Appendix D:
Traffic Operations Assessment

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Consulting Engineers

BAYVIEW DRIVE & BIG BAY POINT ROAD CLASS EA

Phases 3 & 4

Technical Memorandum: Traffic Operations Assessment

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1 Introduction

This technical memorandum details the process and findings of the traffic operations assessment completed in support of the Bayview Drive and Big Bay Point Road Class Environmental Assessment (EA).

1.1 Background

C.C. Tatham & Associates Ltd. (CCTA) was retained by the City of Barrie to complete Phases 3 and 4 of the Municipal Class EA process to assess transportation improvements along Bayview Drive (from Big Bay Point Road to Little Avenue) and Big Bay Point Road (from Bayview Drive to Huronia Road).

The *City of Barrie Multi-Modal Active Transportation Master Plan* (MMATMP) identified Bayview Drive and Big Bay Point Road as key transportation corridors and recommended several transportation infrastructure improvements for each respective road. Bayview Drive, from Big Bay Point Road to Little Avenue, was recommended for widening to a 3-lane profile (i.e. one lane of travel per direction and a continuous centre turn lane) with the implementation of bicycle lanes and sidewalks. It is noted that beyond the 2031 horizon year, the MMATMP identified the potential for further widening of Bayview Drive to a 5-lane profile. Big Bay Point Road, from Bayview Drive to Huronia Road, has been identified for widening to a 7-lane profile (i.e. three lanes of travel per direction and a continuous centre turn lane or raised median) with buffered bicycle lanes and sidewalks. The City has initiated a Class EA to address the recommended improvements to Bayview Drive and Big Bay Point Road.

The MMATMP was completed in accordance with the Class EA planning process to satisfy Phase 1 and 2 requirements. Recommended as a Schedule C undertaking, the Bayview Drive and Big Bay Point Road Class EA will be completed in accordance with the requirements of Phase 3 and 4 of the Class EA process including public consultation and completion of an Environmental Study Report.

1.2 Traffic Operations Assessment

In support of the Class EA study, a traffic operations assessment was conducted to review the existing and future operations of the study area road network and to confirm the transportation improvements required to ensure acceptable operations through the 2031 horizon period. In this respect, the traffic assessment has examined both midblock operations and intersection operations to confirm the overall lane provision required and further identify the need for additional turn lanes at the key intersections. The assessment has also included a review of the operations at select access points (i.e. uncontrolled side streets and/or driveways serving high trip generating land-uses) for the purpose of identifying the need for greater intersection controls (signal vs stop), additional turn lanes and/or turn restrictions.

2 Existing Conditions

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

2.1 Road Sections

2.1.1 Bayview Drive

As per the *City of Barrie Official Plan,* Bayview Drive is classified as a major collector road. From Big Bay Point Road to Little Avenue, the road has a 2-lane rural cross section with gravel shoulders and open drainage ditches bordering both sides of the road. There is a 1.2 metre concrete sidewalk on the west side of the road extending from Little Avenue to the south approximately 380 metres (serving the Allandale Recreation Centre and Innisdale Secondary School). To the south of Big Bay Point Road (south of the study area), Bayview Drive has a 5-lane urban cross section with two lanes per direction, a continuous centre turn lane, sidewalks and curb and gutter; whereas to the north of Little Avenue, Bayview Drive has a 2-lane urban cross section. The posted speed limit through the study area is 50 km/h and hence a design speed of 70 km/h has been assumed (posted speed limit + 20 km/h). Bayview Drive maintains a fairly flat vertical alignment with a slight horizontal 'S' curve to the south of Mollard Court.

2.1.2 Big Bay Point Road

Big Bay Point Road is an arterial road with a 2-lane rural cross-section between Bayview Drive and Huronia Road. The road maintains a 2-lane rural cross section to the west of Bayview Drive; whereas to the east of Huronia Road, Big Bay Point Road widens to provide a 5-lane urban cross section. Big Bay Point Road has a posted speed limit of 50 km/h and a design speed of 70 km/h (posted speed limit + 20 km/h). It is noted that the assumed design speed on Big Bay Point Road to west of Bayview Drive and over Highway 400 was 80 km/h (i.e. assumed 60 km/h speed limit + 20 km/h). While Big Bay Point Road maintains a straight horizontal alignment, the vertical alignment varies throughout the study area.

2.1.3 Lane Capacity

The lane capacities for Bayview Drive and Big Bay Point Road have been established based on the lane capacity inputs employed in the City of Barrie's EMME traffic model and the respective classification of the subject roads, as published in the *City of Barrie Official Plan* and *MMATMP*.

The lane capacity inputs for the City's EMME traffic model are based on road classification and lane provisions, and are provided in Table 1 (as published in the City's *MMATMP*). It is noted that the City's road classification system consists of 4 road classifications (arterial, major collector, minor collector

and local), whereas the traffic model considers 5 classifications (major arterial, minor arterial, major collector, minor collector and local).

Table 1: EMME Model Road Classifications & Lane Capacities[1]

Road Classification	Lanes	Centre Two-way Left Turn Lane (Y/N)	Lane Capacity (vph)
Major Arterial	2, 4 or 6	N	750
	3, 5 or 7	Y	850
Minor Arterial	2, 4 or 6	N	650
	3, 5 or 7	Y	750
Major Collector	2 or 4	N	500
	3 or 5	Y	550
Minor Collector	2	N	400
	3	Y	500
Local	2	N	400

[1] As per Table 3-7 of the *City of Barrie Multi-Modal Active Transportation Master Plan*.

As indicated, the provision of a centre two-way left turn lane is assumed to increase the capacity of a through lane by 10 to 25%.

It is noted that the lane capacity of any given road is dynamic (i.e. it varies by road section as dictated by driveway/access density, intersection spacing, traffic signals, etc.). Capacity is typically reduced at intersections given the interruption of vehicular flow by traffic signals and increased turning movements; whereas between intersections where there are no (or minimal) interruptions in flow, the capacity is significantly increased. As previously noted, the lane capacities in the City's EMME traffic model are based on road classification and thus take into account the operational characteristics specific to the respective road classes – including the impact of traffic signals on the overall lane capacity. As such, the lane capacities noted in Table 1 are considered to be reflective of the lane capacities at the network level (i.e. macro level), rather than the road section level (i.e. micro level).

As previously noted, Big Bay Point Road is classified as an arterial road. For the purpose of assessment, this study assumes that Big Bay Point Road is a major arterial. As such, a lane capacity

of 750 vehicles per hour has been assumed, which is consistent with the City's traffic model lane capacity for a two-lane major arterial.

Based on the lane capacities noted in Table 1, Bayview Drive, as a two-lane major collector, has a lane capacity of 500 vehicles per hour. It is noted that major collector roads serving employment lands (such as Bayview Drive through the study area) will typically have a greater lane capacity than major collectors serving residential areas, recognizing that major collectors in residential areas have a higher density of driveway access points than those serving employment lands. As such, a greater lane capacity of 650 vph, consistent with a two-lane minor arterial, has been assumed for Bayview Drive.

2.2 Key Intersections

2.2.1 Major Intersections

The following intersections have been included in the traffic operations assessment:

1. Little Avenue & Bayview Drive;
2. Bayview Drive & Big Bay Point Road;
3. Welham Road & Big Bay Point Road; and
4. Huronia Road & Big Bay Point Road

2.2.2 Minor Intersections

In addition to the noted major intersections, the following access points/side streets have also been identified for review given that they serve relatively high trip generating land-uses:

5. Innisdale Secondary School North Access & Bayview Drive;
6. Innisdale Secondary School South Access & Bayview Drive;
7. Mollard Court/The Source (north access) & Bayview Drive; and
8. The Source (south access) & Bayview Drive.

2.2.3 Intersection Configurations & Control

The configuration and control type for each of the subject intersections (major and minor) is illustrated in Figure 1.

2.2.4 Private Driveways

Notwithstanding the intersections noted above, there are several other access points along the study area road sections. There are 18 driveways along Bayview Drive and 19 driveways along Big Bay

Point Road. These driveways serve the existing commercial and industrial development in the area. There is also a private residential road access serving the Tamarack Woods townhouse development on the east side of Bayview Drive, immediately south of Little Avenue.

2.3 Existing Traffic Volumes

Existing traffic volumes were determined from weekday AM and PM peak hour turning movement counts provided by the City of Barrie for each of the subject intersections. Data from several turning movement counts conducted between 2011 and 2015 was provided for consideration. A summary of the turning movement counts is provided in Table 2, whereas traffic count details are provided in Appendix A.

Upon review of the available traffic data, the volumes for Bayview Drive have been based on the volumes observed during the October 2014 counts (at both Little Avenue and Big Bay Point Road); whereas the volumes on Big Bay Point Road have been based on the October 2013 counts observed at Huronia Road.

Table 2: Turning Movement Counts

Intersection	2011	2012	2013	2014	2015
Little Avenue & Bayview Drive	June 23	Aug 1	-	Oct 21	-
Bayview Drive & Big Bay Point Road	June 21	-	-	Oct 21	-
Welham Road & Big Bay Point Road	-	Dec 20	Oct 24	-	-
Huronia Road & Big Bay Point Road	-	-	Oct 22	-	-
Innisdale North Access & Bayview Drive	-	-	-	-	Sept 23
Innisdale South Access & Bayview Drive	-	-	-	-	Sept 23
Mollard Court & Bayview Drive	-	-	-	-	Aug 19
The Source South & Bayview Drive	-	-	-	-	Aug 19

With respect to Bayview Drive, the 2014 data indicates that traffic volumes at the north end of Bayview Drive (i.e. south of Little Avenue) are approximately 9% greater than the volumes observed at the south end of Bayview Drive (i.e. north of Big Bay Point Road). The 2011 data indicates the same, with volumes approximately 12% greater. The discrepancy in the traffic volumes between the north and

south is likely due to the traffic generated by the Allandale Recreation Centre and Innisdale Secondary School located at the north end of Bayview Drive. These two facilities generate a large volume of traffic to/from the residential development located immediately north, northwest and northeast of the study area. These trips will not continue south along Bayview Drive to Big Bay Point Road. Similarly, the employment lands along Bayview Drive, north of Big Bay Point Road, will also generate trips to/from the residential development to the north, thus resulting in increased volumes on the north section of Bayview Drive. As such, the volumes on Bayview Drive between Little Avenue and Big Bay Point Road have not been balanced, recognizing that the disparity in volumes is readily explained by the presence of significant traffic generators located to the north.

The volumes on Big Bay Point Road have been based on the 2013 volumes observed at Huronia Road, carried to the west through the network, naturally adjusted and balanced at each of the main intersections based on the observed turning movements. Unlike Bayview Drive, the observed volumes on Big Bay Point Road (i.e. from Bayview Drive to Welham Road to Huronia Road) are fairly consistent with minimal variations in the traffic volumes.

It is noted that the 2013 and 2014 volumes have been adjusted to reflect 2015 existing conditions based on established growth rates (growth rates are discussed in further detail in Section 3.1.1).

The volumes at the minor intersections/access points on Bayview Drive consider the through volumes as noted above and the turning movement volumes as observed during the 2015 counts.

The resulting 2015 volumes are illustrated in Figure 2 and Figure 3.

2.4 Existing Traffic Operations

2.4.1 Intersection Operations

The assessment of existing conditions provides the baseline from which the future traffic volumes and operations can be assessed. The capacity, and hence operations, of a road system is effectively dictated by its intersections. As such, the analysis focused on the operations of the key intersections. The analysis is based on the 2015 traffic volumes, the existing configurations and intersection controls and procedures outlined in the *2000 Highway Capacity Manual*[1] (using Synchro v.8 software). The signal timings have been optimized to ensure optimal operating conditions. For signalized intersections, the analysis considers each approach and the overall intersection. For the unsignalized intersections, the review considers the average delay (measured in seconds), level of service (LOS) and volume to capacity (v/c) for the critical movements, namely the stop movements on the minor street. A summary of the analyses is provided in Table 3 for the signalized intersections and Table 4 for the unsignalized intersections. Level of service A corresponds to the best operating condition with minimal delays whereas level of service F corresponds to poor operations resulting from high

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

intersection delays. A summary of the LOS levels (A to F), as employed in the Highway Capacity Manual Methodology for signalized and unsignalized intersections, is provided in Appendix B. A v/c ratio of less than 1.0 indicates the intersection movement/approach is operating at less than capacity while a v/c ratio of 1.0 indicates capacity has been reached. Detailed operations worksheets for the existing traffic conditions are included in Appendix C.

Table 3: Intersection Operations (Signalized) – 2015 Conditions

Intersection and Movement		Control	Weekday AM Peak Hour			Weekday PM Peak Hour		
			delay	LOS	v/c	delay	LOS	v/c
Little Avenue & Bayview Drive	EB	signal	24	C	0.62	31	C	0.69
	WB		18	B	0.51	23	C	0.50
	NB		23	C	0.28	25	C	0.63
	SB		30	C	0.55	23	C	0.31
	overall	signal	23	C	0.52	26	C	0.61
Bayview Drive & Big Bay Point Road	EB	signal	21	C	0.59	27	C	0.68
	WB		22	C	0.74	25	C	0.76
	NB		34	C	0.64	40	D	0.87
	SB		30	C	0.60	32	C	0.60
	overall	signal	25	C	0.68	31	C	0.78
Welham Road & Big Bay Point Road	EB	signal	6	A	0.36	14	B	0.71
	WB		8	A	0.58	11	B	0.56
	NB		23	C	0.32	24	C	0.69
	SB		21	C	0.12	17	B	0.31
	overall	signal	9	A	0.53	15	B	0.70
Huronia Road & Big Bay Point Road	EB	signal	8	A	0.38	25	C	0.87
	WB		11	B	0.65	18	B	0.76
	NB		17	B	0.45	41	D	0.94
	SB		17	B	0.49	27	C	0.80
	overall	signal	12	B	0.60	28	C	0.90

Table 4: Intersection Operations (Unsignalized) – 2015 Conditions

Intersection and Movement		Control	Weekday AM Peak Hour			Weekday PM Peak Hour		
			delay	LOS	v/c	delay	LOS	v/c
Innisdale North Access & Bayview Drive	EB	stop	17	C	0.28	12	B	0.09
Innisdale South Access & Bayview Drive	EB	stop	16	C	0.27	11	B	0.09
Mollard Court/The Source & Bayview Drive	EB	stop	14	B	0.06	17	C	0.18
	WB	stop	14	B	0.02	14	B	0.15
The Source & Bayview Drive	WB	stop	14	B	0.02	16	C	0.26

Based on the existing volumes, all of the signalized intersections provide good overall levels of service (LOS C or better) with average delays during both peak hours. It is further noted that none of the individual movements (i.e. left turn, right turn, and through movements) operate below a level of service D, with a majority of the movements providing a level of service C or better. With respect to capacity, the signalized intersections operate below capacity, with most movements operating below 80% (i.e. v/c ≤ 0.80). The exceptions being the northbound through movement at the intersection of Bayview Drive with Big Bay Point Road and the eastbound and northbound through movements at the intersection of Huronia Road with Big Bay Point Road, which operate between 87% and 94% of capacity (i.e. 0.87 ≤ v/c ≤ 0.94) during the PM peak hour.

Under existing conditions, the unsignalized intersections considered in this assessment will also provide good overall operating conditions (LOS C or better for the critical movements).

Based on the noted operations of both the signalized and unsignalized intersections, no improvements are required to support the existing conditions.

2.4.2 Road Section Operations

Intersections are essentially pinch points in a road network, recognizing that the capacity at an intersection is typically lower than the mid-block capacity of a road section. Thus the capacity, and hence operations, of a road system is effectively dictated by its intersections. Given the acceptable operations of the study area intersections under existing conditions, additional lane capacity along the subject road sections is not considered necessary to support existing traffic volumes.

3 Future Conditions

3.1 Future Growth

Traffic projections for the 2021 and 2031 horizon years have been determined based on the existing traffic volumes, historical and projected employment and population growth for the City, available average daily traffic data, and traffic projections from the City's EMME transportation model.

3.1.1 Population & Employment Growth

The 2011 census results for the City of Barrie indicate that the population increased from 128,430 persons in 2006 to 135,711 in 2011, translating to an annual growth rate of 1.1%. A further review of previous census data indicates that while the City's population continues to grow, the annual growth rate has slowed considerably when compared to the aggressive growth of the mid to late 1990's. The *Growth Plan for the Greater Golden Horseshoe*[2], which is intended to guide future development within Simcoe County, projects the population of the City of Barrie to grow from 141,000 in 2011 to 210,000 in 2031, translating to an annual increase of 2.0%. In consideration of the 2011 census population level of 135,711 and a projected population of 210,000 in 2031, the annual growth rate is a slightly higher at 2.2%.

With respect to employment growth, the *Growth Plan for the Greater Golden Horseshoe* projects an increase from 70,000 jobs in 2011 to 101,000 jobs in 2031, equating to an annual increase of 1.9%. The City's *Growth Management Strategy*[3] claims a 2011 employment level of 68,000 jobs, which translates to a comparable annual growth rate of 2.1% (assuming 101,000 jobs in 2031).

3.1.2 Historical Traffic Data

A summary of historical average daily traffic (ADT) volumes along Bayview Drive and Big Bay Point Road, as published by the City of Barrie, is provided in Table 5. The review of ADT volumes for Bayview Drive indicates growth varying from -1.1% per annum (i.e. negative growth) to 1.1% per annum. For Big Bay Point Road, historical growth varies from 2.3% to 3.8% per annum. It is noted that the volumes reviewed are average daily traffic volumes rather than annual average daily traffic (AADT). Annual average daily traffic reflects the average 24-hour, two-way traffic for the period January 1 to December 31. With AADT, the daily (i.e. Tuesday vs. Saturday) and seasonal (i.e. summer vs. winter) variations are considered in the average volume. Conversely, ADT reflects the average 24-hour volume for any given time period (i.e. over 2-days, 1 week, 1 month, etc.). Thus daily or seasonal peaks may not be considered when reviewing ADT. Thus the noted variance in growth

[2] *Growth Plan for the Greater Golden Horseshoe, 2006.* Ministry of Infrastructure. (Office consolidated, January 2012)
[3] *City of Barrie Growth Management Study, Executive Summary.* Watson & Associates Economists Ltd. (July 2012)

rates may simply be attributed to the timing of the ADT counts rather than actual growth on the network.

Table 5: Historical Traffic Volumes (ADT)

Road Section	Average Daily Traffic Volumes					Annual Growth
	2008	2010	2011	2012	2013	
Bayview Drive						
Little Avenue to Mollard Court	-	8,502	-	8,309	-	-1.1%
Mollard Court to Big Bay Point Road	8,715	-	9,013	-	-	1.1%
Big Bay Point Road						
Bayview Drive to Welham Road	-	-	13,613	-	14,654	3.8%
Welham Road to Huronia Road	-	13,631	-	-	14,589	2.3%

A review of the turning movement counts provided by the City indicates the following annual growth rates for the study area road network:

- Bayview Drive at Little Avenue: -0.8% (2011 to 2014);
- Bayview Drive at Big Bay Point Road: -0.6% (2011 to 2014);
- Big Bay Point Road at Bayview Drive: -0.5% (2011 to 2014); and
- Big Bay Point Road at Welham Road: -5.9% (2012 to 2013).

While the turning movement counts indicate negative growth on the road network, it is noted that the turning movement counts only capture traffic volumes for a single day (in this case, the counts were conducted over a 10 hour period). Similar to the average daily traffic counts, the turning movement counts do not necessarily provide an accurate assessment of traffic growth as they only portray a snap shot in time that may be impacted by weather events, construction activities, accidents or other external factors.

3.1.3 City of Barrie Transportation Model (EMME)

The traffic projections from the City's macro level transportation model were also reviewed to further inform the establishment of appropriate growth rates for the Bayview Drive and Big Bay Point Road corridors. The model considers the travel demands of the entire City based primarily on population and employment levels within individual zones. In developing future travel demands, a number of factors are considered including: planned growth, development levels, population forecasts, planned road network improvement, and transit initiatives and service levels. Of particular importance with

respect to the study area road network is the planned Harvie Road/Big Bay Point Road crossing over Highway 400 via a new overpass and the implementation of a partial interchange with Highway 400. The traffic model considers the completion of the overpass by 2016, and the implementation of the highway interchange by 2021.

The total weekday peak hour volumes (i.e. AM + PM) for 2011, 2016, 2021, 2026 and 2031 (as per the EMME outputs provided by the City), and the corresponding annual growth rates, are provided in Table 6 through Table 7.

Table 6: EMME Traffic Projections (Volumes)

Road Section	Weekday Peak Volumes (AM + PM)				
	2011	2016	2021	2026	2031
Bayview Drive					
Little Avenue to Mollard Court	613	634	673	725	731
Mollard Court to Big Bay Point Road	496	645	835	850	869
Big Bay Point Road					
Bayview Drive to Welham Road	2,006	3,691	4,903	5,172	5,553
Welham Road to Huronia Road	1,351	2,827	3,892	4,055	4,396

Table 7: EMME Traffic Projections (Growth Rates)

Road Section	Annual Growth Rates				Overall
	2011 to 2016	2016 to 2021	2021 to 2026	2026 to 2031	2011 to 2031
Bayview Drive					
Little Avenue to Mollard Court	0.7%	1.2%	1.5%	0.2%	0.9%
Mollard Court to Big Bay Point Road	5.4%	5.3%	0.4%	0.4%	2.8%
Big Bay Point Road					
Bayview Drive to Welham Road	13.0%	5.8%	1.1%	1.4%	5.2%
Welham Road to Huronia Road	15.9%	6.6%	0.8%	1.6%	6.1%

Bayview Drive Growth

On Bayview Drive, between Little Avenue and Mollard Court, the EMME traffic model projects growth of 0.9% over the 20 year horizon period, whereas annual growth for the road section between Mollard

Court and Big Bay Point Road is projected at 2.8%. It is noted that the annual growth south of Mollard Court fluctuates from approximately 5.4% per annum between 2011 and 2021 to 0.4% per annum between 2021 and 2031

Big Bay Point Road Growth

The projected annual growth on Big Bay Point Road over the 20 year horizon period ranges from 5.2% to 6.1%. This translates into an overall increase in the order of 175% to 227% over 20 years. The primary source of this major increase in traffic is the aforementioned Harvie Road/Big Bay Point Road crossing over Highway 400. The growth is front loaded in terms of timing with much of it occurring by 2016, which coincides with the completion of the Harvie Road/Big Bay Point Road crossing (as per the City's traffic model). The crossing alone (i.e. not considering the interchange) will result in an increase in traffic in the order of 84% to 110% by 2016. The interchange, which the City's traffic model assumes is in place by 2021, further increases the traffic volumes by 33% to 38% over the 2016 volumes. Following the implementation of the crossing and interchange and the initial surge in traffic growth, traffic volumes on Big Bay Point Road are projected to grow at a modest 0.8% to 1.6% per annum (reflective of typical background growth).

3.1.4 Overall Growth

Based on discussions with the City, the Harvie Road/Big Bay Point Road crossing is anticipated to be completed by the 2021 horizon year, whereas the Highway 400 interchange will not be completed within the study horizon period. It is understood that Highway 400 must be widened prior to construction of the proposed interchange. MTO has advised that the required widening is not within their 5 year capital plan and it remains unclear as to when such works will be scheduled. Nonetheless, it is anticipated that the widening of Highway 400 and subsequent implementation of the interchange will occur beyond the 2031 study horizon. As such, the growth rates established for this assessment consider the growth associated with the Harvie Road/Big Bay Point Road crossing but do not consider growth attributed to the implementation of the Highway 400 interchange.

In consideration of the historical and projected growth for the area, and the timing of the planned infrastructure improvements noted above (i.e. Harvie Road/Big Bay Point crossing), the following growth rates have been applied to traffic volumes on the study area road network:

- Bayview Drive
  - 1.5% per annum (2015 to 2031)
- Big Bay Point Road
  - 11.5% per annum (2015 to 2021)
  - 1.5% per annum (2021 to 2031)

- Little Avenue, Welham Road & Huronia Road
    - 1.5% per annum

Additional consideration was also given to the impact that the new Harvie Road/Big Bay Point Road crossing would have on the traffic patterns at the intersections of Big Bay Point Road with Bayview Drive and Huronia Road, recognizing that the crossing over Highway 400 will provide an alternate east-west route to Mapleview Drive (i.e. a portion of motorists will utilize the new crossing to travel east-west rather than travel to/from the south on Bayview Drive or Huronia Road to Mapleview Drive). To account for this, the following adjustments have been made to the through movements and turning movements at the noted intersections:

- 25% of the northbound through volumes have been re-assigned to the eastbound left turn movement;
- 25% of the southbound through volumes have been re-assigned to the southbound right turn movement;
- 25% of the northbound right volumes have been re-assigned to the eastbound through movement; and
- 25% of the westbound left volumes have been re-assigned to the westbound through movement;

3.2 Future Traffic Volumes

The projected 2021 and 2031 traffic volumes are illustrated in Figure 4 through Figure 7. The future volumes are based on the existing volumes, adjusted to reflect the noted growth rates. It is noted that the overall growth in traffic on Big Bay Point Road through 2031 is in the order of 123%, or 5.1% per annum (2015 to 2031). The overall growth on Bayview Drive through 2031 is in the order of 27% to 31%, or 1.5% to 1.6% per annum.

3.3 Future Traffic Operations

3.3.1 Intersection Operations

The key intersections were again analyzed for each horizon year given the projected future volumes. The results are summarized in Table 8 through Table 11 (detailed worksheets are provided in Appendix D). The existing intersection configurations and control have been maintained in the analysis and the signal timings at the signalized intersections have been optimized to ensure efficient operations.

Based on the projected traffic volumes and the existing intersection configurations and control, the operations at the intersections of Big Bay Point Road with Bayview Drive, Welham Road and Huronia Road will begin to experience poor overall operating conditions (LOS E or F) in 2021, with the overall

intersections and/or several individual movements operating well above capacity (v/c > 1.0) with long delays.

Table 8: Intersection Operations (Signalized) – 2021

Intersection and Movement		Control	Weekday AM Peak Hour			Weekday PM Peak Hour		
			delay	LOS	v/c	delay	LOS	v/c
Little Avenue & Bayview Drive	EB	signal	26	C	0.69	33	C	0.75
	WB		19	B	0.56	24	C	0.54
	NB		23	C	0.31	27	C	0.71
	SB		31	C	0.60	25	C	0.38
	overall	signal	24	C	0.58	27	C	0.67
Bayview Drive & Big Bay Point Road	EB	signal	60	E	1.03	156	F	1.29
	WB		170	F	1.32	223	F	1.44
	NB		49	D	0.66	129	F	1.33
	SB		64	E	0.90	76	F	0.94
	overall	signal	108	F	1.15	166	F	1.37
Welham Road & Big Bay Point Road	EB	signal	14	B	0.91	85	F	1.13
	WB		20	C	0.92	47	D	1.03
	NB		55	D	0.58	125	F	1.12
	SB		48	D	0.17	35	D	0.55
	overall	signal	20	C	0.88	72	E	1.12
Huronia Road & Big Bay Point Road	EB	signal	23	C	1.04	118	F	1.66
	WB		22	C	0.91	27	C	1.02
	NB		79	E	1.03	105	F	1.12
	SB		54	D	0.79	79	E	1.23
	overall	signal	32	C	1.03	83	F	1.54

Table 9: Intersection Operations (Signalized) – 2031

Intersection and Movement		Control	Weekday AM Peak Hour			Weekday PM Peak Hour		
			delay	LOS	v/c	delay	LOS	v/c
Little Avenue & Bayview Drive	EB	signal	33	C	0.82	41	D	0.85
	WB		21	C	0.65	25	C	0.62
	NB		24	C	0.38	33	C	0.84
	SB		34	C	0.70	29	C	0.49
	overall	signal	28	C	0.70	32	C	0.79
Bayview Drive & Big Bay Point Road	EB	signal	122	F	1.21	251	F	1.52
	WB		281	F	1.58	336	F	1.71
	NB		52	D	0.72	194	F	1.62
	SB		86	F	1.02	111	F	1.05
	overall	signal	182	F	1.34	254	F	1.64
Welham Road & Big Bay Point Road	EB	signal	46	D	1.74	172	F	1.32
	WB		59	E	1.08	115	F	1.42
	NB		58	E	0.65	196	F	1.29
	SB		47	D	0.19	44	D	0.64
	overall	signal	54	D	1.57	144	F	1.37
Huronia Road & Big Bay Point Road	EB	signal	65	E	1.69	374	F	3.44
	WB		81	F	1.15	54	D	1.05
	NB		69	E	1.05	119	F	1.17
	SB		42	D	0.80	58	E	1.11
	overall	signal	70	E	1.52	198	F	2.72

Table 10: Intersection Operations (Unsignalized) – 2021

Intersection and Movement		Control	Weekday AM Peak Hour			Weekday PM Peak Hour		
			delay	LOS	v/c	delay	LOS	v/c
Innisdale North Access & Bayview Drive	EB	stop	18	C	0.31	13	B	0.09
Innisdale South Access & Bayview Drive	EB	stop	17	C	0.29	12	B	0.09
Mollard Court/The Source & Bayview Drive	EB	stop	15	B	0.07	14	B	0.16
	WB	stop	15	C	0.02	20	C	0.21
The Source & Bayview Drive	WB	stop	15	B	0.02	18	C	0.30

Table 11: Intersection Operations (Unsignalized) – 2031

Intersection and Movement		Control	Weekday AM Peak Hour			Weekday PM Peak Hour		
			delay	LOS	v/c	delay	LOS	v/c
Innisdale North Access & Bayview Drive	EB	stop	22	C	0.37	14	B	0.11
Innisdale South Access & Bayview Drive	EB	stop	20	C	0.34	13	B	0.10
Mollard Court/The Source & Bayview Drive	EB	stop	17	C	0.08	15	C	0.18
	WB	stop	17	C	0.02	25	C	0.26
The Source & Bayview Drive	WB	stop	17	C	0.02	22	C	0.36

By 2031, all three intersections along Big Bay Point Road will be in a state of failure during the PM peak hour with overall delays of 144 seconds or greater. The rapid deterioration of the operations at these intersections is attributed to the substantial increase in east-west traffic volumes along Big Bay Point Road resulting from the Harvie Road/Big Bay Point Road crossing. By contrast, the intersection of Bayview Drive with Little Avenue will continue to provide acceptable overall operations through 2031. Unlike Big Bay Point Road, Bayview Drive is not expected to experience the same growth in traffic volumes and thus the intersection operations at Little Avenue are not impacted to the same degree.

With respect to the unsignalized intersections, all are expected to provide good operations (LOS C or better) with average delays during the AM and PM peak hours, through the 2031 horizon.

3.3.2 Road Section Operations

As previously noted, the capacity of a road network is essentially dictated by its intersections. The poor operating conditions expected at the study area intersections in 2021 and 2031 indicate that the road network may require additional lane capacity. As such, a supplementary review of the road section operations has been conducted which considers the assumed lane capacities noted in Section 2.1.3, the projected 2021 and 2031 peak hour peak directional volumes and the existing lane provision for each road section.

The following lane capacities have been considered for the study area road network:

- Big Bay Point Road – 750 vph; and
- Bayview Drive – 650 vph.

The results of the review are summarized in Table 12 and Table 13.

As indicated, the volumes on Big Bay Point Road will exceed the available lane capacity by 2021, with volumes more than doubling the available capacity by 2031. For Bayview Drive, the peak hour volumes between Little Avenue and Mollard Court will approach capacity in 2021 and slightly exceed the assumed lane capacity in 2031.

Table 12: Road Section Operations – 2021

Road Section and Lanes per Direction		Capacity[1]		Traffic Volumes (vph)		Volume to Capacity	
		EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
Bayview Drive							
Little Avenue to Mollard Court	1	650	650	629	610	0.97	0.94
Mollard Court to Big Bay Point Road	1	650	650	488	418	0.75	0.64
Big Bay Point Road							
Bayview Drive to Welham Road	1	750	750	1,261	1,289	1.68	1.72
Welham Road to Huronia Road	1	750	750	1,424	1,335	1.90	1.78

[1] capacity is denoted as vehicles per hour per direction

Table 13: Road Section Operations – 2031

Road Section and Lanes per Direction		Capacity[1]		Traffic Volumes (vph)		Volume to Capacity	
		EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
Bayview Drive							
Little Avenue to Mollard Court	1	650	650	730	708	1.12	1.09
Mollard Court to Big Bay Point Road	1	650	650	566	485	0.87	0.75
Big Bay Point Road							
Bayview Drive to Welham Road	1	750	750	1,463	1,496	1.95	1.99
Welham Road to Huronia Road	1	750	750	1,653	1,549	2.20	2.07

[1] capacity is denoted as vehicles per hour per direction

3.3.3 Queue Operations

Queue operations are typically reviewed in instances where the available spacing between signalized intersections is limited and the potential exists for queues to spillback and interfere with the operations of the adjacent intersection. Queue operations may also be reviewed where queues at a signalized intersection may interfere with the turning movements at an adjacent entrance or side street; however, such instances are considered common in urban environments and only cause concern where the impacted entrance/side street serves relatively high turning movements (in which case improvements may be required to limit turning movements, such as the implementation of right-in/right-out applications).

The study area was reviewed to identify areas where queue operations could be problematic. With respect to spacing between signalized intersections, it is noted that there is significant spacing between each of the signalized intersections within the study area. Furthermore, there are no signalized intersections beyond the study area that are considered as being in close proximity to the subject intersections. In terms of adjacent commercial entrances, local side streets and other potential hazards that may be impacted by queue lengths at the signalized intersections, the following locations were identified for review:

- the north access to Innisdale Secondary School/Allandale Recreation Centre (located on Bayview Drive approximately 148 metres south of Little Avenue);
- proposed access to former Molson lands (to be located on Big Bay Point Road approximately 100 metres west of Bayview Drive);
- new access to former Molson lands (located on Bayview Drive approximately 100 metres south of Big Bay Point Road);

- the Tim Hortons/commercial access on Huronia Road (approximately 75 metres south of Big Bay Point Road); and
- the railway crossing on Big Bay Point Road (approximately 118 metres east of Huronia Road).

The noted access points have been identified for review based on the traffic volumes which they serve and the potential impacts should the queue lengths at the adjacent intersection spill back and intrude on their operations. The railway crossing on Big Bay Point Road has been identified given the safety concerns associated with the potential encroachment of westbound queues onto the railway crossing. As such, the review has considered the northbound queues along Bayview Drive at Little Avenue, the northbound queue operations along Huronia Road at Big Bay Point Road and the westbound queue operations along Big Bay Point Road at Huronia Road.

The review has considered the 2031 conditions as they reflect the critical scenario where peak volumes and queue lengths are greatest. The available spacing and 95th percentile queue lengths for the AM and PM peak hour are presented in Table 14. The 95th percentile queue length indicates that 95% of the time the queue length will be at or below the reported length. For example, a 95th percentile queue length of 50 metres means that queue lengths will be 50 metres or less 95% of the time (conversely, queue lengths will only surpass 50 metres 5% of the time).

Table 14: Queue Operations – 2031

Intersection and Movement		Available Spacing	95th Percentile Queue Length[1]	
			AM Peak	PM Peak
Bayview Drive & Little Avenue	NB left	148 m	17 m	47 m
	NB thru		37 m	138 m
Big Bay Point Road & Bayview Drive	NB left	100 m	22 m	174 m
	NB thru		71 m	116 m
	EB left	100 m	30 m	43 m
	EB thru		415 m	533 m
Big Bay Point Road & Huronia Road	NB left	75 m	55 m	51 m
	NB thru		49 m	135 m
	WB left	118 m	25 m	26 m
	WB thru		347 m	223 m

[1] 95 percentile queue length for the AM or PM peak

As indicated, given the 2031 traffic volumes, existing intersection configurations and optimized operations, the northbound and westbound queue lengths at the intersection of Big Bay Point Road with Huronia Road will exceed the available spacing, as will the northbound and eastbound queue lengths at Bayview Drive and Big Bay Point Road.

4 Road Network Improvements

This chapter discusses various improvements to the road network which have been recommended to address the operational deficiencies noted in Chapter 3.

4.1 MMATMP Improvements

Aside from the proposed widening of Bayview Drive and Big Bay Point Road, which is the subject of this Class EA; the City's MMATMP identifies several other improvements to the area road network, as noted in Table 15. It is not within the scope of this traffic assessment to review the ultimate lane provision and resulting operations of the noted road sections (recognizing that they are not within the study limits); however, the improvements have been considered with respect to the assessment of the intersection operations and the required lane provision/configuration at each intersection to ensure acceptable operations.

Table 15: MMATMP Road Network Improvements

Road Section	Recommended Improvements	
	2021	2031
Little Avenue Marshall Street to Yonge Street	3-lane profile: 1 lane per direction + TWLTL	-
Bayview Drive north of Little Avenue	-	3-lane profile: 1 lane per direction + TWLTL
Huronia Road north of Big Bay Point Road	5-lane profile: 2 lanes per direction + TWLTL	-
Huronia Road south of Big Bay Point Road	3-lane profile: 1 lane per direction + TWLTL	-
Welham Road north of Big Bay Point Road	-	3-lane profile: 1 lane per direction + TWLTL
Welham Road south of Big Bay Point Road	3-lane profile: 1 lane per direction + TWLTL	

TWLTL - two-way left turn lane (centre turn lane)

4.2 Intersection Improvements

In considering the results of the operational analysis detailed in Section 3.3, several intersection improvements have been recommended to ensure that the subject intersections can accommodate the projected traffic volumes in 2021 and 2031. When considering potential intersection improvements, priority was given to the implementation of exclusive turn lanes and optimization of traffic signal timing plans. Where such improvements were not sufficient, consideration was given to the implementation

of additional through lanes. The recommended improvements for each horizon year are detailed below.

4.2.1 Intersection Improvements – 2021 Horizon

Bayview Drive & Little Avenue

As noted in Table 8, the intersection of Bayview Drive with Little Avenue will provide good overall operating conditions (LOS C) with average delays. The intersection and its individual movements will operate below capacity (v/c < 1.0). Based on the good operating conditions in 2021, no improvements are required to accommodate the projected future volumes.

Bayview Drive & Big Bay Point Road

- North Approach – widen to a 5-lane profile consisting of a shared through/right lane, an exclusive through lane, an exclusive left turn lane and two northbound receiving lanes.
- South Approach – maintain the existing 5-lane profile and repaint the northbound exclusive right as a shared through/right.
- East and West Approaches – widen to a 6-lane profile consisting of an exclusive right turn lane, two exclusive through lanes, an exclusive left turn lane and two receiving lanes in each direction.
- An advance green phase for all left turn movements.

Welham Road & Big Bay Point Road

- North & South Approaches – implement a 3-lane profile consisting of a shared through/right lane, an exclusive left turn a lane and a single receiving lane in each direction.
- East & West Approaches – widen to a 5-lane profile consisting of a shared through/right lane, an exclusive through lane, an exclusive left turn lane and two receiving lanes per direction.
- An advance green phase for the left turn movements on the east and west approaches.

Huronia Road & Big Bay Point Road

- North Approach – maintain the existing 3-lane profile (shared through/right, exclusive left and a single northbound receiving lane).
- South Approach – widen to a 4-lane profile consisting of an exclusive right turn lane, an exclusive through lane, an exclusive left turn lane and a single southbound receiving lane.
- East Approach – maintain the existing 5-lane profile and repaint the existing exclusive right to a shared through/right.

- West Approach – widen to a 6-lane profile consisting of an exclusive right turn lane, two exclusive through lanes, an exclusive left turn lane and two westbound receiving lanes.
- An advance green phase for the eastbound left turn movements during the PM peak hour.

Other Intersections

The remaining intersections along Bayview Drive will provided good overall operations (LOS C or better) through 2021 based on the existing intersection configurations and stop control. No improvements are required to accommodate the projected 2021 traffic volumes.

4.2.2 Intersection Operations – 2021 Horizon

The operations of the key intersections were re-assessed for the 2021 horizon to consider the noted improvements. Only those intersections for which improvements were recommended to address poor operating conditions in 2021 have been re-assessed. The signal timings have been optimized to ensure efficient operations. The results are summarized in Table 16 (detailed worksheets are provided in Appendix E).

Table 16: Intersection Operations – 2021 (w/improvements)

Intersection and Movement		Control	Weekday AM Peak Hour			Weekday PM Peak Hour		
			delay	LOS	v/c	delay	LOS	v/c
Bayview Drive & Big Bay Point Road	EB	signal	16	B	0.56	24	C	0.76
	WB		20	B	0.75	25	C	0.81
	NB		25	C	0.30	34	C	0.83
	SB		25	C	0.43	33	C	0.59
	overall	signal	20	B	0.61	27	C	0.84
Welham Road & Big Bay Point Road	EB	signal	15	B	0.47	19	B	0.70
	WB		20	B	0.71	9	A	0.62
	NB		29	C	0.12	35	C	0.44
	SB		29	C	0.07	31	C	0.25
	overall	signal	19	B	0.51	18	B	0.60
Huronia Road & Big Bay Point Road	EB	signal	6	A	0.55	11	B	0.82
	WB		12	B	0.59	28	C	0.72
	NB		33	C	0.50	32	C	0.54
	SB		36	D	0.55	33	C	0.54
	overall	signal	15	B	0.58	22	C	0.75

As indicated, the recommended improvements will address the poor operating conditions originally reported at the noted intersections under the 2021 conditions. The improvements will result in good overall operations (LOS C or better) with average delays and volume to capacity ratios of 0.83 or less for the individual movements. No further intersection improvements are required to accommodate the projected 2021 traffic volumes.

4.2.3 Intersection Improvements – 2031 Horizon

Bayview Drive & Little Avenue

Similar to the 2021 conditions, the intersection of Bayview Drive with Little Avenue will continue to provide acceptable operations through the 2031 horizon. All of the individual movements will provide acceptable levels of service with average delays and volume to capacity ratios of 0.84 or less. No improvements are required to accommodate the projected 2031 volumes at this intersection.

Bayview Drive & Big Bay Point Road

- North Approach – maintain 5-lane profile configuration as per 2021 improvements but widen to balance improvements to south approach.
- South Approach – widen to a 6-lane profile to accommodate a northbound double left turn lane.
- East & West Approaches – maintain 6-lane profile configuration as per 2021 improvements.
- Install left turn signal heads to control the northbound double left and southbound left turn movements. For safety reasons, all double left turn movements (and the opposing left turn movement) must be controlled by a separate signal head that provides a protected phase for the left turn movement (i.e. double left turns are not permitted during the through phase).

Welham Road & Big Bay Point Road

The intersection of Welham Road and Big Bay Point Road will provide good operations in 2031 given the improvements recommended under the 2021 horizon. No further improvements are required at this intersection to accommodate the 2031 projected volumes.

Huronia Road & Big Bay Point Road

- North Approach – widen to a 4-lane profile consisting of an exclusive right turn lane, an exclusive through lane, an exclusive left turn lane and a single northbound receiving lane.
- South Approach – maintain 4-lane profile as per 2021 improvements.

- East Approach – widen to a 6-lane profile to accommodate an exclusive right turn lane, two exclusive through lanes and an exclusive left turn lane.
- West Approach – maintain 5-lane profile as per 2021 improvements.

Other Intersections

The remaining intersections along Bayview Drive will continue to provide good operating conditions (LOS C or better) through 2031 based on the existing intersection configurations and stop control. No improvements are required to accommodate the projected 2031 traffic volumes.

4.2.4 Intersection Operations – 2031 Horizon

The operations of the key intersections were re-assessed for the 2031 horizon to consider the noted improvements. The signal timings have been optimized to ensure efficient operations. The results are summarized in Table 17 (detailed worksheets are provided in Appendix E).

Table 17: Intersection Operations – 2031 (w/improvements)

Intersection and Movement		Control	Weekday AM Peak Hour			Weekday PM Peak Hour		
			delay	LOS	v/c	delay	LOS	v/c
Bayview Drive & Big Bay Point Road	EB	signal	21	C	0.64	21	C	0.77
	WB		24	C	0.83	34	C	0.88
	NB		35	C	0.44	48	D	0.75
	SB		34	C	0.68	51	D	0.82
	overall	signal	25	C	0.72	34	C	0.83
Welham Road & Big Bay Point Road	EB	signal	17	B	0.68	23	C	0.81
	WB		22	C	0.82	12	B	0.72
	NB		30	C	0.13	38	D	0.56
	SB		29	C	0.08	32	C	0.36
	overall	signal	21	B	0.61	21	C	0.72
Huronia Road & Big Bay Point Road	EB	signal	10	B	0.84	15	B	0.95
	WB		13	B	0.63	27	C	0.74
	NB		32	C	0.42	38	D	0.64
	SB		32	C	0.36	35	D	0.64
	overall	signal	16	B	0.71	25	C	0.89

As indicated, the recommended improvements will result in good overall operations (LOS C or better) through the 2031 horizon period. The intersections will operate below capacity with overall delays of 34 seconds or less.

It is noted that the eastbound left turn movement at the intersection of Huronia Road with Big Bay Point will approach capacity in 2031 during the PM peak hour (v/c = 0.95). While the City's v/c target is 0.85, operating a left turn movement at a v/c below 1.0 can be considered inefficient in that it indicates that the movement is receiving unused green time which could be better allocated to other movements. In this instance, the eastbound approach and overall intersection are providing acceptable operations and thus the v/c of 0.95 is not considered problematic.

Based on the results of the intersection operations analysis, no further intersection improvements are required to accommodate the projected 2031 traffic volumes.

4.3 Road Section Improvements

4.3.1 Bayview Drive

Traffic volumes on Bayview Drive are expected to exceed 100% of the available capacity in 2031. As such, additional capacity may be required to accommodate the future traffic volumes. As per the *MMATMP*, the construction of a two-way left turn lane on Bayview Drive is recommended by 2031. It is noted that despite the capacity issues, the intersection of Bayview Drive with Little Avenue and the other minor intersections/access points along Bayview Drive (i.e. Innisdale Secondary School/Allandale Recreation Centre entrances, Mollard Court and The Source access) will provide good operating conditions through 2031 given the existing lane configurations. Based solely on the intersection operations, no improvements to the existing cross-section on Bayview Drive are required.

Notwithstanding the good intersection operations along Bayview Drive, the need for left turn lanes on Bayview Drive to serve its intersections with the Innisdale Heights access points (north and south), Mollard Court and the south access to The Source has been reviewed in consideration of MTO warrants for exclusive left turn lanes at unsignalized intersections on a two-lane undivided highway. In considering the 2021 and 2031 projected traffic volumes, a design speed of 70 km/h and MTO left turn warrants, exclusive left turn lanes are warranted at each of the noted intersections. The warranted left turn storage requirements and the timing of such are summarized in Table 18.

It is noted that MTO design criteria require that a left turn lane on a two-lane highway with a design speed of 70 km/h consist of the required storage length (as per the Table 18), a 40 metre parallel lane and a 115 metre taper.

Table 18: Left Turn Lane Requirements – Bayview Drive

Intersection	Left Turn Warrant (Y / N)	Left Turn Lane Storage Requirements	
		2021	2031
Innisdale North Access & Bayview Drive	Y	15 m	15 m
Innisdale South Access & Bayview Drive	Y	25 m	30 m
Mollard Court/The Source & Bayview Drive	Y	15 m	15 m
The Source & Bayview Drive	Y	15 m	15 m

In considering the warranted left turn lanes as noted in Table 18, and further considering the existing left turn lane requirements at the intersections with Little Avenue (northbound left) and Big Bay Point Road (southbound left), Bayview Drive would essentially require widening to a 3-lane profile along its entire length in order to accommodate the left turn lane design requirements (i.e. with the warranted storage length, taper, parallel lane and runout lane requirements, etc.). Rather than construct back to back left turn lanes with varying cross-section widths, it is recommended that Bayview Drive be reconstructed to a 3-lane profile with a continuous centre turn lane from Little Avenue to Big Bay Point Road, consistent with the recommendations published in the *MMATMP*. In addition to addressing the warranted left turn lane requirements at the noted intersections, the introduction of a continuous centre turn lane will also increase the through capacity on Bayview Drive without constructing additional through lanes in each direction. As per the City's *MMATMP*, the introduction of a continuous centre turn lane can increase the capacity of a collector road by 10 to 15% by removing left turning traffic from the through lanes and thus reducing impacts and delays to through traffic.

The lane capacity on Bayview Drive has been reassessed in consideration of the recommended 3-lane cross-section. An increased lane capacity of 750 vehicles per hour has (i.e. a 15% increase over existing capacity of 650 vph) been assumed to reflect the additional capacity provided through implementation of the continuous centre turn lane.

4.3.2 Big Bay Point Road

With the implementation of the Harvie Road/Big Bay Point Road crossing, Big Bay Point Road is expected to experience a substantial increase in traffic volumes. To accommodate these volumes, significant additional through capacity is required. As per the *MMATMP*, Big Bay Point Road is to be widened to an ultimate 7-lane cross-section by 2021. This recommended cross-section was predicated on the completion of the Harvie Road/Big Bay Point Road crossing and implementation of a partial interchange at Highway 400 by 2021; however, MTO has advised that the required widening of Highway 400 to accommodate the partial interchange is not within their 5 year capital plan and it

remains unclear as to when such works will be scheduled. Regardless, it is anticipated that the widening of Highway 400 and subsequent implementation of the interchange will occur beyond the 2031 study horizon. Upon review of the projected 2021 traffic volumes (which consider the overpass but does not include the provision of the interchange), and considering the recommended intersection improvements noted in Section 4.2, a 5-lane cross section consisting of two through lanes per direction and a continuous two-way left turn lane is recommended by 2021 to accommodate the initial increase of traffic associated with the completion of the Harvie Road/Big Bay Point Road crossing. With the inclusion of a two-way left turn lane, the capacity of each through lane will increase from 750 to 850 vehicles per hour (as per Table 1). Thus the capacity per direction will increase to 1,700 vehicles per hour upon implementation of a 5-lane cross-section.

In 2031, the key intersections will continue to provide acceptable operations when considering the recommended intersection improvements and a 5-lane cross-section. As such, the 5-lane cross-section recommended for the 2021 horizon has been maintained through the 2031 horizon.

4.3.3 Road Section Operations

The 2021 and 2031 road section operations along Bayview Drive and Big Bay Point Road were re-assessed to consider the following recommended improvements:

2021 Horizon

- 3-lane profile on Bayview Drive (1 lane per direction + TWLTL) with increased lane capacity of 750 vehicles per hour; and
- 5-lane profile on Big Bay Point Road (2 lanes per direction + TWLTL) with increased lane capacity of 850 vehicles per hour (1,700 vehicles per hour per direction).

2031 Horizon

- no further road section improvements beyond those recommended for the 2021 horizon.

The road section operations are summarized in Table 19 and Table 20.

As noted, the subject road sections will operate below capacity through 2031 when considering the projected traffic volumes and the recommended improvements to increase the road section lane capacity.

While the recommendation of a 5-lane cross section on Big Bay Point Road through 2031 differs from the 7-lane recommendation provided in the *MMATMP*, it is noted that the widening of Highway 400 and subsequent construction of the Harvie Road/Big Bay Point Road interchange (which was considered in the *MMATMP)* is not anticipated within the 2031 study horizon. Thus the additional traffic volumes and impacts associated with such have not been considered.

Table 19: Road Section Operation – 2021 (w/improvements)

Road Section and Lanes per Direction		Capacity[1]		Traffic Volumes (vph)		Volume to Capacity	
		EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
Bayview Drive							
Little Avenue to Mollard Court	1	750	750	629	610	0.84	0.81
Mollard Court to Big Bay Point Road	1	750	750	488	418	0.65	0.56
Big Bay Point Road							
Bayview Drive to Welham Road	2	1,700	1,700	1,261	1,289	0.74	0.76
Welham Road to Huronia Road	2	1,700	1,700	1,424	1,335	0.84	0.79

[1] capacity is denoted as vehicles per hour per direction

Table 20: Road Section Operations – 2031 (w/improvements)

Road Section and Lanes per Direction		Capacity[1]		Traffic Volumes (vph)		Volume to Capacity	
		EB/NB	WB/SB	EB/NB	WB/SB	EB/NB	WB/SB
Bayview Drive							
Little Avenue to Mollard Court	1	750	750	730	708	0.97	0.94
Mollard Court to Big Bay Point Road	1	750	750	566	485	0.75	0.65
Big Bay Point Road							
Bayview Drive to Welham Road	2	1,700	1,700	1,463	1,496	0.86	0.88
Welham Road to Huronia Road	2	1,700	1,700	1,653	1,549	0.97	0.91

[1] capacity is denoted as vehicles per hour per direction

4.4 Queue Operations

The queue operations for the movements noted in Section 3.3.3 have been reviewed for the year 2031 with consideration given to the noted improvements. The results are provided in Table 21.

As indicated, the queue operations at the noted locations will be improved to the extent that the 95th percentile queue lengths will not encroach on the adjacent access points or railway crossing. The exception being the eastbound queue on Big Bay Point Road at Bayview Drive and the northbound queue on Huronia Road at Big Bay Point Road. In both cases, the queue length will surpass the available spacing during the PM peak hour. This is not considered problematic given that the

extended queue lengths only occur during the PM peak hour and do not encroach into high volume intersections. It is expected in urban environments that some queue encroachment will occur at access points to adjacent properties during peak hour conditions. Regardless, the overall queue lengths are vastly improved over the existing conditions.

Table 21: Queue Operations – 2031 (w/improvements)

Intersection and Movement		Available Spacing	95th Percentile Queue Length[1]	
			AM Peak	PM Peak
Bayview Drive & Little Avenue	NB left	148 m	17 m	47 m
	NB thru		37 m	138 m
Big Bay Point Road & Bayview Drive	NB left	100 m	11 m	58 m
	NB thru		27 m	56 m
	EB left	100 m	20 m	45 m
	EB thru		84 m	131 m
Big Bay Point Road & Huronia Road	NB left	75 m	36 m	43 m
	NB thru		37 m	78 m
	WB left	118 m	20 m	32 m
	WB thru		77 m	115 m

5 Summary

This traffic assessment has been completed in order to confirm the widening requirements along Bayview Drive and Big Bay Point Road to accommodate traffic volumes through 2031. The assessment also identified potential intersection improvements along Bayview Drive and Big Bay Point Road through the study area. A summary of the recommended improvements, and the timing of such, is provided in Table 22 through Table 24.

Table 22: Recommended Road Section Improvements

Road Section	Recommended Improvements	
	2021	2031
Bayview Drive	3-lane profile: 1 lane per direction + TWLTL	-
Big Bay Point Road	5-lane profile: 2 lanes per direction + TWLTL	-

Table 23: Recommended Intersection Improvements – 2021

Intersection	Recommended Improvements
Bayview Dr. & Little Ave.	▪ Maintain existing configuration and optimize signal timing.
Bayview Dr. & Big Bay Point Rd.	▪ North approach: 5-lane profile (SBTR, SBT, SBL & 2 NB receiving lanes) ▪ South approach: 5-lane profile (NBTR, NBT, NBL & 2 SB receiving lanes) ▪ East approach: 6-lane profile (WBR, 2 WBT, WBL & 2 EB receiving lanes) ▪ West approach: 6-lane profile (EBR, 2 EBT, EBL & 2 WB receiving lanes) ▪ Provide advance green phase for all left turn movements
Welham Rd. & Big Bay Point Rd.	▪ North approach: 3-lane profile (SBTR, SBL & 1 NB receiving lane) ▪ South approach: 4-lane profile (NBR, NBT, NBL & 1 SB receiving lane) ▪ East approach: 5-lane profile (WBTR, WBT, WBL & 2 EB receiving lanes) ▪ West approach: 5-lane profile (EBTR, EBT, EBL & 2 WB receiving lanes) ▪ Provide advance green phase for EB & WB left turn movements
Huronia Rd. & Big Bay Point Rd.	▪ North approach: 3-lane profile (SBTR, SBL & 1 NB receiving lanes) ▪ South approach: 4-lane profile (NBR, NBT, NBL & 1 SB receiving lane) ▪ East approach: 5-lane profile (WBTR, WBT, WBL & 2 EB receiving lanes) ▪ West approach: 6-lane profile (EBR, 2 EBT, EBL & 2 WB receiving lanes) ▪ Provide advance green phase for EB left turn movement

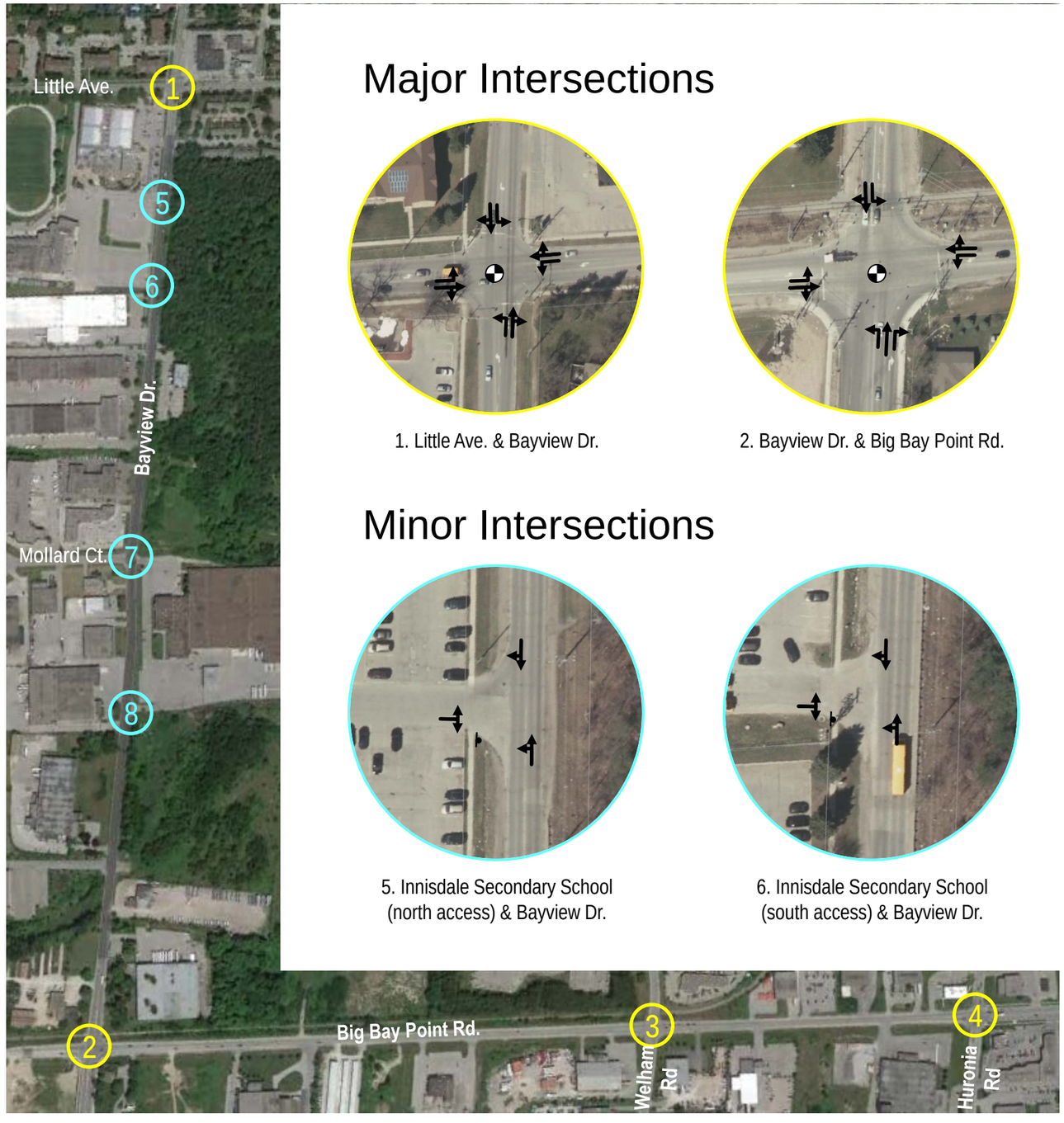
Table 24: Recommended Intersection Improvements – 2031

Road Section	Recommended Improvements
Bayview Dr. & Little Ave.	▪ Maintain existing configuration and optimize signal timing.
Bayview Dr. & Big Bay Point Rd.	▪ North approach: maintain configuration as per 2021 improvements but widen to balance proposed double left turn lane on south approach. ▪ South approach: widen to 6-lane profile to accommodate northbound double left turn lanes. ▪ East/West approaches: maintain configuration as per 2021 improvements. ▪ Install left turn signal heads to provide protected control of NB double left and opposing SB left turn movements.
Welham Rd. & Big Bay Point Rd.	▪ Maintain configuration as per 2021 improvements.
Huronia Rd. & Big Bay Point Rd.	▪ North approach: widen to a 4-lane profile to accommodate exclusive right turn lane, exclusive through lane, exclusive left turn lane. ▪ South approach: maintain configuration as per 2021 improvements. ▪ East approach: widen from a 5-lane to a 6-lane profile to accommodate 2 exclusive through lanes and an exclusive right turn lane. ▪ West approach: maintain configuration as per 2021 improvements.

The interim (2021) and ultimate (2031) intersection configurations are illustrated in Figure 8 through Figure 9. It is noted that the recommended implementation of a continuous two-way left turn lane on Bayview Drive will result in each of the minor intersections/access points being served by an exclusive left turn lane, as warranted based on the projected traffic volumes, design speed and MTO left turn warrants.

Authored by: David Perks, PTP
Transportation Planner

Reviewed by: Michael Cullip, P.Eng.
Director, Manager – Transportation & Municipal Engineering



Major Intersections

1. Little Ave. & Bayview Dr.

2. Bayview Dr. & Big Bay Point Rd.

3. Welham Rd. & Big Bay Point Rd.

4. Huronia Rd. & Big Bay Point Rd.

Minor Intersections

5. Innisdale Secondary School (north access) & Bayview Dr.

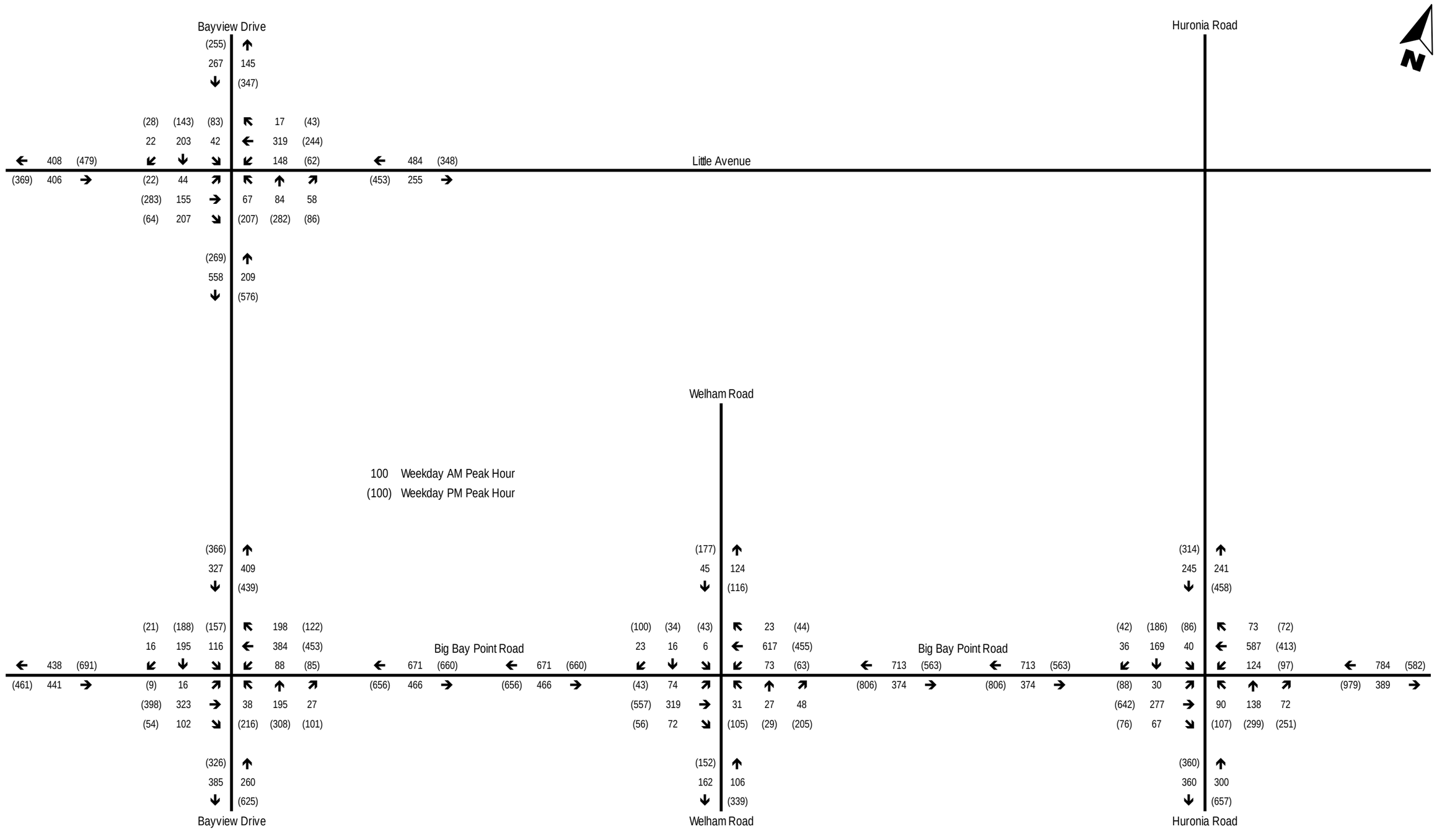
6. Innisdale Secondary School (south access) & Bayview Dr.

7. Mollard Ct./The Source & Bayview Dr.

8. The Source (south access) & Bayview Dr.

Signal Control

Stop Control

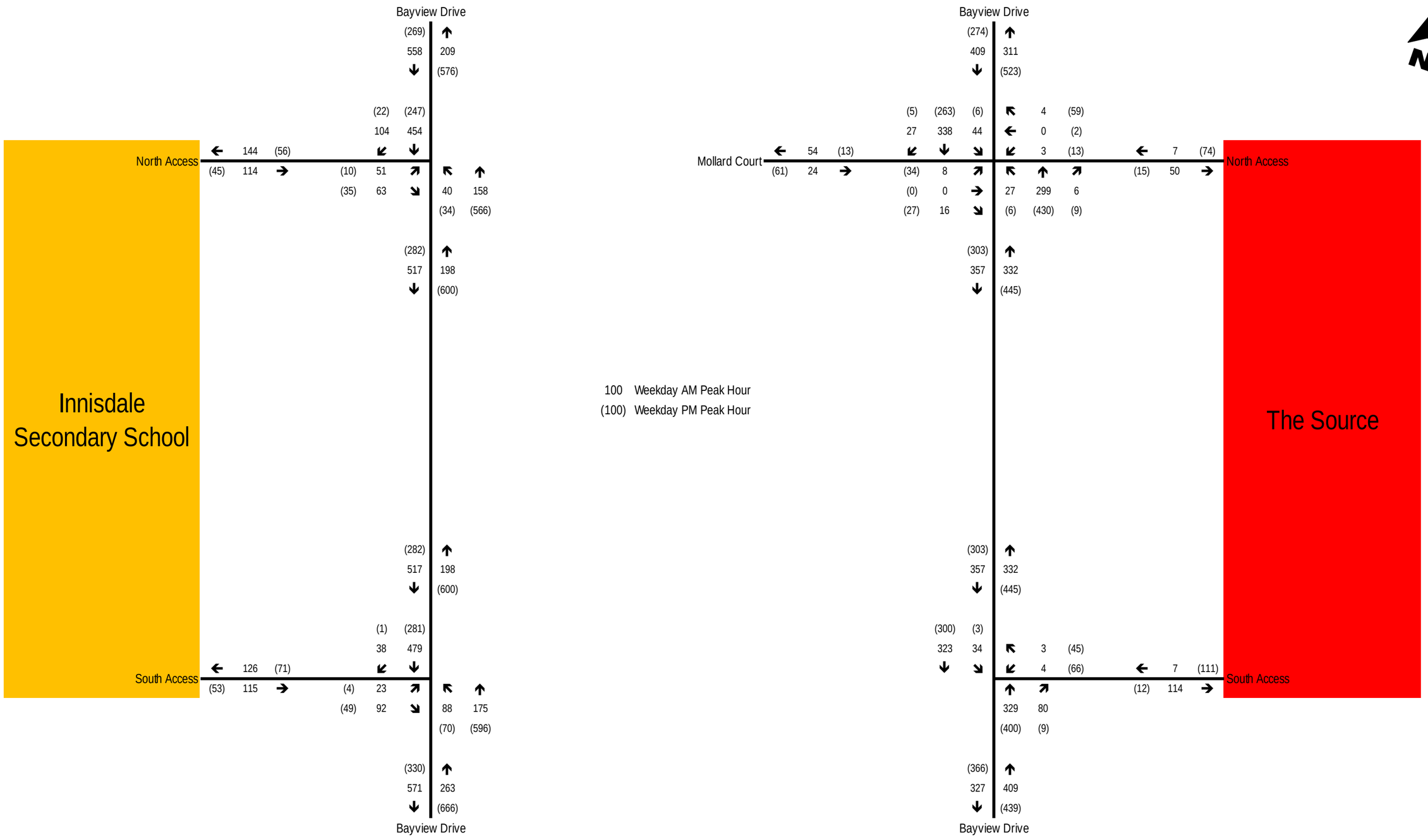


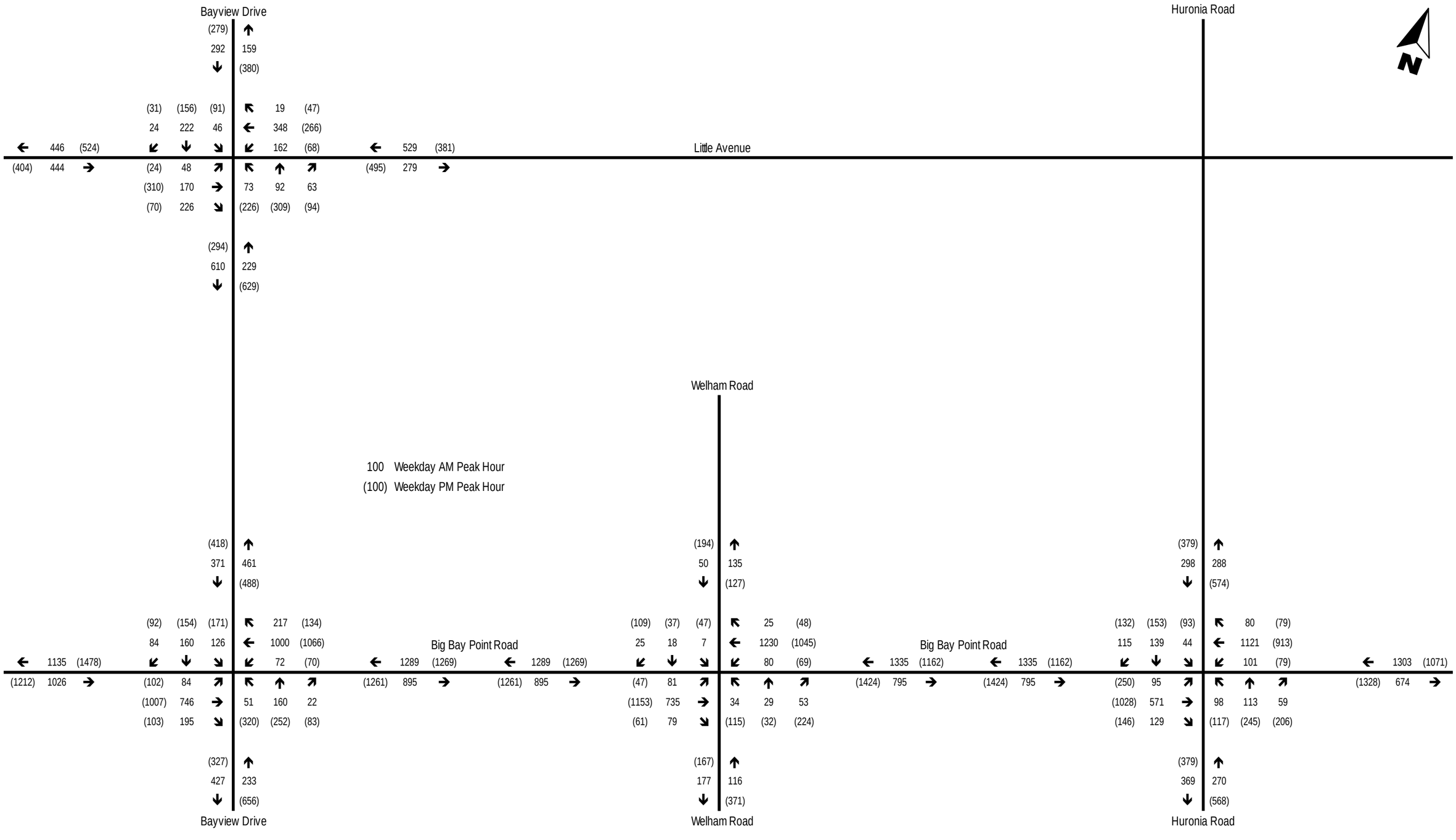
C.C. Tatham & Associates Ltd.
Consulting Engineers

Bayview Drive & Big Bay Point Road Class EA, Traffic Operations Assessment

2015 Traffic Volumes – Major Intersections

Figure 2


Bayview Drive
North Access
Innisdale Secondary School
South Access
Bayview Drive
Mollard Court
North Access
The Source
South Access
Bayview Drive
100 Weekday AM Peak Hour
(100) Weekday PM Peak Hour

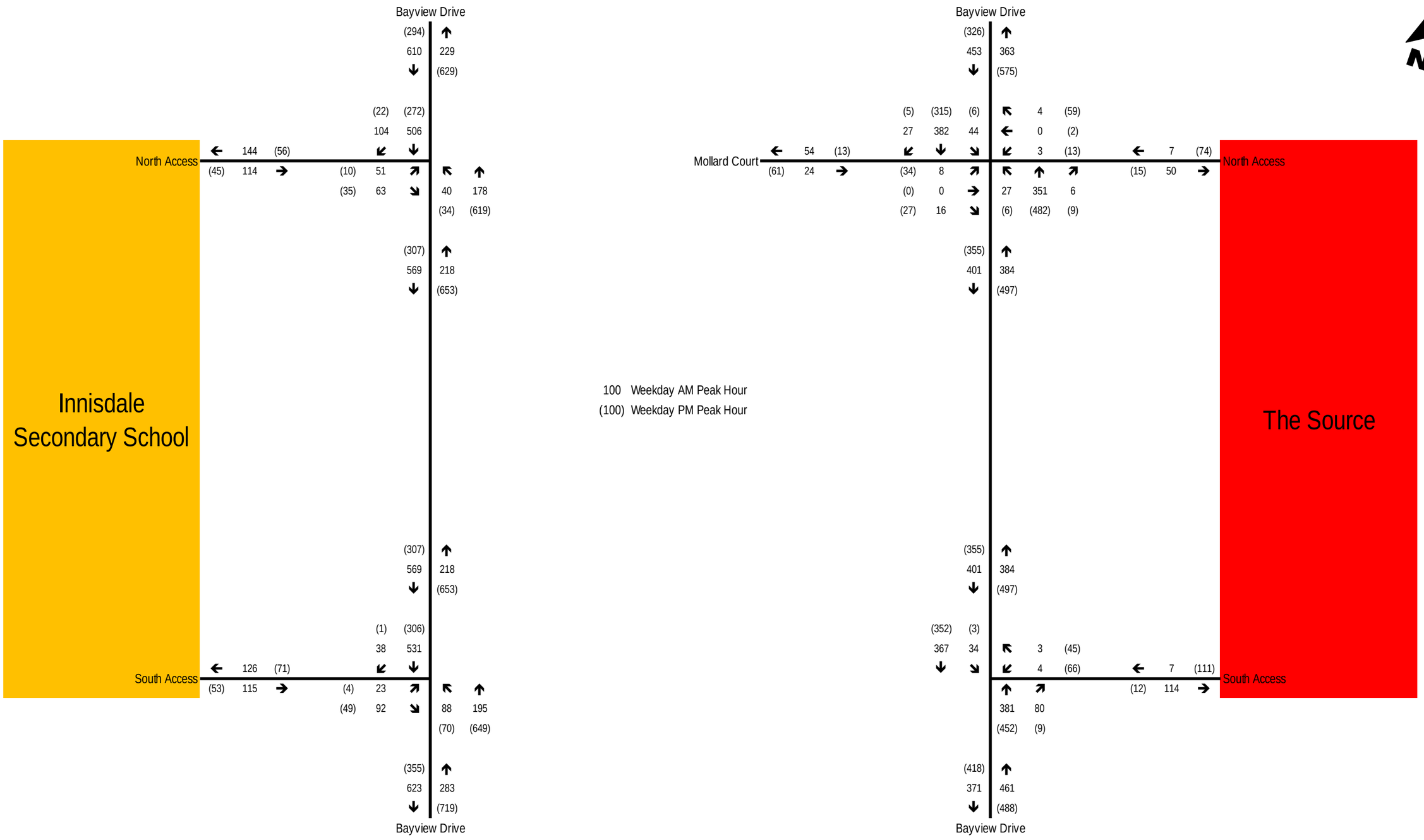


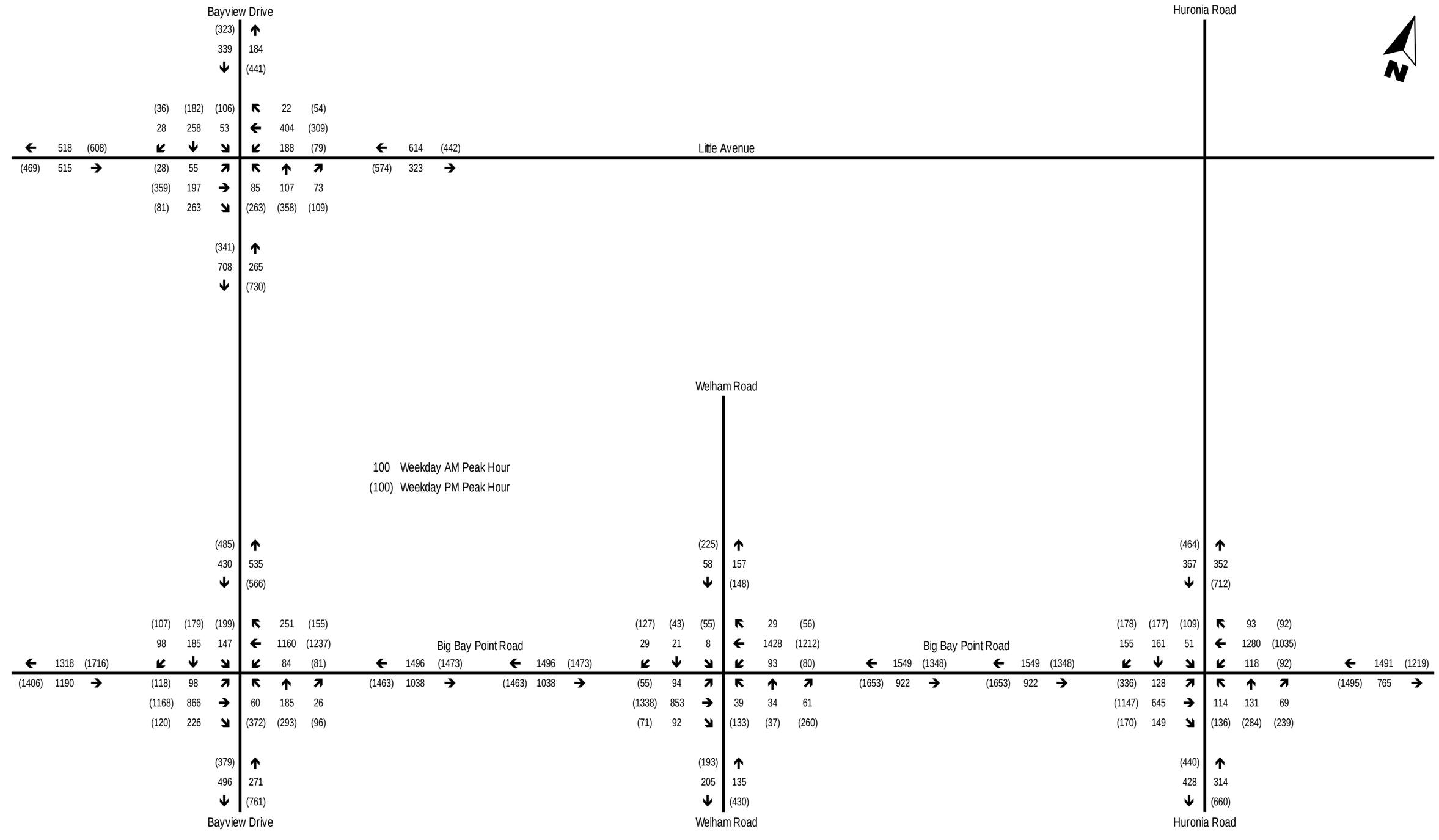
C.C. Tatham & Associates Ltd.
Consulting Engineers

Bayview Drive & Big Bay Point Road Class EA, Traffic Operations Assessment

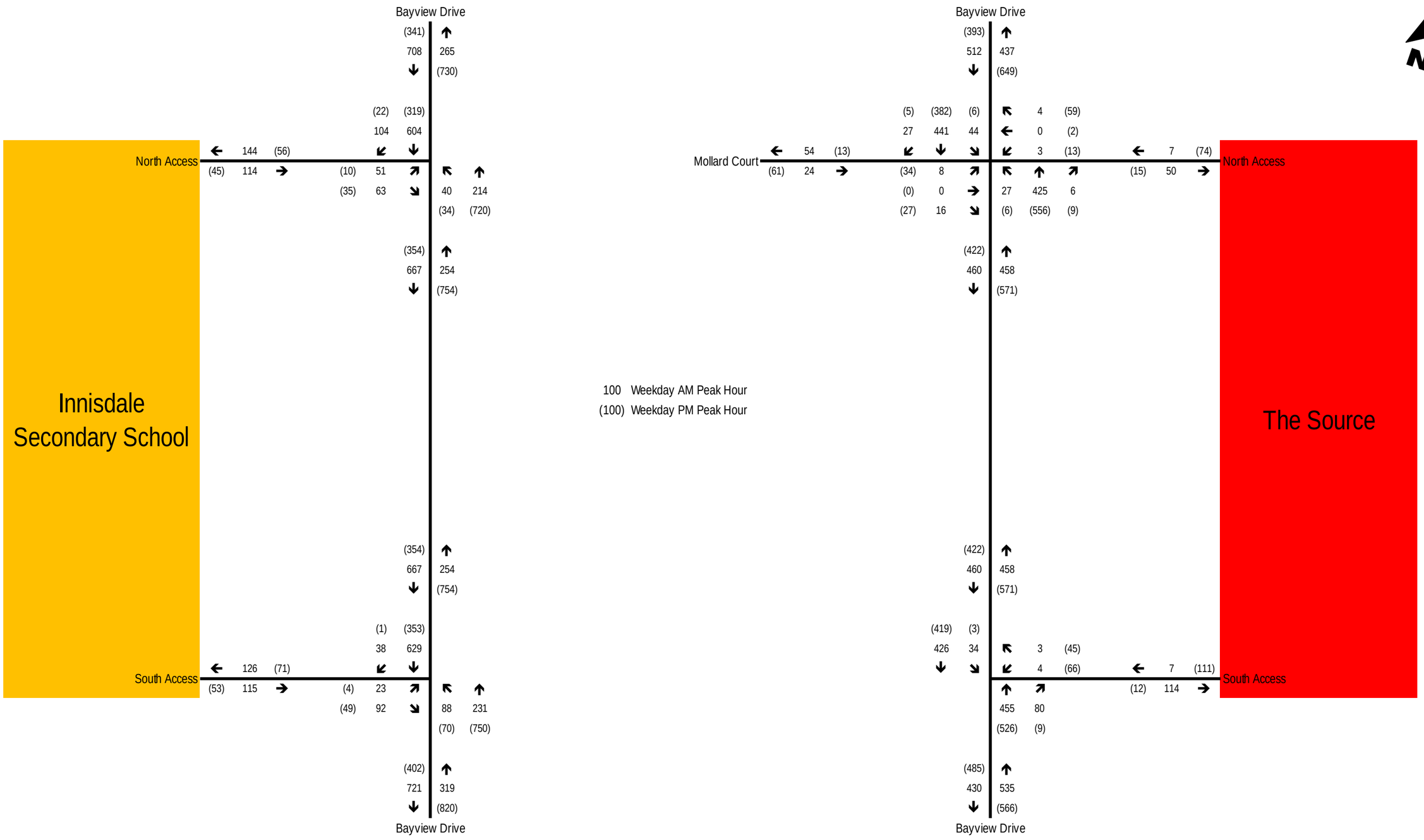
2021 Traffic Volumes – Major Intersections

Figure 4


Bayview Drive
North Access
Innisdale Secondary School
South Access
Bayview Drive
Mollard Court
North Access
The Source
South Access
Bayview Drive
100 Weekday AM Peak Hour
(100) Weekday PM Peak Hour



2031 Traffic Volumes – Major Intersections


Bayview Drive
(341)
708
265
(730)
(22)
104
(319)
604
North Access
144
(56)
(45)
114
(10)
51
(35)
63
40
214
(34)
(720)
(354)
667
254
(754)
Innisdale
Secondary School
(354)
667
254
(754)
(1)
38
(353)
629
South Access
126
(71)
(53)
115
(4)
23
(49)
92
88
231
(70)
(750)
(402)
721
319
(820)
Bayview Drive
Bayview Drive
(393)
512
437
(649)
(5)
27
(382)
441
(6)
44
Mollard Court
54
(13)
(61)
24
(34)
8
(0)
0
(27)
16
4
(59)
0
(2)
3
(13)
27
425
6
(6)
(556)
(9)
7
(74)
(15)
50
North Access
(422)
460
458
(571)
(419)
426
(3)
34
3
(45)
4
(66)
455
80
(526)
(9)
7
(111)
(12)
114
South Access
(485)
430
535
(566)
Bayview Drive
100 Weekday AM Peak Hour
(100) Weekday PM Peak Hour
The Source

Major Intersections

1. Little Ave. & Bayview Dr.

2. Bayview Dr. & Big Bay Point Rd.

3. Welham Rd. & Big Bay Point Rd.

4. Huronia Rd. & Big Bay Point Rd.

Minor Intersections

5. Innisdale Secondary School (north access) & Bayview Dr.

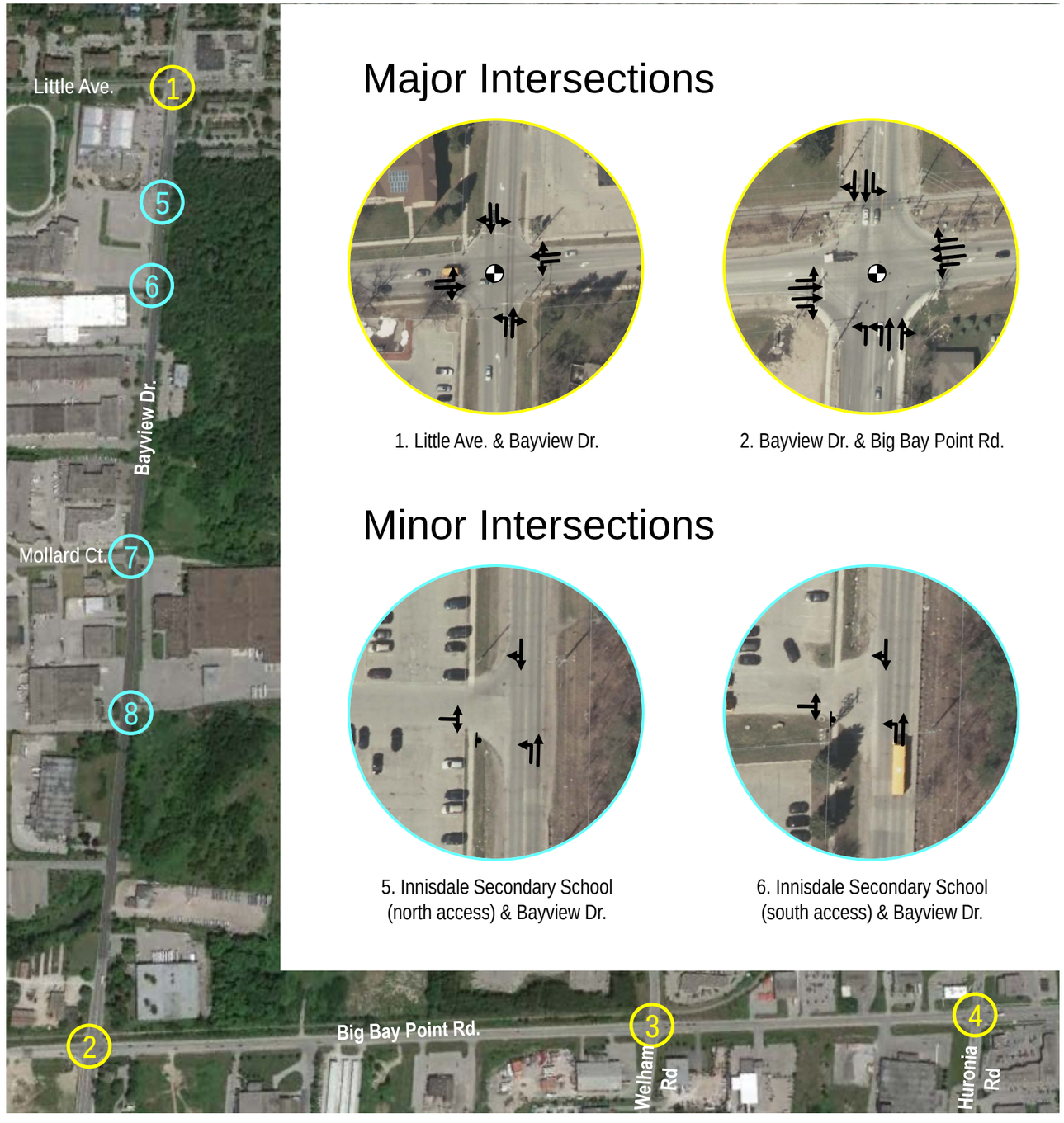
6. Innisdale Secondary School (south access) & Bayview Dr.

7. Mollard Ct./The Source & Bayview Dr.

8. The Source (south access) & Bayview Dr.

Signal Control

Stop Control



Major Intersections

1. Little Ave. & Bayview Dr.

2. Bayview Dr. & Big Bay Point Rd.

3. Welham Rd. & Big Bay Point Rd.

4. Huronia Rd. & Big Bay Point Rd.

Minor Intersections

5. Innisdale Secondary School (north access) & Bayview Dr.

6. Innisdale Secondary School (south access) & Bayview Dr.

7. Mollard Ct./The Source & Bayview Dr.

8. The Source (south access) & Bayview Dr.

Signal Control

Stop Control

APPENDIX A:
TRAFFIC COUNTS

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis
www.accu-traffic.ca
Tel: 1-416-910-0171
Fax: 1-888-711-3125

Accu-Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:30:00
To: 8:30:00

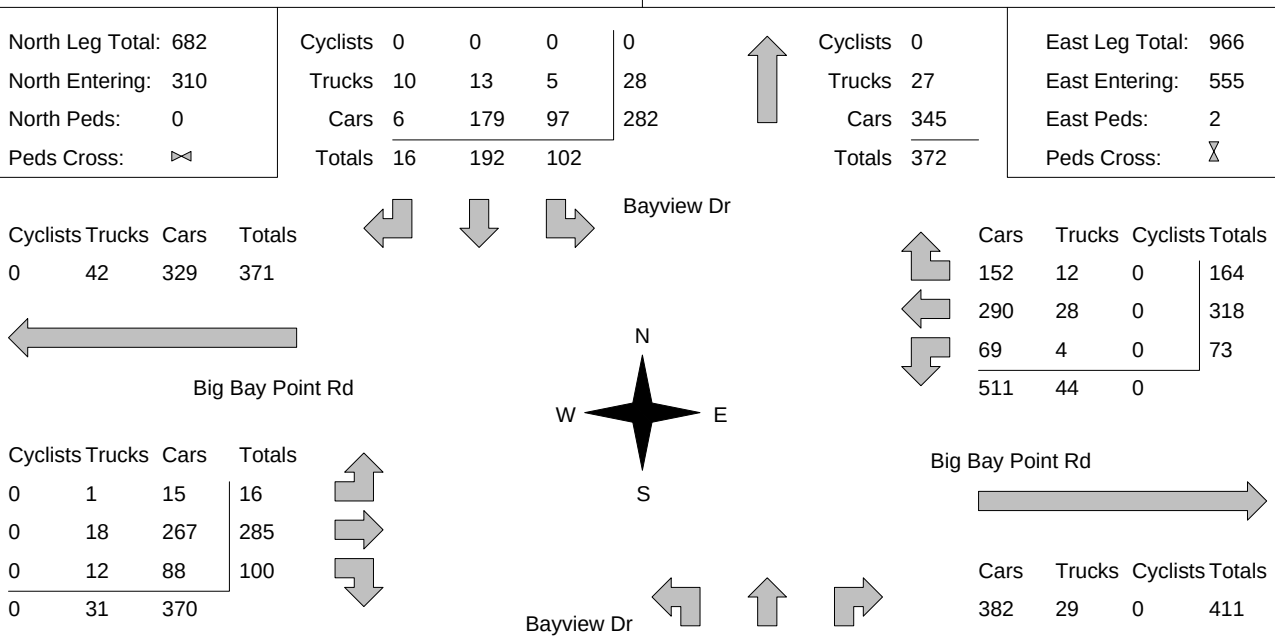
Municipality: Barrie
Site #: 1402300008
Intersection: Big Bay Point Rd & Bayview Dr
TFR File #: 1
Count date: 21-Oct-14

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

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Fax: 1-888-711-3125

Accu-Traffic Inc.

Mid-day Peak Diagram

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

One Hour Peak
From: 12:15:00
To: 13:15:00

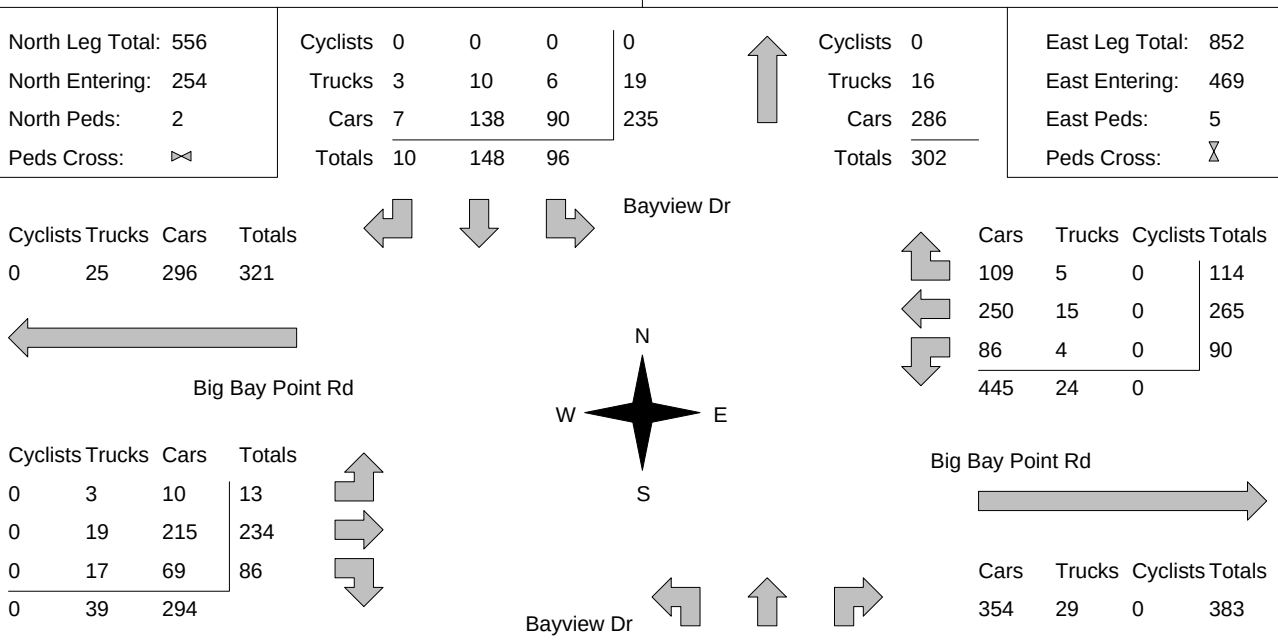
Municipality: Barrie
Site #: 1402300008
Intersection: Big Bay Point Rd & Bayview Dr
TFR File #: 1
Count date: 21-Oct-14

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

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Accu-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: Barrie
Site #: 1402300008
Intersection: Big Bay Point Rd & Bayview Dr
TFR File #: 1
Count date: 21-Oct-14

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E

North Leg				
North Leg Total:	773			
North Entering:	350			
North Peds:	0			
Peds Cross:	⋈			
Cyclists	0	0	0	0
Trucks	1	10	8	19
Cars	20	175	136	331
Totals	21	185	144	

East Leg				
Cyclists	0			
Trucks	21			
Cars	402			
Totals	423			
East Leg Total:	1202			
East Entering:	599			
East Peds:	8			
Peds Cross:	⧖			

Bayview Dr

Cyclists	Trucks	Cars	Totals
0	14	631	645

Cars	Trucks	Cyclists	Totals
106	5	0	111
405	6	0	411
72	5	0	77
583	16	0	

Big Bay Point Rd

N
W E
S

Cyclists	Trucks	Cars	Totals
0	4	5	9
0	9	357	366
0	6	47	53
0	19	409	

Big Bay Point Rd

Cars	Trucks	Cyclists	Totals
580	23	0	603

Bayview Dr

West Leg				
Peds Cross:	⧖			
West Peds:	0			
West Entering:	428			
West Leg Total:	1073			
Cars	294			
Trucks	21			
Cyclists	0			
Totals	315			
Cars	206	291	87	584
Trucks	7	12	6	25
Cyclists	0	0	0	0
Totals	213	303	93	

South Leg				
Peds Cross:	⋈			
South Peds:	0			
South Entering:	609			
South Leg Total:	924			

Comments

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Accu-Traffic Inc.

Total Count Diagram

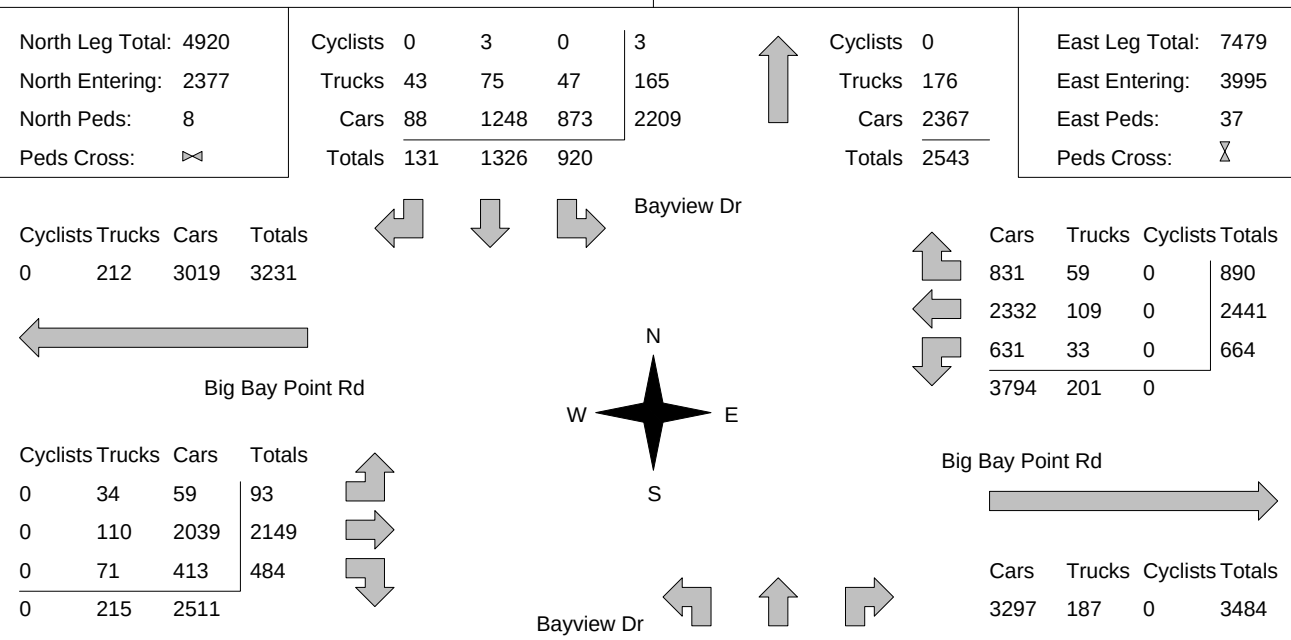
Municipality: Barrie
Site #: 1402300008
Intersection: Big Bay Point Rd & Bayview Dr
TFR File #: 1
Count date: 21-Oct-14

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

Ontario Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:30:00
To: 8:30:00

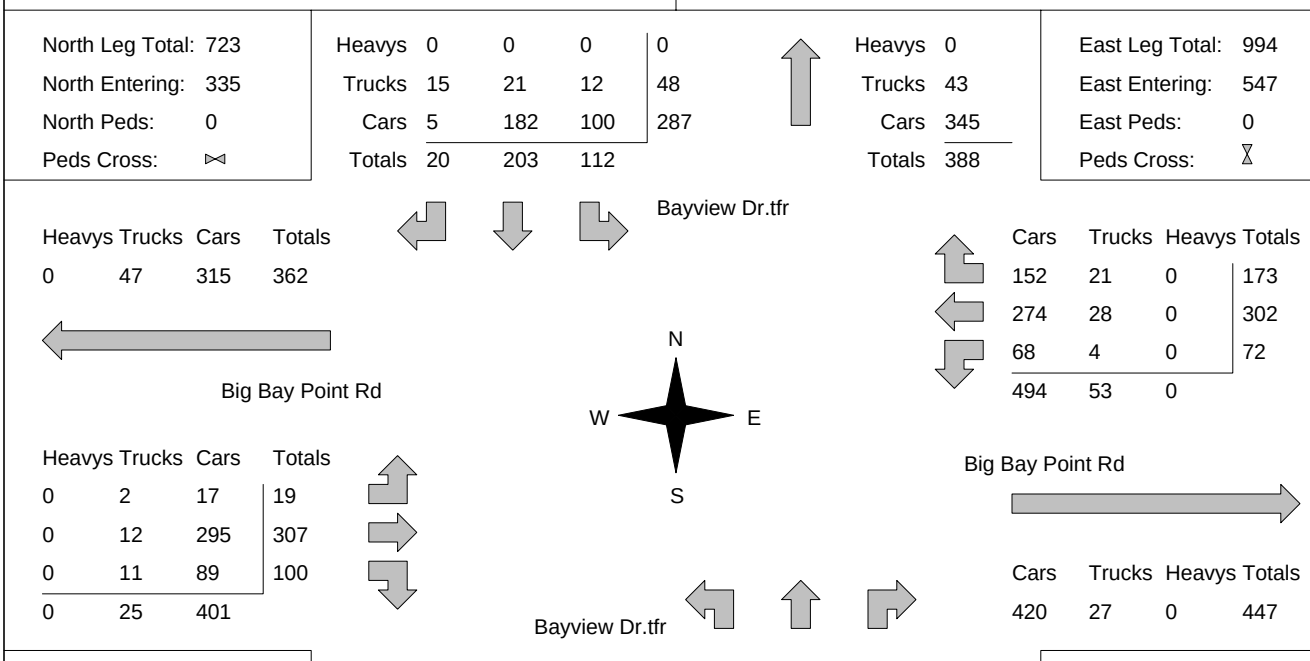
Municipality: Barrie
Site #: 1100900035
Intersection: Big Bay Point Rd & Bayview Dr.tfr
TFR File #: 7
Count date: 21-Jun-11

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

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

One Hour Peak
From: 12:15:00
To: 13:15:00

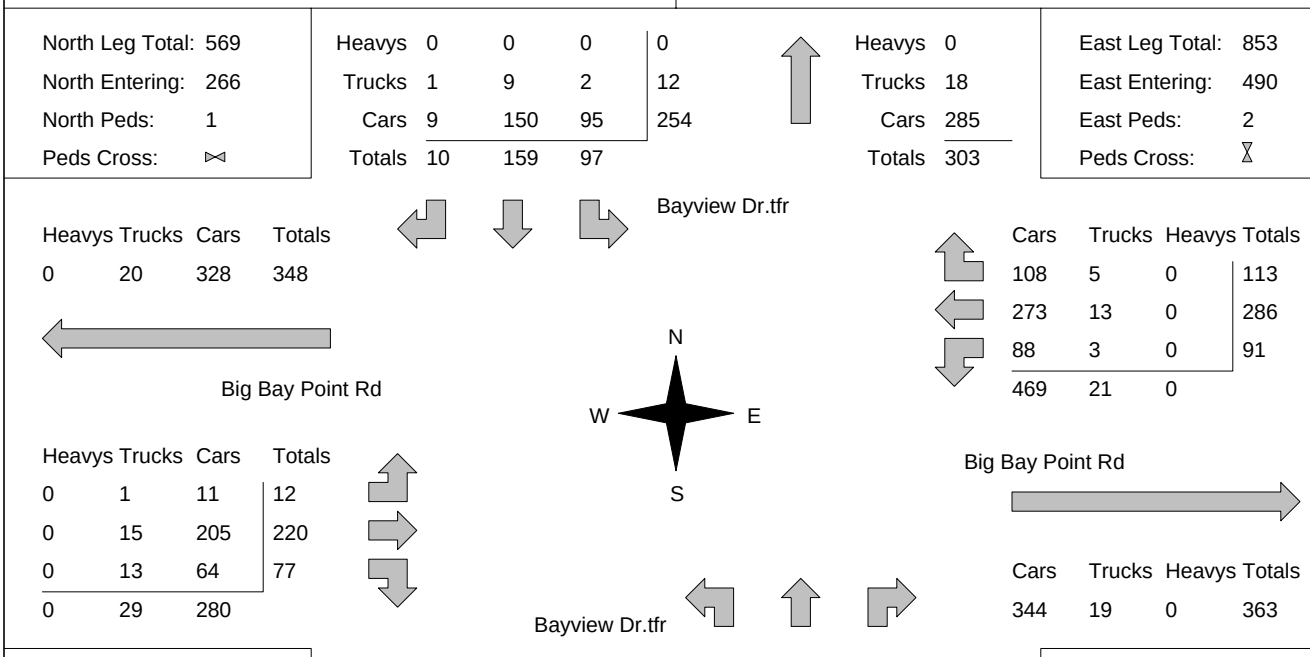
Municipality: Barrie
Site #: 1100900035
Intersection: Big Bay Point Rd & Bayview Dr.tfr
TFR File #: 7
Count date: 21-Jun-11

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



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

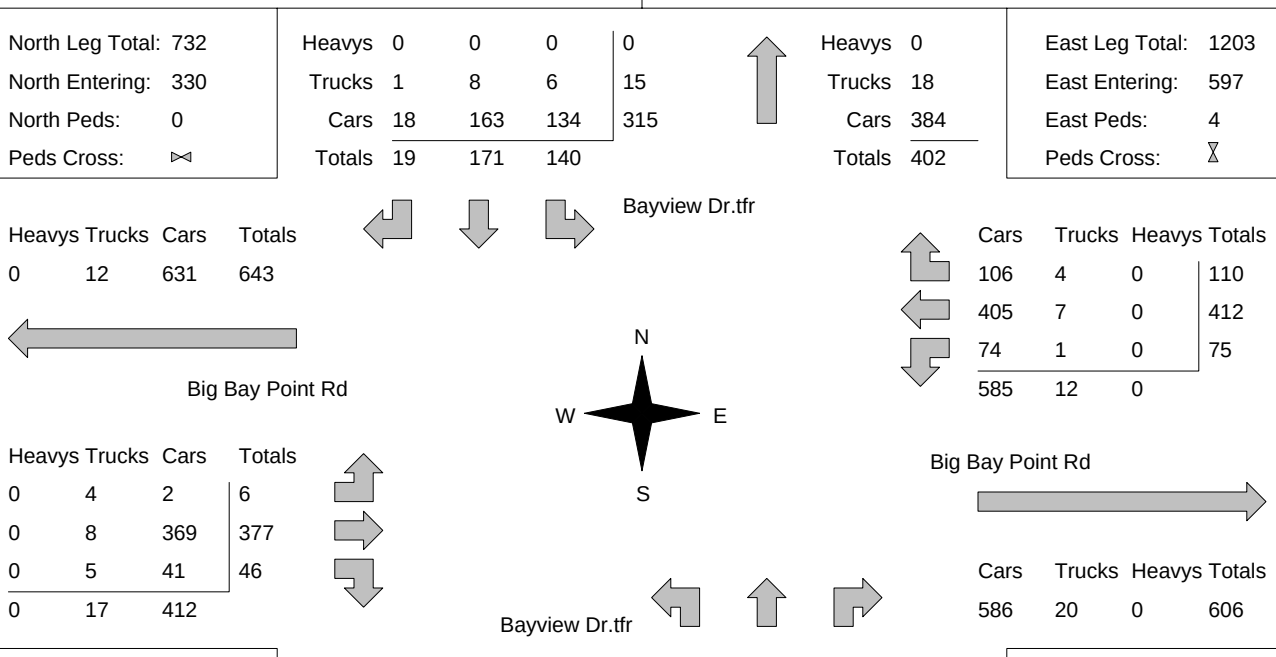
Municipality: Barrie
Site #: 1100900035
Intersection: Big Bay Point Rd & Bayview Dr.tfr
TFR File #: 7
Count date: 21-Jun-11

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

Ontario Traffic Inc.

Total Count Diagram

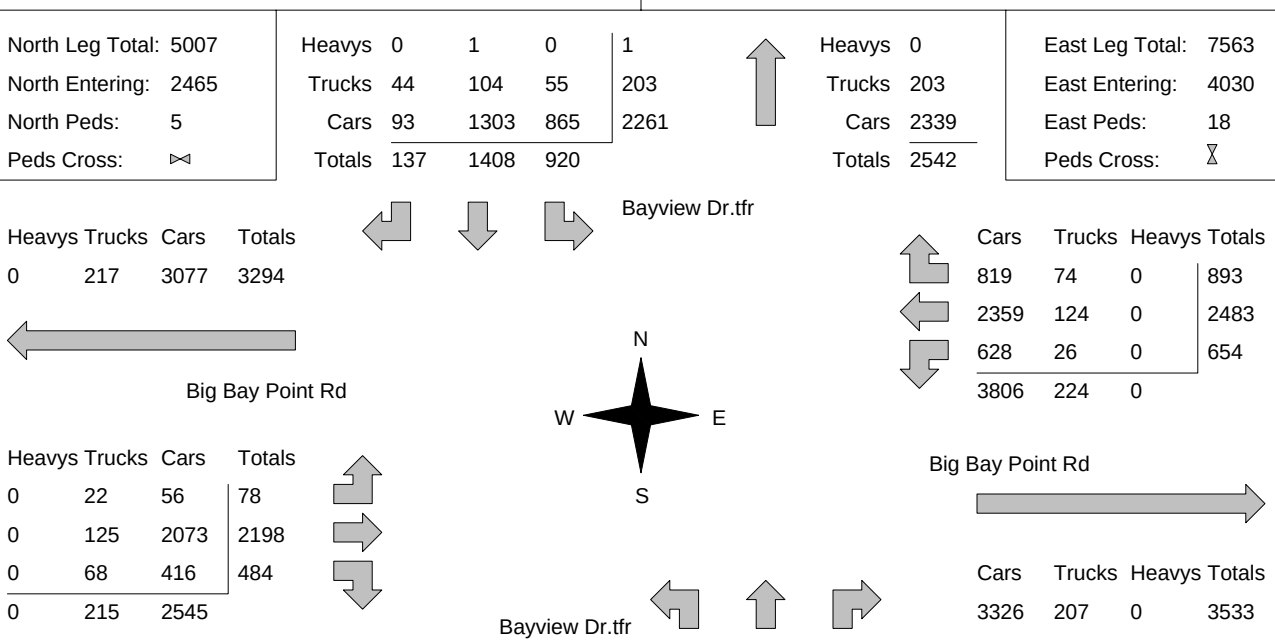
Municipality: Barrie
Site #: 1100900035
Intersection: Big Bay Point Rd & Bayview Dr.tfr
TFR File #: 7
Count date: 21-Jun-11

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

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Traffic Monitoring & Data Analysis
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Fax: 1-888-711-3125

Accu-Traffic Inc

Morning Peak Diagram

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

One Hour Peak
From: 7:30:00
To: 8:30:00

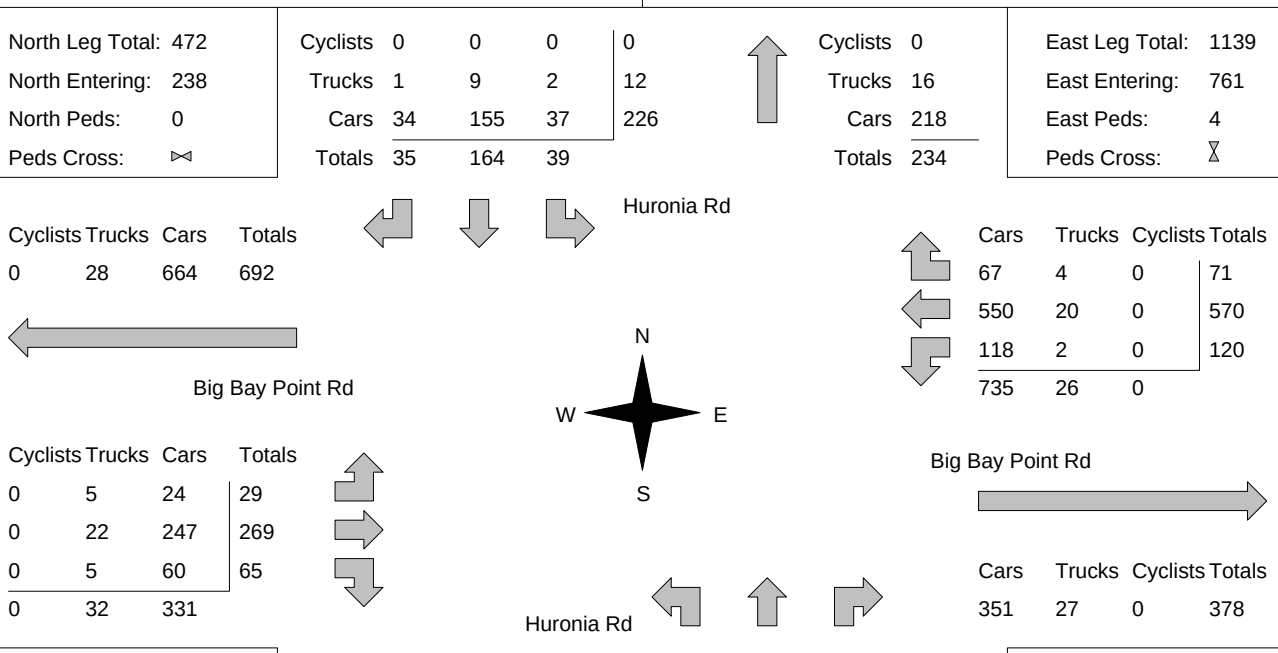
Municipality: Barrie
Site #: 1308600028
Intersection: Big Bay Point Rd & Huronia Rd
TFR File #: 1
Count date: 22-Oct-13

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



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Mid-day Peak Diagram

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

One Hour Peak
From: 12:00:00
To: 13:00:00

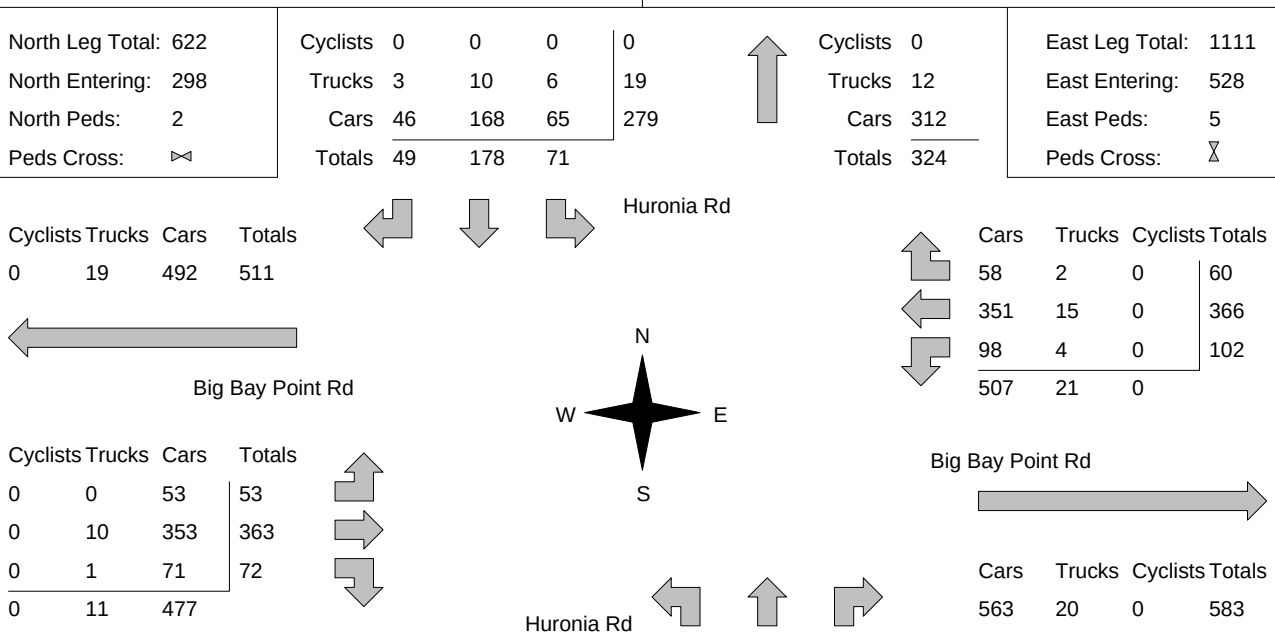
Municipality: Barrie
Site #: 1308600028
Intersection: Big Bay Point Rd & Huronia Rd
TFR File #: 1
Count date: 22-Oct-13

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

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Afternoon Peak Diagram

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

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

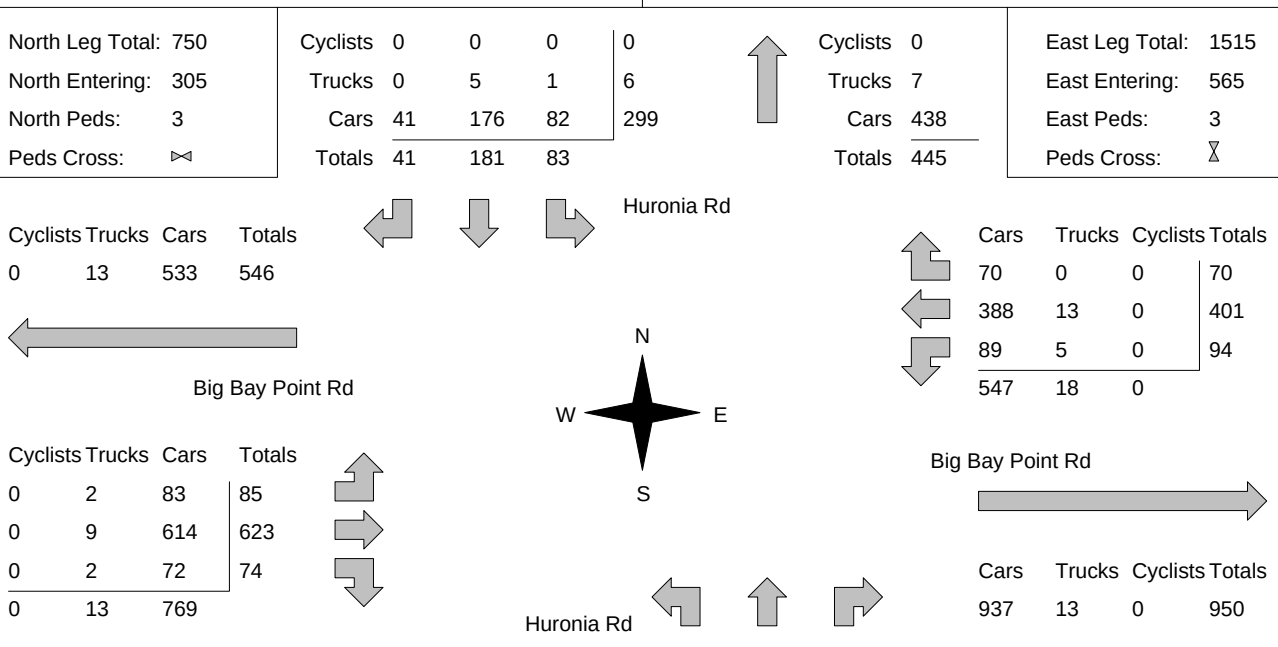
Municipality: Barrie
Site #: 1308600028
Intersection: Big Bay Point Rd & Huronia Rd
TFR File #: 1
Count date: 22-Oct-13

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

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Accu-Traffic Inc

Total Count Diagram

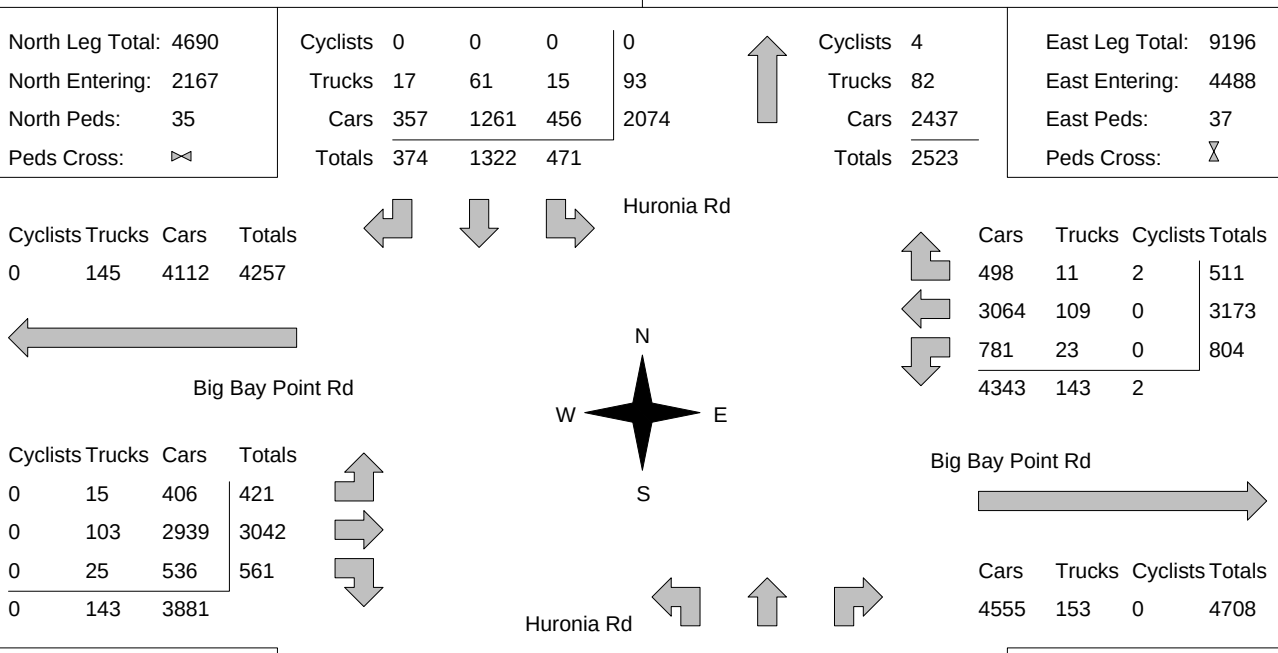
Municipality: Barrie
Site #: 1308600028
Intersection: Big Bay Point Rd & Huronia Rd
TFR File #: 1
Count date: 22-Oct-13

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

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Accu-Traffic Inc

Morning Peak Diagram

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

One Hour Peak
From: 7:45:00
To: 8:45:00

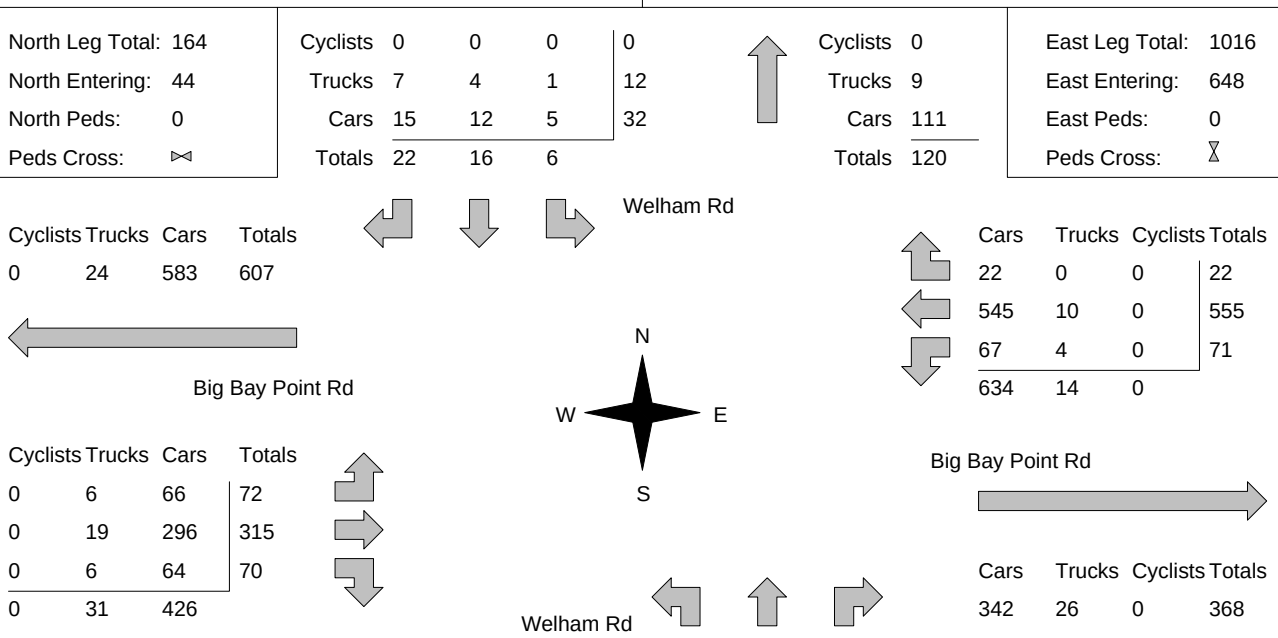
Municipality: Barrie
Site #: 1308600030
Intersection: Big Bay Point Rd & Welham Rd
TFR File #: 1
Count date: 24-Oct-13

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

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Tel: 1-416-910-0171
Fax: 1-888-711-3125

Accu-Traffic Inc

Mid-day Peak Diagram

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

One Hour Peak
From: 11:30:00
To: 12:30:00

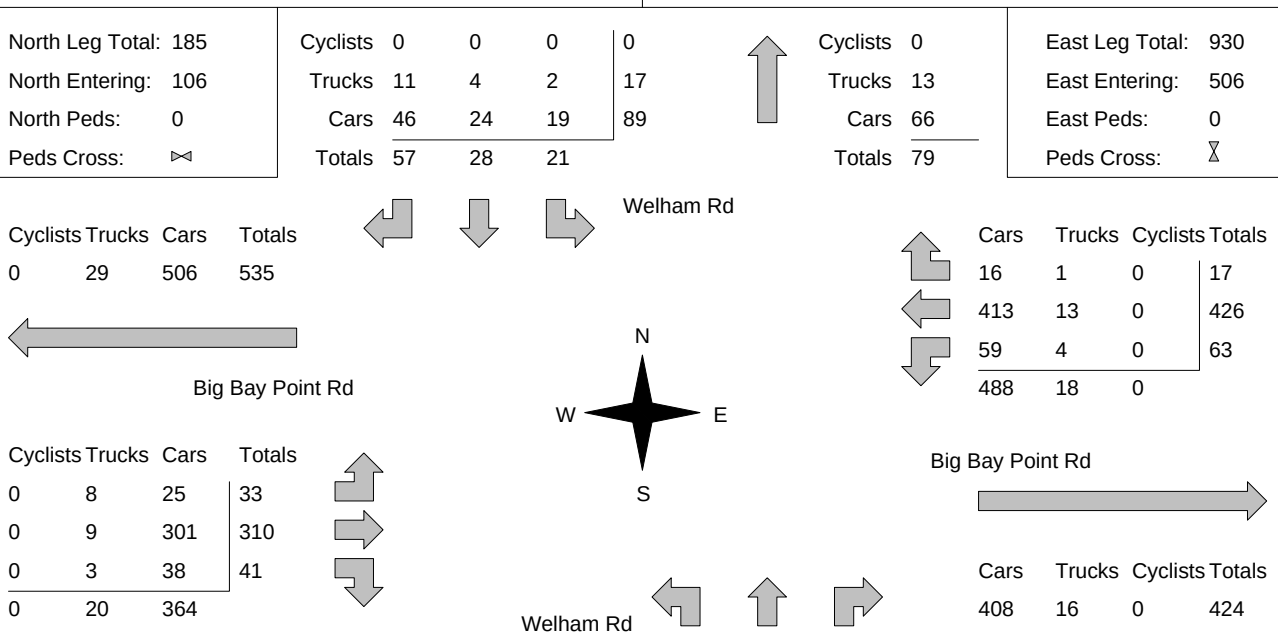
Municipality: Barrie
Site #: 1308600030
Intersection: Big Bay Point Rd & Welham Rd
TFR File #: 1
Count date: 24-Oct-13

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

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Fax: 1-888-711-3125

Accu-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

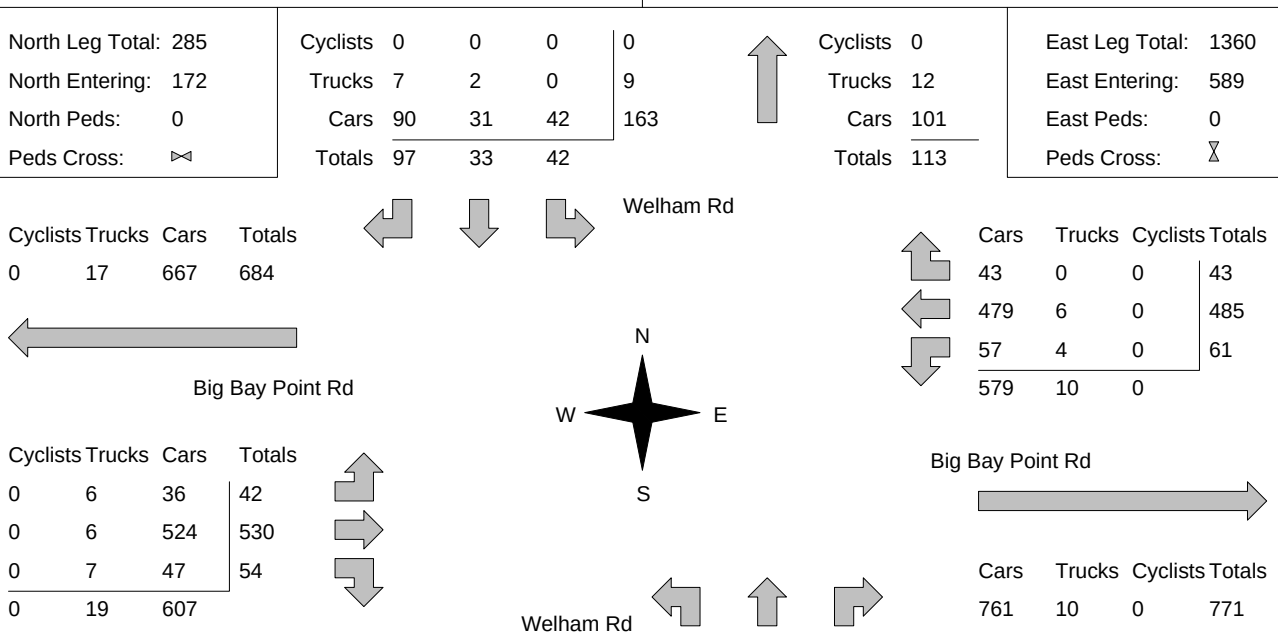
Municipality: Barrie
Site #: 1308600030
Intersection: Big Bay Point Rd & Welham Rd
TFR File #: 1
Count date: 24-Oct-13

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

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Accu-Traffic Inc

Total Count Diagram

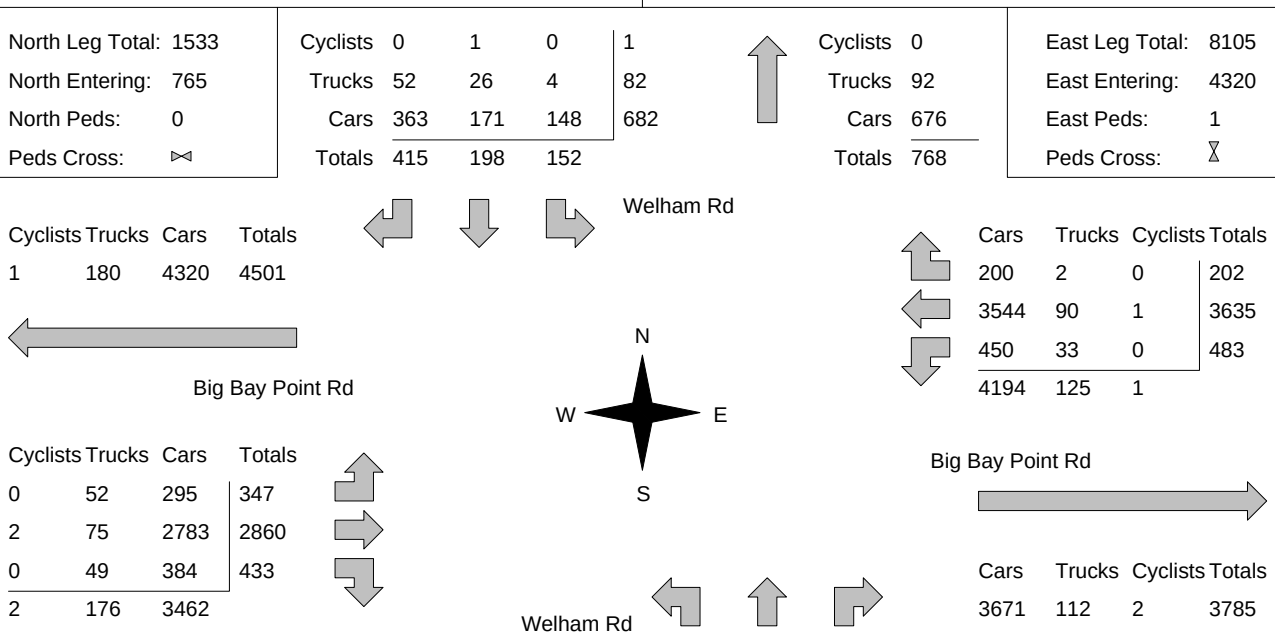
Municipality: Barrie
Site #: 1308600030
Intersection: Big Bay Point Rd & Welham Rd
TFR File #: 1
Count date: 24-Oct-13

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

Ontario Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:45:00
To: 8:45:00

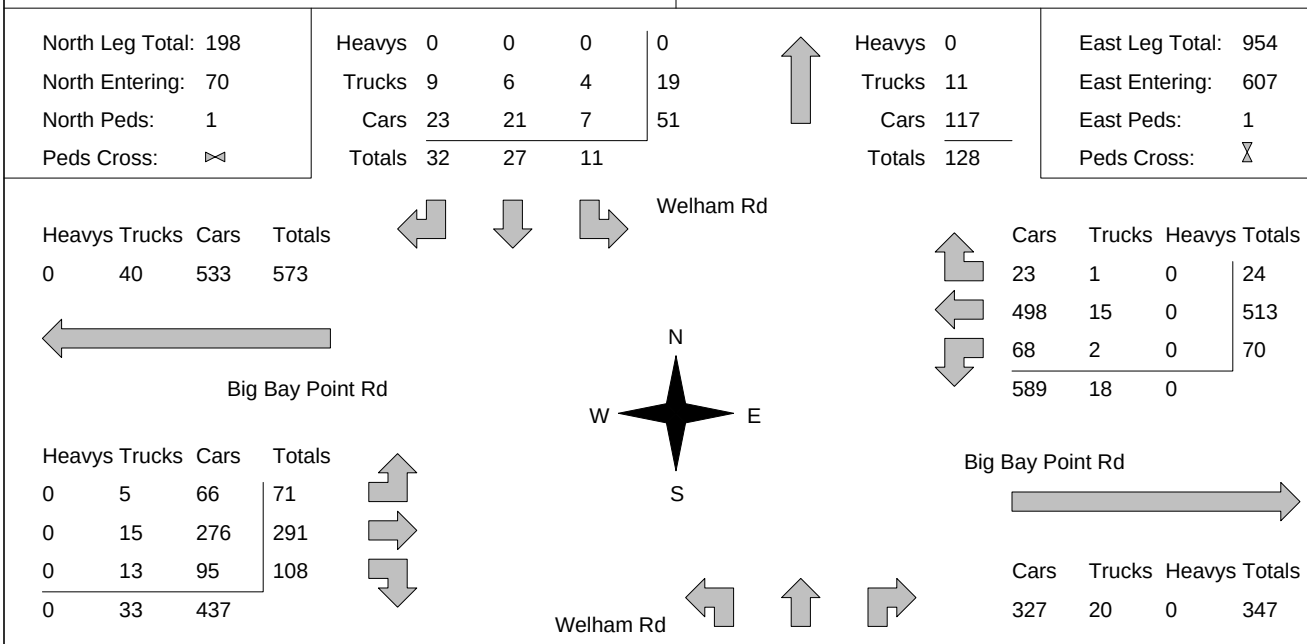
Municipality: Barrie
Site #: 1201300083
Intersection: Big Bay Point Rd & Welham Rd
TFR File #: 7
Count date: 20-Dec-12

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

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

One Hour Peak
From: 11:15:00
To: 12:15:00

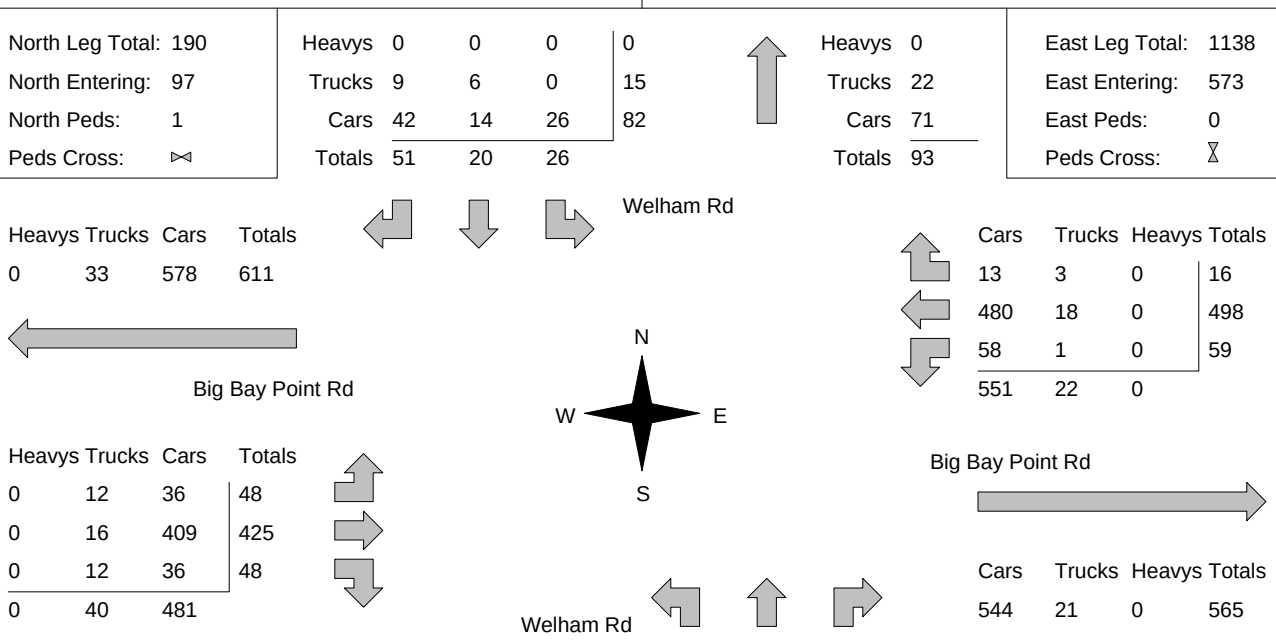
Municipality: Barrie
Site #: 1201300083
Intersection: Big Bay Point Rd & Welham Rd
TFR File #: 7
Count date: 20-Dec-12

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E



Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

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

One Hour Peak
From: 16:15:00
To: 17:15:00

Municipality: Barrie
Site #: 1201300083
Intersection: Big Bay Point Rd & Welham Rd
TFR File #: 7
Count date: 20-Dec-12

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E

North Leg Total:	226
North Entering:	142
North Peds:	1
Peds Cross:	⋈

Heavys	0	0	0	0
Trucks	4	4	1	9
Cars	69	36	28	133
Totals	73	40	29	

Heavys	0	
Trucks	15	
Cars	69	
Totals	84	

East Leg Total:	1408
East Entering:	612
East Peds:	0
Peds Cross:	⧖

Welham Rd

Heavys	Trucks	Cars	Totals
0	19	649	668

Cars	Trucks	Heavys	Totals
36	4	0	40
487	7	0	494
74	4	0	78
597	15	0	

Big Bay Point Rd

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Heavys	Trucks	Cars	Totals
0	5	20	25
0	5	567	572
0	8	43	51
0	18	630	

Big Bay Point Rd

Cars	Trucks	Heavys	Totals
788	8	0	796

Welham Rd

Peds Cross:	⧖
West Peds:	0
West Entering:	648
West Leg Total:	1316

Cars	153			
Trucks	16			
Heavys	0			
Totals	169			

Cars	93	13	193	299
Trucks	8	6	2	16
Heavys	0	0	0	0
Totals	101	19	195	

Peds Cross:	⋈
South Peds:	1
South Entering:	315
South Leg Total:	484

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1201300083
Intersection: Big Bay Point Rd & Welham Rd
TFR File #: 7
Count date: 20-Dec-12

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs W/E

North Leg Total:	1479			
North Entering:	746			
North Peds:	7			
Peds Cross:	⋈			
Heavys	0	0	0	0
Trucks	54	44	8	106
Cars	324	155	161	640
Totals	378	199	169	
Heavys	0			
Trucks	108			
Cars	625			
Totals	733			
East Leg Total:	8644			
East Entering:	4482			
East Peds:	2			
Peds Cross:	⧖			

Welham Rd

Heavys	Trucks	Cars	Totals
0	233	4425	4658

Cars	Trucks	Heavys	Totals
175	12	0	187
3645	122	0	3767
507	21	0	528
4327	155	0	

Big Bay Point Rd

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Heavys	Trucks	Cars	Totals
0	53	286	339
0	99	3017	3116
0	79	430	509
0	231	3733	

Big Bay Point Rd

Cars	Trucks	Heavys	Totals
4035	127	0	4162

Welham Rd

Peds Cross:	⧖			
West Peds:	2			
West Entering:	3964			
West Leg Total:	8622			
Cars	1092			
Trucks	144			
Heavys	0			
Totals	1236			
Cars	456	164	857	1477
Trucks	57	43	20	120
Heavys	0	0	0	0
Totals	513	207	877	
Peds Cross:	⋈			
South Peds:	11			
South Entering:	1597			
South Leg Total:	2833			

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis
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Tel: 1-416-910-0171
Fax: 1-888-711-3125

Accu-Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:45:00
To: 8:45:00

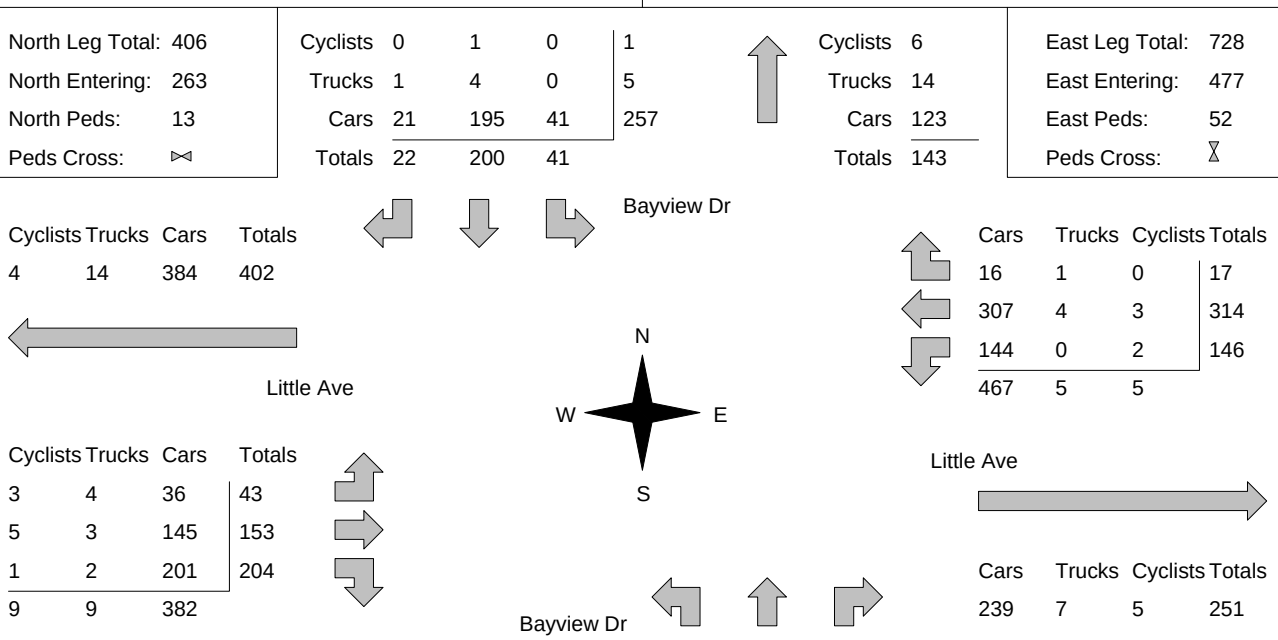
Municipality: Barrie
Site #: 1402300094
Intersection: Little Ave & Bayview Dr
TFR File #: 1
Count date: 21-Oct-14

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E



Comments

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Accu-Traffic Inc.

Mid-day Peak Diagram

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

One Hour Peak
From: 11:15:00
To: 12:15:00

Municipality: Barrie
Site #: 1402300094
Intersection: Little Ave & Bayview Dr
TFR File #: 1
Count date: 21-Oct-14

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E

North Leg Total:	415			
North Entering:	193			
North Peds:	69			
Peds Cross:	⋈			
Cyclists	0	1	0	1
Trucks	0	3	0	3
Cars	31	126	32	189
Totals	31	130	32	
Cyclists	4			
Trucks	7			
Cars	211			
Totals	222			
East Leg Total:	765			
East Entering:	409			
East Peds:	58			
Peds Cross:	⧖			

Bayview Dr

Cyclists	Trucks	Cars	Totals
0	4	414	418

Little Ave

Cyclists	Trucks	Cars	Totals
1	0	37	38
1	0	179	180
2	0	90	92
4	0	306	

Cars	Trucks	Cyclists	Totals
22	2	0	24
258	0	0	258
127	0	0	127
407	2	0	

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Little Ave

Cars	Trucks	Cyclists	Totals
355	0	1	356

Bayview Dr

Peds Cross:	⧖			
West Peds:	59			
West Entering:	310			
West Leg Total:	728			
Cars	343			
Trucks	3			
Cyclists	3			
Totals	349			
Cars	125	152	144	421
Trucks	4	5	0	9
Cyclists	0	3	0	3
Totals	129	160	144	
Peds Cross:	⋈			
South Peds:	29			
South Entering:	433			
South Leg Total:	782			

Comments

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Accu-Traffic Inc.

Afternoon Peak Diagram

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

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

Municipality: Barrie
Site #: 1402300094
Intersection: Little Ave & Bayview Dr
TFR File #: 1
Count date: 21-Oct-14

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E

North Leg Total: 593
North Entering: 251
North Peds: 17
Peds Cross: ⋈

Cyclists	0	3	0	3
Trucks	0	3	0	3
Cars	28	135	82	245
Totals	28	141	82	

Cyclists	5
Trucks	1
Cars	336
Totals	342

East Leg Total: 789
East Entering: 343
East Peds: 21
Peds Cross: ⧖

Bayview Dr

Cyclists	Trucks	Cars	Totals
2	4	466	472

Cars	Trucks	Cyclists	Totals
42	0	0	42
236	2	2	240
60	0	1	61
338	2	3	

Little Ave

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Cyclists	Trucks	Cars	Totals
2	0	20	22
1	4	274	279
3	1	59	63
6	5	353	

Little Ave

Cars	Trucks	Cyclists	Totals
441	4	1	446

Bayview Dr

Peds Cross: ⧖
West Peds: 13
West Entering: 364
West Leg Total: 836

Cars	254
Trucks	4
Cyclists	7
Totals	265

Cars	202	274	85	561
Trucks	2	1	0	3
Cyclists	0	3	0	3
Totals	204	278	85	

Peds Cross: ⋈
South Peds: 17
South Entering: 567
South Leg Total: 832

Comments

Accu-Traffic Inc.
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Accu-Traffic Inc.

Total Count Diagram

Municipality: Barrie
Site #: 1402300094
Intersection: Little Ave & Bayview Dr
TFR File #: 1
Count date: 21-Oct-14

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E

North Leg Total:	3558			
North Entering:	1758			
North Peds:	256			
Peds Cross:	⋈			
Cyclists	2	14	0	16
Trucks	2	27	0	29
Cars	228	1145	340	1713
Totals	232	1186	340	
Cyclists	23			
Trucks	41			
Cars	1736			
Totals	1800			
East Leg Total:	5514			
East Entering:	2895			
East Peds:	255			
Peds Cross:	⧖			

Bayview Dr

Cyclists	Trucks	Cars	Totals
8	47	3074	3129

Little Ave

Cyclists	Trucks	Cars	Totals
10	4	192	206
21	20	1512	1553
12	13	814	839
43	37	2518	

Cars	Trucks	Cyclists	Totals
238	10	0	248
1945	17	5	1967
672	3	5	680
2855	30	10	

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Little Ave

Cars	Trucks	Cyclists	Totals
2571	27	21	2619

Bayview Dr

Peds Cross:	⧖			
West Peds:	265			
West Entering:	2598			
West Leg Total:	5727			
Cars	2631			
Trucks	43			
Cyclists	31			
Totals	2705			
Cars	901	1306	719	2926
Trucks	28	27	7	62
Cyclists	1	13	0	14
Totals	930	1346	726	
Peds Cross:	⋈			
South Peds:	152			
South Entering:	3002			
South Leg Total:	5707			

Comments

Ontario Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:45:00
To: 8:45:00

Municipality: Barrie
Site #: 1201300066
Intersection: Little Ave & Bayview Dr
TFR File #: 1
Count date: 1-Aug-12

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E

North Leg Total:	326
North Entering:	209
North Peds:	8
Peds Cross:	⋈

Heavys	1	5	0	6
Trucks	0	10	0	10
Cars	10	170	13	193
Totals	11	185	13	

Heavys	5
Trucks	10
Cars	102
Totals	117

East Leg Total:	449
East Entering:	328
East Peds:	6
Peds Cross:	⧖

Heavys	Trucks	Cars	Totals
1	8	286	295

Bayview Dr

Cars	Trucks	Heavys	Totals
16	0	0	16
237	4	0	241
68	3	0	71
321	7	0	

Little Ave

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Heavys	Trucks	Cars	Totals
1	3	15	19
1	6	76	83
1	10	153	164
3	19	244	

Little Ave

Cars	Trucks	Heavys	Totals
113	7	1	121

Bayview Dr

Peds Cross:	⧖
West Peds:	7
West Entering:	266
West Leg Total:	561

Cars	391
Trucks	23
Heavys	6
Totals	420

Cars	39	71	24	134
Trucks	4	7	1	12
Heavys	0	4	0	4
Totals	43	82	25	

Peds Cross:	⋈
South Peds:	7
South Entering:	150
South Leg Total:	570

Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

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

One Hour Peak
From: 11:30:00
To: 12:30:00

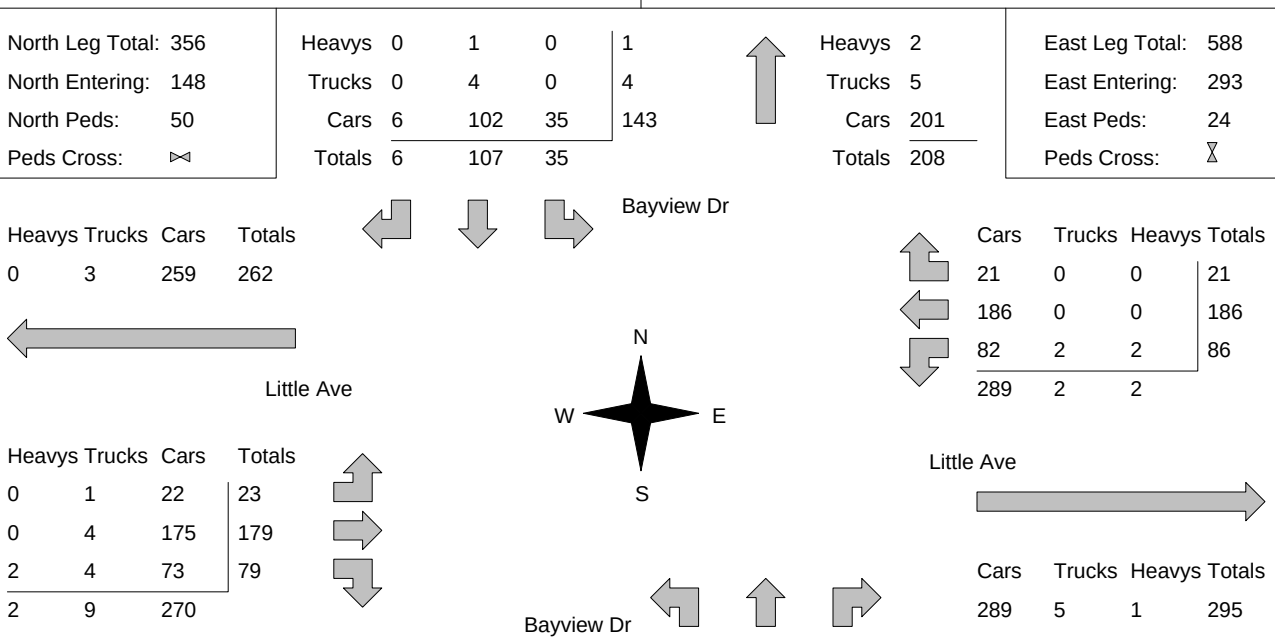
Municipality: Barrie
Site #: 1201300066
Intersection: Little Ave & Bayview Dr
TFR File #: 1
Count date: 1-Aug-12

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E



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: Barrie
Site #: 1201300066
Intersection: Little Ave & Bayview Dr
TFR File #: 1
Count date: 1-Aug-12

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E

North Leg Total:	543
North Entering:	253
North Peds:	14
Peds Cross:	⋈

Heavys	0	4	0	4
Trucks	0	7	0	7
Cars	25	159	58	242
Totals	25	170	58	

Heavys	1
Trucks	2
Cars	287
Totals	290

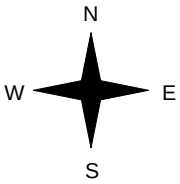
East Leg Total:	788
East Entering:	340
East Peds:	10
Peds Cross:	⧖

Bayview Dr

Heavys	Trucks	Cars	Totals
1	5	382	388

Cars	Trucks	Heavys	Totals
57	0	0	57
230	4	1	235
46	2	0	48
333	6	1	

Little Ave



Heavys	Trucks	Cars	Totals
0	1	29	30
0	8	289	297
0	11	71	82
0	20	389	

Little Ave

Cars	Trucks	Heavys	Totals
438	10	0	448

Bayview Dr

Peds Cross:	⧖
West Peds:	3
West Entering:	409
West Leg Total:	797

Cars	276
Trucks	20
Heavys	4
Totals	300

Cars	127	201	91	419
Trucks	1	1	2	4
Heavys	0	1	0	1
Totals	128	203	93	

Peds Cross:	⋈
South Peds:	2
South Entering:	424
South Leg Total:	724

Comments

Ontario Traffic Inc.

Total Count Diagram

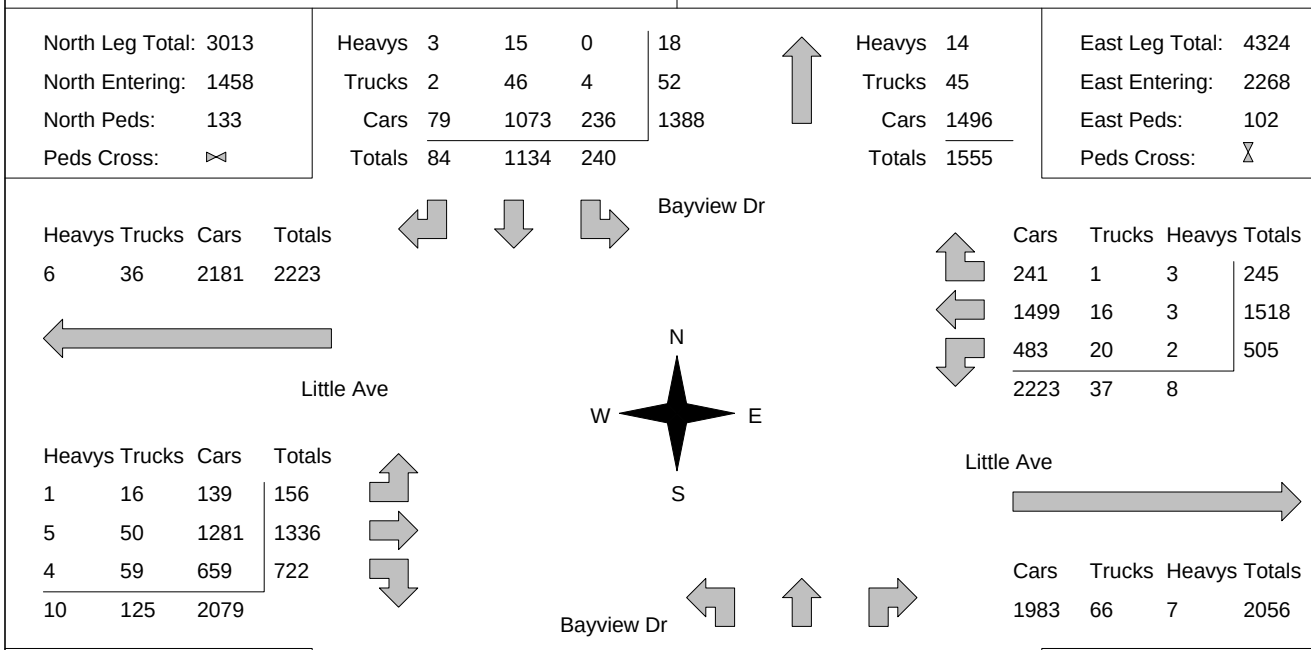
Municipality: Barrie
Site #: 1201300066
Intersection: Little Ave & Bayview Dr
TFR File #: 1
Count date: 1-Aug-12

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E



Comments

Ontario Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:45:00
To: 8:45:00

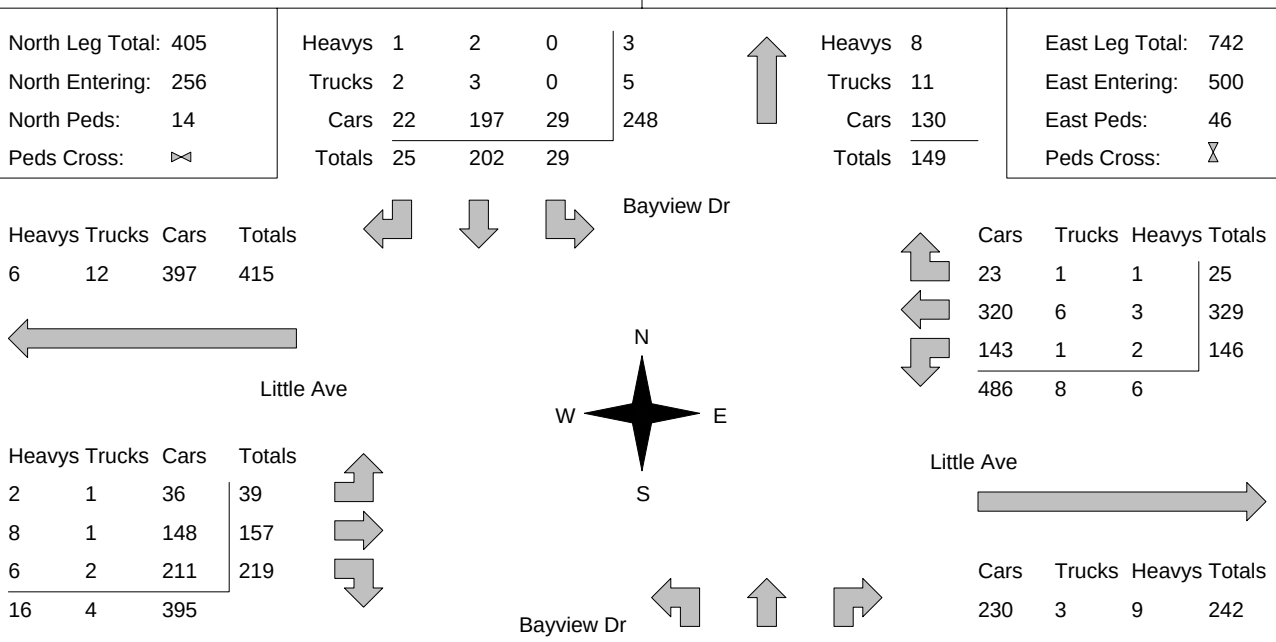
Municipality: Barrie
Site #: 1100900029
Intersection: Little Ave & Bayview Dr
TFR File #: 3
Count date: 23-Jun-11

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E



Comments

Ontario Traffic Inc.

Mid-day Peak Diagram

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

One Hour Peak
From: 11:15:00
To: 12:15:00

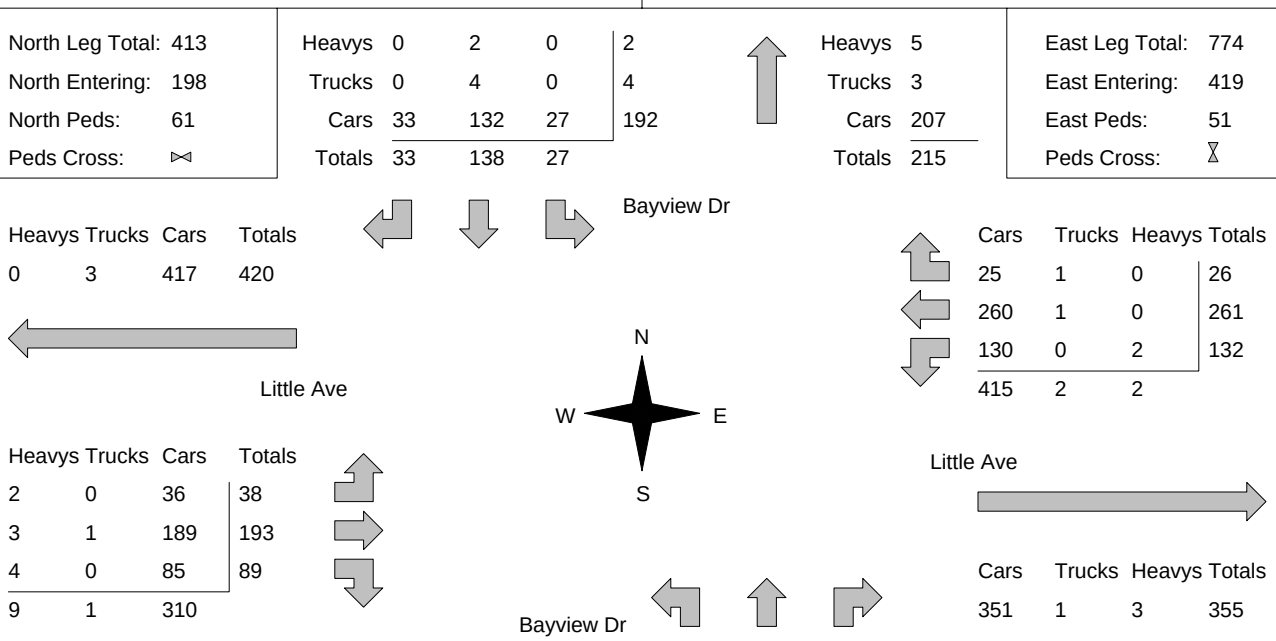
Municipality: Barrie
Site #: 1100900029
Intersection: Little Ave & Bayview Dr
TFR File #: 3
Count date: 23-Jun-11

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E



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

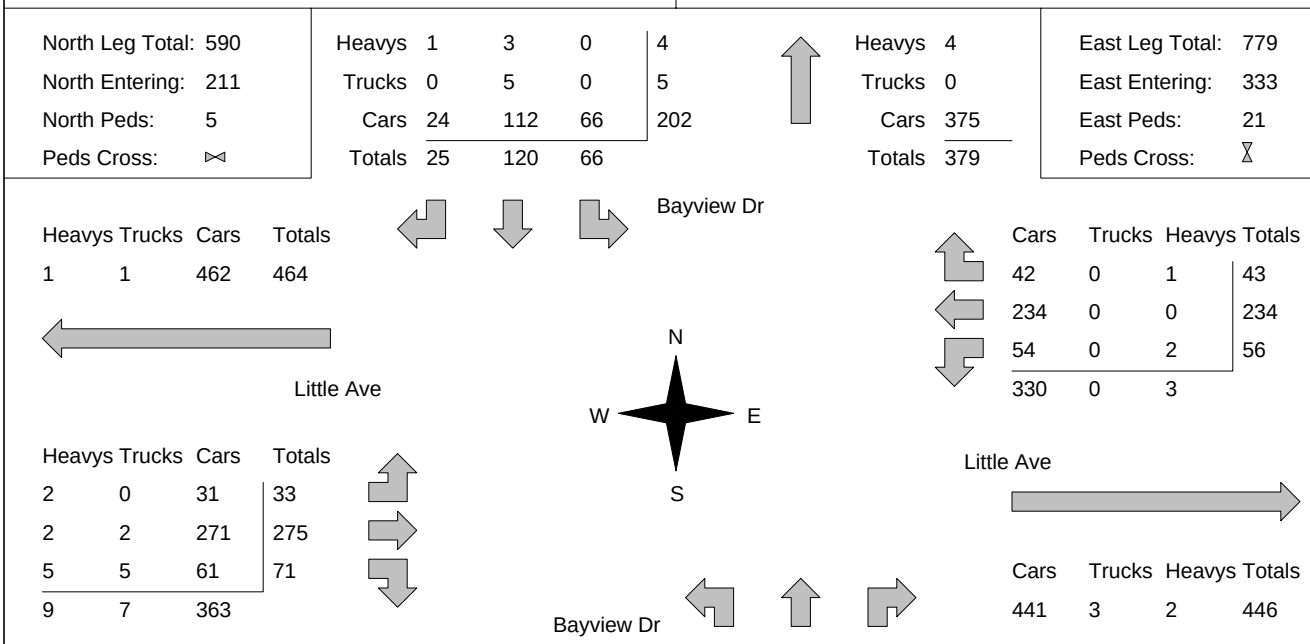
Municipality: Barrie
Site #: 1100900029
Intersection: Little Ave & Bayview Dr
TFR File #: 3
Count date: 23-Jun-11

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E



Comments

Ontario Traffic Inc.

Total Count Diagram

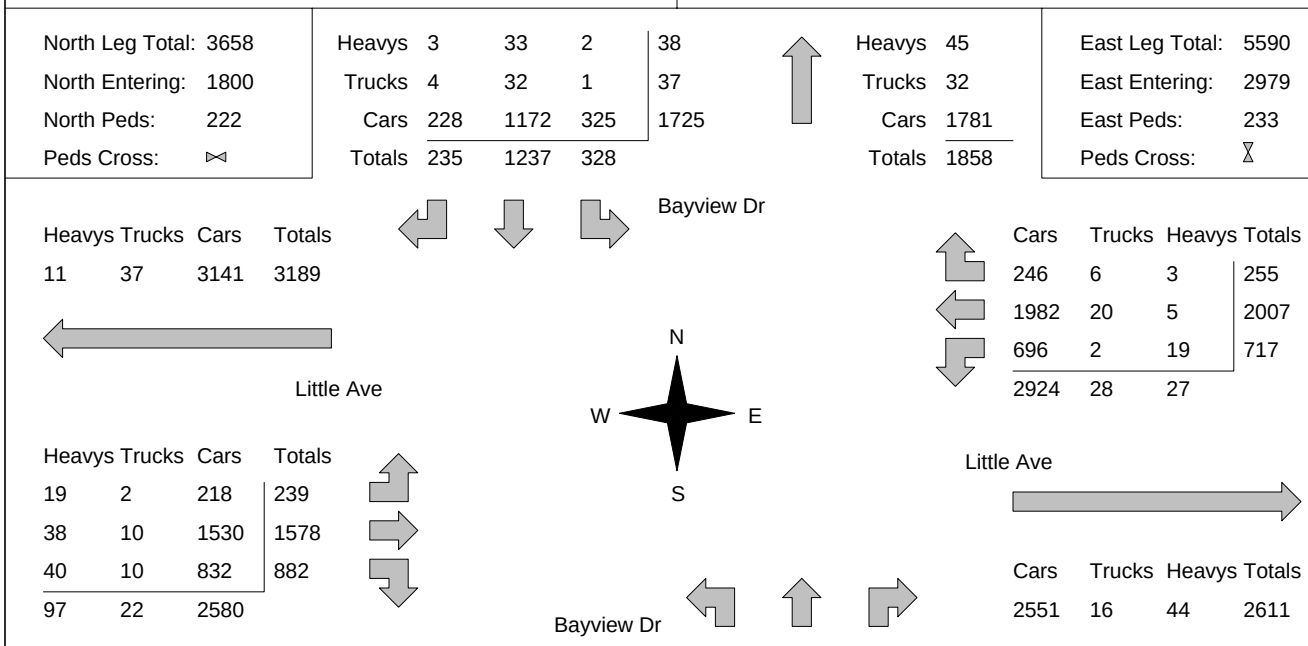
Municipality: Barrie
Site #: 1100900029
Intersection: Little Ave & Bayview Dr
TFR File #: 3
Count date: 23-Jun-11

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Little Ave runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:30:00
To: 8:30:00

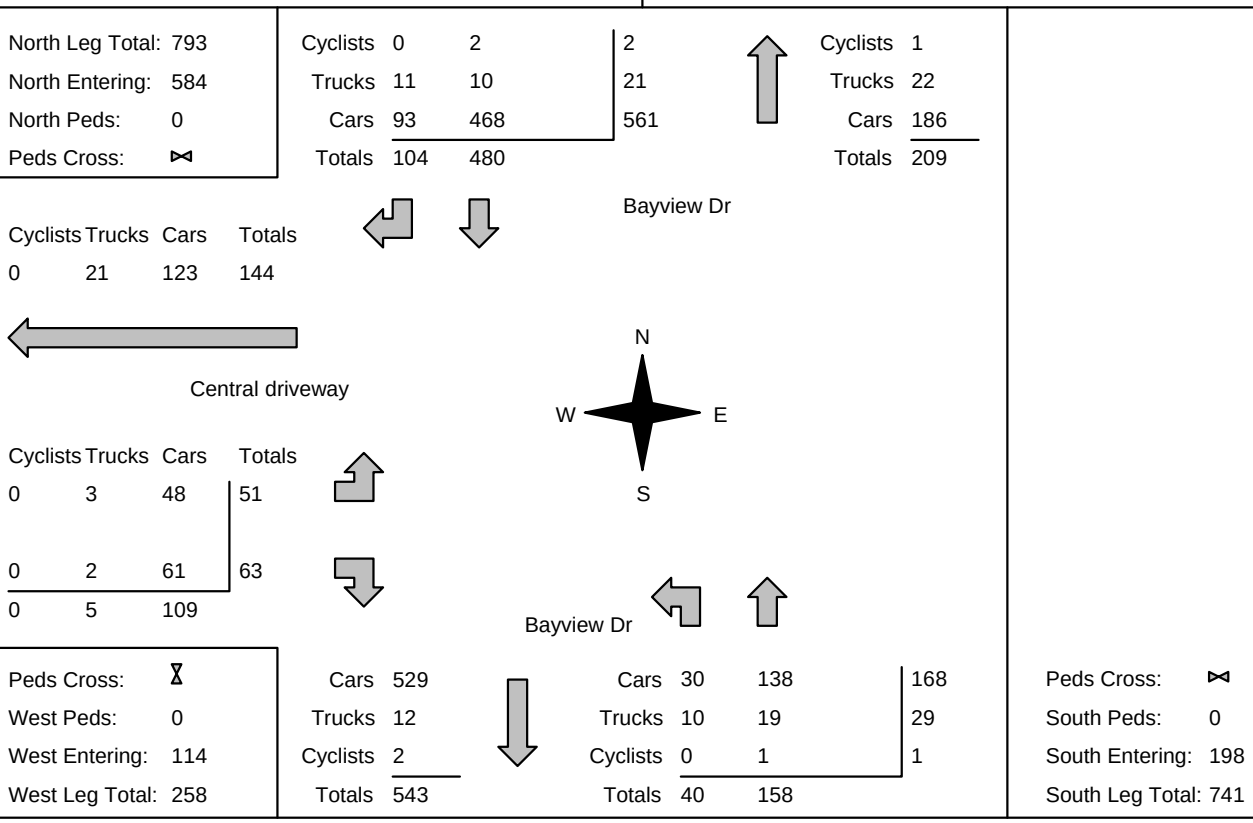
Municipality: Barrie
Site #: 1500200002
Intersection: Bayview Dr & Central driveway
TFR File #: 1
Count date: 23-Sep-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-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: Barrie
Site #: 1500200002
Intersection: Bayview Dr & Central driveway
TFR File #: 1
Count date: 23-Sep-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S

North Leg Total: 804
North Entering: 395
North Peds: 15
Peds Cross: ⋈

Cyclists	0	3	3
Trucks	1	11	12
Cars	21	359	380
Totals	22	373	

Cyclists	2
Trucks	12
Cars	395
Totals	409

Bayview Dr

Cyclists	Trucks	Cars	Totals
0	3	49	52

Central driveway

Cyclists	Trucks	Cars	Totals
0	0	35	35
0	0	36	36
0	0	71	

N
W E
S

Bayview Dr

Peds Cross: ⧖
West Peds: 38
West Entering: 71
West Leg Total: 123

Cars	395		
Trucks	11		
Cyclists	3		
Totals	409		

Cars	28	360	388
Trucks	2	12	14
Cyclists	0	2	2
Totals	30	374	

Peds Cross: ⋈
South Peds: 0
South Entering: 404
South Leg Total: 813

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

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

One Hour Peak
From: 16:15:00
To: 17:15:00

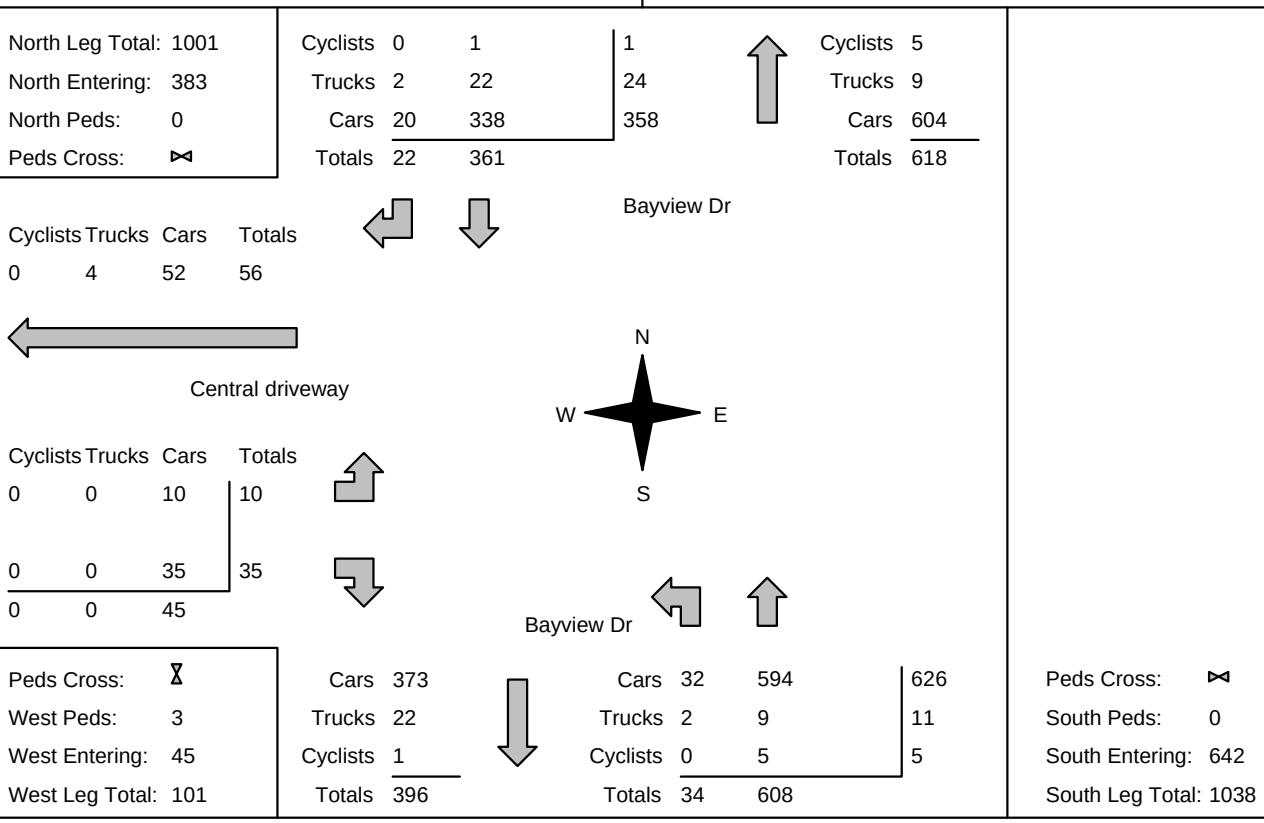
Municipality: Barrie
Site #: 1500200002
Intersection: Bayview Dr & Central driveway
TFR File #: 1
Count date: 23-Sep-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Total Count Diagram

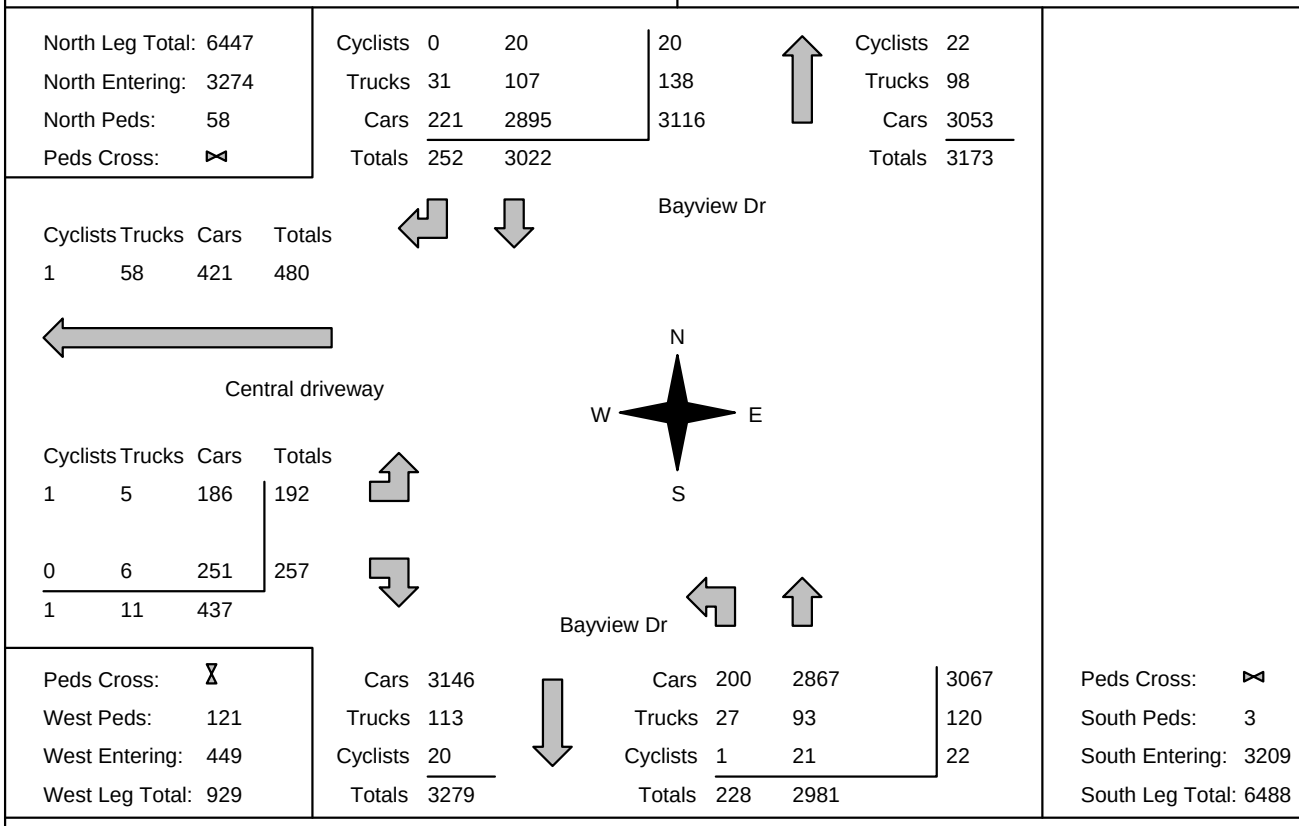
Municipality: Barrie
Site #: 1500200002
Intersection: Bayview Dr & Central driveway
TFR File #: 1
Count date: 23-Sep-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:30:00
To: 8:30:00

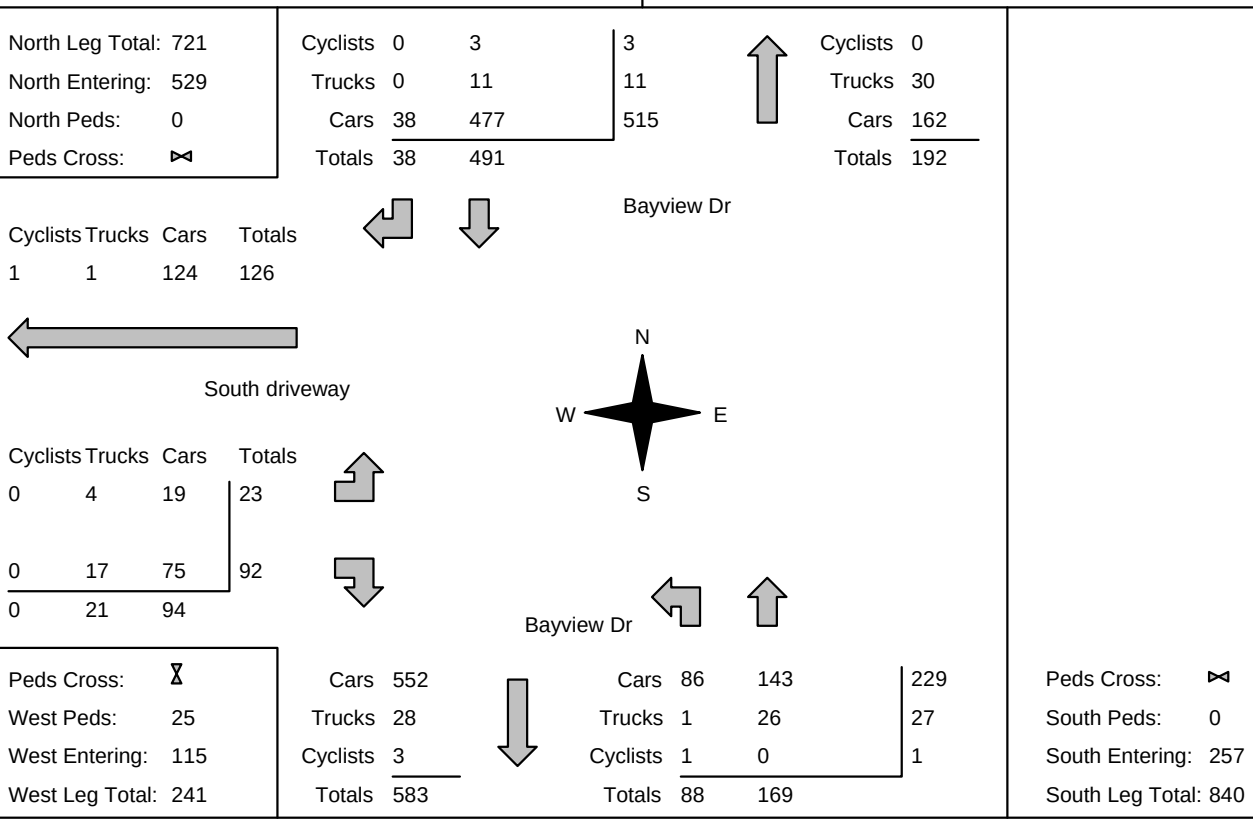
Municipality: Barrie
Site #: 1500200003
Intersection: Bayview Dr & South driveway
TFR File #: 1
Count date: 23-Sep-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-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: Barrie
Site #: 1500200003
Intersection: Bayview Dr & South driveway
TFR File #: 1
Count date: 23-Sep-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S

North Leg Total: 810
North Entering: 414
North Peds: 0
Peds Cross: ⋈

Cyclists	0	1	1
Trucks	0	13	13
Cars	5	395	400
Totals	5	409	

Cyclists	1
Trucks	13
Cars	382
Totals	396

Bayview Dr

Cyclists	Trucks	Cars	Totals
0	1	36	37

South driveway

Cyclists	Trucks	Cars	Totals
0	0	14	14
1	0	43	44
1	0	57	

N
W E
S

Bayview Dr

Peds Cross: ⧖
West Peds: 38
West Entering: 58
West Leg Total: 95

Cars	438		
Trucks	13		
Cyclists	2		
Totals	453		

Cars	31	368	399
Trucks	1	13	14
Cyclists	0	1	1
Totals	32	382	

Peds Cross: ⋈
South Peds: 0
South Entering: 414
South Leg Total: 867

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-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: Barrie
Site #: 1500200003
Intersection: Bayview Dr & South driveway
TFR File #: 1
Count date: 23-Sep-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S

North Leg Total: 1073
North Entering: 405
North Peds: 0
Peds Cross: ⋈

Cyclists	0	0	0
Trucks	0	23	23
Cars	1	381	382
Totals	1	404	

Cyclists	6
Trucks	10
Cars	652
Totals	668

Bayview Dr

Cyclists	Trucks	Cars	Totals
0	0	71	71

South driveway

Cyclists	Trucks	Cars	Totals
0	0	4	4
0	0	49	49
0	0	53	

N
W E
S

Bayview Dr

Peds Cross: ⧖
West Peds: 31
West Entering: 53
West Leg Total: 124

Cars	430		
Trucks	23		
Cyclists	0		
Totals	453		

Cars	70	648	718
Trucks	0	10	10
Cyclists	0	6	6
Totals	70	664	

Peds Cross: ⋈
South Peds: 0
South Entering: 734
South Leg Total: 1187

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Total Count Diagram

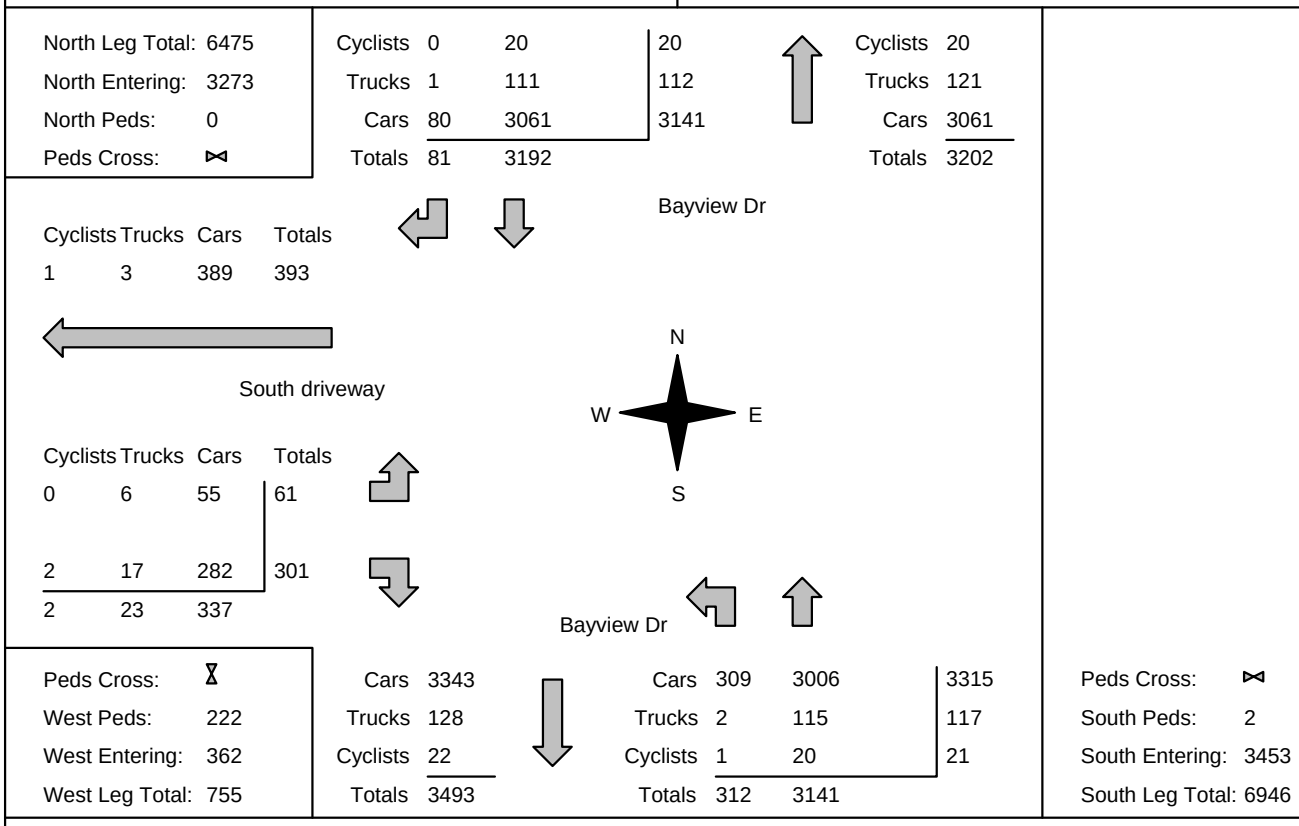
Municipality: Barrie
Site #: 1500200003
Intersection: Bayview Dr & South driveway
TFR File #: 1
Count date: 23-Sep-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:45:00
To: 8:45:00

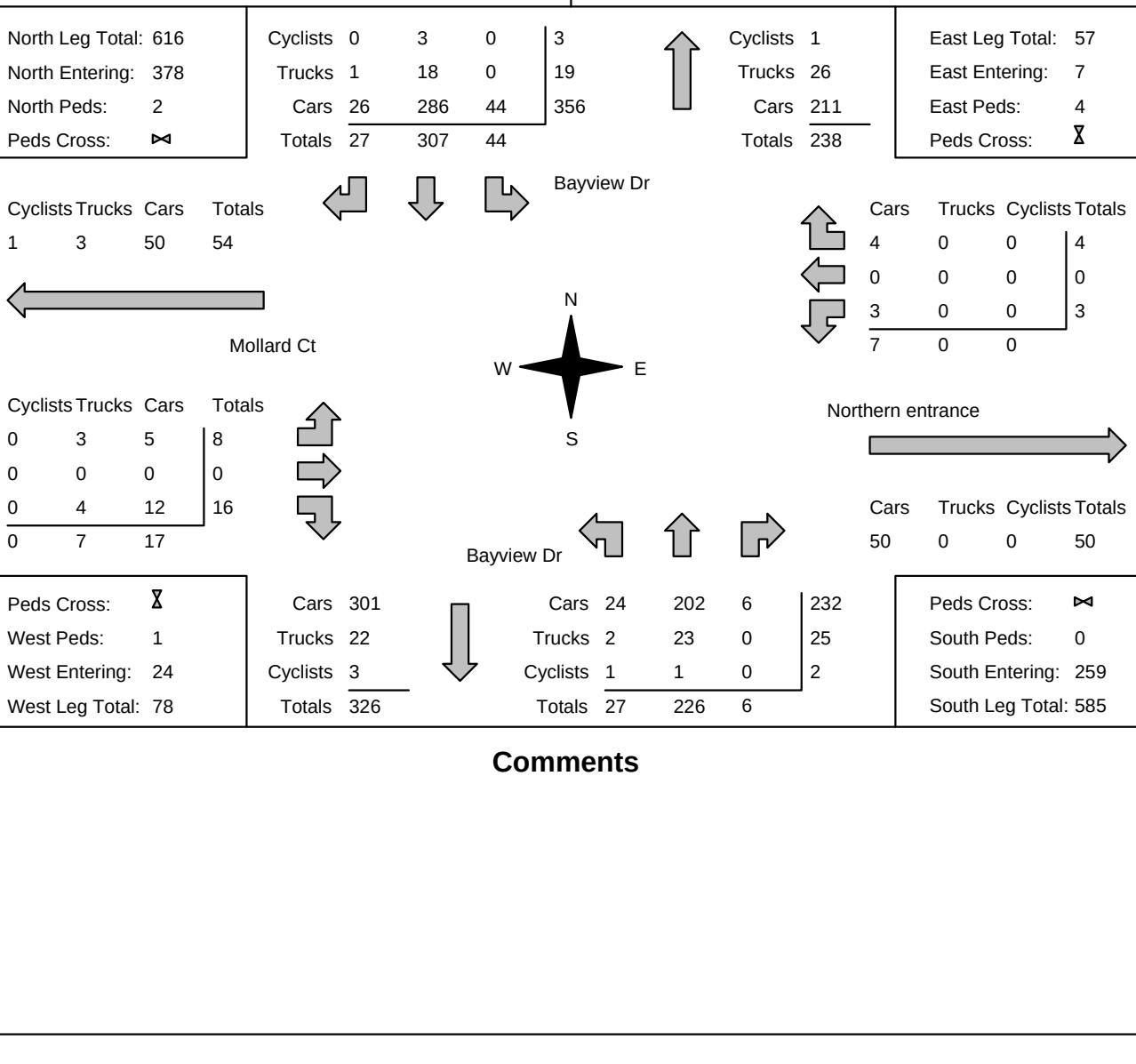
Municipality: Barrie
Site #: 1500200001
Intersection: Bayview Dr & Northern entrance
TFR File #: 1
Count date: 19-Aug-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 15:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

Municipality: Barrie
Site #: 1500200001
Intersection: Bayview Dr & Northern entrance
TFR File #: 1
Count date: 19-Aug-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S

North Leg Total: 731
North Entering: 340
North Peds: 1
Peds Cross: ⋈

Cyclists	0	1	1	2
Trucks	1	13	0	14
Cars	6	310	8	324
Totals	7	324	9	

Cyclists	1
Trucks	14
Cars	376
Totals	391

East Leg Total: 50
East Entering: 31
East Peds: 0
Peds Cross: ⧗

Bayview Dr

Cyclists	Trucks	Cars	Totals
0	6	31	37

Cars	Trucks	Cyclists	Totals
22	0	0	22
0	0	0	0
9	0	0	9
31	0	0	

Mollard Ct

N
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Cyclists	Trucks	Cars	Totals
0	1	19	20
0	0	0	0
0	3	20	23
0	4	39	

Northern entrance

Cars	Trucks	Cyclists	Totals
18	0	1	19

Bayview Dr

Peds Cross: ⧗
West Peds: 3
West Entering: 43
West Leg Total: 80

Cars	339			
Trucks	16			
Cyclists	1			
Totals	356			

Cars	25	335	10	370
Trucks	5	13	0	18
Cyclists	0	1	0	1
Totals	30	349	10	

Peds Cross: ⋈
South Peds: 1
South Entering: 389
South Leg Total: 745

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 20:00:00

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

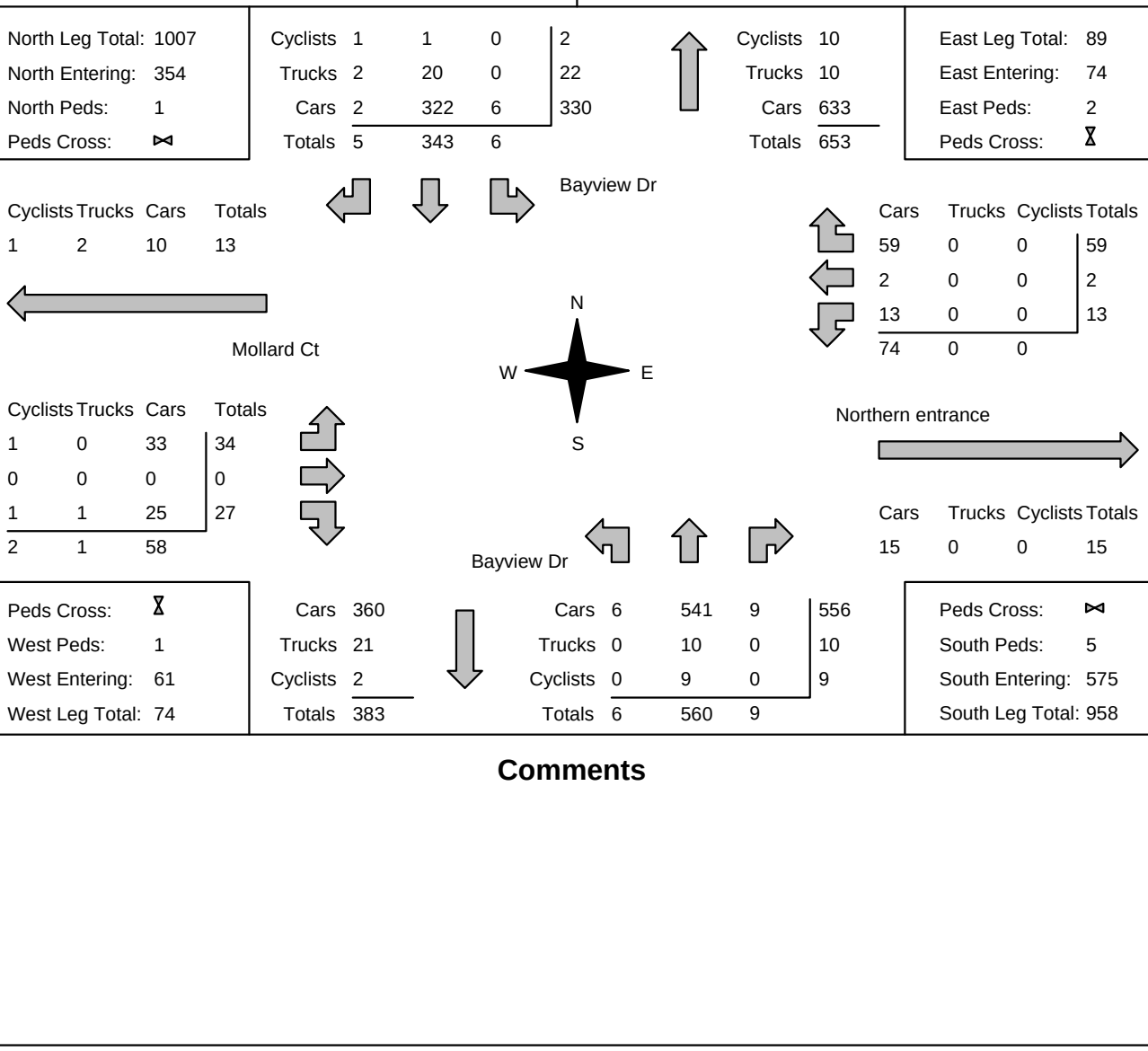
Municipality: Barrie
Site #: 1500200001
Intersection: Bayview Dr & Northern entrance
TFR File #: 1
Count date: 19-Aug-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Total Count Diagram

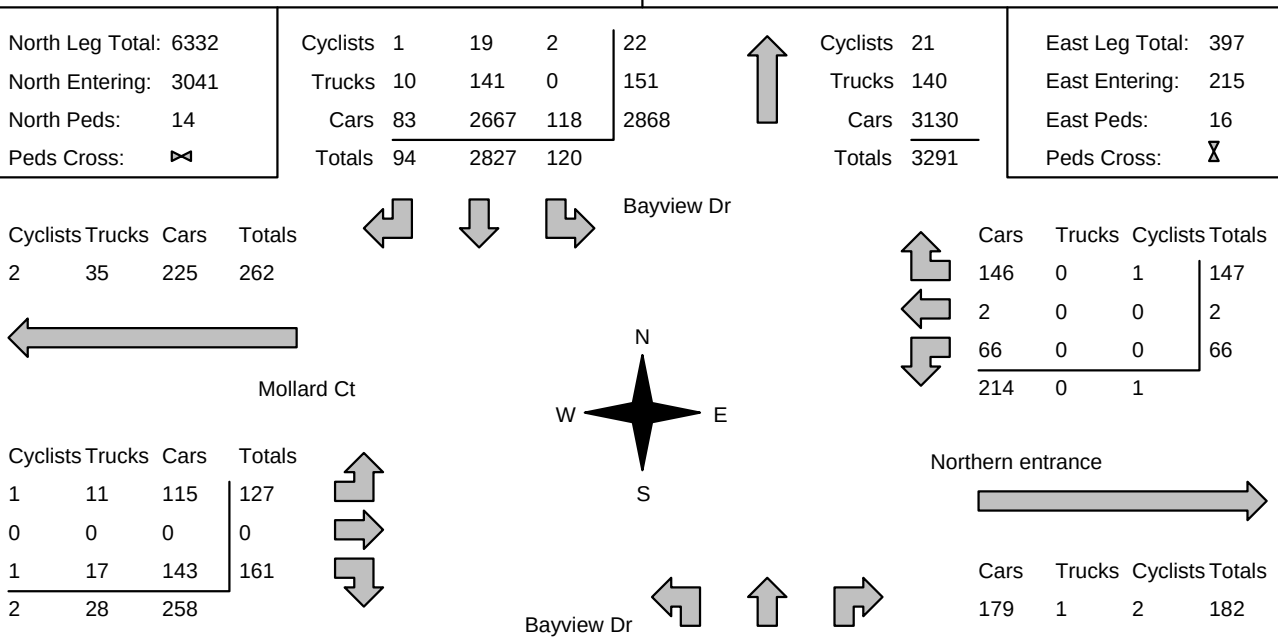
Municipality: Barrie
Site #: 1500200001
Intersection: Bayview Dr & Northern entrance
TFR File #: 1
Count date: 19-Aug-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 7:45:00
To: 8:45:00

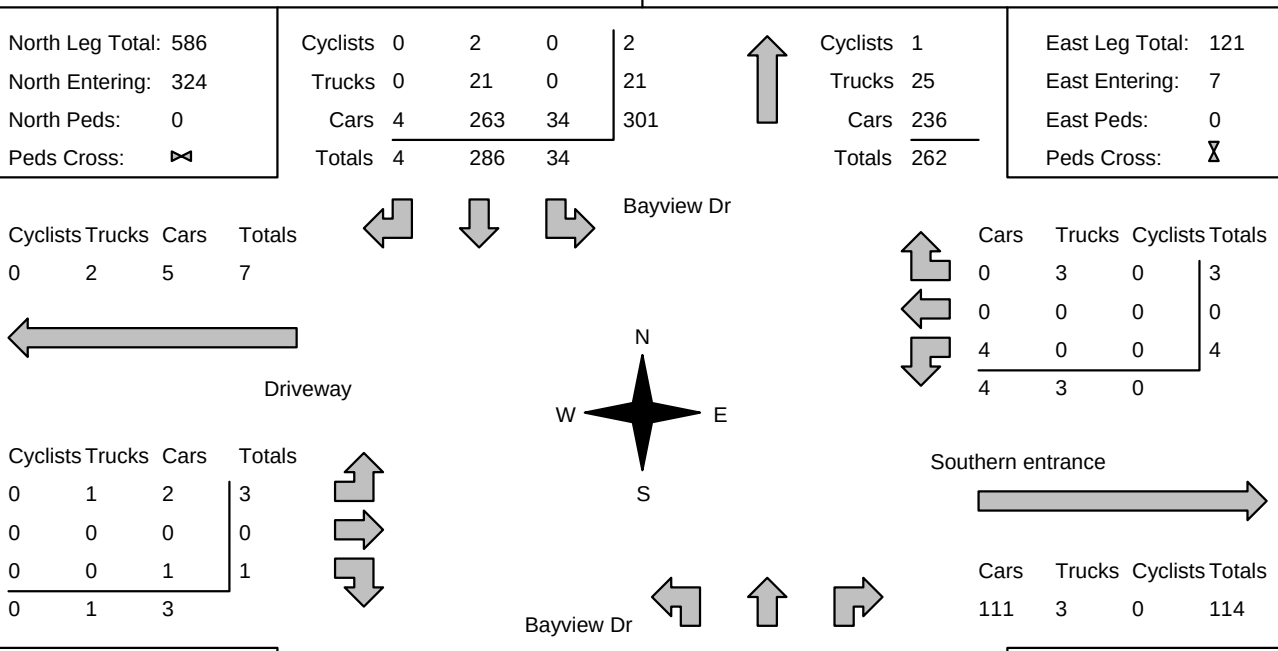
Municipality: Barrie
Site #: 1500200002
Intersection: Bayview Dr & Southern entrance
TFR File #: 1
Count date: 19-Aug-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 15:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

Municipality: Barrie
Site #: 1500200002
Intersection: Bayview Dr & Southern entrance
TFR File #: 1
Count date: 19-Aug-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S

North Leg Total: 740
North Entering: 352
North Peds: 0
Peds Cross: ⋈

Cyclists	0	1	0	1
Trucks	0	19	0	19
Cars	2	324	6	332
Totals	2	344	6	

Cyclists	1
Trucks	20
Cars	367
Totals	388

East Leg Total: 95
East Entering: 57
East Peds: 0
Peds Cross: ⧗

Bayview Dr

Cyclists	Trucks	Cars	Totals
0	1	5	6

Cars	Trucks	Cyclists	Totals
11	0	0	11
0	0	0	0
45	1	0	46
56	1	0	

Driveway

N
W E
S

Cyclists	Trucks	Cars	Totals
0	0	1	1
0	0	0	0
0	0	0	0
0	0	1	

Southern entrance

Cars	Trucks	Cyclists	Totals
37	1	0	38

Bayview Dr

Peds Cross: ⧗
West Peds: 1
West Entering: 1
West Leg Total: 7

Cars	369			
Trucks	20			
Cyclists	1			
Totals	390			

Cars	3	355	31	389
Trucks	1	20	1	22
Cyclists	0	1	0	1
Totals	4	376	32	

Peds Cross: ⋈
South Peds: 0
South Entering: 412
South Leg Total: 802

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 20:00:00

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

Municipality: Barrie
Site #: 1500200002
Intersection: Bayview Dr & Southern entrance
TFR File #: 1
Count date: 19-Aug-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

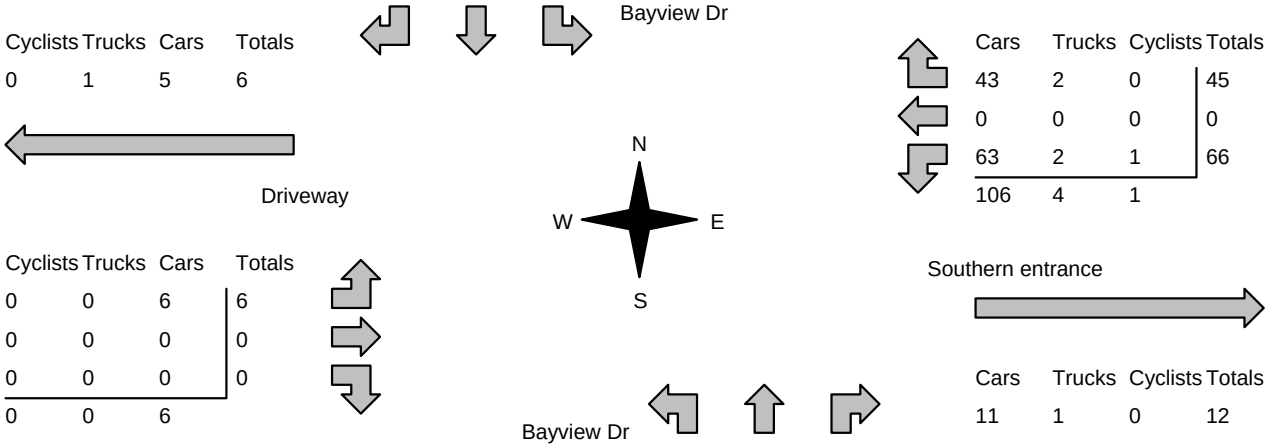
Major Road: Bayview Dr runs N/S

North Leg Total: 971
North Entering: 393
North Peds: 1
Peds Cross: ⋈

Cyclists	0	2	0	2
Trucks	0	21	1	22
Cars	4	363	2	369
Totals	4	386	3	

Cyclists	7
Trucks	10
Cars	561
Totals	578

East Leg Total: 123
East Entering: 111
East Peds: 2
Peds Cross: ⧗



Cyclists	Trucks	Cars	Totals
0	1	5	6

Cars	Trucks	Cyclists	Totals
43	2	0	45
0	0	0	0
63	2	1	66
106	4	1	

Cyclists	Trucks	Cars	Totals
0	0	6	6
0	0	0	0
0	0	0	0
0	0	6	

Cars	Trucks	Cyclists	Totals
11	1	0	12

Peds Cross: ⧗
West Peds: 0
West Entering: 6
West Leg Total: 12

Cars	426			
Trucks	23			
Cyclists	3			
Totals	452			

Cars	1	512	9	522
Trucks	1	8	0	9
Cyclists	0	7	0	7
Totals	2	527	9	

Peds Cross: ⋈
South Peds: 0
South Entering: 538
South Leg Total: 990

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Total Count Diagram

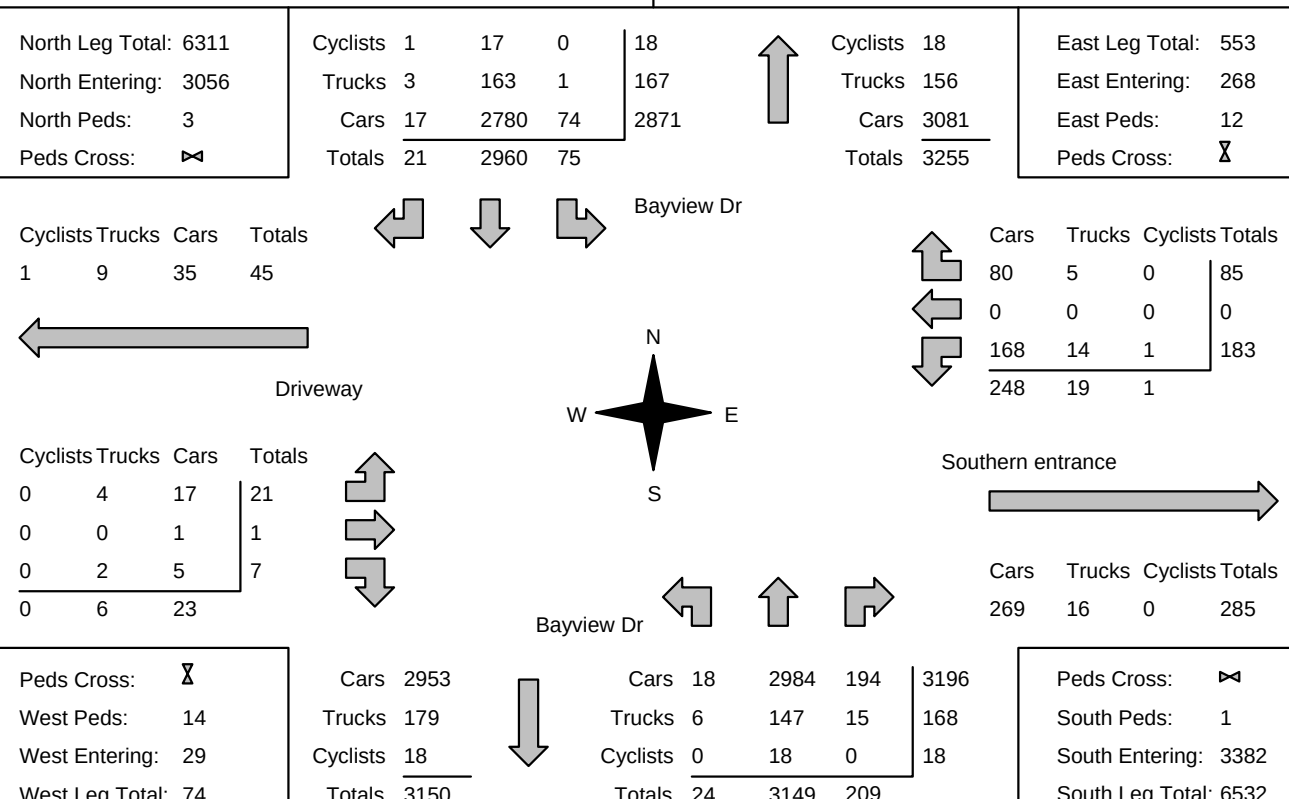
Municipality: Barrie
Site #: 1500200002
Intersection: Bayview Dr & Southern entrance
TFR File #: 1
Count date: 19-Aug-15

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Bayview Dr runs N/S



Comments

APPENDIX B:
HCM LEVEL OF SERVICE

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario L9Y 5A6
Tel: (705) 444-2565
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Web: www.cctatham.com

CAPACITY ANALYSIS AT SIGNALIZED INTERSECTIONS

Highway Capacity Manual Methodology

The capacity of signalized intersections has been determined in terms of delay taken from Chapter 9 of the Highway Capacity Manual, Special Report 209, 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	Expected Delay to Minor Street Traffic	Average Control Delay 'd' (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.	$d \leq 10$
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.	$10 \leq d \leq 20$
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 length, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	$20 \leq d \leq 35$
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.	$35 \leq d \leq 55$
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.	$55 \leq d \leq 80$
F	**LOS 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.	$d > 80$

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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, 1997.

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.

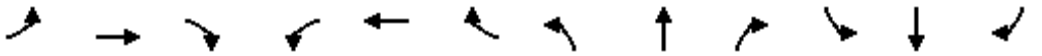
Level of Service	Expected Delay to Minor Street Traffic	Average Control Delay 'd' (sec/veh)
A	Little or no delays	$0 < d \leq 10$
B	Short traffic delays	$10 \leq d \leq 15$
C	Average traffic delays	$15 \leq d \leq 25$
D	Long traffic delays	$25 \leq d \leq 35$
E	Very long traffic delays	$35 \leq d \leq 50$
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	$d > 50$

APPENDIX C:
EXISTING OPERATIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	0	16	3	0	4	27	299	6	44	338	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	8	0	17	3	0	4	28	315	6	46	356	28
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	842	841	370	854	852	318	384			321		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	842	841	370	854	852	318	384			321		
tC, single (s)	7.2	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	97	100	97	99	100	99	97			96		
cM capacity (veh/h)	261	285	658	261	281	727	1132			1250		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	25	7	349	431
Volume Left	8	3	28	46
Volume Right	17	4	6	28
cSH	437	412	1132	1250
Volume to Capacity	0.06	0.02	0.03	0.04
Queue Length 95th (m)	1.4	0.4	0.6	0.9
Control Delay (s)	13.8	13.9	0.9	1.2
Lane LOS	B	B	A	A
Approach Delay (s)	13.8	13.9	0.9	1.2
Approach LOS	B	B		

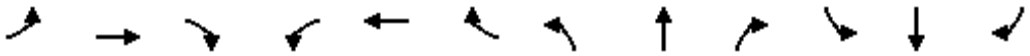
Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	41.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	323	102	88	384	198	38	195	27	116	195	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.95		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)	1552	1706		1700	1698		1700	1789	1521	1700	1756	
Flt Permitted	0.28	1.00		0.34	1.00		0.58	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	450	1706		603	1698		1036	1789	1521	787	1756	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	340	107	93	404	208	40	205	28	122	205	17
RTOR Reduction (vph)	0	11	0	0	17	0	0	0	23	0	3	0
Lane Group Flow (vph)	17	436	0	93	595	0	40	205	5	122	219	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.1	36.6		46.1	40.1		19.4	15.2	15.2	24.2	17.6	
Effective Green, g (s)	39.1	36.6		46.1	40.1		19.4	15.2	15.2	24.2	17.6	
Actuated g/C Ratio	0.46	0.43		0.55	0.48		0.23	0.18	0.18	0.29	0.21	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
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)	241	739		407	806		271	322	273	297	366	
v/s Ratio Prot	0.00	0.26		c0.02	c0.35		0.01	0.11		c0.03	c0.12	
v/s Ratio Perm	0.03			0.11			0.03		0.00	0.09		
v/c Ratio	0.07	0.59		0.23	0.74		0.15	0.64	0.02	0.41	0.60	
Uniform Delay, d1	13.4	18.2		10.4	17.9		25.6	32.0	28.5	23.3	30.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	3.4		0.3	6.0		0.3	4.1	0.0	0.9	2.6	
Delay (s)	13.5	21.6		10.6	23.9		25.9	36.1	28.5	24.2	32.8	
Level of Service	B	C		B	C		C	D	C	C	C	
Approach Delay (s)		21.3			22.1			33.8			29.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	84.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	71.8%	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 (vph)	44	155	207	148	319	17	67	84	58	42	203	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	1.00		1.00	0.94		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.98	1.00		0.93	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1611		1740	1823		1707	1625		1632	1795	
Flt Permitted	0.51	1.00		0.31	1.00		0.46	1.00		0.66	1.00	
Satd. Flow (perm)	931	1611		575	1823		830	1625		1138	1795	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	46	163	218	156	336	18	71	88	61	44	214	23
RTOR Reduction (vph)	0	58	0	0	2	0	0	30	0	0	5	0
Lane Group Flow (vph)	46	323	0	156	352	0	71	119	0	44	232	0
Confl. Peds. (#/hr)	13		23	23		13	38		52	52		38
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.0	25.8		38.2	30.0		26.9	20.7		23.1	18.8	
Effective Green, g (s)	30.0	25.8		38.2	30.0		26.9	20.7		23.1	18.8	
Actuated g/C Ratio	0.38	0.33		0.48	0.38		0.34	0.26		0.29	0.24	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	395	524		400	690		350	424		358	426	
v/s Ratio Prot	0.01	c0.20		c0.04	0.19		c0.02	0.07		0.01	c0.13	
v/s Ratio Perm	0.04			0.15			0.05			0.03		
v/c Ratio	0.12	0.62		0.39	0.51		0.20	0.28		0.12	0.55	
Uniform Delay, d1	15.7	22.5		12.8	18.9		18.2	23.3		20.4	26.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.2		0.6	0.6		0.3	1.7		0.2	5.0	
Delay (s)	15.9	24.7		13.4	19.6		18.5	25.0		20.6	31.4	
Level of Service	B	C		B	B		B	C		C	C	
Approach Delay (s)		23.7			17.7			22.9			29.7	
Approach LOS		C			B			C			C	

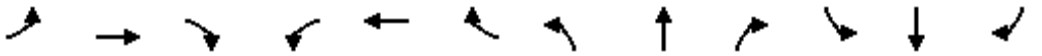
Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	319	72	73	617	23	31	27	48	6	16	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.99			0.94			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1623	1725		1700	1815			1634			1595	
Flt Permitted	0.34	1.00		0.52	1.00			0.88			0.94	
Satd. Flow (perm)	582	1725		932	1815			1465			1510	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	336	76	77	649	24	33	28	51	6	17	24
RTOR Reduction (vph)	0	10	0	0	1	0	0	44	0	0	21	0
Lane Group Flow (vph)	78	402	0	77	672	0	0	68	0	0	26	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	36.2	36.2		36.2	36.2			8.2			8.2	
Effective Green, g (s)	36.2	36.2		36.2	36.2			8.2			8.2	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.15			0.15	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	373	1107		598	1164			212			219	
v/s Ratio Prot		0.23			c0.37							
v/s Ratio Perm	0.13			0.08				c0.05			0.02	
v/c Ratio	0.21	0.36		0.13	0.58			0.32			0.12	
Uniform Delay, d1	4.2	4.7		3.9	5.7			21.6			21.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.3	0.9		0.4	2.1			0.9			0.2	
Delay (s)	5.4	5.6		4.4	7.8			22.5			21.2	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		5.6			7.5			22.5			21.2	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	277	67	124	587	73	90	138	72	40	169	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1716	1767		1733	1824	1566	1716	1719		1733	1742	
Flt Permitted	0.33	1.00		0.54	1.00	1.00	0.62	1.00		0.62	1.00	
Satd. Flow (perm)	588	1767		994	1824	1566	1126	1719		1131	1742	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	292	71	131	618	77	95	145	76	42	178	38
RTOR Reduction (vph)	0	14	0	0	0	37	0	39	0	0	16	0
Lane Group Flow (vph)	32	349	0	131	618	40	95	182	0	42	200	0
Heavy Vehicles (%)	4%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	26.0	26.0		26.0	26.0	26.0	11.6	11.6		11.6	11.6	
Effective Green, g (s)	26.0	26.0		26.0	26.0	26.0	11.6	11.6		11.6	11.6	
Actuated g/C Ratio	0.52	0.52		0.52	0.52	0.52	0.23	0.23		0.23	0.23	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
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)	308	926		521	956	820	263	402		264	407	
v/s Ratio Prot		0.20			c0.34			0.11			c0.11	
v/s Ratio Perm	0.05			0.13		0.03	0.08			0.04		
v/c Ratio	0.10	0.38		0.25	0.65	0.05	0.36	0.45		0.16	0.49	
Uniform Delay, d1	5.9	7.0		6.5	8.5	5.8	15.9	16.3		15.1	16.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.2		1.2	3.4	0.1	0.8	0.8		0.3	0.9	
Delay (s)	6.6	8.2		7.6	11.9	5.9	16.7	17.1		15.4	17.4	
Level of Service	A	A		A	B	A	B	B		B	B	
Approach Delay (s)		8.0			10.6			17.0			17.1	
Approach LOS		A			B			B			B	

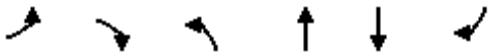
Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	3	329	80	34	323
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	3	346	84	36	340
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	800	388			431	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	800	388			431	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	99	100			97	
cM capacity (veh/h)	336	649			1140	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	431	376
Volume Left	4	0	36
Volume Right	3	84	0
cSH	424	1700	1140
Volume to Capacity	0.02	0.25	0.03
Queue Length 95th (m)	0.4	0.0	0.7
Control Delay (s)	13.6	0.0	1.1
Lane LOS	B		A
Approach Delay (s)	13.6	0.0	1.1
Approach LOS	B		

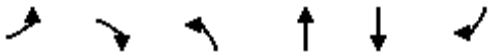
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	51	63	40	158	454	108
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	54	66	42	166	478	114
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					166	
pX, platoon unblocked						
vC, conflicting volume	785	535	592			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	785	535	592			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	84	88	96			
cM capacity (veh/h)	339	536	960			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	120	208	592
Volume Left	54	42	0
Volume Right	66	0	114
cSH	425	960	1700
Volume to Capacity	0.28	0.04	0.35
Queue Length 95th (m)	8.6	1.0	0.0
Control Delay (s)	16.8	2.1	0.0
Lane LOS	C	A	
Approach Delay (s)	16.8	2.1	0.0
Approach LOS	C		

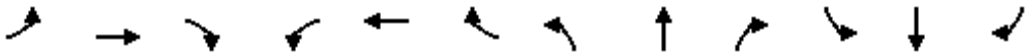
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	23	92	88	175	479	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	97	93	184	504	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					292	
pX, platoon unblocked						
vC, conflicting volume	894	524	544			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	894	524	544			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	91	82	91			
cM capacity (veh/h)	277	543	1000			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	121	277	544
Volume Left	24	93	0
Volume Right	97	0	40
cSH	456	1000	1700
Volume to Capacity	0.27	0.09	0.32
Queue Length 95th (m)	7.9	2.3	0.0
Control Delay (s)	15.7	3.6	0.0
Lane LOS	C	A	
Approach Delay (s)	15.7	3.6	0.0
Approach LOS	C		

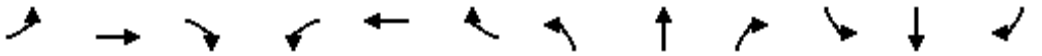
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	34	0	27	13	2	59	6	430	9	6	263	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	36	0	28	14	2	62	6	453	9	6	277	5
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	825	767	279	791	765	457	282			462		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	825	767	279	791	765	457	282			462		
tC, single (s)	7.2	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	86	100	96	95	99	90	99			99		
cM capacity (veh/h)	250	331	741	296	332	608	1236			1110		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	64	78	468	288
Volume Left	36	14	6	6
Volume Right	28	62	9	5
cSH	354	503	1236	1110
Volume to Capacity	0.18	0.15	0.01	0.01
Queue Length 95th (m)	4.9	4.1	0.1	0.1
Control Delay (s)	17.4	13.5	0.2	0.2
Lane LOS	C	B	A	A
Approach Delay (s)	17.4	13.5	0.2	0.2
Approach LOS	C	B		

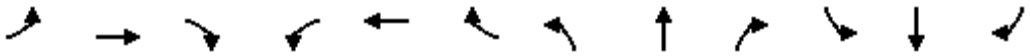
Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	41.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	398	54	85	453	122	216	308	101	157	188	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1552	1747		1700	1733		1700	1789	1521	1700	1746	
Flt Permitted	0.27	1.00		0.27	1.00		0.48	1.00	1.00	0.29	1.00	
Satd. Flow (perm)	434	1747		490	1733		861	1789	1521	512	1746	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	419	57	89	477	128	227	324	106	165	198	22
RTOR Reduction (vph)	0	5	0	0	9	0	0	0	84	0	5	0
Lane Group Flow (vph)	9	471	0	89	596	0	227	324	22	165	215	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	35.9	34.6		44.8	39.5		27.3	18.3	18.3	26.5	17.9	
Effective Green, g (s)	35.9	34.6		44.8	39.5		27.3	18.3	18.3	26.5	17.9	
Actuated g/C Ratio	0.41	0.39		0.51	0.45		0.31	0.21	0.21	0.30	0.20	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
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)	194	689		335	780		354	373	317	271	356	
v/s Ratio Prot	0.00	0.27		c0.02	c0.34		c0.07	c0.18		0.06	0.12	
v/s Ratio Perm	0.02			0.12			0.13		0.01	0.12		
v/c Ratio	0.05	0.68		0.27	0.76		0.64	0.87	0.07	0.61	0.60	
Uniform Delay, d1	16.4	22.0		12.9	20.2		24.2	33.5	27.9	24.2	31.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	5.4		0.4	7.0		3.9	18.8	0.1	3.8	2.9	
Delay (s)	16.5	27.5		13.4	27.2		28.2	52.3	28.0	28.0	34.6	
Level of Service	B	C		B	C		C	D	C	C	C	
Approach Delay (s)		27.3			25.4			40.1			31.8	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	87.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

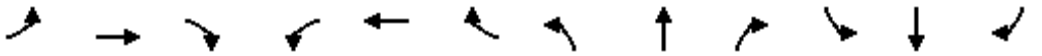
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	283	64	62	244	43	207	282	86	83	143	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.98		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)	1725	1770		1742	1783		1726	1745		1734	1781	
Flt Permitted	0.52	1.00		0.30	1.00		0.57	1.00		0.39	1.00	
Satd. Flow (perm)	942	1770		543	1783		1040	1745		712	1781	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	23	298	67	65	257	45	218	297	91	87	151	29
RTOR Reduction (vph)	0	8	0	0	7	0	0	12	0	0	8	0
Lane Group Flow (vph)	23	357	0	65	295	0	218	376	0	87	172	0
Confl. Peds. (#/hr)	17		17	17		17	13		21	21		13
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.7	26.0		35.5	29.4		39.4	30.5		34.2	27.9	
Effective Green, g (s)	28.7	26.0		35.5	29.4		39.4	30.5		34.2	27.9	
Actuated g/C Ratio	0.32	0.29		0.40	0.33		0.44	0.34		0.38	0.31	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	327	517		299	589		529	598		346	558	
v/s Ratio Prot	0.00	c0.20		c0.01	0.17		c0.04	c0.22		0.02	0.10	
v/s Ratio Perm	0.02			0.07			0.14			0.08		
v/c Ratio	0.07	0.69		0.22	0.50		0.41	0.63		0.25	0.31	
Uniform Delay, d1	20.7	27.9		17.7	23.9		15.9	24.5		18.1	23.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.8		0.4	0.7		0.5	5.0		0.4	1.4	
Delay (s)	20.8	31.7		18.1	24.5		16.4	29.4		18.4	24.6	
Level of Service	C	C		B	C		B	C		B	C	
Approach Delay (s)		31.1			23.4			24.7			22.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

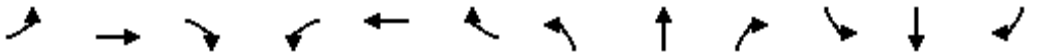
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	557	56	63	455	44	105	29	205	43	34	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.92			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1623	1757		1700	1802			1616			1587	
Flt Permitted	0.39	1.00		0.29	1.00			0.85			0.82	
Satd. Flow (perm)	660	1757		515	1802			1398			1318	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	586	59	66	479	46	111	31	216	45	36	105
RTOR Reduction (vph)	0	5	0	0	5	0	0	100	0	0	77	0
Lane Group Flow (vph)	45	640	0	66	520	0	0	258	0	0	109	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.1	28.1		28.1	28.1			14.6			14.6	
Effective Green, g (s)	28.1	28.1		28.1	28.1			14.6			14.6	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.27			0.27	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	339	902		264	925			373			351	
v/s Ratio Prot		c0.36			0.29							
v/s Ratio Perm	0.07			0.13				c0.18			0.08	
v/c Ratio	0.13	0.71		0.25	0.56			0.69			0.31	
Uniform Delay, d1	6.9	10.2		7.4	9.1			18.0			16.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.8	4.7		2.3	2.5			5.4			0.5	
Delay (s)	7.8	14.9		9.7	11.6			23.5			16.5	
Level of Service	A	B		A	B			C			B	
Approach Delay (s)		14.4			11.3			23.5			16.5	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
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)	88	642	76	97	413	72	107	299	251	86	186	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1716	1793		1733	1824	1566	1716	1690		1733	1740	
Flt Permitted	0.43	1.00		0.15	1.00	1.00	0.59	1.00		0.19	1.00	
Satd. Flow (perm)	781	1793		282	1824	1566	1070	1690		338	1740	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	93	676	80	102	435	76	113	315	264	91	196	44
RTOR Reduction (vph)	0	7	0	0	0	40	0	47	0	0	13	0
Lane Group Flow (vph)	93	749	0	102	435	36	113	532	0	91	227	0
Heavy Vehicles (%)	4%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	31.0	31.0		31.0	31.0	31.0	21.6	21.6		21.6	21.6	
Effective Green, g (s)	31.0	31.0		31.0	31.0	31.0	21.6	21.6		21.6	21.6	
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
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)	374	860		135	875	751	357	565		113	581	
v/s Ratio Prot		c0.42			0.24			c0.31			0.13	
v/s Ratio Perm	0.12			0.36		0.02	0.11			0.27		
v/c Ratio	0.25	0.87		0.76	0.50	0.05	0.32	0.94		0.81	0.39	
Uniform Delay, d1	9.9	15.0		13.7	11.5	8.9	16.0	20.9		19.6	16.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	11.8		31.9	2.0	0.1	0.5	24.3		32.6	0.4	
Delay (s)	11.5	26.8		45.6	13.5	9.1	16.5	45.2		52.2	16.9	
Level of Service	B	C		D	B	A	B	D		D	B	
Approach Delay (s)		25.1			18.3			40.5			26.6	
Approach LOS		C			B			D			C	

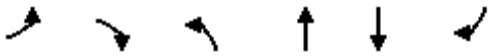
Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	117.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	66	45	400	9	3	300
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	69	47	421	9	3	316
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	748	426			431	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	748	426			431	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	81	92			100	
cM capacity (veh/h)	372	618			1140	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	117	431	319
Volume Left	69	0	3
Volume Right	47	9	0
cSH	443	1700	1140
Volume to Capacity	0.26	0.25	0.00
Queue Length 95th (m)	7.8	0.0	0.1
Control Delay (s)	16.0	0.0	0.1
Lane LOS	C		A
Approach Delay (s)	16.0	0.0	0.1
Approach LOS	C		

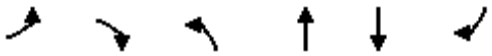
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	35	34	566	247	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	37	36	596	260	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)					166	
pX, platoon unblocked						
vC, conflicting volume	939	272	283			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	939	272	283			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	96	95	97			
cM capacity (veh/h)	279	755	1251			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	47	632	283
Volume Left	11	36	0
Volume Right	37	0	23
cSH	547	1251	1700
Volume to Capacity	0.09	0.03	0.17
Queue Length 95th (m)	2.1	0.7	0.0
Control Delay (s)	12.2	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	12.2	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

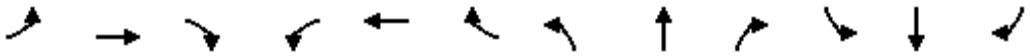


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	49	70	596	281	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	52	74	627	296	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					292	
pX, platoon unblocked						
vC, conflicting volume	1071	296	297			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1071	296	297			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	98	93	94			
cM capacity (veh/h)	225	731	1236			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	56	701	297
Volume Left	4	74	0
Volume Right	52	0	1
cSH	625	1236	1700
Volume to Capacity	0.09	0.06	0.17
Queue Length 95th (m)	2.2	1.4	0.0
Control Delay (s)	11.3	1.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.3	1.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

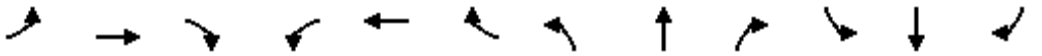
APPENDIX D:
FUTURE OPERATIONS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	0	16	3	0	4	27	351	6	44	382	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	8	0	17	3	0	4	28	369	6	46	402	28
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	943	942	416	955	953	373	431			376		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	943	942	416	955	953	373	431			376		
tC, single (s)	7.2	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	96	100	97	99	100	99	97			96		
cM capacity (veh/h)	222	248	620	222	245	678	1088			1194		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	25	7	404	477
Volume Left	8	3	28	46
Volume Right	17	4	6	28
cSH	388	361	1088	1194
Volume to Capacity	0.07	0.02	0.03	0.04
Queue Length 95th (m)	1.6	0.5	0.6	0.9
Control Delay (s)	14.9	15.2	0.9	1.2
Lane LOS	B	C	A	A
Approach Delay (s)	14.9	15.2	0.9	1.2
Approach LOS	B	C		

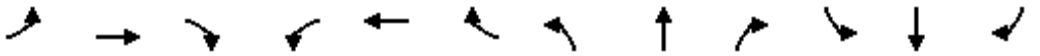
Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	44.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	746	195	72	1000	217	51	160	22	126	160	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1552	1717		1700	1742		1700	1789	1521	1700	1643	
Flt Permitted	0.06	1.00		0.06	1.00		0.32	1.00	1.00	0.43	1.00	
Satd. Flow (perm)	101	1717		111	1742		571	1789	1521	763	1643	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	88	785	205	76	1053	228	54	168	23	133	168	88
RTOR Reduction (vph)	0	8	0	0	6	0	0	0	20	0	15	0
Lane Group Flow (vph)	88	982	0	76	1275	0	54	168	3	133	241	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	71.1	64.7		70.5	64.4		23.2	16.7	16.7	27.8	19.0	
Effective Green, g (s)	71.1	64.7		70.5	64.4		23.2	16.7	16.7	27.8	19.0	
Actuated g/C Ratio	0.61	0.56		0.61	0.55		0.20	0.14	0.14	0.24	0.16	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
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)	141	955		150	964		177	256	218	253	268	
v/s Ratio Prot	c0.03	0.57		0.03	c0.73		0.02	0.09		c0.04	c0.15	
v/s Ratio Perm	0.35			0.28			0.04		0.00	0.09		
v/c Ratio	0.62	1.03		0.51	1.32		0.31	0.66	0.02	0.53	0.90	
Uniform Delay, d1	26.1	25.8		24.5	25.9		38.8	47.1	42.7	36.7	47.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.3	36.7		2.7	152.4		1.0	5.9	0.0	2.0	29.8	
Delay (s)	34.4	62.5		27.2	178.3		39.7	53.0	42.8	38.7	77.5	
Level of Service	C	E		C	F		D	D	D	D	E	
Approach Delay (s)		60.2			169.8			49.1			64.2	
Approach LOS		E			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	108.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	116.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		

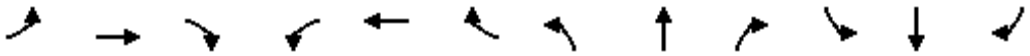
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	170	226	162	348	19	73	92	63	46	222	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	1.00		1.00	0.94		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.98	1.00		0.93	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1737	1611		1743	1823		1713	1628		1636	1796	
Flt Permitted	0.47	1.00		0.27	1.00		0.43	1.00		0.65	1.00	
Satd. Flow (perm)	851	1611		499	1823		769	1628		1126	1796	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	51	179	238	171	366	20	77	97	66	48	234	25
RTOR Reduction (vph)	0	57	0	0	2	0	0	30	0	0	5	0
Lane Group Flow (vph)	51	360	0	171	384	0	77	133	0	48	254	0
Confl. Peds. (#/hr)	13		23	23		13	38		52	52		38
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.1	25.8		38.3	30.0		26.9	20.7		23.3	18.9	
Effective Green, g (s)	30.1	25.8		38.3	30.0		26.9	20.7		23.3	18.9	
Actuated g/C Ratio	0.38	0.32		0.48	0.38		0.34	0.26		0.29	0.24	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	370	523		373	688		334	424		358	427	
v/s Ratio Prot	0.01	c0.22		c0.05	0.21		c0.02	0.08		0.01	c0.14	
v/s Ratio Perm	0.04			0.17			0.06			0.03		
v/c Ratio	0.14	0.69		0.46	0.56		0.23	0.31		0.13	0.60	
Uniform Delay, d1	15.8	23.3		13.3	19.5		18.4	23.6		20.4	26.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	3.7		0.9	1.0		0.4	1.9		0.2	6.0	
Delay (s)	16.0	27.0		14.2	20.5		18.8	25.6		20.6	32.9	
Level of Service	B	C		B	C		B	C		C	C	
Approach Delay (s)		25.8			18.5			23.4			31.0	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

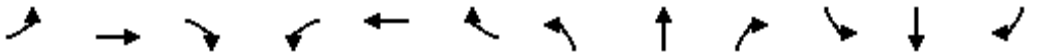
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	735	79	80	1230	25	34	29	53	7	18	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.94			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1623	1755		1700	1819			1634			1598	
Flt Permitted	0.07	1.00		0.28	1.00			0.90			0.95	
Satd. Flow (perm)	119	1755		504	1819			1489			1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	774	83	84	1295	26	36	31	56	7	19	26
RTOR Reduction (vph)	0	3	0	0	0	0	0	26	0	0	23	0
Lane Group Flow (vph)	85	854	0	84	1321	0	0	97	0	0	29	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	92.8	92.8		92.8	92.8			13.3			13.3	
Effective Green, g (s)	92.8	92.8		92.8	92.8			13.3			13.3	
Actuated g/C Ratio	0.79	0.79		0.79	0.79			0.11			0.11	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	93	1379		396	1429			167			172	
v/s Ratio Prot		0.49			c0.73							
v/s Ratio Perm	0.72			0.17				c0.07			0.02	
v/c Ratio	0.91	0.62		0.21	0.92			0.58			0.17	
Uniform Delay, d1	9.6	5.3		3.3	9.9			49.8			47.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	71.9	2.1		1.2	11.5			5.1			0.5	
Delay (s)	81.6	7.4		4.5	21.4			54.9			47.9	
Level of Service	F	A		A	C			D			D	
Approach Delay (s)		14.1			20.4			54.9			47.9	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	118.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.6%	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 (vph)	95	571	129	101	1121	80	98	113	59	44	139	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1716	1770		1733	1824	1566	1716	1719		1733	1668	
Flt Permitted	0.08	1.00		0.31	1.00	1.00	0.31	1.00		0.51	1.00	
Satd. Flow (perm)	136	1770		557	1824	1566	555	1719		935	1668	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	601	136	106	1180	84	103	119	62	46	146	121
RTOR Reduction (vph)	0	7	0	0	0	24	0	17	0	0	27	0
Lane Group Flow (vph)	100	730	0	106	1180	60	103	164	0	46	240	0
Heavy Vehicles (%)	4%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	78.0	78.0		78.0	78.0	78.0	20.0	20.0		20.0	20.0	
Effective Green, g (s)	78.0	78.0		78.0	78.0	78.0	20.0	20.0		20.0	20.0	
Actuated g/C Ratio	0.71	0.71		0.71	0.71	0.71	0.18	0.18		0.18	0.18	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
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)	96	1255		394	1293	1110	100	312		170	303	
v/s Ratio Prot		0.41			0.65			0.10			0.14	
v/s Ratio Perm	c0.74			0.19		0.04	c0.19			0.05		
v/c Ratio	1.04	0.58		0.27	0.91	0.05	1.03	0.53		0.27	0.79	
Uniform Delay, d1	16.0	7.9		5.8	13.2	4.8	45.0	40.7		38.7	43.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	103.6	2.0		1.7	11.3	0.1	98.3	1.6		0.9	13.2	
Delay (s)	119.6	9.9		7.4	24.5	4.9	143.3	42.3		39.6	56.2	
Level of Service	F	A		A	C	A	F	D		D	E	
Approach Delay (s)		23.0			22.0			78.9			53.8	
Approach LOS		C			C			E			D	

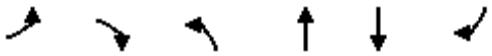
Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	121.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	3	381	80	34	367
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	3	401	84	36	386
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	901	443			485	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	901	443			485	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	99	99			97	
cM capacity (veh/h)	292	604			1088	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	485	422
Volume Left	4	0	36
Volume Right	3	84	0
cSH	375	1700	1088
Volume to Capacity	0.02	0.29	0.03
Queue Length 95th (m)	0.4	0.0	0.8
Control Delay (s)	14.8	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	14.8	0.0	1.0
Approach LOS	B		

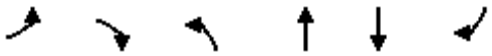
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	51	63	40	178	506	104
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	54	66	42	187	533	109
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					166	
pX, platoon unblocked						
vC, conflicting volume	859	587	642			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	859	587	642			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	82	87	95			
cM capacity (veh/h)	306	500	919			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	120	229	642
Volume Left	54	42	0
Volume Right	66	0	109
cSH	389	919	1700
Volume to Capacity	0.31	0.05	0.38
Queue Length 95th (m)	9.7	1.1	0.0
Control Delay (s)	18.3	2.1	0.0
Lane LOS	C	A	
Approach Delay (s)	18.3	2.1	0.0
Approach LOS	C		

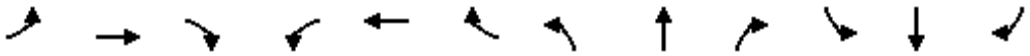
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	23	92	88	195	531	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	97	93	205	559	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					292	
pX, platoon unblocked						
vC, conflicting volume	969	579	599			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	969	579	599			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	90	81	90			
cM capacity (veh/h)	248	506	954			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	121	298	599
Volume Left	24	93	0
Volume Right	97	0	40
cSH	419	954	1700
Volume to Capacity	0.29	0.10	0.35
Queue Length 95th (m)	8.9	2.4	0.0
Control Delay (s)	17.0	3.6	0.0
Lane LOS	C	A	
Approach Delay (s)	17.0	3.6	0.0
Approach LOS	C		

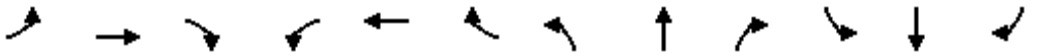
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	2	59	34	0	27	6	482	9	6	315	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	2	62	36	0	28	6	507	9	6	332	5
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	900	876	334	935	874	512	337			517		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	900	876	334	935	874	512	337			517		
tC, single (s)	7.2	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	94	99	91	84	100	95	99			99		
cM capacity (veh/h)	236	286	690	222	287	566	1179			1059		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	78	64	523	343
Volume Left	14	36	6	6
Volume Right	62	28	9	5
cSH	502	304	1179	1059
Volume to Capacity	0.16	0.21	0.01	0.01
Queue Length 95th (m)	4.1	5.9	0.1	0.1
Control Delay (s)	13.5	20.0	0.2	0.2
Lane LOS	B	C	A	A
Approach Delay (s)	13.5	20.0	0.2	0.2
Approach LOS	B	C		

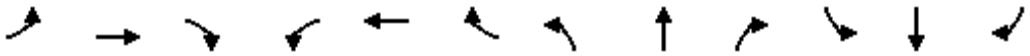
Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	44.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	102	1007	103	70	1066	134	320	252	83	171	154	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1552	1757		1700	1759		1700	1789	1521	1700	1631	
Flt Permitted	0.06	1.00		0.07	1.00		0.21	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	106	1757		120	1759		369	1789	1521	684	1631	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	1060	108	74	1122	141	337	265	87	180	162	97
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	70	0	18	0
Lane Group Flow (vph)	107	1165	0	74	1259	0	337	265	17	180	241	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	70.3	61.9		66.1	59.8		35.9	22.9	22.9	27.9	18.9	
Effective Green, g (s)	70.3	61.9		66.1	59.8		35.9	22.9	22.9	27.9	18.9	
Actuated g/C Ratio	0.59	0.52		0.55	0.50		0.30	0.19	0.19	0.23	0.16	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
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)	163	905		148	875		254	341	290	235	256	
v/s Ratio Prot	c0.05	0.66		0.03	c0.72		c0.14	0.15		0.06	0.15	
v/s Ratio Perm	0.34			0.25			c0.25		0.01	0.12		
v/c Ratio	0.66	1.29		0.50	1.44		1.33	0.78	0.06	0.77	0.94	
Uniform Delay, d1	26.4	29.1		26.2	30.1		37.7	46.2	39.8	41.0	50.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.2	137.7		2.6	204.3		171.7	10.6	0.1	13.8	40.6	
Delay (s)	35.6	166.8		28.9	234.4		209.3	56.8	39.8	54.8	90.7	
Level of Service	D	F		C	F		F	E	D	D	F	
Approach Delay (s)		155.8			223.0			129.3			76.0	
Approach LOS		F			F			F			E	

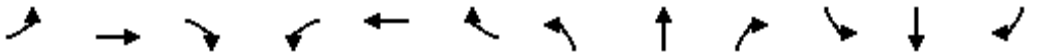
Intersection Summary			
HCM 2000 Control Delay	165.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	120.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	118.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	310	70	68	266	47	226	309	94	91	156	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.97		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)	1729	1769		1745	1783		1731	1746		1736	1779	
Flt Permitted	0.48	1.00		0.26	1.00		0.51	1.00		0.36	1.00	
Satd. Flow (perm)	880	1769		469	1783		924	1746		662	1779	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	326	74	72	280	49	238	325	99	96	164	33
RTOR Reduction (vph)	0	9	0	0	7	0	0	11	0	0	8	0
Lane Group Flow (vph)	25	391	0	72	322	0	238	413	0	96	189	0
Confl. Peds. (#/hr)	17		17	17		17	13		21	21		13
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.9	26.2		35.9	29.7		40.1	29.7		31.4	25.0	
Effective Green, g (s)	28.9	26.2		35.9	29.7		40.1	29.7		31.4	25.0	
Actuated g/C Ratio	0.33	0.30		0.41	0.34		0.45	0.34		0.35	0.28	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	313	523		279	598		519	585		312	502	
v/s Ratio Prot	0.00	c0.22		c0.02	0.18		c0.06	c0.24		0.02	0.11	
v/s Ratio Perm	0.02			0.09			0.15			0.09		
v/c Ratio	0.08	0.75		0.26	0.54		0.46	0.71		0.31	0.38	
Uniform Delay, d1	20.4	28.2		17.7	23.8		15.6	25.6		19.8	25.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	5.8		0.5	0.9		0.6	7.0		0.6	2.2	
Delay (s)	20.6	33.9		18.2	24.8		16.2	32.6		20.4	27.6	
Level of Service	C	C		B	C		B	C		C	C	
Approach Delay (s)		33.1			23.6			26.7			25.3	
Approach LOS		C			C			C			C	

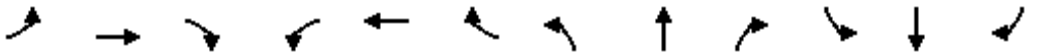
Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	88.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1153	61	69	1045	48	115	32	224	47	37	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.92			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1623	1772		1700	1813			1616			1586	
Flt Permitted	0.06	1.00		0.06	1.00			0.77			0.74	
Satd. Flow (perm)	107	1772		112	1813			1257			1195	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	49	1214	64	73	1100	51	121	34	236	49	39	115
RTOR Reduction (vph)	0	2	0	0	2	0	0	55	0	0	47	0
Lane Group Flow (vph)	49	1276	0	73	1149	0	0	336	0	0	156	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	64.0	64.0		64.0	64.0			24.0			24.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0			24.0			24.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.24			0.24	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	68	1134		71	1160			301			286	
v/s Ratio Prot		c0.72			0.63							
v/s Ratio Perm	0.46			0.65				c0.27			0.13	
v/c Ratio	0.72	1.13		1.03	0.99			1.12			0.55	
Uniform Delay, d1	12.0	18.0		18.0	17.7			38.0			33.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	49.1	68.2		114.8	24.3			87.2			2.1	
Delay (s)	61.1	86.2		132.8	42.0			125.2			35.3	
Level of Service	E	F		F	D			F			D	
Approach Delay (s)		85.3			47.4			125.2			35.3	
Approach LOS		F			D			F			D	

Intersection Summary			
HCM 2000 Control Delay	72.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.4%	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)	250	1028	146	79	913	79	117	245	206	93	153	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.93		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1716	1788		1733	1824	1566	1716	1690		1733	1665	
Flt Permitted	0.14	1.00		0.07	1.00	1.00	0.36	1.00		0.19	1.00	
Satd. Flow (perm)	250	1788		128	1824	1566	655	1690		347	1665	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	1082	154	83	961	83	123	258	217	98	161	139
RTOR Reduction (vph)	0	6	0	0	0	30	0	34	0	0	35	0
Lane Group Flow (vph)	263	1230	0	83	961	53	123	441	0	98	266	0
Heavy Vehicles (%)	4%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	57.0	57.0		57.0	57.0	57.0	21.0	21.0		21.0	21.0	
Effective Green, g (s)	57.0	57.0		57.0	57.0	57.0	21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.63	0.63		0.63	0.63	0.63	0.23	0.23		0.23	0.23	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
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)	158	1132		81	1155	991	152	394		80	388	
v/s Ratio Prot		0.69			0.53			0.26			0.16	
v/s Ratio Perm	c1.05			0.65		0.03	0.19			c0.28		
v/c Ratio	1.66	1.09		1.02	0.83	0.05	0.81	1.12		1.23	0.68	
Uniform Delay, d1	16.5	16.5		16.5	12.8	6.3	32.6	34.5		34.5	31.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	325.3	53.5		106.9	7.1	0.1	26.2	82.0		173.0	4.9	
Delay (s)	341.8	70.0		123.4	19.8	6.4	58.8	116.5		207.5	36.4	
Level of Service	F	E		F	B	A	E	F		F	D	
Approach Delay (s)		117.7			26.5			104.7			78.5	
Approach LOS		F			C			F			E	

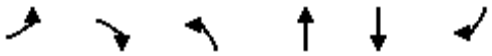
Intersection Summary			
HCM 2000 Control Delay	82.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	136.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	66	45	452	9	3	352
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	69	47	476	9	3	371
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	857	481			485	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	857	481			485	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	78	92			100	
cM capacity (veh/h)	320	575			1088	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	117	485	374
Volume Left	69	0	3
Volume Right	47	9	0
cSH	390	1700	1088
Volume to Capacity	0.30	0.29	0.00
Queue Length 95th (m)	9.3	0.0	0.1
Control Delay (s)	18.1	0.0	0.1
Lane LOS	C		A
Approach Delay (s)	18.1	0.0	0.1
Approach LOS	C		

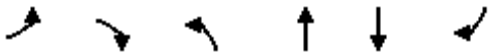
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	35	34	619	272	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	37	36	652	286	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)					166	
pX, platoon unblocked						
vC, conflicting volume	1021	298	309			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1021	298	309			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	96	95	97			
cM capacity (veh/h)	249	730	1223			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	47	687	309
Volume Left	11	36	0
Volume Right	37	0	23
cSH	510	1223	1700
Volume to Capacity	0.09	0.03	0.18
Queue Length 95th (m)	2.3	0.7	0.0
Control Delay (s)	12.8	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	12.8	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	49	70	649	306	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	52	74	683	322	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)					292	
pX, platoon unblocked						
vC, conflicting volume	1153	323	323			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1153	323	323			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	98	93	94			
cM capacity (veh/h)	200	707	1209			

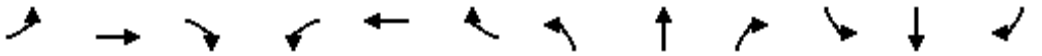
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	56	757	323
Volume Left	4	74	0
Volume Right	52	0	1
cSH	594	1209	1700
Volume to Capacity	0.09	0.06	0.19
Queue Length 95th (m)	2.3	1.5	0.0
Control Delay (s)	11.7	1.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	1.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	67.5%	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 (veh/h)	8	0	16	3	0	4	27	425	6	44	441	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	8	0	17	3	0	4	28	447	6	46	464	28
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	1083	1082	478	1095	1093	451	493			454		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1083	1082	478	1095	1093	451	493			454		
tC, single (s)	7.2	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	95	100	97	98	100	99	97			96		
cM capacity (veh/h)	177	205	571	177	201	613	1031			1118		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	25	7	482	539
Volume Left	8	3	28	46
Volume Right	17	4	6	28
cSH	328	299	1031	1118
Volume to Capacity	0.08	0.02	0.03	0.04
Queue Length 95th (m)	1.9	0.6	0.6	1.0
Control Delay (s)	16.9	17.4	0.8	1.2
Lane LOS	C	C	A	A
Approach Delay (s)	16.9	17.4	0.8	1.2
Approach LOS	C	C		

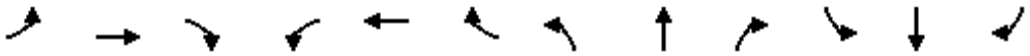
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	866	226	84	1160	251	60	185	26	147	185	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1552	1717		1700	1742		1700	1789	1521	1700	1643	
Flt Permitted	0.06	1.00		0.06	1.00		0.22	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	99	1717		112	1742		398	1789	1521	659	1643	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	103	912	238	88	1221	264	63	195	27	155	195	103
RTOR Reduction (vph)	0	7	0	0	7	0	0	0	23	0	16	0
Lane Group Flow (vph)	103	1143	0	88	1478	0	63	195	4	155	282	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	74.0	65.7		70.2	63.8		24.8	18.0	18.0	29.2	20.2	
Effective Green, g (s)	74.0	65.7		70.2	63.8		24.8	18.0	18.0	29.2	20.2	
Actuated g/C Ratio	0.62	0.55		0.59	0.54		0.21	0.15	0.15	0.25	0.17	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
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)	162	947		151	933		157	270	229	240	278	
v/s Ratio Prot	c0.04	0.67		0.03	c0.85		0.02	0.11		c0.05	c0.17	
v/s Ratio Perm	0.35			0.31			0.06		0.00	0.11		
v/c Ratio	0.64	1.21		0.58	1.58		0.40	0.72	0.02	0.65	1.02	
Uniform Delay, d1	27.1	26.7		26.4	27.6		39.4	48.2	43.0	37.7	49.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.9	103.1		5.6	268.2		1.7	9.2	0.0	5.9	57.9	
Delay (s)	35.0	129.8		32.0	295.9		41.0	57.3	43.1	43.6	107.4	
Level of Service	D	F		C	F		D	E	D	D	F	
Approach Delay (s)		122.0			281.1			52.4			85.5	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	182.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	119.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	116.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



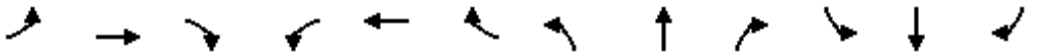
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	197	263	188	404	22	85	107	73	53	258	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	1.00		1.00	0.94		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.94	1.00	
Frt	1.00	0.91		1.00	0.99		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1741	1611		1750	1823		1724	1627		1642	1796	
Flt Permitted	0.38	1.00		0.20	1.00		0.35	1.00		0.64	1.00	
Satd. Flow (perm)	699	1611		361	1823		638	1627		1103	1796	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	207	277	198	425	23	89	113	77	56	272	29
RTOR Reduction (vph)	0	58	0	0	2	0	0	30	0	0	5	0
Lane Group Flow (vph)	58	426	0	198	446	0	89	160	0	56	296	0
Confl. Peds. (#/hr)	13		23	23		13	38		52	52		38
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.2	25.8		38.4	30.0		27.2	20.8		23.4	18.9	
Effective Green, g (s)	30.2	25.8		38.4	30.0		27.2	20.8		23.4	18.9	
Actuated g/C Ratio	0.38	0.32		0.48	0.38		0.34	0.26		0.29	0.24	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	521		323	686		304	424		354	425	
v/s Ratio Prot	0.01	c0.26		c0.07	0.24		c0.02	0.10		0.01	c0.17	
v/s Ratio Perm	0.06			0.23			0.08			0.04		
v/c Ratio	0.18	0.82		0.61	0.65		0.29	0.38		0.16	0.70	
Uniform Delay, d1	16.2	24.8		14.6	20.5		18.7	24.1		20.6	27.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	9.6		3.4	2.2		0.5	2.6		0.2	9.1	
Delay (s)	16.4	34.4		18.1	22.7		19.2	26.7		20.8	36.9	
Level of Service	B	C		B	C		B	C		C	D	
Approach Delay (s)		32.5			21.3			24.3			34.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	853	92	93	1428	29	39	34	61	8	21	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.94			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1623	1755		1700	1819			1634			1596	
Flt Permitted	0.04	1.00		0.22	1.00			0.90			0.94	
Satd. Flow (perm)	74	1755		387	1819			1494			1512	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	898	97	98	1503	31	41	36	64	8	22	31
RTOR Reduction (vph)	0	3	0	0	0	0	0	26	0	0	27	0
Lane Group Flow (vph)	99	992	0	98	1534	0	0	115	0	0	34	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	92.2	92.2		92.2	92.2			14.1			14.1	
Effective Green, g (s)	92.2	92.2		92.2	92.2			14.1			14.1	
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.12			0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	57	1367		301	1417			178			180	
v/s Ratio Prot		0.57			0.84							
v/s Ratio Perm	c1.34			0.25				c0.08			0.02	
v/c Ratio	1.74	0.73		0.33	1.08			0.65			0.19	
Uniform Delay, d1	13.0	6.6		3.9	13.0			49.7			46.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	394.2	3.4		2.9	49.5			7.9			0.5	
Delay (s)	407.2	10.0		6.7	62.6			57.6			47.4	
Level of Service	F	B		A	E			E			D	
Approach Delay (s)		46.0			59.2			57.6			47.4	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.57		
Actuated Cycle Length (s)	118.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.3%	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)	128	645	149	118	1280	93	114	131	69	51	161	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1716	1770		1733	1824	1566	1716	1719		1733	1658	
Flt Permitted	0.07	1.00		0.22	1.00	1.00	0.28	1.00		0.52	1.00	
Satd. Flow (perm)	125	1770		401	1824	1566	515	1719		954	1658	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	135	679	157	124	1347	98	120	138	73	54	169	163
RTOR Reduction (vph)	0	9	0	0	0	32	0	21	0	0	39	0
Lane Group Flow (vph)	135	827	0	124	1347	66	120	190	0	54	293	0
Heavy Vehicles (%)	4%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	58.0	58.0		58.0	58.0	58.0	20.0	20.0		20.0	20.0	
Effective Green, g (s)	58.0	58.0		58.0	58.0	58.0	20.0	20.0		20.0	20.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	0.22	0.22		0.22	0.22	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
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)	80	1140		258	1175	1009	114	382		212	368	
v/s Ratio Prot		0.47			0.74			0.11			0.18	
v/s Ratio Perm	c1.08			0.31		0.04	c0.23			0.06		
v/c Ratio	1.69	0.73		0.48	1.15	0.07	1.05	0.50		0.25	0.80	
Uniform Delay, d1	16.0	10.7		8.2	16.0	5.9	35.0	30.6		28.9	33.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	357.2	4.0		6.3	76.2	0.1	99.1	1.0		0.6	11.3	
Delay (s)	373.2	14.7		14.5	92.2	6.1	134.1	31.6		29.5	44.4	
Level of Service	F	B		B	F	A	F	C		C	D	
Approach Delay (s)		64.6			80.7			68.8			42.3	
Approach LOS		E			F			E			D	

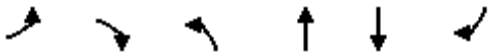
Intersection Summary			
HCM 2000 Control Delay	70.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	133.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	3	455	80	34	426
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	3	479	84	36	448
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	1041	521			563	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1041	521			563	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	98	99			96	
cM capacity (veh/h)	240	546			1018	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	563	484
Volume Left	4	0	36
Volume Right	3	84	0
cSH	316	1700	1018
Volume to Capacity	0.02	0.33	0.04
Queue Length 95th (m)	0.5	0.0	0.8
Control Delay (s)	16.7	0.0	1.0
Lane LOS	C		A
Approach Delay (s)	16.7	0.0	1.0
Approach LOS	C		

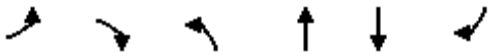
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	51	63	40	214	604	104
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	54	66	42	225	636	109
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					166	
pX, platoon unblocked						
vC, conflicting volume	1000	691	745			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1000	691	745			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	79	85	95			
cM capacity (veh/h)	251	436	840			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	120	267	745
Volume Left	54	42	0
Volume Right	66	0	109
cSH	328	840	1700
Volume to Capacity	0.37	0.05	0.44
Queue Length 95th (m)	12.2	1.2	0.0
Control Delay (s)	22.2	2.0	0.0
Lane LOS	C	A	
Approach Delay (s)	22.2	2.0	0.0
Approach LOS	C		

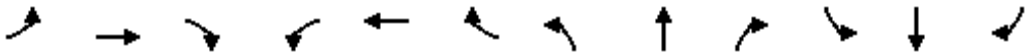
Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	23	92	88	231	629	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	97	93	243	662	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					292	
pX, platoon unblocked						
vC, conflicting volume	1111	682	702			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1111	682	702			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	88	78	89			
cM capacity (veh/h)	202	441	872			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	121	336	702
Volume Left	24	93	0
Volume Right	97	0	40
cSH	357	872	1700
Volume to Capacity	0.34	0.11	0.41
Queue Length 95th (m)	11.0	2.7	0.0
Control Delay (s)	20.2	3.5	0.0
Lane LOS	C	A	
Approach Delay (s)	20.2	3.5	0.0
Approach LOS	C		

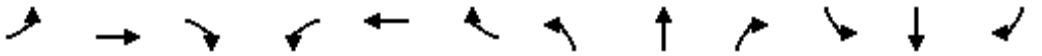
Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	2	59	34	0	27	6	556	9	6	382	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	2	62	36	0	28	6	585	9	6	402	5
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	1048	1025	405	1083	1023	590	407			595		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1048	1025	405	1083	1023	590	407			595		
tC, single (s)	7.2	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	93	99	90	79	100	94	99			99		
cM capacity (veh/h)	186	234	629	174	235	511	1109			991		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	78	64	601	414
Volume Left	14	36	6	6
Volume Right	62	28	9	5
cSH	429	246	1109	991
Volume to Capacity	0.18	0.26	0.01	0.01
Queue Length 95th (m)	4.9	7.6	0.1	0.1
Control Delay (s)	15.2	24.7	0.2	0.2
Lane LOS	C	C	A	A
Approach Delay (s)	15.2	24.7	0.2	0.2
Approach LOS	C	C		

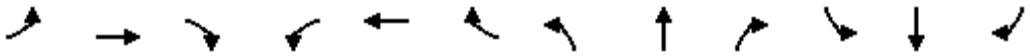
Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	48.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	1168	120	81	1237	155	372	293	96	199	179	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1552	1757		1700	1760		1700	1789	1521	1700	1630	
Flt Permitted	0.07	1.00		0.07	1.00		0.17	1.00	1.00	0.29	1.00	
Satd. Flow (perm)	107	1757		122	1760		298	1789	1521	517	1630	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	124	1229	126	85	1302	163	392	308	101	209	188	113
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	81	0	18	0
Lane Group Flow (vph)	124	1352	0	85	1461	0	392	308	20	209	283	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	69.8	61.0		65.2	58.7		37.0	24.0	24.0	29.0	20.0	
Effective Green, g (s)	69.8	61.0		65.2	58.7		37.0	24.0	24.0	29.0	20.0	
Actuated g/C Ratio	0.58	0.51		0.54	0.49		0.31	0.20	0.20	0.24	0.17	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	6.0	4.0	6.0	
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)	167	889		151	857		242	356	302	212	270	
v/s Ratio Prot	c0.05	0.77		0.03	c0.83		c0.17	0.17		0.07	0.17	
v/s Ratio Perm	0.37			0.27			c0.32		0.01	0.16		
v/c Ratio	0.74	1.52		0.56	1.71		1.62	0.87	0.07	0.99	1.05	
Uniform Delay, d1	30.0	29.8		26.4	30.9		36.4	46.7	39.2	43.3	50.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	16.2	240.2		4.7	322.4		297.2	19.1	0.1	57.3	67.6	
Delay (s)	46.2	269.9		31.1	353.3		333.6	65.8	39.3	100.6	117.8	
Level of Service	D	F		C	F		F	E	D	F	F	
Approach Delay (s)		251.1			335.6			193.5			110.8	
Approach LOS		F			F			F			F	

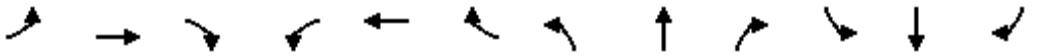
Intersection Summary			
HCM 2000 Control Delay	254.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.64		
Actuated Cycle Length (s)	120.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	134.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	359	81	79	309	54	263	358	109	106	182	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		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)	1735	1770		1750	1783		1736	1746		1742	1780	
Flt Permitted	0.41	1.00		0.18	1.00		0.44	1.00		0.27	1.00	
Satd. Flow (perm)	749	1770		339	1783		801	1746		495	1780	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	29	378	85	83	325	57	277	377	115	112	192	38
RTOR Reduction (vph)	0	8	0	0	7	0	0	11	0	0	7	0
Lane Group Flow (vph)	29	455	0	83	375	0	277	481	0	112	223	0
Confl. Peds. (#/hr)	17		17	17		17	13		21	21		13
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.4	26.6		36.4	30.1		39.6	29.0		29.2	22.6	
Effective Green, g (s)	29.4	26.6		36.4	30.1		39.6	29.0		29.2	22.6	
Actuated g/C Ratio	0.33	0.30		0.41	0.34		0.45	0.33		0.33	0.26	
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	280	532		239	606		495	572		256	454	
v/s Ratio Prot	0.00	c0.26		c0.02	0.21		c0.08	c0.28		0.03	0.13	
v/s Ratio Perm	0.03			0.12			0.17			0.11		
v/c Ratio	0.10	0.85		0.35	0.62		0.56	0.84		0.44	0.49	
Uniform Delay, d1	20.3	29.1		18.3	24.4		16.5	27.6		21.9	28.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	12.7		0.9	1.9		1.4	13.9		1.2	3.8	
Delay (s)	20.5	41.8		19.2	26.3		17.9	41.5		23.1	31.8	
Level of Service	C	D		B	C		B	D		C	C	
Approach Delay (s)		40.5			25.0			33.0			28.9	
Approach LOS		D			C			C			C	

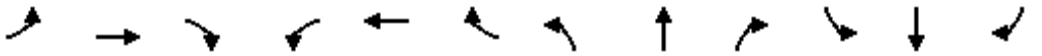
Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	88.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	1338	71	80	1212	56	133	37	260	55	43	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.92			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1623	1772		1700	1813			1616			1587	
Flt Permitted	0.05	1.00		0.05	1.00			0.73			0.72	
Satd. Flow (perm)	90	1772		94	1813			1203			1158	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	1408	75	84	1276	59	140	39	274	58	45	134
RTOR Reduction (vph)	0	1	0	0	1	0	0	40	0	0	39	0
Lane Group Flow (vph)	58	1482	0	84	1334	0	0	413	0	0	198	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	76.0	76.0		76.0	76.0			32.0			32.0	
Effective Green, g (s)	76.0	76.0		76.0	76.0			32.0			32.0	
Actuated g/C Ratio	0.63	0.63		0.63	0.63			0.27			0.27	
Clearance Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	57	1122		59	1148			320			308	
v/s Ratio Prot		0.84			0.74							
v/s Ratio Perm	0.65			c0.89				c0.34			0.17	
v/c Ratio	1.02	1.32		1.42	1.16			1.29			0.64	
Uniform Delay, d1	22.0	22.0		22.0	22.0			44.0			38.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	124.3	150.5		264.6	82.6			151.8			4.6	
Delay (s)	146.3	172.5		286.6	104.6			195.8			43.5	
Level of Service	F	F		F	F			F			D	
Approach Delay (s)		171.5			115.4			195.8			43.5	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	144.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	121.7%	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 (vph)	336	1147	170	92	1035	92	136	284	239	109	177	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.93		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1716	1787		1733	1824	1566	1716	1690		1733	1655	
Flt Permitted	0.10	1.00		0.10	1.00	1.00	0.31	1.00		0.22	1.00	
Satd. Flow (perm)	181	1787		182	1824	1566	564	1690		405	1655	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	354	1207	179	97	1089	97	143	299	252	115	186	187
RTOR Reduction (vph)	0	8	0	0	0	42	0	43	0	0	52	0
Lane Group Flow (vph)	354	1378	0	97	1089	55	143	508	0	115	321	0
Heavy Vehicles (%)	4%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	40.0	40.0		40.0	40.0	40.0	18.0	18.0		18.0	18.0	
Effective Green, g (s)	40.0	40.0		40.0	40.0	40.0	18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.57	0.57		0.57	0.57	0.57	0.26	0.26		0.26	0.26	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
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)	103	1021		104	1042	894	145	434		104	425	
v/s Ratio Prot		0.77			0.60			c0.30			0.19	
v/s Ratio Perm	c1.96			0.53		0.04	0.25			0.28		
v/c Ratio	3.44	1.35		0.93	1.05	0.06	0.99	1.17		1.11	0.76	
Uniform Delay, d1	15.0	15.0		13.8	15.0	6.7	25.9	26.0		26.0	24.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1120.7	164.0		71.4	40.4	0.1	70.0	98.8		119.6	7.5	
Delay (s)	1135.7	179.0		85.2	55.4	6.8	95.9	124.8		145.6	31.4	
Level of Service	F	F		F	E	A	F	F		F	C	
Approach Delay (s)		373.6			54.0			118.8			58.3	
Approach LOS		F			D			F			E	

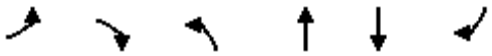
Intersection Summary			
HCM 2000 Control Delay	197.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.72		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	148.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	66	45	526	9	3	419
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	69	47	554	9	3	441
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	1006	558			563	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1006	558			563	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	73	91			100	
cM capacity (veh/h)	261	519			1018	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	117	563	444
Volume Left	69	0	3
Volume Right	47	9	0
cSH	327	1700	1018
Volume to Capacity	0.36	0.33	0.00
Queue Length 95th (m)	11.8	0.0	0.1
Control Delay (s)	22.0	0.0	0.1
Lane LOS	C		A
Approach Delay (s)	22.0	0.0	0.1
Approach LOS	C		

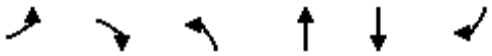
Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	35	34	720	319	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	37	36	758	336	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)					166	
pX, platoon unblocked						
vC, conflicting volume	1177	347	359			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1177	347	359			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	95	95	97			
cM capacity (veh/h)	200	685	1173			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	47	794	359
Volume Left	11	36	0
Volume Right	37	0	23
cSH	445	1173	1700
Volume to Capacity	0.11	0.03	0.21
Queue Length 95th (m)	2.7	0.7	0.0
Control Delay (s)	14.1	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	14.1	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

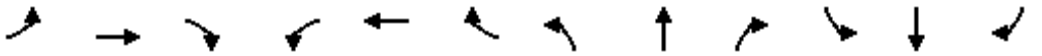


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	49	70	750	353	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	52	74	789	372	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					292	
pX, platoon unblocked						
vC, conflicting volume	1309	372	373			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1309	372	373			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	97	92	94			
cM capacity (veh/h)	161	663	1159			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	56	863	373
Volume Left	4	74	0
Volume Right	52	0	1
cSH	536	1159	1700
Volume to Capacity	0.10	0.06	0.22
Queue Length 95th (m)	2.6	1.5	0.0
Control Delay (s)	12.5	1.6	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	1.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

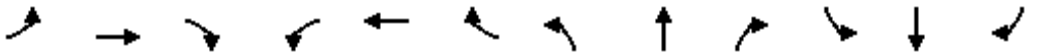
APPENDIX E:
FUTURE OPERATIONS WITH IMPROVEMENTS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	746	195	72	1000	217	51	160	22	126	160	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1552	3400	1452	1700	3400	1521	1700	3338		1700	3122	
Flt Permitted	0.16	1.00	1.00	0.28	1.00	1.00	0.59	1.00		0.63	1.00	
Satd. Flow (perm)	255	3400	1452	496	3400	1521	1062	3338		1130	3122	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	88	785	205	76	1053	228	54	168	23	133	168	88
RTOR Reduction (vph)	0	0	120	0	0	133	0	14	0	0	72	0
Lane Group Flow (vph)	88	785	85	76	1053	95	54	177	0	133	184	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	34.1	29.6	29.6	34.1	29.6	29.6	17.3	12.8		17.3	12.8	
Effective Green, g (s)	34.1	29.6	29.6	34.1	29.6	29.6	17.3	12.8		17.3	12.8	
Actuated g/C Ratio	0.48	0.41	0.41	0.48	0.41	0.41	0.24	0.18		0.24	0.18	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	
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)	203	1409	601	312	1409	630	297	598		309	559	
v/s Ratio Prot	c0.03	0.23		0.02	c0.31		0.01	0.05		c0.03	0.06	
v/s Ratio Perm	0.18		0.06	0.10		0.06	0.03			c0.08		
v/c Ratio	0.43	0.56	0.14	0.24	0.75	0.15	0.18	0.30		0.43	0.33	
Uniform Delay, d1	11.7	15.9	13.0	10.5	17.7	13.0	21.2	25.4		22.2	25.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	1.6	0.5	0.4	3.7	0.5	0.3	0.3		1.0	0.3	
Delay (s)	13.2	17.5	13.5	10.9	21.4	13.6	21.5	25.7		23.2	25.9	
Level of Service	B	B	B	B	C	B	C	C		C	C	
Approach Delay (s)		16.4			19.5			24.7			25.0	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	71.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

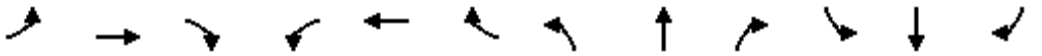
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	735	79	80	1230	25	34	29	53	7	18	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1623	3335		1700	3456		1623	1619		1750	1560	
Flt Permitted	0.12	1.00		0.27	1.00		0.73	1.00		0.70	1.00	
Satd. Flow (perm)	204	3335		488	3456		1243	1619		1290	1560	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	774	83	84	1295	26	36	31	56	7	19	26
RTOR Reduction (vph)	0	8	0	0	1	0	0	42	0	0	19	0
Lane Group Flow (vph)	85	849	0	84	1320	0	36	45	0	7	26	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	58.8	54.0		58.8	54.0		25.2	25.2		25.2	25.2	
Effective Green, g (s)	58.8	54.0		58.8	54.0		25.2	25.2		25.2	25.2	
Actuated g/C Ratio	0.59	0.54		0.59	0.54		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	188	1800		345	1866		313	407		325	393	
v/s Ratio Prot	c0.02	0.25		0.01	c0.38			0.03			0.02	
v/s Ratio Perm	0.24			0.13			c0.03			0.01		
v/c Ratio	0.45	0.47		0.24	0.71		0.12	0.11		0.02	0.07	
Uniform Delay, d1	12.4	14.2		9.4	17.1		28.8	28.8		28.1	28.4	
Progression Factor	1.00	1.00		0.76	1.07		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.9		0.3	1.9		0.7	0.6		0.1	0.3	
Delay (s)	14.1	15.1		7.4	20.3		29.6	29.3		28.2	28.8	
Level of Service	B	B		A	C		C	C		C	C	
Approach Delay (s)		15.0			19.5			29.4			28.7	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

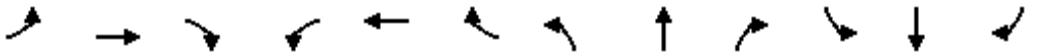
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	571	129	101	1121	80	98	113	59	44	139	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
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)	1716	3466	1536	1733	3434		1716	1807	1551	1733	1668	
Flt Permitted	0.16	1.00	1.00	0.41	1.00		0.44	1.00	1.00	0.68	1.00	
Satd. Flow (perm)	293	3466	1536	748	3434		790	1807	1551	1241	1668	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	601	136	106	1180	84	103	119	62	46	146	121
RTOR Reduction (vph)	0	0	52	0	5	0	0	0	46	0	30	0
Lane Group Flow (vph)	100	601	84	106	1259	0	103	119	16	46	237	0
Heavy Vehicles (%)	4%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	62.0	62.0	62.0	62.0	62.0		26.0	26.0	26.0	26.0	26.0	
Effective Green, g (s)	62.0	62.0	62.0	62.0	62.0		26.0	26.0	26.0	26.0	26.0	
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.62		0.26	0.26	0.26	0.26	0.26	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
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)	181	2148	952	463	2129		205	469	403	322	433	
v/s Ratio Prot		0.17			c0.37			0.07			c0.14	
v/s Ratio Perm	0.34		0.05	0.14			0.13		0.01	0.04		
v/c Ratio	0.55	0.28	0.09	0.23	0.59		0.50	0.25	0.04	0.14	0.55	
Uniform Delay, d1	11.0	8.7	7.6	8.4	11.4		31.5	29.3	27.7	28.4	31.9	
Progression Factor	0.84	0.45	0.68	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.6	0.3	0.2	1.2	1.2		8.5	1.3	0.2	0.9	4.9	
Delay (s)	19.9	4.2	5.4	9.6	12.6		40.0	30.6	27.9	29.4	36.9	
Level of Service	B	A	A	A	B		D	C	C	C	D	
Approach Delay (s)		6.3			12.4			33.4			35.8	
Approach LOS		A			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

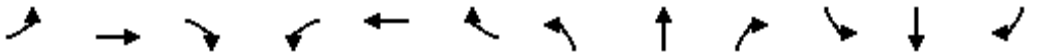
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	102	1007	103	70	1066	134	320	252	83	171	154	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1552	3400	1452	1700	3400	1521	1700	3274		1700	3098	
Flt Permitted	0.12	1.00	1.00	0.14	1.00	1.00	0.43	1.00		0.54	1.00	
Satd. Flow (perm)	193	3400	1452	255	3400	1521	776	3274		968	3098	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	107	1060	108	74	1122	141	337	265	87	180	162	97
RTOR Reduction (vph)	0	0	64	0	0	83	0	38	0	0	84	0
Lane Group Flow (vph)	107	1060	44	74	1122	58	337	314	0	180	175	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	39.6	34.2	34.2	39.4	34.1	34.1	28.1	15.3		19.8	11.0	
Effective Green, g (s)	39.6	34.2	34.2	39.4	34.1	34.1	28.1	15.3		19.8	11.0	
Actuated g/C Ratio	0.47	0.41	0.41	0.47	0.41	0.41	0.34	0.18		0.24	0.13	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	
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)	179	1390	594	211	1386	620	405	599		306	407	
v/s Ratio Prot	c0.04	0.31		0.02	c0.33		c0.13	0.10		0.06	0.06	
v/s Ratio Perm	0.24		0.03	0.14		0.04	c0.15			0.08		
v/c Ratio	0.60	0.76	0.07	0.35	0.81	0.09	0.83	0.52		0.59	0.43	
Uniform Delay, d1	15.1	21.2	15.1	14.0	21.9	15.2	23.3	30.9		27.2	33.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	4.0	0.2	1.0	5.2	0.3	13.6	0.8		2.9	0.7	
Delay (s)	20.4	25.2	15.3	15.1	27.1	15.5	36.9	31.7		30.1	34.1	
Level of Service	C	C	B	B	C	B	D	C		C	C	
Approach Delay (s)		24.0			25.2			34.2			32.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

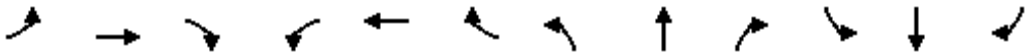
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1153	61	69	1045	48	115	32	224	47	37	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.87		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1623	3366		1700	3444		1623	1585		1750	1517	
Flt Permitted	0.17	1.00		0.13	1.00		0.63	1.00		0.42	1.00	
Satd. Flow (perm)	286	3366		234	3444		1081	1585		780	1517	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	49	1214	64	73	1100	51	121	34	236	49	39	115
RTOR Reduction (vph)	0	4	0	0	3	0	0	116	0	0	86	0
Lane Group Flow (vph)	49	1274	0	73	1148	0	121	154	0	49	68	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	58.8	54.0		58.8	54.0		25.2	25.2		25.2	25.2	
Effective Green, g (s)	58.8	54.0		58.8	54.0		25.2	25.2		25.2	25.2	
Actuated g/C Ratio	0.59	0.54		0.59	0.54		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	1817		207	1859		272	399		196	382	
v/s Ratio Prot	0.01	c0.38		c0.02	0.33			0.10			0.04	
v/s Ratio Perm	0.11			0.19			c0.11			0.06		
v/c Ratio	0.21	0.70		0.35	0.62		0.44	0.39		0.25	0.18	
Uniform Delay, d1	10.5	17.0		11.7	15.9		31.5	31.0		29.9	29.3	
Progression Factor	1.00	1.00		0.79	0.47		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.3		0.7	1.1		5.2	2.8		3.0	1.0	
Delay (s)	10.9	19.3		10.0	8.5		36.7	33.8		32.9	30.3	
Level of Service	B	B		B	A		D	C		C	C	
Approach Delay (s)		19.0			8.6			34.7			30.9	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

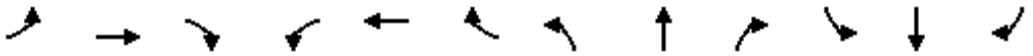
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	1028	146	79	913	79	117	245	206	93	153	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
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)	1716	3466	1536	1733	3427		1716	1807	1551	1733	1665	
Flt Permitted	0.13	1.00	1.00	0.26	1.00		0.42	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	241	3466	1536	482	3427		764	1807	1551	886	1665	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	1082	154	83	961	83	123	258	217	98	161	139
RTOR Reduction (vph)	0	0	65	0	6	0	0	0	64	0	31	0
Lane Group Flow (vph)	263	1082	89	83	1038	0	123	258	153	98	269	0
Heavy Vehicles (%)	4%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	58.0	58.0	58.0	41.8	41.8		30.0	30.0	30.0	30.0	30.0	
Effective Green, g (s)	58.0	58.0	58.0	41.8	41.8		30.0	30.0	30.0	30.0	30.0	
Actuated g/C Ratio	0.58	0.58	0.58	0.42	0.42		0.30	0.30	0.30	0.30	0.30	
Clearance Time (s)	4.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
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)	319	2010	890	201	1432		229	542	465	265	499	
v/s Ratio Prot	c0.10	0.31			0.30			0.14			c0.16	
v/s Ratio Perm	c0.38		0.06	0.17			0.16		0.10	0.11		
v/c Ratio	0.82	0.54	0.10	0.41	0.72		0.54	0.48	0.33	0.37	0.54	
Uniform Delay, d1	18.2	12.8	9.4	20.5	24.3		29.2	28.6	27.2	27.6	29.2	
Progression Factor	0.78	0.59	0.54	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	0.8	0.2	6.2	3.2		8.8	3.0	1.9	3.9	4.1	
Delay (s)	26.4	8.4	5.2	26.6	27.5		38.0	31.6	29.1	31.5	33.4	
Level of Service	C	A	A	C	C		D	C	C	C	C	
Approach Delay (s)		11.2			27.5			32.0			32.9	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		

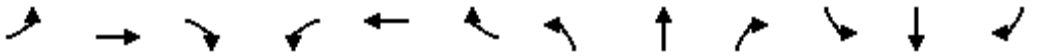
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	866	226	84	1160	251	60	185	26	147	185	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1552	3400	1452	1700	3400	1521	3298	3338		1700	3121	
Flt Permitted	0.11	1.00	1.00	0.20	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	184	3400	1452	366	3400	1521	3298	3338		1700	3121	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	103	912	238	88	1221	264	63	195	27	155	195	103
RTOR Reduction (vph)	0	0	138	0	0	150	0	13	0	0	77	0
Lane Group Flow (vph)	103	912	100	88	1221	114	63	209	0	155	221	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	40.1	35.5	35.5	41.7	36.3	36.3	5.8	12.1		11.3	17.6	
Effective Green, g (s)	40.1	35.5	35.5	41.7	36.3	36.3	5.8	12.1		11.3	17.6	
Actuated g/C Ratio	0.48	0.42	0.42	0.49	0.43	0.43	0.07	0.14		0.13	0.21	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	
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)	162	1431	611	266	1464	654	226	479		227	651	
v/s Ratio Prot	c0.03	0.27		0.02	c0.36		0.02	c0.06		c0.09	0.07	
v/s Ratio Perm	0.27		0.07	0.14		0.07						
v/c Ratio	0.64	0.64	0.16	0.33	0.83	0.17	0.28	0.44		0.68	0.34	
Uniform Delay, d1	15.5	19.3	15.2	12.5	21.3	14.8	37.3	33.0		34.8	28.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.9	2.2	0.6	0.7	5.7	0.6	0.7	0.6		8.2	0.3	
Delay (s)	23.4	21.5	15.8	13.2	27.1	15.3	37.9	33.6		43.0	28.7	
Level of Service	C	C	B	B	C	B	D	C		D	C	
Approach Delay (s)		20.6			24.3			34.6			33.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	84.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

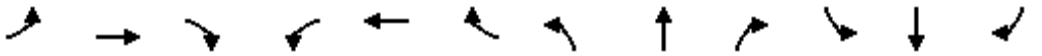
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	853	92	93	1428	29	39	34	61	8	21	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1623	3335		1700	3456		1623	1619		1750	1558	
Flt Permitted	0.07	1.00		0.22	1.00		0.72	1.00		0.69	1.00	
Satd. Flow (perm)	127	3335		393	3456		1234	1619		1275	1558	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	898	97	98	1503	31	41	36	64	8	22	31
RTOR Reduction (vph)	0	8	0	0	1	0	0	48	0	0	23	0
Lane Group Flow (vph)	99	987	0	98	1533	0	41	52	0	8	30	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	58.8	54.0		58.8	54.0		25.2	25.2		25.2	25.2	
Effective Green, g (s)	58.8	54.0		58.8	54.0		25.2	25.2		25.2	25.2	
Actuated g/C Ratio	0.59	0.54		0.59	0.54		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	1800		293	1866		310	407		321	392	
v/s Ratio Prot	c0.03	0.30		0.02	c0.44			0.03			0.02	
v/s Ratio Perm	0.37			0.18			c0.03			0.01		
v/c Ratio	0.68	0.55		0.33	0.82		0.13	0.13		0.02	0.08	
Uniform Delay, d1	16.4	15.0		10.0	19.0		28.9	28.9		28.2	28.5	
Progression Factor	1.00	1.00		0.67	1.01		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.8	1.2		0.6	3.5		0.9	0.6		0.1	0.4	
Delay (s)	28.2	16.2		7.3	22.8		29.8	29.6		28.3	28.9	
Level of Service	C	B		A	C		C	C		C	C	
Approach Delay (s)		17.3			21.8			29.6			28.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

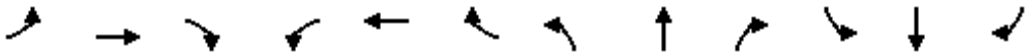
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	128	645	149	118	1280	93	114	131	69	51	161	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	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	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1750	3466	1536	1733	3466	1566	1716	1807	1551	1733	1789	1521
Flt Permitted	0.14	1.00	1.00	0.37	1.00	1.00	0.61	1.00	1.00	0.67	1.00	1.00
Satd. Flow (perm)	260	3466	1536	678	3466	1566	1099	1807	1551	1213	1789	1521
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	135	679	157	124	1347	98	120	138	73	54	169	163
RTOR Reduction (vph)	0	0	60	0	0	37	0	0	54	0	0	44
Lane Group Flow (vph)	135	679	97	124	1347	61	120	138	19	54	169	119
Heavy Vehicles (%)	2%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	62.0	62.0	62.0	62.0	62.0	62.0	26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	62.0	62.0	62.0	62.0	62.0	62.0	26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.62	0.62	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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	3.0
Lane Grp Cap (vph)	161	2148	952	420	2148	970	285	469	403	315	465	395
v/s Ratio Prot		0.20			0.39			0.08			0.09	
v/s Ratio Perm	c0.52		0.06	0.18		0.04	c0.11		0.01	0.04		0.08
v/c Ratio	0.84	0.32	0.10	0.30	0.63	0.06	0.42	0.29	0.05	0.17	0.36	0.30
Uniform Delay, d1	15.0	9.0	7.7	8.8	11.8	7.5	30.7	29.6	27.7	28.7	30.2	29.7
Progression Factor	0.92	0.40	0.62	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	34.1	0.3	0.2	1.8	1.4	0.1	4.5	1.6	0.2	1.2	2.2	1.9
Delay (s)	47.9	4.0	5.0	10.6	13.2	7.6	35.3	31.2	27.9	29.8	32.4	31.6
Level of Service	D	A	A	B	B	A	D	C	C	C	C	C
Approach Delay (s)		10.2			12.7			32.0			31.7	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.2%	ICU Level of Service	F
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)	118	1168	120	81	1237	155	372	293	96	199	179	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1552	3400	1452	1700	3400	1521	3298	3274		1700	3098	
Flt Permitted	0.08	1.00	1.00	0.17	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	128	3400	1452	313	3400	1521	3298	3274		1700	3098	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	124	1229	126	85	1302	163	392	308	101	209	188	113
RTOR Reduction (vph)	0	0	58	0	0	92	0	29	0	0	81	0
Lane Group Flow (vph)	124	1229	68	85	1302	71	392	380	0	209	220	0
Heavy Vehicles (%)	15%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	15%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	58.1	58.1	58.1	47.1	47.1	47.1	17.2	17.6		16.3	16.7	
Effective Green, g (s)	58.1	58.1	58.1	47.1	47.1	47.1	17.2	17.6		16.3	16.7	
Actuated g/C Ratio	0.54	0.54	0.54	0.44	0.44	0.44	0.16	0.16		0.15	0.15	
Clearance Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0		4.0	6.0	
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)	161	1829	781	136	1482	663	525	533		256	479	
v/s Ratio Prot	0.05	c0.36			c0.38		0.12	c0.12		c0.12	0.07	
v/s Ratio Perm	0.36		0.05	0.27		0.05						
v/c Ratio	0.77	0.67	0.09	0.62	0.88	0.11	0.75	0.71		0.82	0.46	
Uniform Delay, d1	20.8	18.1	12.1	23.6	27.8	18.0	43.3	42.8		44.4	41.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.0	2.0	0.2	19.7	7.7	0.3	5.7	4.5		17.9	0.7	
Delay (s)	40.8	20.0	12.3	43.4	35.5	18.3	49.1	47.3		62.3	42.2	
Level of Service	D	C	B	D	D	B	D	D		E	D	
Approach Delay (s)		21.1			34.2			48.2			50.5	
Approach LOS		C			C			D			D	

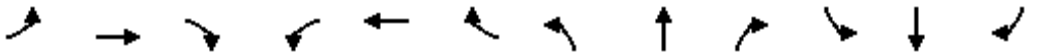
Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	108.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	1338	71	80	1212	56	133	37	260	55	43	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.87		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1623	3366		1700	3444		1623	1585		1750	1516	
Flt Permitted	0.12	1.00		0.08	1.00		0.59	1.00		0.35	1.00	
Satd. Flow (perm)	198	3366		145	3444		1002	1585		644	1516	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	1408	75	84	1276	59	140	39	274	58	45	134
RTOR Reduction (vph)	0	4	0	0	3	0	0	103	0	0	100	0
Lane Group Flow (vph)	58	1479	0	84	1332	0	140	210	0	58	79	0
Heavy Vehicles (%)	10%	5%	10%	5%	3%	2%	10%	10%	2%	2%	10%	10%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	58.8	54.0		58.8	54.0		25.2	25.2		25.2	25.2	
Effective Green, g (s)	58.8	54.0		58.8	54.0		25.2	25.2		25.2	25.2	
Actuated g/C Ratio	0.59	0.54		0.59	0.54		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	184	1817		159	1859		252	399		162	382	
v/s Ratio Prot	0.02	c0.44		c0.03	0.39			0.13			0.05	
v/s Ratio Perm	0.17			0.28			c0.14			0.09		
v/c Ratio	0.32	0.81		0.53	0.72		0.56	0.53		0.36	0.21	
Uniform Delay, d1	12.1	18.9		14.7	17.3		32.5	32.2		30.7	29.5	
Progression Factor	1.00	1.00		2.13	0.51		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	4.1		2.3	1.8		8.6	4.9		6.1	1.2	
Delay (s)	13.1	23.0		33.8	10.5		41.1	37.1		36.8	30.7	
Level of Service	B	C		C	B		D	D		D	C	
Approach Delay (s)		22.6			11.9			38.4			32.2	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.3%	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 (vph)	336	1147	170	92	1035	92	136	284	239	109	177	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	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	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1716	3466	1536	1733	3466	1566	1716	1807	1551	1733	1789	1521
Flt Permitted	0.12	1.00	1.00	0.23	1.00	1.00	0.58	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	217	3466	1536	425	3466	1566	1044	1807	1551	699	1789	1521
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	354	1207	179	97	1089	97	143	299	252	115	186	187
RTOR Reduction (vph)	0	0	68	0	0	56	0	0	61	0	0	138
Lane Group Flow (vph)	354	1207	111	97	1089	41	143	299	191	115	186	49
Heavy Vehicles (%)	4%	3%	4%	3%	3%	2%	4%	4%	3%	3%	5%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	62.0	62.0	62.0	42.2	42.2	42.2	26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	62.0	62.0	62.0	42.2	42.2	42.2	26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.62	0.62	0.62	0.42	0.42	0.42	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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	3.0
Lane Grp Cap (vph)	371	2148	952	179	1462	660	271	469	403	181	465	395
v/s Ratio Prot	c0.15	0.35			0.31			c0.17			0.10	
v/s Ratio Perm	c0.44		0.07	0.23		0.03	0.14		0.12	0.16		0.03
v/c Ratio	0.95	0.56	0.12	0.54	0.74	0.06	0.53	0.64	0.47	0.64	0.40	0.12
Uniform Delay, d1	25.7	11.1	7.8	21.7	24.4	17.2	31.7	32.8	31.2	32.8	30.6	28.3
Progression Factor	1.00	0.43	0.23	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.7	0.7	0.2	11.3	3.5	0.2	7.2	6.5	4.0	15.8	2.6	0.6
Delay (s)	51.5	5.5	1.9	32.9	27.9	17.3	38.9	39.3	35.2	48.6	33.1	28.9
Level of Service	D	A	A	C	C	B	D	D	D	D	C	C
Approach Delay (s)		14.5			27.4			37.7			35.2	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group