	1	0	0	0	0
2T	T	0	0	877	18	0	0
2R	R	0	0	0	0	289	6
South: Mississauga Road S							
3L	L	78	2	0	0	0	0
8T	T	0	0	552	113	0	0
8R	R	0	0	0	0	466	14
East: Wanless Road E							
1L	L	382	8	0	0	0	0
6T	T	0	0	461	9	0	0
6R	R	0	0	0	0	15	1
North: Mississauga Road N							
7L	L	63	2	0	0	0	0
4T	T	0	0	317	13	0	0
4R	R	0	0	0	0	25	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	11	9.1	0	0.0	0	0.0
2T	T	0	0.0	895	2.0	0	0.0
2R	R	0	0.0	0	0.0	295	2.0
South: Mississauga Road S							
3L	L	80	2.5	0	0.0	0	0.0
8T	T	0	0.0	665	17.0	0	0.0
8R	R	0	0.0	0	0.0	480	2.9
East: Wanless Road E							
1L	L	390	2.1	0	0.0	0	0.0
6T	T	0	0.0	470	1.9	0	0.0
6R	R	0	0.0	0	0.0	16	6.2
North: Mississauga Road N							
7L	L	65	3.1	0	0.0	0	0.0
4T	T	0	0.0	330	3.9	0	0.0
4R	R	0	0.0	0	0.0	26	3.8

Unit Time for Volumes = 60 minutes

```
Peak Flow Period =  15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor
```

Table R.0 - Roundabout Basic Parameters

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout
```

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Wanless Road W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	785	2.9	785	0	N	0.905
Exclusive Slip lane (exiting flow):						720	2.9	720	0	N	0.907
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	970	2.1	970	0	N	0.802
Exclusive Slip lane (exiting flow):						960	2.1	960	0	N	0.805
East: Wanless Road E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	755	15.2	835	0	N	0.822
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	940	2.0	940	0	N	0.809
Exclusive Slip lane (exiting flow):						550	2.0	550	0	N	0.906

Table R.1 - Roundabout Gap Acceptance Parameters

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout
```

Turn Lane	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Critical Gap Dist (m)	Foll-up Headway (s)
West: Wanless Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	785	31.4	39.9	1.51	0.519	3.90	34.0	2.70
Thru	1	Subdominant	785	31.4	39.9	1.51	0.519	3.75	32.7	2.60
	2	Dominant	785	31.4	39.9	1.51	0.519	3.68	32.1	2.55
Right	3	Excl. Slip	720E	31.9	44.2	1.62	0.513	3.68	32.6	2.55
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	970	38.1	39.2	1.08	0.474	3.59	38.0	2.55
Thru	1	Subdominant	970	38.1	39.2	1.08	0.474	4.02	42.5	2.86
	2	Dominant	970	38.1	39.2	1.08	0.474	3.91	41.3	2.78
Right	3	Excl. Slip	960E	38.2	39.8	1.09	0.473	3.91	41.5	2.78
East: Wanless Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	835	37.5	44.9	1.03	0.407	3.71	38.7	2.59

Thru	1 Subdominant	835	37.5	44.9	1.03	0.407	3.71	38.7	2.59
	2 Dominant	835	37.5	44.9	1.03	0.407	3.63	37.8	2.53
Right	2 Dominant	835	37.5	44.9	1.03	0.407	3.68	38.3	2.57
North: Mississauga Road N									
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium									
Left	1 Subdominant	940	32.4	34.5	1.09	0.466	3.64	32.7	2.58
Thru	1 Subdominant	940	32.4	34.5	1.09	0.466	3.64	32.8	2.58
	2 Dominant	940	32.4	34.5	1.09	0.466	3.52	31.7	2.49
Right	3 Excl. Slip	550E	37.2	67.6	1.67	0.429	3.52	36.3	2.49

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Wanless Road W										
5L L	11	9.1	785	2.9	785	18	0.85	39	100	0.611
2T T	895	2.0	785	2.9	785	1427	0.85	36	100	0.627
2R R	295	2.0	720	2.9	720	761	0.85	119	100	0.388
South: Mississauga Road S										
3L L	80	2.5	970	2.1	970	114	0.85	21	100	0.702
8T T	665	17.0	970	2.1	970	950	0.85	21	100	0.700
8R R	480	2.9	960	2.1	960	540	0.85	-4	100	0.889*
East: Wanless Road E										
1L L	390	2.1	755	15.2	835	599	0.85	31	100	0.651
6T T	470	1.9	755	15.2	835	722	0.85	31	100	0.651
6R R	16	6.2	755	15.2	835	25	0.85	33	100	0.640
North: Mississauga Road N										
7L L	65	3.1	940	2.0	940	208	0.85	172	100	0.312
4T T	330	3.9	940	2.0	940	1055	0.85	172	100	0.313
4R R	26	3.8	550	2.0	550	899	0.85	2839	100	0.029

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Intersection Level of Service	=	B
Worst movement Level of Service	=	C
Average intersection delay (s/pers)	=	14.3
Largest average movement delay (s)	=	22.8

Largest back of queue, 95% (m)	=	86
Performance Index	=	89.24
Degree of saturation (highest)	=	0.889
Practical Spare Capacity (lowest)	=	-4 %
Effective intersection capacity, (veh/h)	=	4188
Total vehicle flow (veh/h)	=	3723
Total person flow (pers/h)	=	4468
Total vehicle delay (veh-h/h)	=	14.77
Total person delay (pers-h/h)	=	17.72
Total effective vehicle stops (veh/h)	=	3725
Total effective person stops (pers/h)	=	4470
Total vehicle travel (veh-km/h)	=	2363.9
Total cost ($/h)	=	1083.40
Total fuel (L/h)	=	322.5
Total CO2 (kg/h)	=	808.12

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W										
5L	L	0.06	0.07	19.4	0.82	1.04	5.9	46	0.28	42.9
2T	T	3.05	3.66	12.3	0.82	0.99	6.0	46	20.50	48.1
2R	R	0.81	0.97	9.9	0.70	0.81	2.7	21	5.85	50.0
South: Mississauga Road S										
3L	L	0.47	0.57	21.2	0.86	1.08	6.0	51	2.21	41.5
8T	T	2.70	3.23	14.6	0.86	1.04	6.0	52	16.49	46.3
8R	R	3.04	3.64	22.8	0.95	1.27	11.1	86	14.79	39.3
East: Wanless Road E										
1L	L	1.99	2.39	18.3	0.83	1.03	5.6	43	9.94	43.6
6T	T	1.45	1.75	11.1	0.83	0.99	5.7	44	10.55	49.3
6R	R	0.05	0.07	12.3	0.83	1.00	5.7	44	0.36	48.0
North: Mississauga Road N										
7L	L	0.29	0.34	15.9	0.71	0.92	1.9	15	1.49	45.7
4T	T	0.81	0.97	8.8	0.71	0.73	1.9	15	6.33	50.5
4R	R	0.06	0.07	7.9	0.52	0.60	0.2	1	0.45	51.3

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

	Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W	1201	0.627	3.92	4.70	11.7	0.79	0.95	46	26.63	48.5
South: Mississauga Road S	1225	0.889	6.20	7.44	18.2	0.90	1.13	86	33.49	42.9
East: Wanless Road E	876	0.651	3.50	4.20	14.4	0.83	1.01	44	20.85	46.5
North: Mississauga Road N	421	0.313	1.15	1.38	9.8	0.70	0.75	15	8.27	49.7

```
ALL VEHICLES:
 3723   0.889   14.77    17.72    14.3   0.82  1.00    86   89.24    46.2
--------------------------------------------------------------------------
INTERSECTION (persons):
 4468   0.889            17.72    14.3   0.82  1.00         89.24    46.2
--------------------------------------------------------------------------
Queue values in this table are 95% back of queue (metres).
```

Table S.7 - Lane Performance

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

-------------------------------------------------------------
          Dem                              Q u e u e
         Flow   Cap  Deg.  Aver.  Eff.   95% Back       Lane
 Lane    (veh  (veh  Satn  Delay  Stop  ------------   Length
 No.      /h)   /h)   x    (sec)  Rate  (vehs)  (m)     (m)
-------------------------------------------------------------
 West: Wanless Road W
 1 LT      447   712 0.627   12.5  0.99    5.9   45.8    500.0
 2 T       459   732 0.627   12.2  0.99    6.0   46.1    500.0
 3 R       295   761 0.387    9.9  0.81    2.7   21.0     75.0
-------------------------------------------------------------
 South: Mississauga Road S
 1 LT      371   530 0.700   16.1  1.05    6.0   50.8    500.0
 2 T       374   535 0.700   14.5  1.04    6.0   52.2    500.0
 3 R       480   540 0.889   22.8  1.27   11.1   86.2     75.0
-------------------------------------------------------------
 East: Wanless Road E
 1 LT      431   662 0.651   17.7  1.03    5.6   43.4    500.0
 2 TR      445   684 0.651   11.2  0.99    5.7   43.9    500.0
-------------------------------------------------------------
 North: Mississauga Road N
 1 LT      193   616 0.313   11.3  0.80    1.9   14.7    500.0
 2 T       202   647 0.313    8.7  0.72    1.9   15.0    500.0
 3 R        26   899 0.029    7.9  0.60    0.2    1.3     75.0
-------------------------------------------------------------
```

Table S.8 - Lane Flow and Capacity Information

```
Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

-------------------------------------------------
                                 Min  Tot
 Lane      Dem Flow (veh/h)      Cap  Cap  Deg.  Lane
 No.    ------------------     (veh (veh  Satn  Util
         Lef Thru  Rig  Tot      /h)  /h)   x     %
-------------------------------------------------
 West: Wanless Road W
 1 LT     11  436    0  447     150  712  0.627  100
 2 T       0  459    0  459     150  732  0.627  100
 3 R       0    0  295  295     150  761  0.387  100
-------------------------------------------------
 South: Mississauga Road S
 1 LT     80  291    0  371     150  530  0.700  100
 2 T       0  374    0  374     150  535  0.700  100
 3 R       0    0  480  480     150  540  0.889  100
-------------------------------------------------
 East: Wanless Road E
 1 LT    390   41    0  431     150  662  0.651  100
 2 TR      0  429   16  445     150  684  0.651  100
-------------------------------------------------
```

North: Mississauga Road N								
1	LT	65	128	0	193	150	616	0.313	100
2	T	0	202	0	202	150	647	0.313	100
3	R	0	0	26	26	26	899	0.029	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Wanless Road W									
5L	L	11	18	100	0.611	19.4	1.04	5.9	0.28
2T	T	895	1427	100	0.627	12.3	0.99	6.0	20.50
2R	R (Slp)	295	761	100	0.388	9.9	0.81	2.7	5.85
South: Mississauga Road S									
3L	L	80	114	100	0.702	21.2	1.08	6.0	2.21
8T	T	665	950	100	0.700	14.6	1.04	6.0	16.49
8R	R (Slp)	480	540	100	0.889*	22.8	1.27	11.1	14.79
East: Wanless Road E									
1L	L	390	599	100	0.651	18.3	1.03	5.6	9.94
6T	T	470	722	100	0.651	11.1	0.99	5.7	10.55
6R	R	16	25	100	0.640	12.3	1.00	5.7	0.36
North: Mississauga Road N									
7L	L	65	208	100	0.312	15.9	0.92	1.9	1.49
4T	T	330	1055	100	0.313	8.8	0.73	1.9	6.33
4R	R (Slp)	26	899	100	0.029	7.9	0.60	0.2	0.45

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Mov ID		Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Wanless Road W							
5L	L	0.9	3.38	0.004	0.20	0.006	2.4
2T	T	69.6	239.18	0.289	14.46	0.445	174.3
2R	R	22.4	76.19	0.093	4.67	0.144	56.2
		93.0	318.74	0.386	19.33	0.595	232.8
South: Mississauga Road S							
3L	L	7.0	25.12	0.030	1.47	0.043	17.4
8T	T	76.0	230.14	0.275	16.53	0.514	191.3

8R R	41.8	149.62	0.177	8.84	0.264	104.5
	124.7	404.88	0.483	26.83	0.821	313.3
East: Wanless Road E						
1L L	33.4	118.45	0.143	7.07	0.208	83.6
6T T	36.2	123.47	0.150	7.51	0.232	90.6
6R R	1.3	4.28	0.005	0.27	0.008	3.1
	70.9	246.20	0.298	14.84	0.449	177.3
North: Mississauga Road N						
7L L	5.6	19.38	0.023	1.18	0.035	14.0
4T T	26.3	87.65	0.105	5.40	0.169	65.9
4R R	1.9	6.54	0.008	0.39	0.012	4.8
	33.8	113.57	0.137	6.97	0.216	84.7
INTERSECTION:	322.5	1083.40	1.303	67.98	2.081	808.1

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Wanless Road W						
5L L	12.8	0.46	0.547	26.90	0.793	320.0
2T T	12.4	0.42	0.513	25.68	0.790	309.4
2R R	12.2	0.41	0.505	25.33	0.780	304.8
	12.3	0.42	0.511	25.60	0.788	308.3
South: Mississauga Road S						
3L L	12.9	0.47	0.556	27.20	0.800	323.2
8T T	18.2	0.55	0.658	39.49	1.228	457.1
8R R	13.9	0.50	0.592	29.48	0.882	348.7
	16.2	0.52	0.625	34.75	1.064	405.6
East: Wanless Road E						
1L L	12.7	0.45	0.543	26.85	0.792	317.6
6T T	12.2	0.42	0.506	25.39	0.785	306.4
6R R	12.6	0.43	0.529	26.78	0.810	315.3
	12.5	0.43	0.523	26.09	0.789	311.7
North: Mississauga Road N						
7L L	12.7	0.44	0.535	26.89	0.801	319.1
4T T	12.7	0.42	0.506	25.99	0.814	317.3
4R R	11.9	0.40	0.487	24.15	0.753	297.0
	12.6	0.42	0.510	26.02	0.808	316.4
INTERSECTION:	13.6	0.46	0.551	28.76	0.880	341.9

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Wanless Road W												
1 LT	11	436		447	2				0.627	12.5	46	500
2 T		459		459	2				0.627	12.2	46	500
3 R			295	295	2				0.387	9.9	21	75
	11	895	295	1201	2				0.627	11.7	46	
South: Mississauga Road S												
1 LT	80	291		371	14				0.700	16.1	51	500
2 T		374		374	17				0.700	14.5	52	500
3 R			480	480	3				0.889	22.8	86	75
	80	665	480	1225	11				0.889	18.2	86	
East: Wanless Road E												
1 LT	390	41		431	2				0.651	17.7	43	500
2 TR		429	16	445	2				0.651	11.2	44	500
	390	470	16	876	2				0.651	14.4	44	
North: Mississauga Road N												
1 LT	65	128		193	4				0.313	11.3	15	500
2 T		202		202	4				0.313	8.7	15	500
3 R			26	26	4				0.029	7.9	1	75
	65	330	26	421	4				0.313	9.8	15	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	3723	5	0.889	14.3	86

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Wanless Road W								
5L	L	11	18	0.611	19.4	B	5.9	46
2T	T	895	1427	0.627	12.3	B	6.0	46

2R	R (Slp)	295	761	0.388	9.9	A	2.7	21
South: Mississauga Road S								
3L	L	80	114	0.702	21.2	C	6.0	51
8T	T	665	950	0.700	14.6	B	6.0	52
8R	R (Slp)	480	540	0.889*	22.8	C	11.1	86
East: Wanless Road E								
1L	L	390	599	0.651	18.3	B	5.6	43
6T	T	470	722	0.651	11.1	B	5.7	44
6R	R	16	25	0.640	12.3	B	5.7	44
North: Mississauga Road N								
7L	L	65	208	0.312	15.9	B	1.9	15
4T	T	330	1055	0.313	8.8	A	1.9	15
4R	R (Slp)	26	899	0.029	7.9	A	0.2	1
ALL VEHICLES:		3723		0.889	14.3	B	11.1	86

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)	Distance User Spec?
West: Wanless Road W								
	South	Right	41.0	34.5	19.3	500	127	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	41.0	34.5	19.3	500	128	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Wanless Road E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	41.0	34.5	19.3	500	127	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Wanless Road W										
1 LT	0.627	4.7	2.3	7.0	5.4	1.6	1.6	0.0	5.6	12.5
2 T	0.627	4.5	2.2	6.8	5.4	1.4	1.4	0.0	5.4	12.2
3 R	0.387	3.6	0.2	3.7	4.2	0.0	0.0	0.0	6.2	9.9
South: Mississauga Road S										
1 LT	0.700	5.2	3.6	8.9	5.4	3.5	2.2	1.3	7.2	16.1
2 T	0.700	5.2	3.6	8.8	5.7	3.1	2.2	0.9	5.8	14.5
3 R	0.889	5.8	10.7	16.6	5.8	10.8	5.4	5.4	6.2	22.8
East: Wanless Road E										
1 LT	0.651	3.8	2.1	6.0	4.2	1.8	1.4	0.3	11.7	17.7
2 TR	0.651	3.7	2.0	5.7	5.4	0.3	0.3	0.0	5.4	11.2
North: Mississauga Road N										
1 LT	0.313	3.5	0.0	3.5	4.3	0.0	0.0	0.0	7.8	11.3
2 T	0.313	3.3	0.0	3.3	4.7	0.0	0.0	0.0	5.4	8.7
3 R	0.029	1.7	0.0	1.7	3.1	0.0	0.0	0.0	6.2	7.9

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Effective Stop Rate he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Wanless Road W							
1 LT	0.627	0.82	0.09	0.08	0.99	0.816	0.27
2 T	0.627	0.82	0.09	0.08	0.99	0.816	0.26
3 R	0.387	0.66	0.01	0.15	0.81	0.701	0.02
South: Mississauga Road S							
1 LT	0.700	0.86	0.12	0.07	1.05	0.859	0.36
2 T	0.700	0.86	0.12	0.06	1.04	0.859	0.36
3 R	0.889	0.95	0.29	0.02	1.27	0.951	0.90
East: Wanless Road E							
1 LT	0.651	0.83	0.08	0.12	1.03	0.828	0.25
2 TR	0.651	0.83	0.08	0.08	0.99	0.828	0.24
North: Mississauga Road N							
1 LT	0.313	0.64	0.00	0.15	0.80	0.713	0.00
2 T	0.313	0.59	0.00	0.13	0.72	0.713	0.00
3 R	0.029	0.36	0.00	0.24	0.60	0.516	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.627	0.4	1.5	0.4	1.9	3.4	4.2	4.7	5.9	6.9	0.09
2 T	0.627	0.4	1.5	0.4	2.0	3.4	4.2	4.8	6.0	6.9	0.09
3 R	0.387	0.0	0.8	0.0	0.9	1.6	1.9	2.2	2.7	3.2	0.28
South: Mississauga Road S											
1 LT	0.700	0.4	1.5	0.4	2.0	3.4	4.2	4.8	6.0	7.0	0.10
2 T	0.700	0.4	1.5	0.4	2.0	3.4	4.2	4.8	6.0	7.0	0.10
3 R	0.889	1.4	2.2	1.6	3.8	6.2	7.7	8.8	11.1	13.0	1.15
East: Wanless Road E											
1 LT	0.651	0.3	1.5	0.3	1.8	3.2	4.0	4.5	5.6	6.5	0.09
2 TR	0.651	0.3	1.5	0.3	1.9	3.3	4.0	4.6	5.7	6.6	0.09
North: Mississauga Road N											
1 LT	0.313	0.0	0.6	0.0	0.6	1.1	1.3	1.5	1.9	2.2	0.03
2 T	0.313	0.0	0.6	0.0	0.6	1.1	1.4	1.5	1.9	2.2	0.03
3 R	0.029	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.02

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.627	2.7	11.8	3.2	15.0	26.3	32.3	36.8	45.8	53.3	0.09
2 T	0.627	2.7	11.9	3.2	15.1	26.4	32.5	37.0	46.1	53.7	0.09
3 R	0.387	0.2	6.6	0.2	6.7	12.3	15.0	17.0	21.0	24.4	0.28
South: Mississauga Road S											
1 LT	0.700	3.5	13.0	3.7	16.7	29.1	35.8	40.8	50.8	59.1	0.10
2 T	0.700	3.6	13.4	3.8	17.1	29.9	36.8	41.9	52.2	60.7	0.10
3 R	0.889	10.9	17.0	12.4	29.3	48.0	59.8	68.6	86.2	100.9	1.15
East: Wanless Road E											
1 LT	0.651	2.3	11.6	2.6	14.2	25.0	30.6	34.9	43.4	50.5	0.09
2 TR	0.651	2.3	11.7	2.6	14.4	25.2	31.0	35.3	43.9	51.1	0.09
North: Mississauga Road N											
1 LT	0.313	0.0	4.7	0.0	4.7	8.6	10.5	11.9	14.7	17.1	0.03
2 T	0.313	0.0	4.7	0.0	4.7	8.8	10.7	12.1	15.0	17.3	0.03
3 R	0.029	0.0	0.4	0.0	0.4	0.8	0.9	1.1	1.3	1.5	0.02

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP
Intersection ID: 2
Roundabout

Mov ID	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall	Geom Delay (sec)
West: Wanless Road W									
5L L	65.0	25.7	25.7	65.0	18.3		43.8	42.9	12.4
2T T	65.0	39.1	39.1	65.0	18.6		48.1	48.1	5.4
2R R	65.0	34.5	34.5	65.0	19.4		50.0	50.0	6.2
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0	17.7		43.3	41.5	12.4
8T T	65.0	39.1	39.1	65.0	17.2		47.2	46.3	5.8
8R R	65.0	34.5	34.5	65.0	16.5		43.4	39.3	6.2
East: Wanless Road E									
1L L	65.0	25.7	25.7	65.0	17.5		43.9	43.6	12.4
6T T	65.0	39.1	39.1	65.0	17.7		49.3	49.3	5.4
6R R	65.0	32.5	32.5	65.0	17.6		48.0	48.0	6.6
North: Mississauga Road N									
7L L	65.0	25.7	25.7	65.0	17.1		45.7	45.7	12.4
4T T	65.0	39.1	39.1	65.0	17.3		50.5	50.5	5.4
4R R	65.0	34.5	34.5	65.0			51.3	51.3	6.2

"Running Speed" is the average speed excluding stopped periods.

SIDRA SOLUTIONS

Site: Wanless 2031 PM TTMP
C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap
Processed Jan 12, 2010 12:04:37PM

A1492, AECOM, Small Office
Produced by SIDRA Intersection 3.2.2.1563

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SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Mayfield Road W							
	South	2R	Right	76	14	1.00	1.00
	East	2T	Thru	1172	88	1.00	1.00
	North	5L	Left	64	1	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	15	0	1.00	1.00
	East	8R	Right	38	7	1.00	1.00
	North	8T	Thru	52	8	1.00	1.00
East: Mayfield Road E							
	West	6T	Thru	455	80	1.00	1.00
	South	1L	Left	153	17	1.00	1.00
	North	6R	Right	25	0	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	74	1	1.00	1.00
	South	4T	Thru	389	16	1.00	1.00
	East	7L	Left	55	5	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	64	1	0	0	0	0
2T	T	0	0	1172	88	0	0
2R	R	0	0	0	0	76	14
South: Mississauga Road S							
3L	L	15	1	0	0	0	0
8T	T	0	0	52	8	0	0
8R	R	0	0	0	0	38	7
East: Mayfield Road E							
1L	L	153	17	0	0	0	0
6T	T	0	0	455	80	0	0
6R	R	0	0	0	0	25	1
North: Mississauga Road N							
7L	L	55	5	0	0	0	0
4T	T	0	0	389	16	0	0
4R	R	0	0	0	0	74	2

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	65	1.5	0	0.0	0	0.0
2T	T	0	0.0	1260	7.0	0	0.0
2R	R	0	0.0	0	0.0	90	15.6
South: Mississauga Road S							
3L	L	16	6.2	0	0.0	0	0.0
8T	T	0	0.0	60	13.3	0	0.0
8R	R	0	0.0	0	0.0	45	15.6
East: Mayfield Road E							
1L	L	170	10.0	0	0.0	0	0.0
6T	T	0	0.0	535	15.0	0	0.0
6R	R	0	0.0	0	0.0	26	3.8
North: Mississauga Road N							
7L	L	60	8.3	0	0.0	0	0.0
4T	T	0	0.0	405	4.0	0	0.0
4R	R	0	0.0	0	0.0	76	2.6

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Mayfield Road W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	635	6.0	646	0	N	0.925
Exclusive Slip lane (exiting flow):						575	5.8	584	0	N	0.936
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1385	6.8	1413	0	N	0.645
East: Mayfield Road E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	140	7.1	145	0	N	0.982
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	720	13.5	782	0	N	0.931

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Mayfield Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	646	34.3	53.1	1.36	0.414	3.86	36.7	2.61
Thru	1	Subdominant	646	34.3	53.1	1.36	0.414	3.94	37.5	2.67
	2	Dominant	646	34.3	53.1	1.36	0.414	3.92	37.3	2.66
Right	3	Excl. Slip	584E	35.2	60.2	1.31	0.373	3.92	38.3	2.66
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1413	37.9	26.8	1.05	0.605	3.38	35.6	2.52
Thru	1	Subdominant	1413	37.9	26.8	1.05	0.605	3.62	38.1	2.69
	2	Dominant	1413	37.9	26.8	1.05	0.605	3.37	35.5	2.51
Right	2	Dominant	1413	37.9	26.8	1.05	0.605	3.44	36.2	2.56
East: Mayfield Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Dominant	145	31.5	216.4	1.66	0.136	4.55	39.8	2.80
Thru	1	Dominant	145	31.5	216.4	1.66	0.136	4.74	41.5	2.91
	2	Subdominant	145	31.5	216.4	1.66	0.136	4.74	41.5	2.92D

Right	2	Subdominant	145	31.5	216.4	1.66	0.136	4.34	37.9	2.67D
North: Mississauga Road N										
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	782	35.7	45.6	1.05	0.393	3.89	38.5	2.69
Thru	1	Subdominant	782	35.7	45.6	1.05	0.393	3.76	37.3	2.61
	2	Dominant	782	35.7	45.6	1.05	0.393	3.69	36.5	2.55
Right	2	Dominant	782	35.7	45.6	1.05	0.393	3.69	36.5	2.55

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic
D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Mayfield Road W										
5L L	65	1.5	635	6.0	646	77	0.85	1	100	0.844*
2T T	1260	7.0	635	6.0	646	1494	0.85	1	100	0.843
2R R	90	15.6	575	5.8	584	835	0.85	689	100	0.108
South: Mississauga Road S										
3L L	16	6.2	1385	6.8	1413	99	0.85	426	100	0.162
8T T	60	13.3	1385	6.8	1413	369	0.85	423	100	0.163
8R R	45	15.6	1385	6.8	1413	277	0.85	423	100	0.162
East: Mayfield Road E										
1L L	170	10.0	140	7.1	145	502	0.85	151	100	0.339
6T T	535	15.0	140	7.1	145	1578	0.85	151	100	0.339
6R R	26	3.8	140	7.1	145	77	0.85	152	100	0.338
North: Mississauga Road N										
7L L	60	8.3	720	13.5	782	171	0.85	142	100	0.351
4T T	405	4.0	720	13.5	782	1155	0.85	142	100	0.351
4R R	76	2.6	720	13.5	782	217	0.85	143	100	0.350

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Intersection Level of Service	=	B
Worst movement Level of Service	=	C
Average intersection delay (s/pers)	=	12.6
Largest average movement delay (s)	=	23.1

Largest back of queue, 95% (m)	=	96
Performance Index	=	63.03
Degree of saturation (highest)	=	0.844
Practical Spare Capacity (lowest)	=	1 %
Effective intersection capacity, (veh/h)	=	3326
Total vehicle flow (veh/h)	=	2808
Total person flow (pers/h)	=	3370
Total vehicle delay (veh-h/h)	=	9.81
Total person delay (pers-h/h)	=	11.77
Total effective vehicle stops (veh/h)	=	2541
Total effective person stops (pers/h)	=	3049
Total vehicle travel (veh-km/h)	=	1780.0
Total cost ($/h)	=	841.23
Total fuel (L/h)	=	260.0
Total CO2 (kg/h)	=	652.34

Table S.5 - Movement Performance

Mov ID	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W									
5L L	0.42	0.50	23.1	0.93	1.20	11.9	96	1.93	40.2
2T T	5.66	6.80	16.2	0.93	1.18	12.0	96	33.93	44.6
2R R	0.22	0.26	8.7	0.52	0.67	0.6	5	1.60	51.3
South: Mississauga Road S									
3L L	0.08	0.10	17.8	0.78	0.94	0.9	8	0.41	44.0
8T T	0.18	0.22	11.1	0.78	0.88	0.9	8	1.35	49.7
8R R	0.15	0.18	12.2	0.78	0.90	0.9	8	1.02	48.6
East: Mayfield Road E									
1L L	0.64	0.76	13.5	0.36	0.68	2.3	20	3.38	47.2
6T T	0.98	1.17	6.6	0.36	0.51	2.3	20	8.77	53.2
6R R	0.05	0.06	7.4	0.36	0.55	2.3	20	0.44	52.0
North: Mississauga Road N									
7L L	0.26	0.32	15.8	0.63	0.90	2.0	16	1.33	45.9
4T T	0.96	1.15	8.6	0.63	0.71	2.0	16	7.44	51.1
4R R	0.20	0.24	9.6	0.63	0.78	2.0	16	1.44	50.3

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W									
1415	0.844	6.30	7.56	16.0	0.90	1.15	96	37.46	44.7
South: Mississauga Road S									
121	0.163	0.42	0.50	12.4	0.78	0.89	8	2.78	48.4
East: Mayfield Road E									
731	0.339	1.67	2.00	8.2	0.36	0.55	20	12.59	51.6
North: Mississauga Road N									
541	0.351	1.43	1.71	9.5	0.63	0.74	16	10.21	50.3

ALL VEHICLES:

2808	0.844	9.81	11.77	12.6	0.70	0.90	96	63.03	47.5

INTERSECTION (persons):

3370	0.844		11.77	12.6	0.70	0.90		63.03	47.5

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Mayfield Road W								
1 LT	662	784	0.843	16.9	1.19	11.9	95.7	500.0
2 T	663	787	0.843	16.2	1.18	12.0	96.2	500.0
3 R	90	835	0.108	8.7	0.67	0.6	4.9	75.0
South: Mississauga Road S								
1 LT	59	361	0.162	13.0	0.89	0.9	7.6	500.0
2 TR	62	385	0.162	11.9	0.89	0.9	8.0	500.0
East: Mayfield Road E								
1 LT	368	1086	0.339	9.8	0.59	2.3	19.8	500.0
2 TR	363	1071	0.339	6.7	0.51	2.3	19.9	500.0
North: Mississauga Road N								
1 LT	265	756	0.351	10.3	0.76	2.0	15.8	500.0
2 TR	276	787	0.351	8.8	0.72	2.0	15.7	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Mayfield Road W								
1 LT	65	597	0	662	150	784	0.843	100
2 T	0	663	0	663	150	787	0.843	100
3 R	0	0	90	90	90	835	0.108	100
South: Mississauga Road S								
1 LT	16	43	0	59	59	361	0.162	100
2 TR	0	17	45	62	62	385	0.162	100
East: Mayfield Road E								
1 LT	170	198	0	368	150	1086	0.339	100
2 TR	0	337	26	363	150	1071	0.339	100
North: Mississauga Road N								
1 LT	60	205	0	265	150	756	0.351	100
2 TR	0	200	76	276	150	787	0.351	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Mayfield Road W									
5L	L	65	77	100	0.844*	23.1	1.20	11.9	1.93
2T	T	1260	1494	100	0.843	16.2	1.18	12.0	33.93
2R	R (Slp)	90	835	100	0.108	8.7	0.67	0.6	1.60
South: Mississauga Road S									
3L	L	16	99	100	0.162	17.8	0.94	0.9	0.41
8T	T	60	369	100	0.163	11.1	0.88	0.9	1.35
8R	R	45	277	100	0.162	12.2	0.90	0.9	1.02
East: Mayfield Road E									
1L	L	170	502	100	0.339	13.5	0.68	2.3	3.38
6T	T	535	1578	100	0.339	6.6	0.51	2.3	8.77
6R	R	26	77	100	0.338	7.4	0.55	2.3	0.44
North: Mississauga Road N									
7L	L	60	171	100	0.351	15.8	0.90	2.0	1.33
4T	T	405	1155	100	0.351	8.6	0.71	2.0	7.44
4R	R	76	217	100	0.350	9.6	0.78	2.0	1.44

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Mayfield Road W						
5L L	5.8	20.98	0.025	1.23	0.036	14.5
2T T	118.0	389.69	0.470	25.53	0.777	295.9
2R R	9.4	28.20	0.034	1.99	0.063	23.7
	133.2	438.86	0.529	28.75	0.875	334.0
South: Mississauga Road S						
3L L	1.4	4.80	0.006	0.28	0.008	3.4
8T T	6.2	18.88	0.023	1.32	0.041	15.6
8R R	4.9	14.80	0.018	1.08	0.033	12.4
	12.5	38.49	0.046	2.68	0.083	31.4

East: Mayfield Road E							
1L	L	16.9	54.57	0.065	3.58	0.109	42.5
6T	T	52.1	158.09	0.182	10.31	0.334	130.9
6R	R	1.9	6.46	0.008	0.39	0.012	4.8
		70.9	219.12	0.255	14.28	0.455	178.2
North: Mississauga Road N							
7L	L	5.8	19.19	0.023	1.24	0.037	14.6
4T	T	31.8	106.04	0.126	6.43	0.203	79.6
4R	R	5.8	19.54	0.024	1.20	0.037	14.4
		43.4	144.76	0.173	8.88	0.277	108.7
INTERSECTION:		260.0	841.23	1.004	54.58	1.690	652.3

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID		Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Mayfield Road W							
5L	L	13.2	0.48	0.572	28.08	0.818	330.0
2T	T	14.9	0.49	0.593	32.19	0.979	373.1
2R	R	16.8	0.50	0.599	35.38	1.112	421.6
		14.9	0.49	0.593	32.19	0.980	374.0
South: Mississauga Road S							
3L	L	12.6	0.45	0.535	26.29	0.781	314.5
8T	T	16.4	0.50	0.599	34.93	1.095	412.6
8R	R	17.6	0.53	0.643	38.49	1.188	442.2
		16.3	0.50	0.606	35.01	1.085	409.6
East: Mayfield Road E							
1L	L	14.8	0.48	0.570	31.21	0.949	370.8
6T	T	15.5	0.47	0.539	30.62	0.992	388.9
6R	R	11.8	0.40	0.482	23.88	0.745	294.4
		15.2	0.47	0.545	30.53	0.973	381.2
North: Mississauga Road N							
7L	L	14.4	0.47	0.571	30.73	0.925	361.5
4T	T	12.5	0.42	0.496	25.23	0.797	312.5
4R	R	12.2	0.41	0.505	25.37	0.779	304.4
		12.7	0.42	0.506	25.90	0.809	317.1
INTERSECTION:		14.6	0.47	0.564	30.66	0.950	366.5

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Mayfield Road W												
1 LT	65	597		662	6				0.843	16.9	96	500
2 T		663		663	7				0.843	16.2	96	500
3 R			90	90	16				0.108	8.7	5	75
	65	1260	90	1415	7				0.843	16.0	96	
South: Mississauga Road S												
1 LT	16	43		59	11				0.162	13.0	8	500
2 TR		17	45	62	15				0.162	11.9	8	500
	16	60	45	121	13				0.162	12.4	8	
East: Mayfield Road E												
1 LT	170	198		368	13				0.339	9.8	20	500
2 TR		337	26	363	14				0.339	6.7	20	500
	170	535	26	731	13				0.339	8.2	20	
North: Mississauga Road N												
1 LT	60	205		265	5				0.351	10.3	16	500
2 TR		200	76	276	4				0.351	8.8	16	500
	60	405	76	541	4				0.351	9.5	16	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	2808	9	0.844	12.6	96

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Mayfield Road W								
5L	L	65	77	0.844*	23.1	C	11.9	96
2T	T	1260	1494	0.843	16.2	B	12.0	96
2R	R (Slp)	90	835	0.108	8.7	A	0.6	5
South: Mississauga Road S								
3L	L	16	99	0.162	17.8	B	0.9	8
8T	T	60	369	0.163	11.1	B	0.9	8
8R	R	45	277	0.162	12.2	B	0.9	8
East: Mayfield Road E								

1L	L	170	502	0.339	13.5	B	2.3	20
6T	T	535	1578	0.339	6.6	A	2.3	20
6R	R	26	77	0.338	7.4	A	2.3	20
North: Mississauga Road N								
7L	L	60	171	0.351	15.8	B	2.0	16
4T	T	405	1155	0.351	8.6	A	2.0	16
4R	R	76	217	0.350	9.6	A	2.0	16
ALL VEHICLES:		2808		0.844	12.6	B	12.0	96

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Mayfield Road W								
	South	Right	41.0	34.5	19.3	500	141	No
	East	Thru	57.3	39.1	47.1	500	136	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: Mayfield Road E								
	West	Thru	57.3	39.1	47.1	500	144	No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

	Delay (seconds/veh)

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Mayfield Road W										
1 LT	0.843	4.7	6.0	10.7	6.0	4.7	4.0	0.7	6.2	16.9
2 T	0.843	4.7	5.9	10.6	6.1	4.5	4.0	0.5	5.5	16.2
3 R	0.108	2.1	0.0	2.1	3.1	0.0	0.0	0.0	6.7	8.7
South: Mississauga Road S										
1 LT	0.162	5.5	0.0	5.5	4.8	0.7	0.0	0.7	7.5	13.0
2 TR	0.162	5.2	0.0	5.2	4.7	0.5	0.0	0.5	6.7	11.9
East: Mayfield Road E										
1 LT	0.339	0.8	0.0	0.8	2.1	0.0	0.0	0.0	8.9	9.8
2 TR	0.339	0.8	0.0	0.8	2.4	0.0	0.0	0.0	5.8	6.7
North: Mississauga Road N										
1 LT	0.351	3.1	0.1	3.2	3.9	0.0	0.0	0.0	7.1	10.3
2 TR	0.351	2.9	0.1	3.0	4.0	0.0	0.0	0.0	5.7	8.8

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Mayfield Road W							
1 LT	0.843	0.93	0.22	0.03	1.19	0.930	0.60
2 T	0.843	0.93	0.22	0.03	1.18	0.930	0.59
3 R	0.108	0.43	0.00	0.24	0.67	0.519	0.00
South: Mississauga Road S							
1 LT	0.162	0.78	0.00	0.12	0.89	0.776	0.00
2 TR	0.162	0.78	0.00	0.11	0.89	0.778	0.00
East: Mayfield Road E							
1 LT	0.339	0.22	0.00	0.36	0.59	0.361	0.00
2 TR	0.339	0.23	0.00	0.29	0.51	0.363	0.00
North: Mississauga Road N							
1 LT	0.351	0.57	0.01	0.19	0.76	0.629	0.02
2 TR	0.351	0.54	0.01	0.18	0.72	0.626	0.01

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio

West: Mayfield Road W											
1 LT	0.843	1.2	2.5	1.6	4.1	6.6	8.3	9.5	11.9	14.0	0.19
2 T	0.843	1.2	2.5	1.6	4.1	6.6	8.3	9.5	12.0	14.0	0.19
3 R	0.108	0.0	0.2	0.0	0.2	0.3	0.4	0.5	0.6	0.7	0.07
South: Mississauga Road S											
1 LT	0.162	0.0	0.3	0.0	0.3	0.5	0.7	0.7	0.9	1.1	0.02
2 TR	0.162	0.0	0.3	0.0	0.3	0.6	0.7	0.8	0.9	1.1	0.02
East: Mayfield Road E											
1 LT	0.339	0.0	0.7	0.0	0.7	1.4	1.7	1.9	2.3	2.7	0.04
2 TR	0.339	0.0	0.7	0.0	0.7	1.4	1.7	1.9	2.3	2.7	0.04
North: Mississauga Road N											
1 LT	0.351	0.0	0.6	0.0	0.6	1.2	1.4	1.6	2.0	2.3	0.03
2 TR	0.351	0.0	0.6	0.0	0.6	1.2	1.4	1.6	2.0	2.3	0.03

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Mayfield Road W											
1 LT	0.843	9.4	19.8	13.0	32.8	53.1	66.2	76.0	95.7	112.0	0.19
2 T	0.843	9.4	19.9	13.0	32.9	53.3	66.5	76.4	96.2	112.6	0.19
3 R	0.108	0.0	1.5	0.0	1.5	2.9	3.5	4.0	4.9	5.7	0.07
South: Mississauga Road S											
1 LT	0.162	0.0	2.4	0.0	2.4	4.5	5.5	6.2	7.6	8.8	0.02
2 TR	0.162	0.0	2.5	0.0	2.5	4.7	5.7	6.5	8.0	9.3	0.02
East: Mayfield Road E											
1 LT	0.339	0.0	6.3	0.0	6.3	11.6	14.1	16.0	19.8	22.9	0.04
2 TR	0.339	0.0	6.4	0.0	6.4	11.7	14.2	16.1	19.9	23.1	0.04
North: Mississauga Road N											
1 LT	0.351	0.1	4.9	0.1	5.0	9.3	11.3	12.8	15.8	18.3	0.03
2 TR	0.351	0.1	4.9	0.1	5.0	9.2	11.2	12.7	15.7	18.2	0.03

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 AM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Mayfield Road W									
5L L	65.0	25.7	25.7	65.0	19.8		41.7	40.2	12.4

2T	T	65.0	39.1	39.1	65.0	19.7	45.1	44.6	5.5
2R	R	65.0	34.5	34.5	65.0		51.3	51.3	6.7
South: Mississauga Road S									
3L	L	65.0	25.7	25.7	65.0		45.4	44.0	12.4
8T	T	65.0	39.1	39.1	65.0		50.0	49.7	5.7
8R	R	65.0	32.5	32.5	65.0		49.3	48.6	7.1
East: Mayfield Road E									
1L	L	65.0	25.7	25.7	65.0		47.2	47.2	12.6
6T	T	65.0	39.1	39.1	65.0		53.2	53.2	5.7
6R	R	65.0	32.5	32.5	65.0		52.0	52.0	6.6
North: Mississauga Road N									
7L	L	65.0	25.7	25.7	65.0	17.9	45.9	45.9	12.6
4T	T	65.0	39.1	39.1	65.0	18.1	51.1	51.1	5.4
4R	R	65.0	32.5	32.5	65.0	18.2	50.3	50.3	6.6

"Running Speed" is the average speed excluding stopped periods.

Site: Mayfield 2031 AM TTMP Red N/S
C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap
Processed Jan 12, 2010 12:01:46PM

A1492, AECOM, Small Office

SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Mayfield Road W							
	South	2R	Right	63	12	1.00	1.00
	East	2T	Thru	1088	57	1.00	1.00
	North	5L	Left	118	2	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	54	1	1.00	1.00
	East	8R	Right	214	41	1.00	1.00
	North	8T	Thru	292	48	1.00	1.00
East: Mayfield Road E							
	West	6T	Thru	633	112	1.00	1.00
	South	1L	Left	86	9	1.00	1.00
	North	6R	Right	44	1	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	34	1	1.00	1.00
	South	4T	Thru	96	4	1.00	1.00
	East	7L	Left	18	2	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	118	2	0	0	0	0
2T	T	0	0	1088	57	0	0
2R	R	0	0	0	0	63	12
South: Mississauga Road S							
3L	L	54	1	0	0	0	0
8T	T	0	0	292	48	0	0
8R	R	0	0	0	0	214	41
East: Mayfield Road E							
1L	L	86	10	0	0	0	0
6T	T	0	0	633	112	0	0
6R	R	0	0	0	0	44	1
North: Mississauga Road N							
7L	L	18	2	0	0	0	0
4T	T	0	0	96	4	0	0
4R	R	0	0	0	0	34	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Mayfield Road W							
5L	L	120	1.7	0	0.0	0	0.0
2T	T	0	0.0	1145	5.0	0	0.0
2R	R	0	0.0	0	0.0	75	16.0
South: Mississauga Road S							
3L	L	55	1.8	0	0.0	0	0.0
8T	T	0	0.0	340	14.1	0	0.0
8R	R	0	0.0	0	0.0	255	16.1
East: Mayfield Road E							
1L	L	96	10.4	0	0.0	0	0.0
6T	T	0	0.0	745	15.0	0	0.0
6R	R	0	0.0	0	0.0	45	2.2
North: Mississauga Road N							
7L	L	20	10.0	0	0.0	0	0.0
4T	T	0	0.0	100	4.0	0	0.0
4R	R	0	0.0	0	0.0	35	2.9

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Mayfield Road W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	215	7.0	220	0	N	0.979
Exclusive Slip lane (exiting flow):						195	6.9	200	0	N	0.980
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1285	4.8	1290	0	N	0.812
East: Mayfield Road E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	515	9.9	546	0	N	0.912
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	895	13.7	975	0	N	0.810

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Mayfield Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	220	32.0	144.9	1.55	0.188	4.20	37.3	2.62
Thru	1	Subdominant	220	32.0	144.9	1.55	0.188	4.21	37.4	2.63
	2	Dominant	220	32.0	144.9	1.55	0.188	4.21	37.4	2.63
Right	3	Excl. Slip	200E	32.6	163.1	1.53	0.170	4.21	38.1	2.63
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1290	37.6	29.2	1.02	0.557	3.40	35.6	2.51
Thru	1	Subdominant	1290	37.6	29.2	1.02	0.557	3.71	38.8	2.74
	2	Dominant	1290	37.6	29.2	1.02	0.557	3.50	36.6	2.58
Right	2	Dominant	1290	37.6	29.2	1.02	0.557	3.56	37.2	2.62
East: Mayfield Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	546	34.6	63.3	1.55	0.403	4.18	40.2	2.78D
Thru	1	Subdominant	546	34.6	63.3	1.55	0.403	4.37	41.9	2.91D
	2	Dominant	546	34.6	63.3	1.55	0.403	4.37	41.9	2.91

Right	2	Dominant	546	34.6	63.3	1.55	0.403	3.97	38.1	2.64
North: Mississauga Road N										
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	975	36.9	37.8	1.09	0.480	3.81	39.0	2.71
Thru	1	Subdominant	975	36.9	37.8	1.09	0.480	3.63	37.2	2.59
	2	Dominant	975	36.9	37.8	1.09	0.480	3.49	35.7	2.48
Right	2	Dominant	975	36.9	37.8	1.09	0.480	3.48	35.7	2.48

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic
D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Total Adjust. Flow (pcu/h)	Prac. Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Mayfield Road W										
5L L	120	1.7	215	7.0	220	213	0.85	51	100	0.563
2T T	1145	5.0	215	7.0	220	2035	0.85	51	100	0.563
2R R	75	16.0	195	6.9	200	1143	0.85	1195	100	0.066
South: Mississauga Road S										
3L L	55	1.8	1285	4.8	1290	83	0.85	28	100	0.663
8T T	340	14.1	1285	4.8	1290	512	0.85	28	100	0.664*
8R R	255	16.1	1285	4.8	1290	384	0.85	28	100	0.664*
East: Mayfield Road E										
1L L	96	10.4	515	9.9	546	159	0.85	41	100	0.604
6T T	745	15.0	515	9.9	546	1237	0.85	41	100	0.602
6R R	45	2.2	515	9.9	546	75	0.85	42	100	0.600
North: Mississauga Road N										
7L L	20	10.0	895	13.7	975	159	0.85	576	100	0.126
4T T	100	4.0	895	13.7	975	794	0.85	575	100	0.126
4R R	35	2.9	895	13.7	975	278	0.85	575	100	0.126

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Intersection Level of Service	=	B
Worst movement Level of Service	=	C
Average intersection delay (s/pers)	=	10.8
Largest average movement delay (s)	=	22.3

Largest back of queue, 95% (m)	=	48
Performance Index	=	62.59
Degree of saturation (highest)	=	0.664
Practical Spare Capacity (lowest)	=	28 %
Effective intersection capacity, (veh/h)	=	4564
Total vehicle flow (veh/h)	=	3031
Total person flow (pers/h)	=	3637
Total vehicle delay (veh-h/h)	=	9.12
Total person delay (pers-h/h)	=	10.95
Total effective vehicle stops (veh/h)	=	2401
Total effective person stops (pers/h)	=	2881
Total vehicle travel (veh-km/h)	=	1918.4
Total cost ($/h)	=	901.19
Total fuel (L/h)	=	283.1
Total CO2 (kg/h)	=	710.79

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W										
5L	L	0.46	0.55	13.8	0.53	0.72	4.8	38	2.48	46.4
2T	T	2.19	2.63	6.9	0.53	0.57	4.8	38	19.69	51.9
2R	R	0.15	0.18	7.3	0.31	0.52	0.4	3	1.20	52.8
South: Mississauga Road S										
3L	L	0.34	0.41	22.3	0.84	1.08	5.0	42	1.52	40.7
8T	T	1.47	1.76	15.6	0.84	1.03	5.1	44	8.44	45.3
8R	R	1.17	1.40	16.5	0.84	1.04	5.1	44	6.36	44.5
East: Mayfield Road E										
1L	L	0.48	0.57	18.0	0.77	0.99	5.6	48	2.40	44.2
6T	T	2.29	2.75	11.1	0.77	0.94	5.6	48	16.47	49.8
6R	R	0.15	0.18	11.9	0.77	0.94	5.6	47	1.00	48.4
North: Mississauga Road N										
7L	L	0.09	0.11	15.9	0.66	0.90	0.7	6	0.45	45.8
4T	T	0.24	0.29	8.6	0.66	0.71	0.7	6	1.89	50.8
4R	R	0.09	0.11	9.6	0.66	0.77	0.7	6	0.68	50.0

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Mayfield Road W									
1340	0.563	2.81	3.37	7.5	0.52	0.58	38	23.37	51.3
South: Mississauga Road S									
650	0.664	2.98	3.58	16.5	0.84	1.04	44	16.33	44.5
East: Mayfield Road E									
886	0.604	2.92	3.50	11.8	0.77	0.94	48	19.87	49.0
North: Mississauga Road N									
155	0.126	0.42	0.50	9.8	0.66	0.75	6	3.02	49.9

ALL VEHICLES:									
3031	0.664	9.12	10.95	10.8	0.67	0.79	48	62.59	49.0
INTERSECTION (persons):									
3637	0.664		10.95	10.8	0.67	0.79		62.59	49.0

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Mayfield Road W								
1 LT	633	1124	0.563	8.2	0.60	4.8	37.6	500.0
2 T	632	1124	0.563	6.9	0.57	4.8	37.8	500.0
3 R	75	1143	0.066	7.3	0.52	0.4	3.0	75.0
South: Mississauga Road S								
1 LT	317	477	0.664	16.8	1.04	5.0	41.9	500.0
2 TR	333	502	0.664	16.2	1.04	5.1	43.8	500.0
East: Mayfield Road E								
1 LT	443	735	0.602	12.6	0.95	5.6	47.6	500.0
2 TR	443	735	0.602	11.1	0.94	5.6	47.4	500.0
North: Mississauga Road N								
1 LT	74	590	0.126	10.7	0.77	0.7	5.5	500.0
2 TR	81	641	0.126	8.9	0.73	0.7	5.6	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Mayfield Road W								
1 LT	120	513	0	633	150	1124	0.563	100
2 T	0	632	0	632	150	1124	0.563	100
3 R	0	0	75	75	75	1143	0.066	100
South: Mississauga Road S								
1 LT	55	262	0	317	150	477	0.664	100
2 TR	0	78	255	333	150	502	0.664	100
East: Mayfield Road E								
1 LT	96	347	0	443	150	735	0.602	100
2 TR	0	398	45	443	150	735	0.602	100
North: Mississauga Road N								
1 LT	20	54	0	74	74	590	0.126	100
2 TR	0	46	35	81	81	641	0.126	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Mayfield Road W									
5L	L	120	213	100	0.563	13.8	0.72	4.8	2.48
2T	T	1145	2035	100	0.563	6.9	0.57	4.8	19.69
2R	R (Slp)	75	1143	100	0.066	7.3	0.52	0.4	1.20
South: Mississauga Road S									
3L	L	55	83	100	0.663	22.3	1.08	5.0	1.52
8T	T	340	512	100	0.664*	15.6	1.03	5.1	8.44
8R	R	255	384	100	0.664*	16.5	1.04	5.1	6.36
East: Mayfield Road E									
1L	L	96	159	100	0.604	18.0	0.99	5.6	2.40
6T	T	745	1237	100	0.602	11.1	0.94	5.6	16.47
6R	R	45	75	100	0.600	11.9	0.94	5.6	1.00
North: Mississauga Road N									
7L	L	20	159	100	0.126	15.9	0.90	0.7	0.45
4T	T	100	794	100	0.126	8.6	0.71	0.7	1.89
4R	R	35	278	100	0.126	9.6	0.77	0.7	0.68

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Mayfield Road W						
5L L	9.9	34.66	0.042	2.06	0.062	24.8
2T T	90.7	299.74	0.354	18.10	0.577	227.3
2R R	7.6	22.77	0.027	1.56	0.050	19.1
	108.2	357.17	0.422	21.72	0.689	271.2
South: Mississauga Road S						
3L L	4.8	17.45	0.021	1.01	0.030	12.0
8T T	36.5	113.70	0.135	7.82	0.243	91.7
8R R	28.9	88.63	0.107	6.35	0.195	72.7
	70.2	219.78	0.263	15.18	0.468	176.4

East: Mayfield Road E							
1L	L	10.0	32.59	0.039	2.17	0.065	25.1
6T	T	78.7	237.91	0.285	16.79	0.527	197.9
6R	R	3.5	11.95	0.015	0.74	0.023	8.8
		92.2	282.45	0.339	19.71	0.614	231.8
North: Mississauga Road N							
7L	L	1.9	6.41	0.008	0.42	0.013	4.9
4T	T	7.9	26.34	0.031	1.61	0.051	19.8
4R	R	2.7	9.04	0.011	0.56	0.017	6.7
		12.5	41.79	0.050	2.58	0.080	31.4
INTERSECTION:		283.1	901.19	1.074	59.19	1.851	710.8

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID		Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Mayfield Road W							
5L	L	12.2	0.43	0.517	25.47	0.762	305.9
2T	T	12.6	0.42	0.491	25.11	0.801	315.5
2R	R	16.2	0.49	0.572	33.33	1.060	408.3
		12.8	0.42	0.498	25.60	0.812	319.7
South: Mississauga Road S							
3L	L	13.0	0.47	0.558	27.10	0.799	324.0
8T	T	17.0	0.53	0.632	36.56	1.136	428.6
8R	R	18.2	0.56	0.673	39.94	1.225	457.0
		17.1	0.54	0.641	37.02	1.140	430.1
East: Mayfield Road E							
1L	L	15.5	0.50	0.607	33.48	1.004	388.2
6T	T	16.8	0.51	0.607	35.82	1.123	422.1
6R	R	12.5	0.43	0.524	26.52	0.804	312.8
		16.4	0.50	0.603	35.08	1.093	412.8
North: Mississauga Road N							
7L	L	14.4	0.47	0.573	30.83	0.928	362.5
4T	T	12.6	0.42	0.500	25.54	0.804	314.5
4R	R	12.2	0.41	0.508	25.57	0.783	305.8
		12.7	0.43	0.512	26.28	0.816	319.2
INTERSECTION:		14.8	0.47	0.560	30.85	0.965	370.5

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Mayfield Road W											
1 LT	120	513		633	4			0.563	8.2	38	500
2 T		632		632	5			0.563	6.9	38	500
3 R			75	75	16			0.066	7.3	3	75
	120	1145	75	1340	5			0.563	7.5	38	
South: Mississauga Road S											
1 LT	55	262		317	12			0.664	16.8	42	500
2 TR		78	255	333	16			0.664	16.2	44	500
	55	340	255	650	14			0.664	16.5	44	
East: Mayfield Road E											
1 LT	96	347		443	14			0.602	12.6	48	500
2 TR		398	45	443	14			0.602	11.1	47	500
	96	745	45	886	14			0.602	11.8	48	
North: Mississauga Road N											
1 LT	20	54		74	6			0.126	10.7	6	500
2 TR		46	35	81	4			0.126	8.9	6	500
	20	100	35	155	5			0.126	9.8	6	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	3031	10	0.664	10.8	48

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Mayfield Road W								
5L	L	120	213	0.563	13.8	B	4.8	38
2T	T	1145	2035	0.563	6.9	A	4.8	38
2R	R (Slp)	75	1143	0.066	7.3	A	0.4	3
South: Mississauga Road S								
3L	L	55	83	0.663	22.3	C	5.0	42
8T	T	340	512	0.664*	15.6	B	5.1	44
8R	R	255	384	0.664*	16.5	B	5.1	44
East: Mayfield Road E								

1L	L	96	159	0.604	18.0	B	5.6	48
6T	T	745	1237	0.602	11.1	B	5.6	48
6R	R	45	75	0.600	11.9	B	5.6	47
North: Mississauga Road N								
7L	L	20	159	0.126	15.9	B	0.7	6
4T	T	100	794	0.126	8.6	A	0.7	6
4R	R	35	278	0.126	9.6	A	0.7	6
ALL VEHICLES:		3031		0.664	10.8	B	5.6	48

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Mayfield Road W								
	South	Right	41.0	34.5	19.3	500	141	No
	East	Thru	57.3	39.1	47.1	500	134	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	140	No
	North	Thru	57.3	39.1	47.1	500	143	No
East: Mayfield Road E								
	West	Thru	57.3	39.1	47.1	500	144	No
	South	Left	19.0	25.7	74.6	500	184	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	182	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

	Delay (seconds/veh)

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Mayfield Road W										
1 LT	0.563	1.4	0.0	1.4	3.3	0.0	0.0	0.0	6.8	8.2
2 T	0.563	1.4	0.0	1.4	3.5	0.0	0.0	0.0	5.5	6.9
3 R	0.066	0.7	0.0	0.7	1.9	0.0	0.0	0.0	6.7	7.3
South: Mississauga Road S										
1 LT	0.664	6.2	3.7	10.0	5.3	4.6	2.2	2.5	6.9	16.8
2 TR	0.664	5.9	3.5	9.5	5.0	4.4	2.2	2.2	6.7	16.2
East: Mayfield Road E										
1 LT	0.602	3.8	1.6	5.3	4.8	0.5	0.4	0.1	7.2	12.6
2 TR	0.602	3.8	1.6	5.3	5.0	0.3	0.3	0.0	5.8	11.1
North: Mississauga Road N										
1 LT	0.126	3.3	0.0	3.3	4.1	0.0	0.0	0.0	7.4	10.7
2 TR	0.126	3.0	0.0	3.0	4.1	0.0	0.0	0.0	5.9	8.9

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Mayfield Road W							
1 LT	0.563	0.36	0.00	0.23	0.60	0.530	0.00
2 T	0.563	0.36	0.00	0.21	0.57	0.530	0.00
3 R	0.066	0.18	0.00	0.35	0.52	0.311	0.00
South: Mississauga Road S							
1 LT	0.664	0.84	0.12	0.08	1.04	0.843	0.38
2 TR	0.664	0.84	0.12	0.08	1.04	0.838	0.37
East: Mayfield Road E							
1 LT	0.602	0.77	0.07	0.11	0.95	0.771	0.17
2 TR	0.602	0.77	0.07	0.10	0.94	0.771	0.17
North: Mississauga Road N							
1 LT	0.126	0.60	0.00	0.17	0.77	0.664	0.00
2 TR	0.126	0.57	0.00	0.16	0.73	0.662	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio

West: Mayfield Road W											
1 LT	0.563	0.0	1.6	0.0	1.6	2.8	3.4	3.8	4.8	5.6	0.08
2 T	0.563	0.0	1.6	0.0	1.6	2.8	3.4	3.8	4.8	5.6	0.08
3 R	0.066	0.0	0.1	0.0	0.1	0.2	0.3	0.3	0.4	0.4	0.04
South: Mississauga Road S											
1 LT	0.664	0.4	1.3	0.3	1.6	2.9	3.5	4.0	5.0	5.8	0.08
2 TR	0.664	0.4	1.3	0.3	1.7	2.9	3.6	4.1	5.1	5.9	0.09
East: Mayfield Road E											
1 LT	0.602	0.2	1.5	0.3	1.8	3.2	3.9	4.5	5.6	6.5	0.10
2 TR	0.602	0.2	1.5	0.3	1.8	3.2	3.9	4.5	5.6	6.5	0.09
North: Mississauga Road N											
1 LT	0.126	0.0	0.2	0.0	0.2	0.4	0.5	0.6	0.7	0.8	0.01
2 TR	0.126	0.0	0.2	0.0	0.2	0.4	0.5	0.6	0.7	0.8	0.01

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Mayfield Road W											
1 LT	0.563	0.0	12.2	0.0	12.2	21.7	26.6	30.3	37.6	43.8	0.08
2 T	0.563	0.0	12.3	0.0	12.3	21.8	26.8	30.5	37.8	44.0	0.08
3 R	0.066	0.0	0.9	0.0	0.9	1.8	2.2	2.5	3.0	3.5	0.04
South: Mississauga Road S											
1 LT	0.664	3.0	10.8	2.8	13.6	24.2	29.6	33.7	41.9	48.7	0.08
2 TR	0.664	3.1	11.3	2.9	14.3	25.2	31.0	35.2	43.8	50.9	0.09
East: Mayfield Road E											
1 LT	0.602	2.1	12.9	2.7	15.6	27.3	33.6	38.2	47.6	55.3	0.10
2 TR	0.602	2.1	12.9	2.7	15.5	27.3	33.5	38.1	47.4	55.2	0.09
North: Mississauga Road N											
1 LT	0.126	0.0	1.7	0.0	1.7	3.3	4.0	4.5	5.5	6.4	0.01
2 TR	0.126	0.0	1.7	0.0	1.7	3.3	4.0	4.5	5.6	6.4	0.01

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Mayfield Road 2031 PM TTMP Reduced N/S
Intersection ID: 1
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Mayfield Road W									
5L L	65.0	25.7	25.7	65.0			46.4	46.4	12.4

2T	T	65.0	39.1	39.1	65.0		51.9	51.9	5.5
2R	R	65.0	34.5	34.5	65.0		52.8	52.8	6.7
South: Mississauga Road S									
3L	L	65.0	25.7	25.7	65.0	16.3	43.3	40.7	12.4
8T	T	65.0	39.1	39.1	65.0	15.9	47.3	45.3	5.7
8R	R	65.0	32.5	32.5	65.0	16.2	46.7	44.5	7.1
East: Mayfield Road E									
1L	L	65.0	25.7	25.7	65.0	21.3	44.4	44.2	12.6
6T	T	65.0	39.1	39.1	65.0	20.9	49.8	49.8	5.7
6R	R	65.0	32.5	32.5	65.0	21.7	48.4	48.4	6.6
North: Mississauga Road N									
7L	L	65.0	25.7	25.7	65.0		45.9	45.8	12.6
4T	T	65.0	39.1	39.1	65.0		50.8	50.8	5.4
4R	R	65.0	32.5	32.5	65.0		50.0	50.0	6.6

"Running Speed" is the average speed excluding stopped periods.

SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Sandalwood Parkway W							
	South	2R	Right	255	5	1.00	1.00
	East	2T	Thru	142	3	1.00	1.00
	North	5L	Left	10	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	34	1	1.00	1.00
	East	8R	Right	172	3	1.00	1.00
	North	8T	Thru	183	37	1.00	1.00
East: Sandalwood Parkway E							
	West	6T	Thru	78	2	1.00	1.00
	South	1L	Left	176	4	1.00	1.00
	North	6R	Right	240	5	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	44	1	1.00	1.00
	South	4T	Thru	600	25	1.00	1.00
	East	7L	Left	270	5	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Sandalwood Parkway W							
5L	L	10	1	0	0	0	0
2T	T	0	0	142	3	0	0
2R	R	0	0	0	0	255	5
South: Mississauga Road S							
3L	L	34	1	0	0	0	0
8T	T	0	0	183	37	0	0
8R	R	0	0	0	0	172	3
East: Sandalwood Parkway E							
1L	L	176	4	0	0	0	0
6T	T	0	0	78	2	0	0
6R	R	0	0	0	0	240	5
North: Mississauga Road N							
7L	L	270	6	0	0	0	0
4T	T	0	0	600	25	0	0
4R	R	0	0	0	0	44	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Sandalwood Parkway W							
5L	L	11	9.1	0	0.0	0	0.0
2T	T	0	0.0	145	2.1	0	0.0
2R	R	0	0.0	0	0.0	260	1.9
South: Mississauga Road S							
3L	L	35	2.9	0	0.0	0	0.0
8T	T	0	0.0	220	16.8	0	0.0
8R	R	0	0.0	0	0.0	175	1.7
East: Sandalwood Parkway E							
1L	L	180	2.2	0	0.0	0	0.0
6T	T	0	0.0	80	2.5	0	0.0
6R	R	0	0.0	0	0.0	245	2.0
North: Mississauga Road N							
7L	L	276	2.2	0	0.0	0	0.0
4T	T	0	0.0	625	4.0	0	0.0
4R	R	0	0.0	0	0.0	45	2.2

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Sandalwood Parkway W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	1080	3.2	1081	0	N	0.859
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	430	2.0	430	0	N	0.963
East: Sandalwood Parkway E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	265	14.5	291	0	N	0.959
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	295	2.0	295	0	N	0.970

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Sandalwood Parkway W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1081	33.5	31.0	1.20	0.553	4.02	37.3	2.90
Thru	1	Subdominant	1081	33.5	31.0	1.20	0.553	3.86	35.9	2.78
Right	2	Dominant	1081	33.5	31.0	1.20	0.553	3.38	31.5	2.44
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	430	30.2	70.3	2.00	0.409	4.15	34.9	2.71
Thru	1	Subdominant	430	30.2	70.3	2.00	0.409	4.64	39.0	3.03
	2	Dominant	430	30.2	70.3	2.00	0.409	4.61	38.7	3.00
Right	2	Dominant	430	30.2	70.3	2.00	0.409	4.12	34.6	2.68
East: Sandalwood Parkway E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	291	36.8	126.4	1.44	0.226	4.32	44.2	2.74D
Thru	1	Subdominant	291	36.8	126.4	1.44	0.226	4.32	44.2	2.74D
	2	Dominant	291	36.8	126.4	1.44	0.226	4.32	44.2	2.74
Right	2	Dominant	291	36.8	126.4	1.44	0.226	4.32	44.2	2.74

North: Mississauga Road N
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium

Left	1	Subdominant	295	29.4	99.5	1.78	0.274	4.24	34.6	2.69D
Thru	1	Subdominant	295	29.4	99.5	1.78	0.274	4.24	34.6	2.69D
	2	Dominant	295	29.4	99.5	1.78	0.274	4.24	34.6	2.69
Right	2	Dominant	295	29.4	99.5	1.78	0.274	4.24	34.6	2.69

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Sandalwood Parkway W										
5L L	11	9.1	1080	3.2	1081	37	0.85	186	74	0.297
2T T	145	2.1	1080	3.2	1081	487	0.85	185	74	0.298
2R R	260	1.9	1080	3.2	1081	644	0.85	111	100	0.404
South: Mississauga Road S										
3L L	35	2.9	430	2.0	430	136	0.85	230	100	0.257
8T T	220	16.8	430	2.0	430	856	0.85	231	100	0.257
8R R	175	1.7	430	2.0	430	681	0.85	231	100	0.257
East: Sandalwood Parkway E										
1L L	180	2.2	265	14.5	291	711	0.85	236	100	0.253
6T T	80	2.5	265	14.5	291	316	0.85	236	100	0.253
6R R	245	2.0	265	14.5	291	968	0.85	236	100	0.253
North: Mississauga Road N										
7L L	276	2.2	295	2.0	295	596	0.85	84	100	0.463
4T T	625	4.0	295	2.0	295	1350	0.85	84	100	0.463
4R R	45	2.2	295	2.0	295	97	0.85	83	100	0.464*

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Intersection Level of Service	=	A
Worst movement Level of Service	=	B
Average intersection delay (s/pers)	=	9.7
Largest average movement delay (s)	=	17.4
Largest back of queue, 95% (m)	=	28
Performance Index	=	43.29
Degree of saturation (highest)	=	0.464

Practical Spare Capacity (lowest)	=	83 %
Effective intersection capacity, (veh/h)	=	4951
Total vehicle flow (veh/h)	=	2297
Total person flow (pers/h)	=	2756
Total vehicle delay (veh-h/h)	=	6.19
Total person delay (pers-h/h)	=	7.43
Total effective vehicle stops (veh/h)	=	1599
Total effective person stops (pers/h)	=	1919
Total vehicle travel (veh-km/h)	=	1464.1
Total cost ($/h)	=	618.45
Total fuel (L/h)	=	184.4
Total CO2 (kg/h)	=	461.76

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: Sandalwood Parkway W										
5L	L	0.05	0.06	17.4	0.71	0.92	1.7	13	0.26	44.4
2T	T	0.42	0.50	10.4	0.71	0.84	1.7	13	3.00	50.1
2R	R	0.82	0.99	11.4	0.74	0.91	2.7	21	5.48	49.0
South: Mississauga Road S										
3L	L	0.15	0.18	15.0	0.55	0.78	1.6	14	0.75	46.3
8T	T	0.51	0.61	8.4	0.55	0.66	1.7	13	3.99	51.7
8R	R	0.43	0.52	8.9	0.55	0.69	1.7	13	3.19	50.8
East: Sandalwood Parkway E										
1L	L	0.68	0.82	13.7	0.45	0.73	1.6	12	3.64	46.8
6T	T	0.15	0.18	6.7	0.45	0.56	1.6	12	1.33	52.5
6R	R	0.54	0.64	7.9	0.45	0.63	1.6	12	4.23	51.4
North: Mississauga Road N										
7L	L	1.08	1.30	14.1	0.55	0.75	3.5	27	5.76	46.4
4T	T	1.25	1.50	7.2	0.55	0.59	3.5	27	10.85	51.7
4R	R	0.10	0.12	8.3	0.55	0.67	3.5	28	0.81	50.8

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Sandalwood Parkway W									
416	0.404	1.30	1.56	11.2	0.73	0.89	21	8.73	49.2
South: Mississauga Road S									
430	0.257	1.09	1.31	9.1	0.55	0.68	14	7.93	50.8
East: Sandalwood Parkway E									
505	0.253	1.37	1.64	9.8	0.45	0.65	12	9.20	49.7
North: Mississauga Road N									
946	0.464	2.44	2.92	9.3	0.55	0.64	28	17.43	49.9
ALL VEHICLES:									
2297	0.464	6.19	7.43	9.7	0.56	0.70	28	43.29	49.9

INTERSECTION (persons):

2756	0.464	7.43	9.7	0.56	0.70	43.29	49.9

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Sandalwood Parkway W								
1 LT	156	524	0.298	10.9	0.85	1.7	13.0	500.0
2 R	260	644	0.403	11.4	0.91	2.7	20.5	500.0
South: Mississauga Road S								
1 LT	205	796	0.257	9.6	0.68	1.6	13.9	500.0
2 TR	225	878	0.257	8.7	0.68	1.7	13.2	500.0
East: Sandalwood Parkway E								
1 LT	252	998	0.253	11.7	0.68	1.6	12.3	500.0
2 TR	253	998	0.253	7.8	0.63	1.6	12.3	500.0
North: Mississauga Road N								
1 LT	473	1022	0.463	11.2	0.69	3.5	27.4	500.0
2 TR	473	1021	0.463	7.3	0.60	3.5	27.6	500.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Sandalwood Parkway W								
1 LT	11	145	0	156	150	524	0.298	74P
2 R	0	0	260	260	150	644	0.403	100
South: Mississauga Road S								
1 LT	35	170	0	205	150	796	0.257	100
2 TR	0	50	175	225	150	878	0.257	100
East: Sandalwood Parkway E								
1 LT	180	72	0	252	150	998	0.253	100
2 TR	0	8	245	253	150	998	0.253	100
North: Mississauga Road N								
1 LT	276	197	0	473	150	1022	0.463	100
2 TR	0	428	45	473	150	1021	0.463	100

P Lane under-utilisation found by the "Program". This includes cases where the value of lane under-utilisation due to downstream effects has been modified by the program during lane flow calculations (e.g. a de facto exclusive lane has been found).

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Sandalwood Parkway W									
5L	L	11	37	74	0.297	17.4	0.92	1.7	0.26
2T	T	145	487	74	0.298	10.4	0.84	1.7	3.00
2R	R	260	644	100	0.404	11.4	0.91	2.7	5.48
South: Mississauga Road S									
3L	L	35	136	100	0.257	15.0	0.78	1.6	0.75
8T	T	220	856	100	0.257	8.4	0.66	1.7	3.99
8R	R	175	681	100	0.257	8.9	0.69	1.7	3.19
East: Sandalwood Parkway E									
1L	L	180	711	100	0.253	13.7	0.73	1.6	3.64
6T	T	80	316	100	0.253	6.7	0.56	1.6	1.33
6R	R	245	968	100	0.253	7.9	0.63	1.6	4.23
North: Mississauga Road N									
7L	L	276	596	100	0.463	14.1	0.75	3.5	5.76
4T	T	625	1350	100	0.463	7.2	0.59	3.5	10.85
4R	R	45	97	100	0.464*	8.3	0.67	3.5	0.81

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID		Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Sandalwood Parkway W							
5L	L	0.9	3.28	0.004	0.19	0.006	2.3
2T	T	10.9	37.37	0.045	2.22	0.070	27.4
2R	R	20.1	68.38	0.084	4.24	0.129	50.3
		32.0	109.04	0.133	6.66	0.204	80.0
South: Mississauga Road S							
3L	L	2.9	10.13	0.012	0.60	0.018	7.2
8T	T	23.2	69.24	0.081	4.78	0.152	58.3
8R	R	13.1	44.52	0.054	2.72	0.084	32.9
		39.2	123.89	0.148	8.10	0.254	98.4
East: Sandalwood Parkway E							

1L L	14.8	51.66	0.062	3.06	0.092	36.9
6T T	5.7	19.65	0.023	1.12	0.036	14.4
6R R	18.2	61.58	0.075	3.73	0.116	45.5
	38.7	132.89	0.160	7.91	0.243	96.8
North: Mississauga Road N						
7L L	22.8	79.83	0.096	4.75	0.142	57.0
4T T	48.3	161.35	0.191	9.63	0.307	121.0
4R R	3.4	11.45	0.014	0.70	0.022	8.5
	74.5	252.63	0.301	15.09	0.470	186.5
INTERSECTION:	184.4	618.45	0.742	37.75	1.172	461.8

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Sandalwood Parkway W						
5L L	12.5	0.44	0.531	26.09	0.776	313.3
2T T	12.0	0.41	0.491	24.37	0.762	299.9
2R R	12.4	0.42	0.518	26.17	0.796	310.3
	12.3	0.42	0.509	25.54	0.784	306.7
South: Mississauga Road S						
3L L	12.2	0.43	0.518	25.55	0.763	306.6
8T T	16.7	0.50	0.585	34.51	1.101	421.3
8R R	12.0	0.41	0.498	24.92	0.768	301.2
	14.5	0.46	0.544	29.87	0.938	363.0
East: Sandalwood Parkway E						
1L L	12.2	0.43	0.512	25.23	0.756	304.2
6T T	11.4	0.39	0.459	22.21	0.714	285.6
6R R	11.9	0.40	0.490	24.40	0.757	297.7
	11.9	0.41	0.494	24.37	0.750	298.2
North: Mississauga Road N						
7L L	12.2	0.43	0.517	25.52	0.763	306.3
4T T	12.3	0.41	0.485	24.49	0.780	307.7
4R R	12.0	0.41	0.498	24.91	0.768	301.2
	12.3	0.42	0.496	24.83	0.774	307.0
INTERSECTION:	12.6	0.42	0.507	25.79	0.801	315.4

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Sandalwood Parkway W												
1 LT	11	145		156	3				0.298	10.9	13	500
2 R			260	260	2				0.403	11.4	21	500
	11	145	260	416	2				0.403	11.2	21	
South: Mississauga Road S												
1 LT	35	170		205	14				0.257	9.6	14	500
2 TR		50	175	225	5				0.257	8.7	13	500
	35	220	175	430	10				0.257	9.1	14	
East: Sandalwood Parkway E												
1 LT	180	72		252	2				0.253	11.7	12	500
2 TR		8	245	253	2				0.253	7.8	12	500
	180	80	245	505	2				0.253	9.8	12	
North: Mississauga Road N												
1 LT	276	197		473	3				0.463	11.2	27	500
2 TR		428	45	473	4				0.463	7.3	28	500
	276	625	45	946	3				0.463	9.3	28	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	2297	4	0.464	9.7	28

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Sandalwood Parkway W								
5L	L	11	37	0.297	17.4	B	1.7	13
2T	T	145	487	0.298	10.4	B	1.7	13
2R	R	260	644	0.404	11.4	B	2.7	21
South: Mississauga Road S								
3L	L	35	136	0.257	15.0	B	1.6	14
8T	T	220	856	0.257	8.4	A	1.7	13
8R	R	175	681	0.257	8.9	A	1.7	13
East: Sandalwood Parkway E								
1L	L	180	711	0.253	13.7	B	1.6	12

6T	T	80	316	0.253	6.7	A	1.6	12
6R	R	245	968	0.253	7.9	A	1.6	12
North: Mississauga Road N								
7L	L	276	596	0.463	14.1	B	3.5	27
4T	T	625	1350	0.463	7.2	A	3.5	27
4R	R	45	97	0.464*	8.3	A	3.5	28
ALL VEHICLES:		2297		0.464	9.7	A	3.5	28

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Sandalwood Parkway W								
	South	Right	35.0	32.5	19.4	500	126	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Sandalwood Parkway E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

	Delay (seconds/veh)			
Deg.	Stop-line Delay	Acc.	Queuing	Stopd

Lane No.	Satn x	1st d1	2nd d2	Total dSL	Dec. dn	Total dq	MvUp dqm	(Idle) di	Geom dig	Control dic
West: Sandalwood Parkway W										
1 LT	0.298	5.0	0.1	5.0	4.6	0.4	0.1	0.4	5.9	10.9
2 R	0.403	4.3	0.6	4.8	4.3	0.5	0.5	0.0	6.6	11.4
South: Mississauga Road S										
1 LT	0.257	2.6	0.0	2.6	3.5	0.0	0.0	0.0	6.9	9.6
2 TR	0.257	2.3	0.0	2.3	3.3	0.0	0.0	0.0	6.4	8.7
East: Sandalwood Parkway E										
1 LT	0.253	1.3	0.0	1.3	2.5	0.0	0.0	0.0	10.4	11.7
2 TR	0.253	1.3	0.0	1.3	2.6	0.0	0.0	0.0	6.5	7.8
North: Mississauga Road N										
1 LT	0.463	1.7	0.0	1.7	3.1	0.0	0.0	0.0	9.5	11.2
2 TR	0.463	1.8	0.0	1.8	3.6	0.0	0.0	0.0	5.5	7.3

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Sandalwood Parkway W							
1 LT	0.298	0.71	0.00	0.13	0.85	0.712	0.01
2 R	0.403	0.74	0.03	0.14	0.91	0.742	0.09
South: Mississauga Road S							
1 LT	0.257	0.47	0.00	0.22	0.68	0.554	0.00
2 TR	0.257	0.45	0.00	0.23	0.68	0.546	0.00
East: Sandalwood Parkway E							
1 LT	0.253	0.33	0.00	0.35	0.68	0.454	0.00
2 TR	0.253	0.34	0.00	0.29	0.63	0.454	0.00
North: Mississauga Road N							
1 LT	0.463	0.41	0.00	0.27	0.69	0.545	0.00
2 TR	0.463	0.39	0.00	0.21	0.60	0.545	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Sandalwood Parkway W											
1 LT	0.298	0.0	0.5	0.0	0.5	1.0	1.2	1.4	1.7	1.9	0.03

2 R	0.403	0.1	0.8	0.1	0.8	1.6	1.9	2.1	2.7	3.1	0.04
South: Mississauga Road S											
1 LT	0.257	0.0	0.5	0.0	0.5	1.0	1.2	1.3	1.6	1.9	0.03
2 TR	0.257	0.0	0.5	0.0	0.5	1.0	1.2	1.3	1.7	1.9	0.03
East: Sandalwood Parkway E											
1 LT	0.253	0.0	0.5	0.0	0.5	0.9	1.1	1.3	1.6	1.8	0.02
2 TR	0.253	0.0	0.5	0.0	0.5	0.9	1.1	1.3	1.6	1.8	0.02
North: Mississauga Road N											
1 LT	0.463	0.0	1.1	0.0	1.1	2.0	2.5	2.8	3.5	4.1	0.05
2 TR	0.463	0.0	1.1	0.0	1.1	2.0	2.5	2.8	3.5	4.1	0.06

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Sandalwood Parkway W											
1 LT	0.298	0.0	4.1	0.0	4.1	7.6	9.3	10.5	13.0	15.0	0.03
2 R	0.403	0.5	6.1	0.4	6.6	12.0	14.6	16.6	20.5	23.8	0.04
South: Mississauga Road S											
1 LT	0.257	0.0	4.4	0.0	4.4	8.1	9.9	11.2	13.9	16.0	0.03
2 TR	0.257	0.0	4.2	0.0	4.2	7.8	9.4	10.7	13.2	15.3	0.03
East: Sandalwood Parkway E											
1 LT	0.253	0.0	3.9	0.0	3.9	7.2	8.8	9.9	12.3	14.2	0.02
2 TR	0.253	0.0	3.9	0.0	3.9	7.2	8.8	9.9	12.3	14.2	0.02
North: Mississauga Road N											
1 LT	0.463	0.0	8.8	0.0	8.8	15.9	19.5	22.1	27.4	31.8	0.05
2 TR	0.463	0.0	8.9	0.0	8.9	16.1	19.6	22.3	27.6	32.0	0.06

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 AM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Sandalwood Parkway W									
5L L	65.0	25.7	25.7	65.0	15.8		45.6	44.4	12.4
2T T	65.0	39.1	39.1	65.0	16.1		50.4	50.1	5.4
2R R	65.0	32.5	32.5	65.0	16.9		49.0	49.0	6.6
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0			46.3	46.3	12.4

8T	T	65.0	39.1	39.1	65.0	51.7	51.7	5.8
8R	R	65.0	32.5	32.5	65.0	50.8	50.8	6.6
East: Sandalwood Parkway E								
1L	L	65.0	25.7	25.7	65.0	46.8	46.8	12.4
6T	T	65.0	39.1	39.1	65.0	52.5	52.5	5.4
6R	R	65.0	32.5	32.5	65.0	51.4	51.4	6.6
North: Mississauga Road N								
7L	L	65.0	25.7	25.7	65.0	46.4	46.4	12.4
4T	T	65.0	39.1	39.1	65.0	51.7	51.7	5.4
4R	R	65.0	32.5	32.5	65.0	50.8	50.8	6.6

"Running Speed" is the average speed excluding stopped periods.

Site: Mississauga and Sandalwood 2031 AM TTMP Red N/S
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Processed Dec 10, 2009 11:46:01AM

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SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Sandalwood Parkway W							
	South	2R	Right	162	3	1.00	1.00
	East	2T	Thru	162	3	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	64	1	1.00	1.00
	East	8R	Right	382	8	1.00	1.00
	North	8T	Thru	403	82	1.00	1.00
East: Sandalwood Parkway E							
	West	6T	Thru	108	2	1.00	1.00
	South	1L	Left	216	4	1.00	1.00
	North	6R	Right	426	9	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	20	0	1.00	1.00
	South	4T	Thru	254	11	1.00	1.00
	East	7L	Left	132	3	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Sandalwood Parkway W							
5L	L	5	1	0	0	0	0
2T	T	0	0	162	3	0	0
2R	R	0	0	0	0	162	3
South: Mississauga Road S							
3L	L	64	1	0	0	0	0
8T	T	0	0	403	82	0	0
8R	R	0	0	0	0	382	8
East: Sandalwood Parkway E							
1L	L	216	4	0	0	0	0
6T	T	0	0	108	2	0	0
6R	R	0	0	0	0	426	9
North: Mississauga Road N							
7L	L	132	3	0	0	0	0
4T	T	0	0	254	11	0	0
4R	R	0	0	0	0	20	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Sandalwood Parkway W							
5L	L	6	16.7	0	0.0	0	0.0
2T	T	0	0.0	165	1.8	0	0.0
2R	R	0	0.0	0	0.0	165	1.8
South: Mississauga Road S							
3L	L	65	1.5	0	0.0	0	0.0
8T	T	0	0.0	485	16.9	0	0.0
8R	R	0	0.0	0	0.0	390	2.1
East: Sandalwood Parkway E							
1L	L	220	1.8	0	0.0	0	0.0
6T	T	0	0.0	110	1.8	0	0.0
6R	R	0	0.0	0	0.0	435	2.1
North: Mississauga Road N							
7L	L	135	2.2	0	0.0	0	0.0
4T	T	0	0.0	265	4.2	0	0.0
4R	R	0	0.0	0	0.0	21	4.8

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Sandalwood Parkway W											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	620	2.9	620	0	N	0.945
South: Mississauga Road S											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	305	2.0	305	0	N	0.976
East: Sandalwood Parkway E											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	555	15.1	613	0	N	0.916
North: Mississauga Road N											
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium						
30	10	50	2	2	4.00	395	2.0	395	0	N	0.945

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Sandalwood Parkway W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	620	31.5	50.7	1.38	0.407	4.34	37.9	2.93
Thru	1	Subdominant	620	31.5	50.7	1.38	0.407	3.89	34.0	2.62
	2	Dominant	620	31.5	50.7	1.38	0.407	3.87	33.8	2.61
Right	2	Dominant	620	31.5	50.7	1.38	0.407	3.87	33.8	2.61
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	305	33.0	108.1	1.88	0.294	4.27	39.1	2.71
Thru	1	Subdominant	305	33.0	108.1	1.88	0.294	4.77	43.6	3.03
	2	Dominant	305	33.0	108.1	1.88	0.294	4.72	43.3	3.00
Right	2	Dominant	305	33.0	108.1	1.88	0.294	4.22	38.7	2.68
East: Sandalwood Parkway E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	613	37.4	61.0	1.44	0.418	4.11	42.7	2.77
Thru	1	Subdominant	613	37.4	61.0	1.44	0.418	4.11	42.7	2.77
Right	2	Dominant	613	37.4	61.0	1.44	0.418	3.88	40.3	2.62

```
North: Mississauga Road N
  Environment Factor: 1.20   Entry/Circulating Flow Adjustment: Medium
Left  1 Subdominant  395   29.5    74.6  2.00   0.382    4.17    34.1    2.70D
Thru  1 Subdominant  395   29.5    74.6  2.00   0.382    4.17    34.1    2.70D
      2 Dominant     395   29.5    74.6  2.00   0.382    4.17    34.1    2.70
Right 2 Dominant     395   29.5    74.6  2.00   0.382    4.18    34.2    2.70
--------------------------------------------------------------------------------

  Priority sharing is implied for some movements (Follow-up Headway plus
  Intra-bunch Headway is larger than the Critical Gap).  The O-D Factor
  (Table R.0) allows for priority sharing and priority emphasis.

  D  Subdominant lane follow-up headway was calculated as less than
     the dominant lane value and was set to the dominant lane value

  Dist (Distance): Spacing, i.e. distance between the front ends of two
                   successive vehicles across all lanes in the circulating
                   or exiting stream
```

Table S.2 - Movement Capacity Parameters

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

-------------------------------------------------------------------------
 Mov                    Opposing Movement  Total Prac. Prac.  Lane  Deg.
 ID      Demand                   Adjust.  Cap. Deg.  Spare  Util  Satn
         Flow     HV   Flow   HV  Flow     (veh  Satn  Cap.
         (veh/h)  (%) (veh/h) (%) (pcu/h)  /h)   xp    (%)    (%)   x
-------------------------------------------------------------------------
West: Sandalwood Parkway W
  5L L       6  16.7    620  2.9    620     30  0.85   325   100  0.200
  2T T     165   1.8    620  2.9    620    815  0.85   320   100  0.202
  2R R     165   1.8    620  2.9    620    815  0.85   320   100  0.202
-------------------------------------------------------------------------
South: Mississauga Road S
  3L L      65   1.5    305  2.0    305    131  0.85    71   100  0.496
  8T T     485  16.9    305  2.0    305    974  0.85    71   100  0.498
  8R R     390   2.1    305  2.0    305    783  0.85    71   100  0.498
-------------------------------------------------------------------------
East: Sandalwood Parkway E
  1L L     220   1.8    555 15.1    613    499  0.85    93    82  0.441
  6T T     110   1.8    555 15.1    613    249  0.85    92    82  0.442
  6R R     435   2.1    555 15.1    613    809  0.85    58   100  0.538*
-------------------------------------------------------------------------
North: Mississauga Road N
  7L L     135   2.2    395  2.0    395    584  0.85   268   100  0.231
  4T T     265   4.2    395  2.0    395   1146  0.85   268   100  0.231
  4R R      21   4.8    395  2.0    395     91  0.85   268   100  0.231
-------------------------------------------------------------------------
```

Table S.3 - Intersection Parameters

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

-------------------------------------------------------------------------
   Intersection Level of Service              =         A
   Worst movement Level of Service            =         B
   Average intersection delay (s/pers)        =       9.9
   Largest average movement delay (s)         =      16.1
   Largest back of queue, 95% (m)             =        35
   Performance Index                          =     47.59
   Degree of saturation (highest)             =     0.538
```

Practical Spare Capacity (lowest)	=	58 %
Effective intersection capacity, (veh/h)	=	4579
Total vehicle flow (veh/h)	=	2462
Total person flow (pers/h)	=	2954
Total vehicle delay (veh-h/h)	=	6.78
Total person delay (pers-h/h)	=	8.14
Total effective vehicle stops (veh/h)	=	1822
Total effective person stops (pers/h)	=	2186
Total vehicle travel (veh-km/h)	=	1562.8
Total cost ($/h)	=	675.46
Total fuel (L/h)	=	204.3
Total CO2 (kg/h)	=	512.02

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: Sandalwood Parkway W										
5L	L	0.02	0.03	14.8	0.56	0.84	1.1	9	0.13	46.3
2T	T	0.36	0.43	7.8	0.56	0.65	1.1	9	2.91	51.6
2R	R	0.41	0.49	9.0	0.56	0.72	1.1	9	3.01	50.7
South: Mississauga Road S										
3L	L	0.27	0.32	14.8	0.58	0.77	3.8	33	1.40	46.2
8T	T	1.09	1.31	8.1	0.58	0.64	3.8	31	8.83	51.5
8R	R	0.93	1.11	8.6	0.57	0.68	3.8	31	7.13	50.6
East: Sandalwood Parkway E										
1L	L	0.98	1.18	16.1	0.68	0.92	3.2	24	5.07	45.5
6T	T	0.28	0.33	9.1	0.68	0.78	3.2	24	2.16	50.7
6R	R	1.30	1.56	10.8	0.73	0.91	4.5	35	9.13	49.6
North: Mississauga Road N										
7L	L	0.54	0.65	14.4	0.54	0.76	1.5	12	2.82	46.4
4T	T	0.55	0.66	7.4	0.54	0.61	1.5	12	4.63	51.8
4R	R	0.05	0.06	8.5	0.54	0.67	1.5	12	0.38	50.9

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Sandalwood Parkway W									
336	0.202	0.80	0.96	8.5	0.56	0.69	9	6.05	51.1
South: Mississauga Road S									
940	0.498	2.29	2.74	8.8	0.57	0.67	33	17.35	50.7
East: Sandalwood Parkway E									
765	0.538	2.56	3.08	12.1	0.71	0.90	35	16.36	48.4
North: Mississauga Road N									
421	0.231	1.13	1.36	9.7	0.54	0.66	12	7.83	49.8
ALL VEHICLES:									
2462	0.538	6.78	8.14	9.9	0.61	0.74	35	47.59	49.9

```
INTERSECTION (persons):
 2954   0.538              8.14      9.9   0.61  0.74         47.59     49.9
-------------------------------------------------------------------------------
Queue values in this table are 95% back of queue (metres).
```

Table S.7 - Lane Performance

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

-------------------------------------------------------------------
          Dem                                  Q u e u e
         Flow   Cap  Deg.  Aver.  Eff.   95% Back       Lane
 Lane    (veh  (veh  Satn  Delay  Stop  ------------   Length
 No.      /h)   /h)   x    (sec)  Rate  (vehs)  (m)     (m)
-------------------------------------------------------------------
 West: Sandalwood Parkway W
 1 LT      167   825 0.202    8.1  0.66    1.1    8.8    500.0
 2 TR      169   835 0.202    9.0  0.72    1.1    8.8    500.0
-------------------------------------------------------------------
 South: Mississauga Road S
 1 LT      447   897 0.498    9.1  0.67    3.8   32.6    500.0
 2 TR      493   991 0.498    8.4  0.67    3.8   30.5    500.0
-------------------------------------------------------------------
 East: Sandalwood Parkway E
 1 LT      330   748 0.441   13.8  0.88    3.2   24.4    500.0
 2 R       435   809 0.538   10.8  0.91    4.5   34.8    500.0
-------------------------------------------------------------------
 North: Mississauga Road N
 1 LT      211   911 0.231   11.9  0.71    1.5   12.0    500.0
 2 TR      210   910 0.231    7.5  0.62    1.5   12.2    500.0
-------------------------------------------------------------------
```

Table S.8 - Lane Flow and Capacity Information

```
Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

-------------------------------------------------
                                 Min  Tot
 Lane      Dem Flow (veh/h)      Cap  Cap  Deg.  Lane
 No.    -------------------    (veh (veh  Satn  Util
         Lef Thru  Rig  Tot     /h)  /h)   x     %
-------------------------------------------------
 West: Sandalwood Parkway W
 1 LT      6  161    0  167    150  825  0.202  100
 2 TR      0    4  165  169    150  835  0.202  100
-------------------------------------------------
 South: Mississauga Road S
 1 LT     65  382    0  447    150  897  0.498  100
 2 TR      0  103  390  493    150  991  0.498  100
-------------------------------------------------
 East: Sandalwood Parkway E
 1 LT    220  110    0  330    150  748  0.441   82P
 2 R       0    0  435  435    150  809  0.538  100
-------------------------------------------------
 North: Mississauga Road N
 1 LT    135   76    0  211    150  911  0.231  100
 2 TR      0  189   21  210    150  910  0.231  100
-------------------------------------------------
  P  Lane under-utilisation found by the "Program".  This includes cases where
     the value of lane under-utilisation due to downstream effects has been
     modified by the program during lane flow calculations (e.g. a de facto
     exclusive lane has been found).
```

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Sandalwood Parkway W									
5L	L	6	30	100	0.200	14.8	0.84	1.1	0.13
2T	T	165	815	100	0.202	7.8	0.65	1.1	2.91
2R	R	165	815	100	0.202	9.0	0.72	1.1	3.01
South: Mississauga Road S									
3L	L	65	131	100	0.496	14.8	0.77	3.8	1.40
8T	T	485	974	100	0.498	8.1	0.64	3.8	8.83
8R	R	390	783	100	0.498	8.6	0.68	3.8	7.13
East: Sandalwood Parkway E									
1L	L	220	499	82	0.441	16.1	0.92	3.2	5.07
6T	T	110	249	82	0.442	9.1	0.78	3.2	2.16
6R	R	435	809	100	0.538*	10.8	0.91	4.5	9.13
North: Mississauga Road N									
7L	L	135	584	100	0.231	14.4	0.76	1.5	2.82
4T	T	265	1146	100	0.231	7.4	0.61	1.5	4.63
4R	R	21	91	100	0.231	8.5	0.67	1.5	0.38

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID		Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Sandalwood Parkway W							
5L	L	0.5	1.68	0.002	0.10	0.003	1.2
2T	T	12.1	41.24	0.049	2.39	0.076	30.2
2R	R	12.4	42.05	0.051	2.57	0.079	31.0
		24.9	84.97	0.102	5.06	0.158	62.4
South: Mississauga Road S							
3L	L	5.4	18.86	0.023	1.12	0.034	13.5
8T	T	51.4	153.37	0.180	10.64	0.339	129.3
8R	R	29.4	99.51	0.122	6.09	0.188	73.5
		86.1	271.74	0.324	17.85	0.560	216.2
East: Sandalwood Parkway E							

1L L	18.4	64.72	0.078	3.87	0.115	46.1
6T T	8.2	28.10	0.034	1.67	0.052	20.6
6R R	33.4	113.28	0.139	7.04	0.215	83.6
	60.1	206.09	0.251	12.58	0.382	150.3
North: Mississauga Road N						
7L L	11.1	39.02	0.047	2.32	0.069	27.9
4T T	20.5	68.31	0.081	4.07	0.130	51.2
4R R	1.6	5.34	0.007	0.33	0.010	3.9
	33.2	112.67	0.134	6.72	0.209	83.1
INTERSECTION:	204.3	675.46	0.812	42.21	1.309	512.0

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Sandalwood Parkway W						
5L L	11.6	0.42	0.502	23.95	0.712	291.1
2T T	11.6	0.40	0.471	23.05	0.732	290.8
2R R	12.1	0.41	0.499	24.99	0.770	301.7
	11.8	0.40	0.486	24.01	0.750	296.1
South: Mississauga Road S						
3L L	12.3	0.43	0.519	25.64	0.765	307.1
8T T	16.8	0.50	0.590	34.86	1.109	423.5
8R R	12.1	0.41	0.500	25.05	0.771	302.1
	14.5	0.46	0.548	30.15	0.945	365.1
East: Sandalwood Parkway E						
1L L	12.4	0.44	0.527	26.08	0.775	310.6
6T T	11.9	0.41	0.487	24.12	0.756	297.9
6R R	12.3	0.42	0.514	25.95	0.792	308.3
	12.3	0.42	0.514	25.73	0.782	307.5
North: Mississauga Road N						
7L L	12.2	0.43	0.517	25.49	0.762	306.1
4T T	12.3	0.41	0.484	24.41	0.778	307.2
4R R	12.0	0.41	0.497	24.86	0.767	301.2
	12.2	0.42	0.496	24.80	0.772	306.6
INTERSECTION:	13.1	0.43	0.520	27.01	0.838	327.6

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Sandalwood Parkway W												
1 LT	6	161		167	2				0.202	8.1	9	500
2 TR		4	165	169	2				0.202	9.0	9	500
	6	165	165	336	2				0.202	8.5	9	
South: Mississauga Road S												
1 LT	65	382		447	15				0.498	9.1	33	500
2 TR		103	390	493	5				0.498	8.4	31	500
	65	485	390	940	10				0.498	8.8	33	
East: Sandalwood Parkway E												
1 LT	220	110		330	2				0.441	13.8	24	500
2 R			435	435	2				0.538	10.8	35	500
	220	110	435	765	2				0.538	12.1	35	
North: Mississauga Road N												
1 LT	135	76		211	3				0.231	11.9	12	500
2 TR		189	21	210	4				0.231	7.5	12	500
	135	265	21	421	4				0.231	9.7	12	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	2462	5	0.538	9.9	35

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Sandalwood Parkway W								
5L	L	6	30	0.200	14.8	B	1.1	9
2T	T	165	815	0.202	7.8	A	1.1	9
2R	R	165	815	0.202	9.0	A	1.1	9
South: Mississauga Road S								
3L	L	65	131	0.496	14.8	B	3.8	33
8T	T	485	974	0.498	8.1	A	3.8	31
8R	R	390	783	0.498	8.6	A	3.8	31
East: Sandalwood Parkway E								
1L	L	220	499	0.441	16.1	B	3.2	24

6T	T	110	249	0.442	9.1	A	3.2	24
6R	R	435	809	0.538*	10.8	B	4.5	35
North: Mississauga Road N								
7L	L	135	584	0.231	14.4	B	1.5	12
4T	T	265	1146	0.231	7.4	A	1.5	12
4R	R	21	91	0.231	8.5	A	1.5	12
ALL VEHICLES:		2462		0.538	9.9	A	4.5	35

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Sandalwood Parkway W								
	South	Right	35.0	32.5	19.4	500	126	No
	East	Thru	57.3	39.1	47.1	500	129	No
	North	Left	19.0	25.7	74.6	500	175	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	35.0	32.5	19.4	500	126	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Sandalwood Parkway E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	35.0	32.5	19.4	500	126	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	176	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

	Deg.	Delay (seconds/veh) Stop-line Delay	Acc.	Queuing	Stopd

Lane No.	Satn x	1st d1	2nd d2	Total dSL	Dec. dn	Total dq	MvUp dqm	(Idle) di	Geom dig	Control dic
West: Sandalwood Parkway W										
1 LT	0.202	2.5	0.0	2.5	3.7	0.0	0.0	0.0	5.6	8.1
2 TR	0.202	2.4	0.0	2.4	3.3	0.0	0.0	0.0	6.5	9.0
South: Mississauga Road S										
1 LT	0.498	2.3	0.1	2.4	3.7	0.0	0.0	0.0	6.8	9.1
2 TR	0.498	2.0	0.0	2.0	3.4	0.0	0.0	0.0	6.4	8.4
East: Sandalwood Parkway E										
1 LT	0.441	3.3	0.4	3.7	3.7	0.2	0.2	0.0	10.1	13.8
2 R	0.538	3.3	0.9	4.2	4.2	0.0	0.0	0.0	6.6	10.8
North: Mississauga Road N										
1 LT	0.231	2.0	0.0	2.0	3.0	0.0	0.0	0.0	9.9	11.9
2 TR	0.231	2.0	0.0	2.0	3.5	0.0	0.0	0.0	5.6	7.5

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Sandalwood Parkway W							
1 LT	0.202	0.46	0.00	0.20	0.66	0.560	0.00
2 TR	0.202	0.49	0.00	0.23	0.72	0.559	0.00
South: Mississauga Road S							
1 LT	0.498	0.46	0.00	0.20	0.67	0.582	0.01
2 TR	0.498	0.45	0.00	0.22	0.67	0.569	0.00
East: Sandalwood Parkway E							
1 LT	0.441	0.66	0.02	0.20	0.88	0.684	0.06
2 R	0.538	0.72	0.05	0.14	0.91	0.728	0.12
North: Mississauga Road N							
1 LT	0.231	0.42	0.00	0.29	0.71	0.536	0.00
2 TR	0.231	0.41	0.00	0.21	0.62	0.536	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Sandalwood Parkway W											
1 LT	0.202	0.0	0.4	0.0	0.4	0.7	0.8	0.9	1.1	1.3	0.02

2 TR	0.202	0.0	0.4	0.0	0.4	0.7	0.8	0.9	1.1	1.3	0.02
South: Mississauga Road S											
1 LT	0.498	0.0	1.2	0.0	1.2	2.2	2.7	3.1	3.8	4.4	0.07
2 TR	0.498	0.0	1.2	0.0	1.2	2.2	2.7	3.1	3.8	4.5	0.06
East: Sandalwood Parkway E											
1 LT	0.441	0.1	0.9	0.1	1.0	1.8	2.2	2.6	3.2	3.7	0.05
2 R	0.538	0.2	1.3	0.2	1.5	2.6	3.2	3.6	4.5	5.2	0.07
North: Mississauga Road N											
1 LT	0.231	0.0	0.5	0.0	0.5	0.9	1.1	1.3	1.5	1.8	0.02
2 TR	0.231	0.0	0.5	0.0	0.5	0.9	1.1	1.3	1.5	1.8	0.02

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Sandalwood Parkway W											
1 LT	0.202	0.0	2.8	0.0	2.8	5.2	6.3	7.2	8.8	10.2	0.02
2 TR	0.202	0.0	2.8	0.0	2.8	5.2	6.3	7.2	8.8	10.2	0.02
South: Mississauga Road S											
1 LT	0.498	0.1	10.4	0.2	10.5	18.9	23.2	26.3	32.6	37.9	0.07
2 TR	0.498	0.0	9.8	0.0	9.8	17.7	21.6	24.6	30.5	35.4	0.06
East: Sandalwood Parkway E											
1 LT	0.441	0.5	7.3	0.5	7.8	14.2	17.3	19.7	24.4	28.3	0.05
2 R	0.538	1.2	9.8	1.5	11.3	20.1	24.6	28.0	34.8	40.4	0.07
North: Mississauga Road N											
1 LT	0.231	0.0	3.8	0.0	3.8	7.1	8.6	9.7	12.0	13.9	0.02
2 TR	0.231	0.0	3.8	0.0	3.8	7.2	8.7	9.8	12.2	14.1	0.02

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Sandalwood Parkway 2031 PM TTMP Red N/S
Intersection ID: 3
Roundabout

Mov ID	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall	Geom Delay (sec)
West: Sandalwood Parkway W									
5L L	65.0	25.7	25.7	65.0			46.3	46.3	12.3
2T T	65.0	39.1	39.1	65.0			51.6	51.6	5.4
2R R	65.0	32.5	32.5	65.0			50.7	50.7	6.6
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0	27.0		46.2	46.2	12.4

8T	T	65.0	39.1	39.1	65.0	25.5	51.5	51.5	5.8
8R	R	65.0	32.5	32.5	65.0		50.6	50.6	6.6
East: Sandalwood Parkway E									
1L	L	65.0	25.7	25.7	65.0	19.4	45.5	45.5	12.4
6T	T	65.0	39.1	39.1	65.0	19.4	50.7	50.7	5.4
6R	R	65.0	32.5	32.5	65.0	19.9	49.6	49.6	6.6
North: Mississauga Road N									
7L	L	65.0	25.7	25.7	65.0		46.4	46.4	12.4
4T	T	65.0	39.1	39.1	65.0		51.8	51.8	5.4
4R	R	65.0	32.5	32.5	65.0		50.9	50.9	6.6

"Running Speed" is the average speed excluding stopped periods.

SIDRA SOLUTIONS

Site: Mississauga and Sandalwood 2031 PM TTMP Red N/S
G:\PROJECTS\105163 Mississagua Road Class EA\Sidra\Mississauga Rd EA Dec 9 Update.aap
Processed Dec 10, 2009 11:46:05AM

A1492, AECOM, Small Office
Produced by SIDRA Intersection 3.2.2.1563

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SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Wanless Road 2031 AM TTMP Red N/S

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Wanless Road W							
	South	2R	Right	221	4	1.00	1.00
	East	2T	Thru	730	15	1.00	1.00
	North	5L	Left	5	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	20	0	1.00	1.00
	East	8R	Right	92	3	1.00	1.00
	North	8T	Thru	104	21	1.00	1.00
East: Wanless Road E							
	West	6T	Thru	456	9	1.00	1.00
	South	1L	Left	377	8	1.00	1.00
	North	6R	Right	10	0	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	34	1	1.00	1.00
	South	4T	Thru	514	21	1.00	1.00
	East	7L	Left	233	7	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	5	1	0	0	0	0
2T	T	0	0	730	15	0	0
2R	R	0	0	0	0	221	5
South: Mississauga Road S							
3L	L	20	1	0	0	0	0
8T	T	0	0	104	21	0	0
8R	R	0	0	0	0	92	3
East: Wanless Road E							
1L	L	377	8	0	0	0	0
6T	T	0	0	456	9	0	0
6R	R	0	0	0	0	10	1
North: Mississauga Road N							
7L	L	233	7	0	0	0	0
4T	T	0	0	514	21	0	0
4R	R	0	0	0	0	34	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	6	16.7	0	0.0	0	0.0
2T	T	0	0.0	745	2.0	0	0.0
2R	R	0	0.0	0	0.0	226	2.2
South: Mississauga Road S							
3L	L	21	4.8	0	0.0	0	0.0
8T	T	0	0.0	125	16.8	0	0.0
8R	R	0	0.0	0	0.0	95	3.2
East: Wanless Road E							
1L	L	385	2.1	0	0.0	0	0.0
6T	T	0	0.0	465	1.9	0	0.0
6R	R	0	0.0	0	0.0	11	9.1
North: Mississauga Road N							
7L	L	240	2.9	0	0.0	0	0.0
4T	T	0	0.0	535	3.9	0	0.0
4R	R	0	0.0	0	0.0	35	2.9

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Wanless Road W											
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium											
30	10	50	2	2	4.00	1160	3.1	1161	0	N	0.827
Exclusive Slip lane (exiting flow):						920	3.2	921	0	N	0.883
South: Mississauga Road S											
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium											
30	10	50	2	2	4.00	990	2.2	990	0	N	0.808
Exclusive Slip lane (exiting flow):						985	2.2	985	0	N	0.809
East: Wanless Road E											
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium											
30	10	50	2	2	4.00	150	14.5	165	0	N	0.966
North: Mississauga Road N											
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium											
30	10	50	2	2	4.00	870	2.0	870	0	N	0.911
Exclusive Slip lane (exiting flow):						485	2.0	485	0	N	0.955

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Wanless Road W										
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	1161	31.9	27.5	1.34	0.627	3.91	34.6	2.84
Thru	1	Subdominant	1161	31.9	27.5	1.34	0.627	3.50	31.0	2.55
	2	Dominant	1161	31.9	27.5	1.34	0.627	3.31	29.3	2.41
Right	3	Excl. Slip	921E	33.5	36.4	1.62	0.608	3.31	30.8	2.41
South: Mississauga Road S										
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	990	35.8	36.1	1.27	0.541	3.58	35.6	2.55
Thru	1	Subdominant	990	35.8	36.1	1.27	0.541	3.99	39.7	2.85
	2	Dominant	990	35.8	36.1	1.27	0.541	3.88	38.6	2.77
Right	3	Excl. Slip	985E	35.8	36.4	1.27	0.541	3.88	38.6	2.77
East: Wanless Road E										
Environment Factor: 1.20 Entry/Circulating Flow Adjustment: Medium										
Left	1	Subdominant	165	36.9	223.4	1.04	0.099	4.30	44.0	2.65D

Thru	1 Subdominant	165	36.9	223.4	1.04	0.099	4.30	44.0	2.65D
	2 Dominant	165	36.9	223.4	1.04	0.099	4.30	44.0	2.65
Right	2 Dominant	165	36.9	223.4	1.04	0.099	4.47	45.8	2.76
North: Mississauga Road N									
Environment Factor: 1.20		Entry/Circulating Flow Adjustment: Medium							
Left	1 Subdominant	870	32.9	37.8	1.03	0.423	3.69	33.7	2.59
Thru	1 Subdominant	870	32.9	37.8	1.03	0.423	3.69	33.7	2.59
	2 Dominant	870	32.9	37.8	1.03	0.423	3.59	32.8	2.52
Right	3 Excl. Slip	485E	38.6	79.5	1.60	0.378	3.59	38.5	2.52

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic
D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Wanless Road W										
5L L	6	16.7	1160	3.1	1161	9	0.85	28	100	0.667
2T T	745	2.0	1160	3.1	1161	1102	0.85	26	100	0.676*
2R R	226	2.2	920	3.2	921	698	0.85	163	100	0.324
South: Mississauga Road S										
3L L	21	4.8	990	2.2	990	151	0.85	511	100	0.139
8T T	125	16.8	990	2.2	990	897	0.85	510	100	0.139
8R R	95	3.2	985	2.2	985	526	0.85	371	100	0.181
East: Wanless Road E										
1L L	385	2.1	150	14.5	165	1025	0.85	126	100	0.376
6T T	465	1.9	150	14.5	165	1238	0.85	126	100	0.376
6R R	11	9.1	150	14.5	165	29	0.85	124	100	0.379
North: Mississauga Road N										
7L L	240	2.9	870	2.0	870	455	0.85	61	100	0.527
4T T	535	3.9	870	2.0	870	1014	0.85	61	100	0.528
4R R	35	2.9	485	2.0	485	980	0.85	2280	100	0.036

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Intersection Level of Service	=	B
Worst movement Level of Service	=	C

Average intersection delay (s/pers)	=	12.1
Largest average movement delay (s)	=	23.3
Largest back of queue, 95% (m)	=	49
Performance Index	=	61.57
Degree of saturation (highest)	=	0.676
Practical Spare Capacity (lowest)	=	26 %
Effective intersection capacity, (veh/h)	=	4273
Total vehicle flow (veh/h)	=	2889
Total person flow (pers/h)	=	3467
Total vehicle delay (veh-h/h)	=	9.68
Total person delay (pers-h/h)	=	11.61
Total effective vehicle stops (veh/h)	=	2438
Total effective person stops (pers/h)	=	2925
Total vehicle travel (veh-km/h)	=	1846.0
Total cost ($/h)	=	791.60
Total fuel (L/h)	=	231.8
Total CO2 (kg/h)	=	580.32

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W										
5L	L	0.04	0.05	23.3	0.88	1.10	6.2	48	0.17	40.1
2T	T	3.29	3.95	15.9	0.88	1.07	6.4	49	19.02	44.7
2R	R	0.66	0.79	10.5	0.73	0.85	2.2	17	4.60	49.8
South: Mississauga Road S										
3L	L	0.10	0.12	16.5	0.69	0.90	0.8	7	0.49	45.1
8T	T	0.35	0.41	9.9	0.69	0.79	0.8	7	2.53	50.6
8R	R	0.28	0.33	10.5	0.70	0.85	1.0	8	1.97	50.0
East: Wanless Road E										
1L	L	1.41	1.69	13.2	0.41	0.68	2.8	22	7.68	47.0
6T	T	0.80	0.96	6.2	0.41	0.51	2.8	22	7.61	52.8
6R	R	0.02	0.03	7.4	0.41	0.58	2.8	22	0.19	51.7
North: Mississauga Road N										
7L	L	1.15	1.38	17.3	0.72	0.98	3.8	29	5.71	44.5
4T	T	1.51	1.81	10.2	0.72	0.89	3.8	30	11.02	50.4
4R	R	0.07	0.09	7.6	0.44	0.59	0.2	1	0.58	51.8

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W									
977	0.676	3.99	4.79	14.7	0.85	1.02	49	23.79	45.7
South: Mississauga Road S									
241	0.181	0.72	0.86	10.7	0.70	0.82	8	4.99	49.8
East: Wanless Road E									
861	0.379	2.23	2.68	9.3	0.41	0.59	22	15.48	49.9
North: Mississauga Road N									

810	0.528	2.74	3.28	12.2	0.71	0.90	30	17.31	48.4
ALL VEHICLES:									
2889	0.676	9.68	11.61	12.1	0.67	0.84	49	61.57	48.0
INTERSECTION (persons):									
3467	0.676		11.61	12.1	0.67	0.84		61.57	48.0

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Wanless Road W								
1 LT	359	532	0.676	16.4	1.07	6.2	47.6	500.0
2 T	392	579	0.676	15.5	1.07	6.4	49.2	500.0
3 R	226	698	0.324	10.5	0.85	2.2	17.0	75.0
South: Mississauga Road S								
1 LT	73	524	0.139	11.8	0.82	0.8	6.7	500.0
2 T	73	524	0.139	9.9	0.79	0.8	6.9	500.0
3 R	95	526	0.181	10.5	0.85	1.0	8.1	75.0
East: Wanless Road E								
1 LT	431	1147	0.376	12.5	0.67	2.8	21.9	500.0
2 TR	430	1145	0.376	6.2	0.52	2.8	21.9	500.0
North: Mississauga Road N								
1 LT	380	721	0.527	14.7	0.95	3.8	29.4	500.0
2 T	395	749	0.527	10.1	0.89	3.8	29.8	500.0
3 R	35	980	0.036	7.6	0.59	0.2	1.4	75.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Wanless Road W								
1 LT	6	353	0	359	150	532	0.676	100
2 T	0	392	0	392	150	579	0.676	100
3 R	0	0	226	226	150	698	0.324	100
South: Mississauga Road S								
1 LT	21	52	0	73	73	524	0.139	100
2 T	0	73	0	73	73	524	0.139	100
3 R	0	0	95	95	95	526	0.181	100
East: Wanless Road E								
1 LT	385	46	0	431	150	1147	0.376	100

2 TR	0	419	11	430	150	1145	0.376	100
North: Mississauga Road N								
1 LT	240	140	0	380	150	721	0.527	100
2 T	0	395	0	395	150	749	0.527	100
3 R	0	0	35	35	35	980	0.036	100

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Wanless Road W									
5L L		6	9	100	0.667	23.3	1.10	6.2	0.17
2T T		745	1102	100	0.676*	15.9	1.07	6.4	19.02
2R R	(Slp)	226	698	100	0.324	10.5	0.85	2.2	4.60
South: Mississauga Road S									
3L L		21	151	100	0.139	16.5	0.90	0.8	0.49
8T T		125	897	100	0.139	9.9	0.79	0.8	2.53
8R R	(Slp)	95	526	100	0.181	10.5	0.85	1.0	1.97
East: Wanless Road E									
1L L		385	1025	100	0.376	13.2	0.68	2.8	7.68
6T T		465	1238	100	0.376	6.2	0.51	2.8	7.61
6R R		11	29	100	0.379	7.4	0.58	2.8	0.19
North: Mississauga Road N									
7L L		240	455	100	0.527	17.3	0.98	3.8	5.71
4T T		535	1014	100	0.528	10.2	0.89	3.8	11.02
4R R	(Slp)	35	980	100	0.036	7.6	0.59	0.2	0.58

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Wanless Road W						
5L L	0.5	1.87	0.002	0.10	0.003	1.3
2T T	59.7	209.49	0.250	12.42	0.379	149.5
2R R	17.3	58.63	0.072	3.60	0.111	43.2
	77.5	269.98	0.324	16.13	0.493	193.9
South: Mississauga Road S						

3L L	1.8	6.20	0.007	0.37	0.011	4.4
8T T	13.5	40.34	0.048	2.86	0.090	34.1
8R R	7.4	24.97	0.030	1.55	0.048	18.6
	22.7	71.51	0.086	4.78	0.149	57.1
East: Wanless Road E						
1L L	31.5	110.07	0.132	6.52	0.196	78.7
6T T	33.1	113.36	0.133	6.39	0.207	82.9
6R R	0.8	2.75	0.003	0.17	0.005	2.0
	65.4	226.18	0.269	13.07	0.407	163.6
North: Mississauga Road N						
7L L	20.9	72.86	0.088	4.41	0.131	52.2
4T T	42.7	142.35	0.171	8.78	0.275	107.0
4R R	2.6	8.72	0.010	0.52	0.016	6.4
	66.2	223.92	0.269	13.70	0.422	165.7
INTERSECTION:	231.8	791.60	0.948	47.68	1.471	580.3

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Wanless Road W						
5L L	12.3	0.46	0.546	25.53	0.747	309.9
2T T	12.7	0.45	0.534	26.49	0.809	318.8
2R R	12.2	0.42	0.508	25.54	0.785	306.2
	12.6	0.44	0.528	26.27	0.803	315.8
South: Mississauga Road S						
3L L	12.4	0.44	0.528	26.01	0.774	311.1
8T T	17.2	0.51	0.609	36.33	1.147	432.9
8R R	12.5	0.42	0.513	26.18	0.807	313.9
	14.9	0.47	0.564	31.41	0.980	375.1
East: Wanless Road E						
1L L	12.1	0.42	0.510	25.09	0.753	303.1
6T T	11.3	0.39	0.454	21.84	0.706	283.2
6R R	11.8	0.40	0.486	24.14	0.751	296.7
	11.7	0.40	0.480	23.38	0.728	292.6
North: Mississauga Road N						
7L L	12.9	0.45	0.543	27.21	0.808	322.6
4T T	12.7	0.42	0.508	26.07	0.816	317.9
4R R	11.7	0.40	0.480	23.68	0.743	293.8
	12.7	0.43	0.517	26.32	0.810	318.3

INTERSECTION:	12.6	0.43	0.514	25.83	0.797	314.4

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st 2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Wanless Road W											
1 LT	6	353		359	2			0.676	16.4	48	500
2 T		392		392	2			0.676	15.5	49	500
3 R			226	226	2			0.324	10.5	17	75
	6	745	226	977	2			0.676	14.7	49	
South: Mississauga Road S											
1 LT	21	52		73	13			0.139	11.8	7	500
2 T		73		73	17			0.139	9.9	7	500
3 R			95	95	3			0.181	10.5	8	75
	21	125	95	241	10			0.181	10.7	8	
East: Wanless Road E											
1 LT	385	46		431	2			0.376	12.5	22	500
2 TR		419	11	430	2			0.376	6.2	22	500
	385	465	11	861	2			0.376	9.3	22	
North: Mississauga Road N											
1 LT	240	140		380	3			0.527	14.7	29	500
2 T		395		395	4			0.527	10.1	30	500
3 R			35	35	3			0.036	7.6	1	75
	240	535	35	810	4			0.527	12.2	30	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	2889	3	0.676	12.1	49

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: Wanless Road W								

5L	L	6	9	0.667	23.3	C	6.2	48
2T	T	745	1102	0.676*	15.9	B	6.4	49
2R	R (Slp)	226	698	0.324	10.5	B	2.2	17
South: Mississauga Road S								
3L	L	21	151	0.139	16.5	B	0.8	7
8T	T	125	897	0.139	9.9	A	0.8	7
8R	R (Slp)	95	526	0.181	10.5	B	1.0	8
East: Wanless Road E								
1L	L	385	1025	0.376	13.2	B	2.8	22
6T	T	465	1238	0.376	6.2	A	2.8	22
6R	R	11	29	0.379	7.4	A	2.8	22
North: Mississauga Road N								
7L	L	240	455	0.527	17.3	B	3.8	29
4T	T	535	1014	0.528	10.2	B	3.8	30
4R	R (Slp)	35	980	0.036	7.6	A	0.2	1
ALL VEHICLES:		2889		0.676	12.1	B	6.4	49

· Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane
v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream (m)	Distance User Spec?
West: Wanless Road W								
	South	Right	41.0	34.5	19.3	500	127	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	175	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	41.0	34.5	19.3	500	128	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Wanless Road E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	41.0	34.5	19.3	500	127	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Wanless Road W										
1 LT	0.676	6.5	4.4	10.9	5.8	5.2	2.5	2.6	5.5	16.4
2 T	0.676	6.0	4.2	10.2	5.8	4.3	2.5	1.8	5.4	15.5
3 R	0.324	4.3	0.0	4.3	4.4	0.0	0.0	0.0	6.2	10.5
South: Mississauga Road S										
1 LT	0.139	4.1	0.0	4.1	4.2	0.2	0.0	0.2	7.7	11.8
2 T	0.139	4.1	0.0	4.1	4.6	0.0	0.0	0.0	5.8	9.9
3 R	0.181	4.2	0.0	4.2	4.3	0.0	0.0	0.0	6.2	10.5
East: Wanless Road E										
1 LT	0.376	0.8	0.0	0.8	2.1	0.0	0.0	0.0	11.6	12.5
2 TR	0.376	0.8	0.0	0.8	2.7	0.0	0.0	0.0	5.4	6.2
North: Mississauga Road N										
1 LT	0.527	3.8	1.1	4.9	4.0	0.9	0.7	0.2	9.8	14.7
2 T	0.527	3.6	1.0	4.7	4.8	0.0	0.0	0.0	5.4	10.1
3 R	0.036	1.4	0.0	1.4	2.7	0.0	0.0	0.0	6.2	7.6

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Effective Stop Rate he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Wanless Road W							
1 LT	0.676	0.88	0.14	0.05	1.07	0.879	0.42
2 T	0.676	0.88	0.14	0.05	1.07	0.884	0.41
3 R	0.324	0.72	0.00	0.13	0.85	0.733	0.00
South: Mississauga Road S							
1 LT	0.139	0.66	0.00	0.16	0.82	0.692	0.00
2 T	0.139	0.66	0.00	0.14	0.79	0.692	0.00
3 R	0.181	0.70	0.00	0.15	0.85	0.701	0.00
East: Wanless Road E							
1 LT	0.376	0.26	0.00	0.41	0.67	0.409	0.00
2 TR	0.376	0.25	0.00	0.26	0.52	0.409	0.00
North: Mississauga Road N							
1 LT	0.527	0.72	0.06	0.17	0.95	0.722	0.16
2 T	0.527	0.71	0.05	0.12	0.89	0.720	0.16
3 R	0.036	0.31	0.00	0.28	0.59	0.444	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.676	0.5	1.5	0.5	2.0	3.5	4.3	4.9	6.2	7.2	0.10
2 T	0.676	0.5	1.6	0.5	2.1	3.6	4.5	5.1	6.4	7.4	0.10
3 R	0.324	0.0	0.7	0.0	0.7	1.3	1.6	1.8	2.2	2.5	0.23
South: Mississauga Road S											
1 LT	0.139	0.0	0.2	0.0	0.2	0.5	0.6	0.6	0.8	0.9	0.01
2 T	0.139	0.0	0.2	0.0	0.2	0.5	0.6	0.6	0.8	0.9	0.01
3 R	0.181	0.0	0.3	0.0	0.3	0.6	0.7	0.8	1.0	1.2	0.11
East: Wanless Road E											
1 LT	0.376	0.0	0.9	0.0	0.9	1.7	2.0	2.3	2.8	3.3	0.04
2 TR	0.376	0.0	0.9	0.0	0.9	1.7	2.0	2.3	2.8	3.3	0.04
North: Mississauga Road N											
1 LT	0.527	0.2	1.0	0.2	1.2	2.2	2.7	3.0	3.8	4.4	0.06
2 T	0.527	0.2	1.1	0.2	1.2	2.2	2.7	3.1	3.8	4.4	0.06
3 R	0.036	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.02

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.676	3.8	11.9	3.7	15.6	27.3	33.5	38.2	47.6	55.5	0.10
2 T	0.676	3.8	12.3	3.9	16.2	28.2	34.6	39.5	49.2	57.3	0.10
3 R	0.324	0.0	5.4	0.0	5.4	10.0	12.1	13.8	17.0	19.7	0.23
South: Mississauga Road S											
1 LT	0.139	0.0	2.1	0.0	2.1	4.0	4.8	5.4	6.7	7.7	0.01
2 T	0.139	0.0	2.2	0.0	2.2	4.1	4.9	5.6	6.9	7.9	0.01
3 R	0.181	0.0	2.6	0.0	2.6	4.8	5.8	6.6	8.1	9.4	0.11
East: Wanless Road E											
1 LT	0.376	0.0	7.0	0.0	7.0	12.8	15.6	17.7	21.9	25.4	0.04
2 TR	0.376	0.0	7.0	0.0	7.0	12.8	15.6	17.7	21.9	25.4	0.04
North: Mississauga Road N											
1 LT	0.527	1.3	8.2	1.3	9.5	17.1	20.9	23.7	29.4	34.1	0.06
2 T	0.527	1.2	8.3	1.3	9.6	17.3	21.2	24.0	29.8	34.6	0.06
3 R	0.036	0.0	0.4	0.0	0.4	0.9	1.0	1.2	1.4	1.7	0.02

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Wanless Road 2031 AM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall	Geom Delay (sec)
West: Wanless Road W									
5L L	65.0	25.7	25.7	65.0	15.9		43.0	40.1	12.3
2T T	65.0	39.1	39.1	65.0	16.7		46.7	44.7	5.4
2R R	65.0	34.5	34.5	65.0			49.8	49.8	6.2
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0			45.7	45.1	12.4
8T T	65.0	39.1	39.1	65.0			50.6	50.6	5.8
8R R	65.0	34.5	34.5	65.0			50.0	50.0	6.2
East: Wanless Road E									
1L L	65.0	25.7	25.7	65.0			47.0	47.0	12.4
6T T	65.0	39.1	39.1	65.0			52.8	52.8	5.4
6R R	65.0	32.5	32.5	65.0			51.7	51.7	6.6
North: Mississauga Road N									
7L L	65.0	25.7	25.7	65.0	17.4		44.8	44.5	12.4
4T T	65.0	39.1	39.1	65.0	17.6		50.4	50.4	5.4
4R R	65.0	34.5	34.5	65.0			51.8	51.8	6.2

"Running Speed" is the average speed excluding stopped periods.

Site: Wanless 2031 AM TTMP Red N/S
C:\Documents and Settings\sargeants\Desktop\Mississauga Rd EA Jan 11 Update.aap
Processed Jan 12, 2010 12:03:04PM

A1492, AECOM, Small Office

SIDRA INTERSECTION

Output Tables

Mississauga Road EA

Mississauga Road and Wanless Road 2031 PM TTMP Red N/S

Run Information

```
* Basic Parameters:
  Intersection Type: Roundabout
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Model Defaults: US HCM (Metric)
  Peak Flow Period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes.
  Delay definition: Control delay
                    Geometric delay included
  HCM Delay Model option selected
  HCM Queue Model option selected
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile
```

Table B.1 - Movement Definitions and Flow Rates (Origin-Destination)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale	Peak Flow Factor
West: Wanless Road W							
	South	2R	Right	397	8	1.00	1.00
	East	2T	Thru	1201	24	1.00	1.00
	North	5L	Left	15	0	1.00	1.00
South: Mississauga Road S							
	West	3L	Left	49	1	1.00	1.00
	East	8R	Right	272	8	1.00	1.00
	North	8T	Thru	324	66	1.00	1.00
East: Wanless Road E							
	West	6T	Thru	412	8	1.00	1.00
	South	1L	Left	348	7	1.00	1.00
	North	6R	Right	15	0	1.00	1.00
North: Mississauga Road N							
	West	4R	Right	20	0	1.00	1.00
	South	4T	Thru	182	8	1.00	1.00
	East	7L	Left	39	1	1.00	1.00

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2A - Flow Rates (Separate Light and Heavy Vehicles)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		LV	HV	LV	HV	LV	HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	15	1	0	0	0	0
2T	T	0	0	1201	24	0	0
2R	R	0	0	0	0	397	8
South: Mississauga Road S							
3L	L	49	1	0	0	0	0
8T	T	0	0	324	66	0	0
8R	R	0	0	0	0	272	8
East: Wanless Road E							
1L	L	348	7	0	0	0	0
6T	T	0	0	412	8	0	0
6R	R	0	0	0	0	15	1
North: Mississauga Road N							
7L	L	39	1	0	0	0	0
4T	T	0	0	182	8	0	0
4R	R	0	0	0	0	20	1

Unit Time for Volumes = 60 minutes
Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table B.2B - Flow Rates (Total Vehicles and Percent Heavy)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID		Left		Through		Right	
		Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/hour as used by the program							
West: Wanless Road W							
5L	L	16	6.2	0	0.0	0	0.0
2T	T	0	0.0	1225	2.0	0	0.0
2R	R	0	0.0	0	0.0	405	2.0
South: Mississauga Road S							
3L	L	50	2.0	0	0.0	0	0.0
8T	T	0	0.0	390	16.9	0	0.0
8R	R	0	0.0	0	0.0	280	2.9
East: Wanless Road E							
1L	L	355	2.0	0	0.0	0	0.0
6T	T	0	0.0	420	1.9	0	0.0
6R	R	0	0.0	0	0.0	16	6.2
North: Mississauga Road N							
7L	L	40	2.5	0	0.0	0	0.0
4T	T	0	0.0	190	4.2	0	0.0
4R	R	0	0.0	0	0.0	21	4.8

Unit Time for Volumes = 60 minutes

Peak Flow Period = 15 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

Table R.0 - Roundabout Basic Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Cent Island Diam (m)	Circ Width (m)	Insc Diam. (m)	No.of Circ. Lanes	No.of Entry Lanes	Av.Ent Lane Width (m)	Circulating/Exiting Stream Flow (veh/h)	%HV	Adjust. Flow (pcu/h)	%Exit Incl.	Cap. Constr. Effect	O-D Factor
West: Wanless Road W											
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium							
30	10	50	2	3	4.00	585	2.7	585	0	N	0.938
Shared Slip lane (exiting flow):						545	2.7	545	0	N	0.939
South: Mississauga Road S											
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium							
30	10	50	2	2	4.00	1280	2.0	1280	0	N	0.735
Exclusive Slip lane (exiting flow):						1265	2.0	1265	0	N	0.738
East: Wanless Road E											
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium							
30	10	50	2	2	4.00	455	14.9	502	0	N	0.905
North: Mississauga Road N											
Environment Factor: 1.20				Entry/Circulating Flow Adjustment: Medium							
30	10	50	2	2	4.00	825	2.0	825	0	N	0.870
Exclusive Slip lane (exiting flow):						470	2.0	470	0	N	0.934

Table R.1 - Roundabout Gap Acceptance Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Turn	Lane No.	Lane Type	Circulating/Exiting Stream Flow Rate (pcu/h)	Aver Speed (km/h)	Aver In-Bnch Dist (m)	Headway (s)	Prop Bunched	Critical Gap Hdwy (s)	Dist (m)	Foll-up Headway (s)
West: Wanless Road W										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	585	30.1	51.4	1.61	0.439	3.68	30.7	2.47
Thru	1	Subdominant	585	30.1	51.4	1.61	0.439	3.63	30.3	2.43
	2	Dominant	585	30.1	51.4	1.61	0.439	3.25	27.2	2.18
Right	3	Shared Slip	545E	30.4	55.8	1.71	0.435	3.86	32.6	2.57
South: Mississauga Road S										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	1280	38.5	30.1	1.09	0.580	3.41	36.5	2.51
Thru	1	Subdominant	1280	38.5	30.1	1.09	0.580	3.82	40.8	2.81
	2	Dominant	1280	38.5	30.1	1.09	0.580	3.59	38.5	2.65
Right	3	Excl. Slip	1265E	38.7	30.6	1.10	0.579	3.59	38.6	2.65
East: Wanless Road E										
Environment Factor: 1.20					Entry/Circulating Flow Adjustment: Medium					
Left	1	Subdominant	502	37.2	74.1	1.06	0.277	4.02	41.6	2.66D

Thru	1 Subdominant	502	37.2	74.1	1.06	0.277	4.02	41.6	2.66D
	2 Dominant	502	37.2	74.1	1.06	0.277	4.02	41.6	2.66
Right	2 Dominant	502	37.2	74.1	1.06	0.277	4.08	42.1	2.69
North: Mississauga Road N									
Environment Factor: 1.20		Entry/Circulating Flow Adjustment: Medium							
Left	1 Subdominant	825	32.5	39.4	1.08	0.419	3.72	33.6	2.59
Thru	1 Subdominant	825	32.5	39.4	1.08	0.419	3.72	33.6	2.59
	2 Dominant	825	32.5	39.4	1.08	0.419	3.64	32.9	2.54
Right	3 Excl. Slip	470E	37.7	80.2	1.63	0.374	3.64	38.1	2.54

Priority sharing is implied for some movements (Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap). The O-D Factor (Table R.0) allows for priority sharing and priority emphasis.

E Exiting flow for slip lane traffic
D Subdominant lane follow-up headway was calculated as less than the dominant lane value and was set to the dominant lane value

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

Table S.2 - Movement Capacity Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Demand Flow (veh/h)	HV (%)	Opposing Movement Flow (veh/h)	HV (%)	Adjust. Flow (pcu/h)	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: Wanless Road W										
5L L	16	6.2	585	2.7	585	25	0.85	33	100	0.640*
2T T	1225	2.0	585	2.7	585	1950	0.85	35	74	0.628
2R R	405	2.0	545	2.7	545	874	0.85	83	74	0.463
South: Mississauga Road S										
3L L	50	2.0	1280	2.0	1280	97	0.85	65	100	0.515
8T T	390	16.9	1280	2.0	1280	759	0.85	65	100	0.514
8R R	280	2.9	1265	2.0	1265	446	0.85	35	100	0.628
East: Wanless Road E										
1L L	355	2.0	455	14.9	502	764	0.85	83	100	0.465
6T T	420	1.9	455	14.9	502	904	0.85	83	100	0.465
6R R	16	6.2	455	14.9	502	34	0.85	81	100	0.471
North: Mississauga Road N										
7L L	40	2.5	825	2.0	825	248	0.85	427	100	0.161
4T T	190	4.2	825	2.0	825	1176	0.85	426	100	0.162
4R R	21	4.8	470	2.0	470	957	0.85	3774	100	0.022

Table S.3 - Intersection Parameters

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Intersection Level of Service	=	B
Worst movement Level of Service	=	C

Average intersection delay (s/pers)	=	11.2
Largest average movement delay (s)	=	20.5
Largest back of queue, 95% (m)	=	51
Performance Index	=	72.08
Degree of saturation (highest)	=	0.640
Practical Spare Capacity (lowest)	=	33 %
Effective intersection capacity, (veh/h)	=	5325
Total vehicle flow (veh/h)	=	3408
Total person flow (pers/h)	=	4090
Total vehicle delay (veh-h/h)	=	10.59
Total person delay (pers-h/h)	=	12.70
Total effective vehicle stops (veh/h)	=	2922
Total effective person stops (pers/h)	=	3507
Total vehicle travel (veh-km/h)	=	2161.9
Total cost ($/h)	=	934.95
Total fuel (L/h)	=	278.5
Total CO2 (kg/h)	=	697.40

Table S.5 - Movement Performance

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W										
5L	L	0.08	0.09	17.2	0.77	0.98	6.4	49	0.39	44.5
2T	T	3.35	4.01	9.8	0.76	0.88	6.6	51	25.42	50.1
2R	R	1.10	1.32	9.8	0.68	0.81	3.6	28	7.97	50.0
South: Mississauga Road S										
3L	L	0.28	0.34	20.5	0.82	1.01	3.4	29	1.34	42.1
8T	T	1.47	1.77	13.6	0.82	0.96	3.5	30	9.31	47.2
8R	R	1.20	1.44	15.5	0.86	1.02	4.7	37	7.02	45.0
East: Wanless Road E										
1L	L	1.48	1.78	15.0	0.66	0.88	3.4	26	7.89	45.9
6T	T	0.94	1.12	8.0	0.66	0.68	3.4	26	7.76	50.9
6R	R	0.04	0.05	9.2	0.66	0.76	3.4	26	0.31	50.1
North: Mississauga Road N										
7L	L	0.17	0.20	15.2	0.62	0.87	0.9	7	0.88	46.1
4T	T	0.43	0.52	8.1	0.62	0.67	0.9	7	3.44	51.2
4R	R	0.04	0.05	7.6	0.46	0.57	0.1	1	0.35	51.7

Table S.6 - Intersection Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: Wanless Road W									
1646	0.640	4.52	5.43	9.9	0.74	0.86	51	33.78	50.0
South: Mississauga Road S									
720	0.628	2.96	3.55	14.8	0.83	0.99	37	17.67	45.9
East: Wanless Road E									
791	0.471	2.46	2.95	11.2	0.66	0.77	26	15.96	48.4
North: Mississauga Road N									

251	0.162	0.64	0.77	9.2	0.60	0.70	7	4.66	50.3
ALL VEHICLES:									
3408	0.640	10.59	12.70	11.2	0.73	0.86	51	72.08	48.7
INTERSECTION (persons):									
4090	0.640		12.70	11.2	0.73	0.86		72.08	48.7

Queue values in this table are 95% back of queue (metres).

Table S.7 - Lane Performance

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Lane Length (m)
West: Wanless Road W								
1 LT	576	917	0.628	10.4	0.91	6.4	49.3	500.0
2 T	665	1058	0.628	9.5	0.86	6.6	51.0	500.0
3 R	405	874	0.463	9.8	0.81	3.6	27.9	75.0
South: Mississauga Road S								
1 LT	214	416	0.514	15.4	0.97	3.4	29.1	500.0
2 T	226	441	0.514	13.4	0.96	3.5	30.4	500.0
3 R	280	446	0.627	15.5	1.02	4.7	36.8	75.0
East: Wanless Road E								
1 LT	396	851	0.465	14.3	0.86	3.4	26.4	500.0
2 TR	395	851	0.465	8.1	0.69	3.4	26.4	500.0
North: Mississauga Road N								
1 LT	113	701	0.162	10.7	0.75	0.9	6.9	500.0
2 T	117	723	0.162	8.1	0.67	0.9	7.0	500.0
3 R	21	957	0.022	7.6	0.57	0.1	0.9	75.0

Table S.8 - Lane Flow and Capacity Information

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Min Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: Wanless Road W								
1 LT	16	560	0	576	150	917	0.628	100
2 T	0	665	0	665	150	1058	0.628	100
3 R	0	0	405	405	150	874	0.463	74P
South: Mississauga Road S								
1 LT	50	164	0	214	150	416	0.514	100
2 T	0	226	0	226	150	441	0.514	100
3 R	0	0	280	280	150	446	0.627	100
East: Wanless Road E								
1 LT	355	41	0	396	150	851	0.465	100

2 TR	0	379	16	395	150	851	0.465	100
North: Mississauga Road N								
1 LT	40	73	0	113	113	701	0.162	100
2 T	0	117	0	117	117	723	0.162	100
3 R	0	0	21	21	21	957	0.022	100

P Lane under-utilisation found by the "Program". This includes cases where the value of lane under-utilisation due to downstream effects has been modified by the program during lane flow calculations (e.g. a de facto exclusive lane has been found).

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

Table S.10 - Movement Capacity and Performance Summary

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Dem Flow (veh /h)	Total Cap. (veh /h)	Lane Util (%)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	95% Back of Queue (veh)	Perf. Index
West: Wanless Road W									
5L	L	16	25	100	0.640*	17.2	0.98	6.4	0.39
2T	T	1225	1950	74	0.628	9.8	0.88	6.6	25.42
2R	R (Slp)	405	874	74	0.463	9.8	0.81	3.6	7.97
South: Mississauga Road S									
3L	L	50	97	100	0.515	20.5	1.01	3.4	1.34
8T	T	390	759	100	0.514	13.6	0.96	3.5	9.31
8R	R (Slp)	280	446	100	0.628	15.5	1.02	4.7	7.02
East: Wanless Road E									
1L	L	355	764	100	0.465	15.0	0.88	3.4	7.89
6T	T	420	904	100	0.465	8.0	0.68	3.4	7.76
6R	R	16	34	100	0.471	9.2	0.76	3.4	0.31
North: Mississauga Road N									
7L	L	40	248	100	0.161	15.2	0.87	0.9	0.88
4T	T	190	1176	100	0.162	8.1	0.67	0.9	3.44
4R	R (Slp)	21	957	100	0.022	7.6	0.57	0.1	0.35

* Maximum degree of saturation

Table S.12A - Fuel Consumption, Emissions and Cost (TOTAL)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: Wanless Road W						
5L L	1.4	4.79	0.006	0.29	0.008	3.4
2T T	93.1	316.94	0.382	19.09	0.594	232.9
2R R	30.9	104.67	0.128	6.46	0.198	77.2

	125.3	426.40	0.517	25.84	0.801	313.5
South: Mississauga Road S						
3L L	4.3	15.51	0.019	0.90	0.027	10.8
8T T	43.9	132.48	0.158	9.45	0.295	110.5
8R R	23.0	79.27	0.096	4.85	0.147	57.6
	71.2	227.25	0.272	15.20	0.469	178.8
East: Wanless Road E						
1L L	29.6	103.66	0.125	6.20	0.185	74.0
6T T	31.3	106.79	0.128	6.32	0.199	78.3
6R R	1.2	4.13	0.005	0.25	0.008	3.1
	62.1	214.59	0.258	12.77	0.391	155.4
North: Mississauga Road N						
7L L	3.4	11.83	0.014	0.72	0.021	8.5
4T T	14.9	49.65	0.059	3.00	0.095	37.3
4R R	1.5	5.24	0.006	0.31	0.010	3.9
	19.8	66.71	0.080	4.03	0.126	49.7
INTERSECTION:	278.5	934.95	1.127	57.84	1.787	697.4

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.70
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	19.00
Time value factor	=	0.40
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

Table S.12B - Fuel Consumption, Emissions and Cost (RATE)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Fuel Rate L/100km	Cost Rate $/km	HC Rate g/km	CO Rate g/km	NOX Rate g/km	CO2 Rate g/km
West: Wanless Road W						
5L L	12.6	0.44	0.537	26.61	0.786	315.3
2T T	12.1	0.41	0.496	24.76	0.771	302.0
2R R	12.2	0.41	0.508	25.57	0.783	305.8
	12.1	0.41	0.499	24.98	0.774	303.1
South: Mississauga Road S						
3L L	12.8	0.46	0.549	26.77	0.791	319.9
8T T	17.9	0.54	0.644	38.52	1.203	450.0
8R R	13.1	0.45	0.547	27.71	0.842	329.1
	15.7	0.50	0.600	33.48	1.034	393.8
East: Wanless Road E						
1L L	12.3	0.43	0.523	25.88	0.771	308.9
6T T	11.8	0.40	0.483	23.89	0.752	296.4
6R R	12.2	0.41	0.508	25.54	0.782	306.0
	12.1	0.42	0.503	24.85	0.761	302.4
North: Mississauga Road N						
7L L	12.7	0.44	0.529	26.57	0.794	316.7

4T T	12.5	0.42	0.494	25.12	0.794	311.8
4R R	11.8	0.40	0.481	23.78	0.745	294.7
	12.4	0.42	0.499	25.26	0.790	311.2
INTERSECTION:	12.9	0.43	0.521	26.76	0.827	322.6

Table S.14 - Summary of Input and Output Data

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: Wanless Road W												
1 LT	16	560		576	2				0.628	10.4	49	500
2 T		665		665	2				0.628	9.5	51	500
3 R			405	405	2				0.463	9.8	28	75
	16	1225	405	1646	2				0.628	9.9	51	
South: Mississauga Road S												
1 LT	50	164		214	13				0.514	15.4	29	500
2 T		226		226	17				0.514	13.4	30	500
3 R			280	280	3				0.627	15.5	37	75
	50	390	280	720	10				0.627	14.8	37	
East: Wanless Road E												
1 LT	355	41		396	2				0.465	14.3	26	500
2 TR		379	16	395	2				0.465	8.1	26	500
	355	420	16	791	2				0.465	11.2	26	
North: Mississauga Road N												
1 LT	40	73		113	4				0.162	10.7	7	500
2 T		117		117	4				0.162	8.1	7	500
3 R			21	21	5				0.022	7.6	1	75
	40	190	21	251	4				0.162	9.2	7	
ALL VEHICLES		Total Flow	% HV						Max X	Aver. Delay	Max Queue	
		3408	4						0.640	11.2	51	

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	Mov Typ	Total Flow	Total Cap.	Deg. of	Aver. Delay	LOS	Longest Queue 95% Back

	(veh /h)	(veh /h)	Satn (v/c)	(sec)		(vehs)	(m)
West: Wanless Road W							
5L L	16	25	0.640*	17.2	B	6.4	49
2T T	1225	1950	0.628	9.8	A	6.6	51
2R R (Slp)	405	874	0.463	9.8	A	3.6	28
South: Mississauga Road S							
3L L	50	97	0.515	20.5	C	3.4	29
8T T	390	759	0.514	13.6	B	3.5	30
8R R (Slp)	280	446	0.628	15.5	B	4.7	37
East: Wanless Road E							
1L L	355	764	0.465	15.0	B	3.4	26
6T T	420	904	0.465	8.0	A	3.4	26
6R R	16	34	0.471	9.2	A	3.4	26
North: Mississauga Road N							
7L L	40	248	0.161	15.2	B	0.9	7
4T T	190	1176	0.162	8.1	A	0.9	7
4R R (Slp)	21	957	0.022	7.6	A	0.1	1
ALL VEHICLES:	3408		0.640	11.2	B	6.6	51

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

Table D.0 - Geometric Delay Data

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

From Approach	To Approach	Turn	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)	User Spec?
West: Wanless Road W								
	South	Right	36.0	32.8	19.4	500	126	No
	East	Thru	57.3	39.1	47.1	500	131	No
	North	Left	19.0	25.7	74.6	500	176	No
South: Mississauga Road S								
	West	Left	19.0	25.7	74.6	500	176	No
	East	Right	41.0	34.5	19.3	500	128	No
	North	Thru	57.3	39.1	47.1	500	146	No
East: Wanless Road E								
	West	Thru	57.3	39.1	47.1	500	131	No
	South	Left	19.0	25.7	74.6	500	176	No
	North	Right	35.0	32.5	19.4	500	126	No
North: Mississauga Road N								
	West	Right	41.0	34.5	19.3	500	127	No
	South	Thru	57.3	39.1	47.1	500	133	No
	East	Left	19.0	25.7	74.6	500	177	No

Maximum Negotiation (Design) Speed = 50.0 km/h

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - Lane Delays

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: Wanless Road W										
1 LT	0.628	3.3	1.5	4.9	5.0	0.0	0.0	0.0	5.6	10.4
2 T	0.628	2.9	1.2	4.1	5.0	0.0	0.0	0.0	5.4	9.5
3 R	0.463	3.0	0.3	3.3	4.0	0.0	0.0	0.0	6.5	9.8
South: Mississauga Road S										
1 LT	0.514	6.0	2.0	8.1	5.1	3.0	1.2	1.8	7.3	15.4
2 T	0.514	5.7	1.9	7.6	5.4	2.2	1.2	1.0	5.8	13.4
3 R	0.627	5.9	3.3	9.3	5.2	4.1	1.7	2.3	6.2	15.5
East: Wanless Road E										
1 LT	0.465	2.3	0.3	2.6	3.3	0.0	0.0	0.0	11.7	14.3
2 TR	0.465	2.3	0.3	2.6	4.3	0.0	0.0	0.0	5.4	8.1
North: Mississauga Road N										
1 LT	0.162	2.8	0.0	2.8	3.7	0.0	0.0	0.0	7.9	10.7
2 T	0.162	2.7	0.0	2.7	4.1	0.0	0.0	0.0	5.4	8.1
3 R	0.022	1.4	0.0	1.4	2.8	0.0	0.0	0.0	6.2	7.6

dn is average stop-start delay for all vehicles queued and unqueued

Table D.2 - Lane Stops

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: Wanless Road W							
1 LT	0.628	0.74	0.07	0.11	0.91	0.768	0.18
2 T	0.628	0.68	0.06	0.11	0.86	0.757	0.16
3 R	0.463	0.62	0.02	0.17	0.81	0.675	0.04
South: Mississauga Road S							
1 LT	0.514	0.82	0.06	0.09	0.97	0.820	0.20
2 T	0.514	0.82	0.06	0.08	0.96	0.822	0.20
3 R	0.627	0.86	0.09	0.07	1.02	0.855	0.30
East: Wanless Road E							
1 LT	0.465	0.61	0.02	0.24	0.86	0.657	0.04
2 TR	0.465	0.52	0.02	0.15	0.69	0.657	0.04
North: Mississauga Road N							
1 LT	0.162	0.54	0.00	0.21	0.75	0.617	0.00
2 T	0.162	0.50	0.00	0.17	0.67	0.615	0.00
3 R	0.022	0.30	0.00	0.27	0.57	0.460	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

Table D.3A - Lane Queues (veh)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.628	0.3	1.7	0.4	2.1	3.6	4.5	5.1	6.4	7.4	0.10
2 T	0.628	0.3	1.8	0.4	2.2	3.8	4.6	5.3	6.6	7.7	0.10
3 R	0.463	0.1	1.1	0.1	1.2	2.1	2.6	2.9	3.6	4.2	0.37
South: Mississauga Road S											
1 LT	0.514	0.1	1.0	0.1	1.1	2.0	2.4	2.8	3.4	4.0	0.06
2 T	0.514	0.1	1.0	0.1	1.1	2.0	2.5	2.8	3.5	4.1	0.06
3 R	0.627	0.3	1.3	0.3	1.5	2.7	3.3	3.8	4.7	5.5	0.49
East: Wanless Road E											
1 LT	0.465	0.1	1.0	0.1	1.1	2.0	2.4	2.8	3.4	4.0	0.05
2 TR	0.465	0.1	1.0	0.1	1.1	2.0	2.4	2.8	3.4	4.0	0.05
North: Mississauga Road N											
1 LT	0.162	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.9	1.0	0.01
2 T	0.162	0.0	0.3	0.0	0.3	0.5	0.6	0.7	0.9	1.0	0.01
3 R	0.022	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.01

Values printed in this table are back of queue (vehicles).

Table D.3B - Lane Queues (metres)

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: Wanless Road W											
1 LT	0.628	2.4	13.0	3.2	16.2	28.2	34.7	39.6	49.3	57.4	0.10
2 T	0.628	2.2	13.6	3.2	16.8	29.1	35.9	40.9	51.0	59.4	0.10
3 R	0.463	0.4	8.5	0.5	9.0	16.2	19.8	22.5	27.9	32.4	0.37
South: Mississauga Road S											
1 LT	0.514	1.3	8.3	1.0	9.4	16.9	20.7	23.5	29.1	33.8	0.06
2 T	0.514	1.3	8.7	1.0	9.8	17.7	21.6	24.5	30.4	35.3	0.06
3 R	0.627	2.2	10.0	2.0	12.0	21.3	26.1	29.7	36.8	42.8	0.49
East: Wanless Road E											
1 LT	0.465	0.4	8.0	0.5	8.5	15.3	18.7	21.3	26.4	30.6	0.05
2 TR	0.465	0.4	8.0	0.5	8.5	15.4	18.7	21.3	26.4	30.6	0.05
North: Mississauga Road N											
1 LT	0.162	0.0	2.2	0.0	2.2	4.1	4.9	5.6	6.9	8.0	0.01
2 T	0.162	0.0	2.2	0.0	2.2	4.1	5.0	5.7	7.0	8.1	0.01
3 R	0.022	0.0	0.3	0.0	0.3	0.6	0.7	0.8	0.9	1.1	0.01

Values printed in this table are back of queue (metres).

Table D.4 - Movement Speeds (km/h) and Geometric Delay

Mississauga Road EA
Mississauga Road and Wanless Road 2031 PM TTMP Red N/S
Intersection ID: 2
Roundabout

Mov ID	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall	Geom Delay (sec)
West: Wanless Road W									
5L L	65.0	25.7	25.7	65.0	21.0		44.5	44.5	12.4
2T T	65.0	39.1	39.1	65.0	21.7		50.1	50.1	5.4
2R R	65.0	32.8	32.8	65.0	21.2		50.0	50.0	6.5
South: Mississauga Road S									
3L L	65.0	25.7	25.7	65.0	16.5		44.2	42.1	12.4
8T T	65.0	39.1	39.1	65.0	16.1		48.4	47.2	5.8
8R R	65.0	34.5	34.5	65.0	15.6		47.2	45.0	6.2
East: Wanless Road E									
1L L	65.0	25.7	25.7	65.0	20.7		45.9	45.9	12.4
6T T	65.0	39.1	39.1	65.0	20.7		50.9	50.9	5.4
6R R	65.0	32.5	32.5	65.0	20.6		50.1	50.1	6.6
North: Mississauga Road N									
7L L	65.0	25.7	25.7	65.0			46.1	46.1	12.4
4T T	65.0	39.1	39.1	65.0			51.2	51.2	5.4
4R R	65.0	34.5	34.5	65.0			51.7	51.7	6.2

"Running Speed" is the average speed excluding stopped periods.