BA Group

SILVERCREEK JUNCTION TRAFFIC IMPACT STUDY

City of Guelph

Prepared For: Silvercreek Guelph Developments Limited

November 14, 2019

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45 St. Clair Avenue West, Suite 300
Toronto, ON M4V 1K9
www.bagroup.com

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1.0 INTRODUCTION

BA Group is retained by Silvercreek Guelph Developments Limited to provide a Traffic Impact Study for the proposed plan of subdivision application being made to the City of Guelph for the lands located at 35 & 40 Silvercreek Parkway South (also referred to herein to as "the Site") as requested at the pre-consultation meeting held on September 20, 2017 followed by a letter from the City dated October 17, 2017. Over the past year, the plan of subdivision has been refined in consultation with the City.

This plan of subdivision application is being made to implement the approved Official Plan designations, zoning, Minutes of Settlement and the *Silvercreek Parkway South Improvements Class Environmental Assessment*. The proposed Draft Plan of Subdivision will create blocks for the development of 777 residential units and 6,500 m^2 (69,965 ft^2) of commercial uses.

The site is located on the west side of the City of Guelph and is generally bound by the Hanlon Expressway (Highway 6 North) to the west, and on the north-east diagonal and the south-east diagonal by lines of the Goderich Exeter Railway. The rail line abutting the property on the north is the former CN mainline. The rail line to the south of the property is a secondary line which serves a number of businesses in the City of Cambridge south-west of Guelph. To the east are lands previously conveyed to the City by Silvercreek Guelph Developments Limited for stormwater and open spaces purposes. **Figure 1** and **Figure 2** illustrate the location and context of the site to the surrounding area, respectively.

The site is currently divided into east and west sections by an existing municipal road known as Silvercreek Parkway South which runs parallel to, and approximately 200 metres east of (centreline-to-centreline), the Hanlon Expressway.

Vehicular access will be provided via several full movement access driveways and intersections along Silvercreek Parkway. In conjunction with the proposed development, Silvercreek Parkway will be extended north to Paisley Road. This northerly extension will include a CNR underpass structure. The level crossing of Silvercreek Parkway with the Goderich Exeter Railway will be retained.

1.1 BACKGROUND

1.1.1 Ontario Municipal Board

In October 2005, Silvercreek Guelph Developments Limited ("Silvercreek") submitted Official Plan and Zoning By-law applications to the City of Guelph permit the development of a retail commercial centre with a proposed gross floor area of 41,806 m^2 (450,000 ft^2) on the Site. Over the next two years, the applications continued to be processed by the City and a number of information exchanges and discussions took place although City Council did not make a decision with respect to these applications. In 2007, Silvercreek appealed its applications to the Ontario Municipal Board and over the following two years engaged in mediation sessions with the City which ultimately resulted in an agreed upon Minutes of Settlement in 2009.

Key items in the 2009 Minutes of Settlement as they relate to the transportation aspects of the subject application include:

9. *Silvercreek and the City acknowledge and agree that the following undertakings (collectively the "EA Undertakings") will be subject to approval of class environmental assessments under the Environmental Assessment Act, R.S.O. 1990, c.E.18:*

   (i) *the construction of a grade separation crossing at the intersection of Silvercreek Parkway South and the Canadian National Railway rail line at the north lot line of the Lands (the "Underpass");*
   (ii) *within the Lands, the realignment, reconstruction and improvement of Silvercreek Parkway South within a 30 metre right of way including construction of a two lane road with two parking lanes, bike lanes, lighting, sidewalks, landscaping and any required intersection improvement ("Silvercreek Improvements"); and*
   (iii) *the construction of a new public highway on the lands to the east of Silvercreek Parkway South with a right of way of 18 metres, as depicted on the Concept Plan ("New Internal Road").*

The agreed upon Silvercreek Junction Concept Plan dated December 16, 2008 is attached for reference in **Appendix A**.

1.1.2 Silvercreek Parkway Class EA

In June 2012, the City issued their notice of completion for the *Silvercreek Parkway South Improvements Class Environmental Assessment* study. The traffic forecasting and analysis work for the EA study relied upon the *Traffic Impact Study Update (April 2012)* for the Silvercreek Guelph site prepared by BA Consulting Group.

In addition to establishing a design for Silvercreek Parkway, the recommended solution also included:

- An underpass at the CNR mainline;
- Reconnecting Silvercreek Parkway between the two CN rail lines – two through lanes, bike lanes, and sidewalks throughout;
- Identifying development driveway locations and intersection control;
- Improvements at the intersection of Silvercreek Parkway and Paisley Road; and
- Safety improvements for the Fergus subdivision at the CNR secondary line.

The safety improvements recommended by the *Detailed Safety Assessment (March 1, 2012)* completed as part of the EA Study for the level crossing of Silvercreek Parkway at the CNR secondary line at Fergus subdivision level crossing at the CNR included:

- Crossing warning system including lights, bells, and gates;
- Active "Prepare to Stop at Railway Crossing" signage for the north approach of the crossing;
- "No Train Whistles at this Crossing" signage;
- "Railway Advance Warning" signage indicating a skewed crossing; and
- "Pedestrians Stop Here When Lights Are Flashing" signage.

Reduced scale design drawings and cross sections from the EA Study are attached for reference in **Appendix A**.

1.2 THIS STUDY

BA produced Draft Terms of Reference for this TIS which were provided to the City on February 26, 2018 for their review. The City provided their comments on March 8, 2018. The Draft Terms of Reference and the City's comments are included in **Appendix B** to this report. This scope of work was established with the City of Guelph for the purposes of this traffic impact analysis. The City also provided the current signal timing plans on March 9, 2018 for the signalized intersections within the study area.

The limits of the study area were Paisley Road to the north, Wellington Street to the south, Imperial Road to the west and Edinburgh Road to the east.

The study area intersections are summarized below:

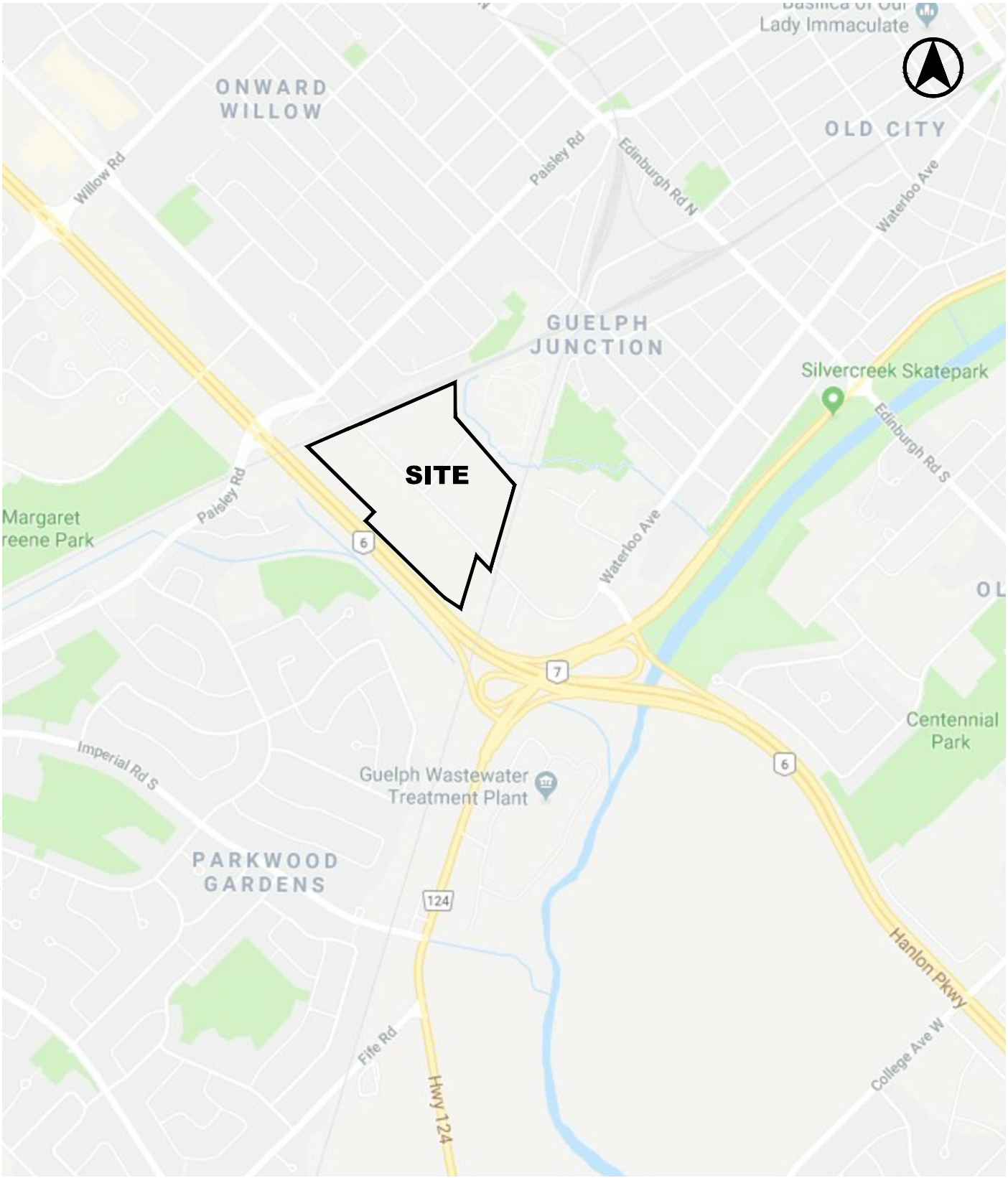
- Hanlon Expressway at Paisley Road signalized intersection;
- Paisley Road at Silvercreek Parkway South signalized intersection;
- Paisley Road at Edinburgh Road signalized intersection;
- Waterloo Avenue at Edinburgh Road signalized intersection;
- Wellington Street at Edinburgh Road signalized intersection;
- Waterloo Avenue at Silvercreek Parkway South unsignalized intersection;
- Wellington Street at Waterloo Avenue / East Ramp Terminal signalized intersection;
- Wellington Street at West Ramp Terminal signalized intersection;
- Wellington Street at Imperial Road signalized intersection; and
- The development's driveways with Silvercreek Parkway South.

The analysis scenarios are summarized below:

- Existing traffic conditions;
- 2021 future background traffic;
- 2026 future background traffic;
- 2031 future background traffic;
- 2021 future total traffic representing the opening day of development;
- 2026 future total traffic representing five years after opening day; and
- 2031 future total traffic representing ten years after opening day.

The analysis time periods are the weekday a.m. and p.m. peak hour and the Saturday mid-day peak hour.

Analyses of the signalized and unsignalized intersections were carried out using the methods outlined in the *Highway Capacity Manual* (HCM 2000) using the Trafficware Synchro (Version 9.2) software package. Details of the procedures, assumptions, findings, conclusions and recommendations resulting from the study are summarized in subsequent sections of this report.



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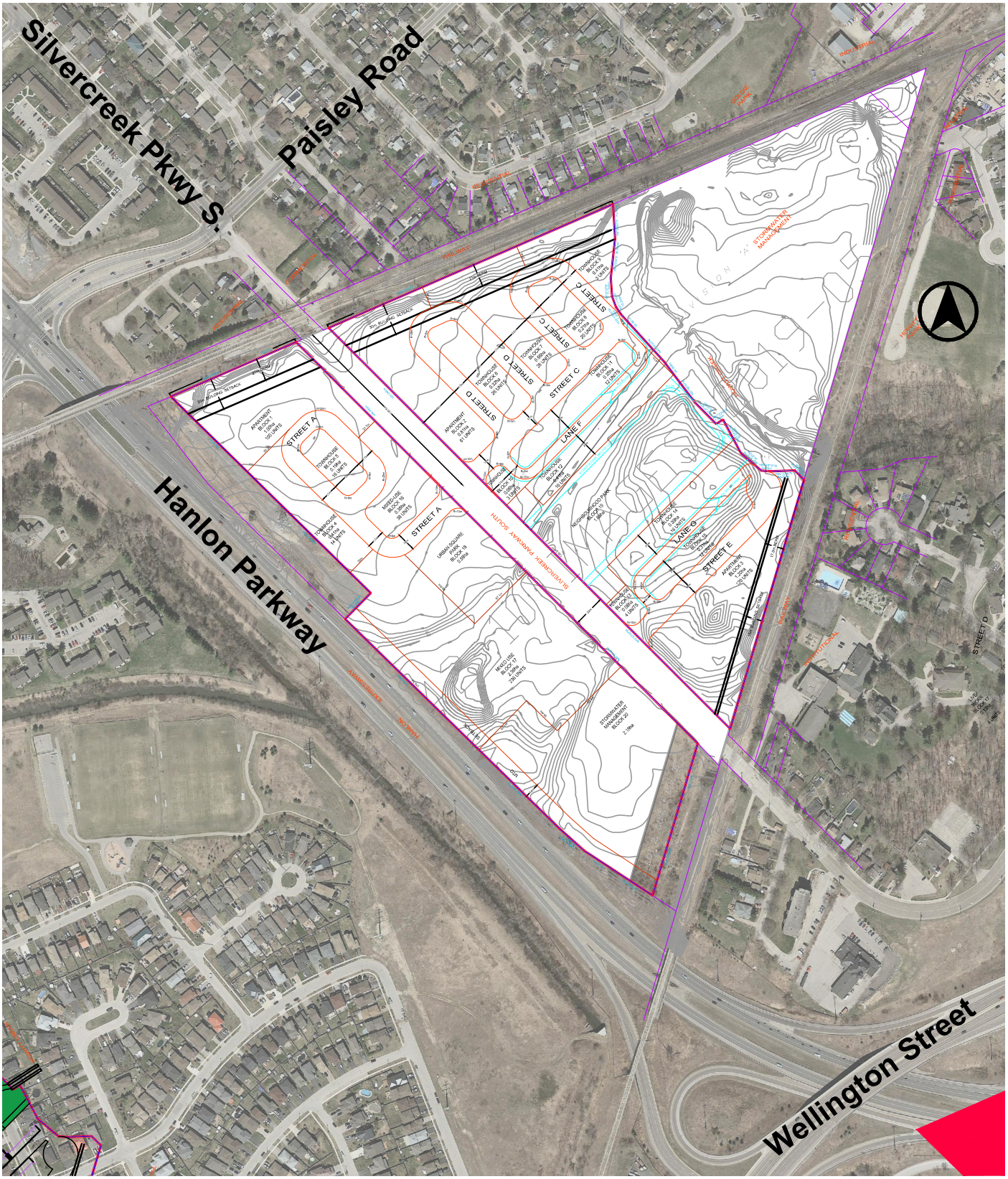
SITE LOCATION

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 1



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SITE CONTEXT

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 2

2.0 DEVELOPMENT PROPOSAL

The Draft Plan of Subdivision proposed by Silvercreek Guelph Developments Limited will implement the *2009 OMB Minutes of Settlement* and the recommended solution from the *2012 Silvercreek Parkway Class EA*. The proposed Draft Plan of Subdivision is included for reference in **Appendix C**. The revised Concept Plan is also provided for illustrative purposes.

The concept plan comprises:

- 777 residential units in a mix of apartments and townhomes; and
- 6,500 m^2 (69,965 ft^2) of commercial uses.

This concept plan differs from the previous concept plan in that the residential uses, permitted in the approved zoning, are proposed rather than the large format retail uses permitted in the same zone. This will result in 590 (48%) and 875 (55%) fewer net new vehicle trips, two-way, in the weekday p.m. and Saturday mid-day peak hours as discussed in further detail in **Section 5.2.1**. At the City's request, Silvercreek Parkway now maintains a straight alignment instead of the curvilinear alignment proposed in the *2012 Silvercreek Parkway Class EA*. Other elements of the concept plan such as the driveway locations to Silvercreek Parkway South and the "Urban Square" format remain unchanged.

3.0 AREA TRANSPORTATION CONTEXT

3.1 EXISTING AREA STREET NETWORK

An overview of area roads surrounding the site area are discussed below and illustrated in **Figure 3.** Existing lane configurations and traffic control are illustrated in **Figure 4**.

3.1.1 Hanlon Expressway

The Hanlon Expressway is a four-lane divided controlled-access highway under the jurisdiction of the Ministry of Transportation of Ontario (MTO). It runs in a north-south direction from Highway 401 to the north end of Guelph with a posted speed limit of 70 km/h through the study area.

The Hanlon Expressway has progressively been upgraded over the years, and the long range objective is that the facility will eventually become a full expressway with grade-separated interchanges and crossovers replacing the existing signal-controlled at-grade intersections. It has a full interchange with Wellington Street West and a signalized at-grade intersection with Paisley Road.

It is our understanding that there is a long-term plan to convert the Hanlon Expressway at Paisley Road intersection to a flyover only and that a new interchange is to be built at Westwood Road. At this time, we are not aware of the specific design of the interchange, planned timing of the upgrade, or whether the project has been incorporated in a budget plan.

3.1.2 Wellington Street

Wellington Street is a major east-west arterial road under the jurisdiction of the City of Guelph. It has a posted speed limit of 60 km/h through the study area and is a four-lane roadway except around the interchange with the Hanlon Expressway where it widens to six lanes plus auxiliary turning lanes. The Hanlon Expressway East and West Ramp Terminal intersections at Wellington Street operate under signal control.

3.1.3 Paisley Road

Paisley Road is an east-west arterial road under the jurisdiction of the City of Guelph. Paisley Road is a four-lane roadway west of Silvercreek Parkway and a two-lane roadway east of Silvercreek Parkway. Paisley Road has a posted speed limit of 50 km/h through the study area as well as a maximum speed limit of 40 km/h when flashing school zone between Ridgewood Avenue and Alma Street. The Paisley Road intersections with Edinburgh Road, Alma Street, Silvercreek Parkway, and the Hanlon Expressway operate under signal control.

3.1.4 Edinburgh Road

Edinburgh Road is a north-south arterial road under the jurisdiction of the City of Guelph. Edinburgh Road is a two-lane roadway with a posted speed limit of 50 km/h through the study area. Approaching the Wellington Street West intersection, Edinburgh Road South widens to a four-lane roadway plus auxiliary turning lanes. Its intersections with Waterloo Avenue and Wellington Street West operate under signal control.

3.1.5 Silvercreek Parkway

Silvercreek Parkway is a four-lane north-south collector road under the jurisdiction of the City of Guelph. South of the CNR mainline, there is no posted speed limit so it is assumed that the statutory speed limit of 50 km/h applies. North of Paisley Road, Silvercreek Parkway North is a four-lane arterial road with a posted speed limit of 50 km/h. Silvercreek Parkway is discontinuous at the CNR mainline.

3.1.6 Waterloo Avenue

Waterloo Avenue is an east-west collector road under the jurisdiction of the City of Guelph. It is a two-lane roadway with no posted speed limit so it is assumed that the statutory speed limit of 50 km/h applies.

3.1.7 Imperial Road

Imperial Road South is a north-south arterial road under the jurisdiction of the City of Guelph. It has a basic three-lane cross-section and a posted speed limit of 50 km/h.

3.2 LOCAL TRANSIT FACILITIES

No transit is provided on Silvercreek Parkway South as it is discontinuous from Silvercreek Parkway North and the site is currently vacant. However transit service is provided on Paisley Road to the north and Waterloo Avenue and Wellington Street West to the south. The existing area transit context is illustrated in **Figure 5**. A brief summary of the current area transit services is provided below.

3.2.1 Route 9 Waterloo

Route 9 Waterloo runs between Guelph Central Station and Elmira Road on the westerly edge of Guelph along Waterloo Avenue and Wellington Street West Monday to Friday from approximately 6:00 a.m. to 1 a.m. at 30 minute headways. The closet stops to the site for this route are located on Waterloo Avenue between Beechwood Avenue and Woodycrest Drive.

3.2.2 Route 10 Imperial

Route 10 Imperial runs between Guelph Central Station and the West End Community Centre along Paisley Road, Westwood Road, and Imperial Road, Monday to Friday from approximately 6:00 a.m. to 1 a.m. at 20 minute headways during the peak hours. The closet stops to the site for this route are located on Paisley Road immediately east of Silvercreek Parkway North.

3.2.3 Route 17 Woodlawn Watson

Route 17 Woodlawn Watson runs in a circular clockwise direction near the periphery of the west, north and east City limits and the University Guelph along Stone Road, Hanlon Expressway, Wellington Street West, Elmira Road, Imperial Road, Woodlawn Road, Victoria Road, Eastview Road, Watson Parkway, and York Road. Service is provided Monday to Friday from approximately 6:00 a.m. to 1:00 p.m. in 30 minute headways. The closet stop to the site for this route is located on Wellington Street West east of Imperial Road South.

3.2.4 Route 18 Watson Woodlawn

Route 18 Watson Woodlawn runs in a circular counter-clockwise direction near the periphery of the west, north, and east City limits and the University of Guelph using the same roads as Route 17 (Stone Road, Hanlon Expressway, Wellington Street West, Elmira Road, Imperial Road, Woodlawn Road, Victoria Road, Eastview Road, Watson Parkway, and York Road) but in the opposite direction. Service is provided Monday to Friday from approximately 6:00 a.m. to 1:00 p.m. in 30 minute headways. The closet stop to the site for this route is located on Wellington Street West east of Imperial Road South.

3.3 ACTIVE TRANSPORTATION FACILITIES

The active transportation context is illustrated in **Figure 6**.

Sidewalks are provided on the east/north sides of Silvercreek Parkway South. No dedicated cycling facilities are currently provided on Silvercreek Parkway South.

Sidewalks and bike lanes are provided on both sides of Waterloo Avenue through the study area.

On Wellington Street West, paved shoulders are provided across the Hanlon Expressway to a short distance beyond the Howitt Creek crossing where the paved shoulder on the south side ends and the paved shoulder on the north side turns northward and connects into Bristol Street on the north side. No sidewalks are provided on Wellington Street West.

Sidewalks are provided on both sides of Silvercreek Parkway North, north of Paisley Road, both sides of Paisley Road, and both sides of Edinburgh Road through the study area.

For recreational purposes, the Royal Recreational Trail which forms part of the Eramosa River Trail runs along the north and south sides of the speed River south of Wellington Street West.

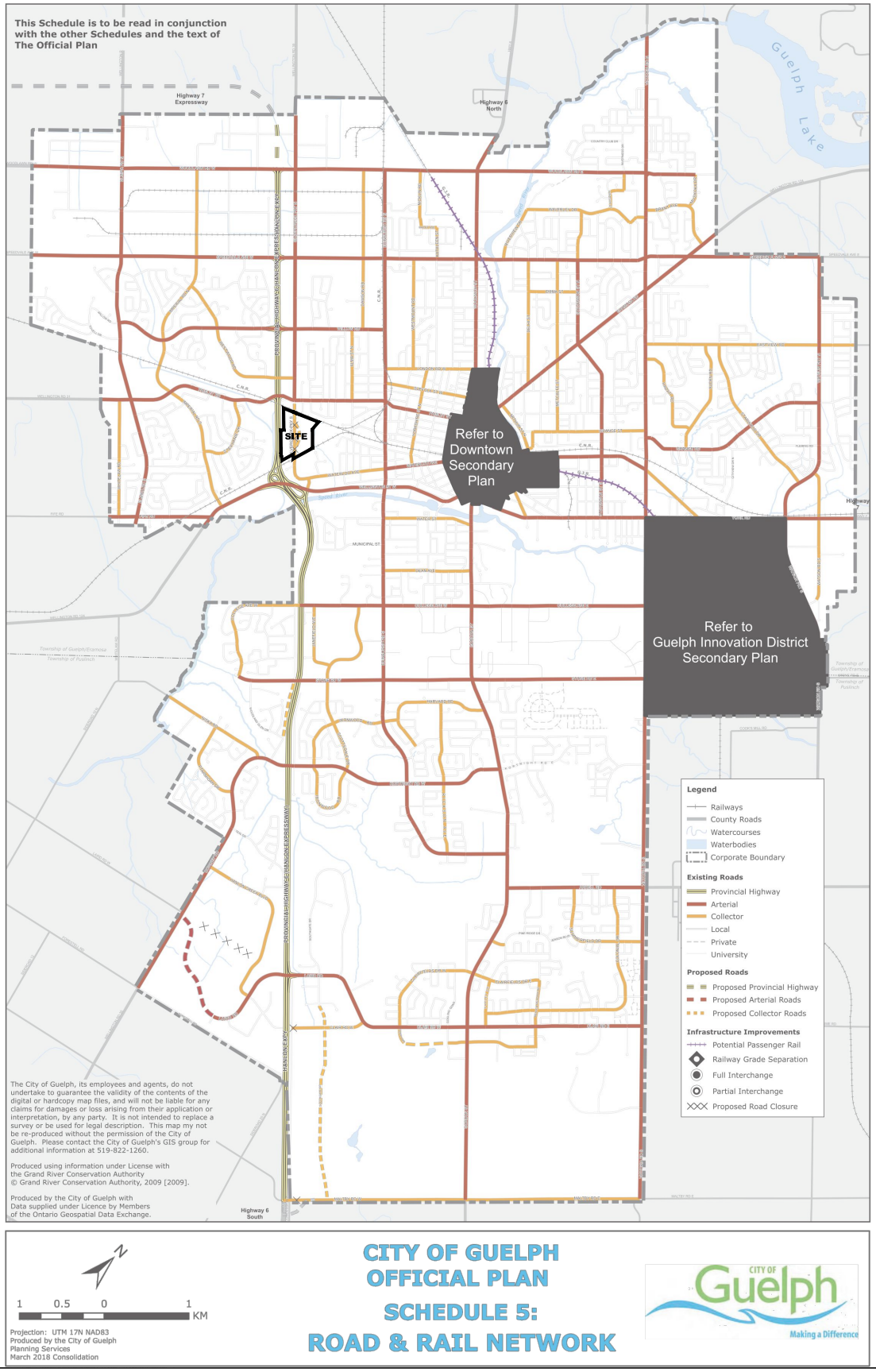
3.4 EXISTING TRAFFIC VOLUMES

Baseline traffic volumes for the study area intersections were undertaken from traffic counts undertaken by Spectrum Traffic Data Inc. as commissioned by BA Group. The traffic counts adopted as the basis for the traffic operations analysis undertaken to assess the operational impacts of the proposed development is summarized in **Table 1**. The turning movement counts are attached for reference in **Appendix D**.

TABLE 1 TRAFFIC DATA INFORMATION

Intersection	Date	Conducted By
Hanlon Expressway at Paisley Road	Tuesday February 13, 2018 Saturday February 24, 2018	Spectrum Traffic Data for BA Group
Paisley Road at Silvercreek Parkway South	Tuesday February 13, 2018 Saturday February 24, 2018	Spectrum Traffic Data for BA Group
Paisley Road at Edinburgh Road	Tuesday February 13, 2018 Saturday February 24, 2018	Spectrum Traffic Data for BA Group
Waterloo Avenue at Edinburgh Road	Tuesday February 13, 2018 Saturday February 24, 2018	Spectrum Traffic Data for BA Group
Wellington Street at Edinburgh Road	Tuesday February 13, 2018 Saturday February 24, 2018	Spectrum Traffic Data for BA Group
Waterloo Avenue at Silvercreek Parkway South	Tuesday February 13, 2018 Saturday February 24, 2018	Spectrum Traffic Data for BA Group
Wellington Street at Waterloo Avenue / East Ramp Terminal	Tuesday February 13, 2018 Saturday February 24, 2018	Spectrum Traffic Data for BA Group
Wellington Street at West Ramp Terminal	Tuesday February 13, 2018 Saturday February 24, 2018	Spectrum Traffic Data for BA Group
Wellington Street at Imperial Road	Tuesday February 13, 2018 Saturday February 24, 2018	Spectrum Traffic Data for BA Group

The existing traffic volumes are illustrated in **Figure 7**.



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AREA ROAD NETWORK

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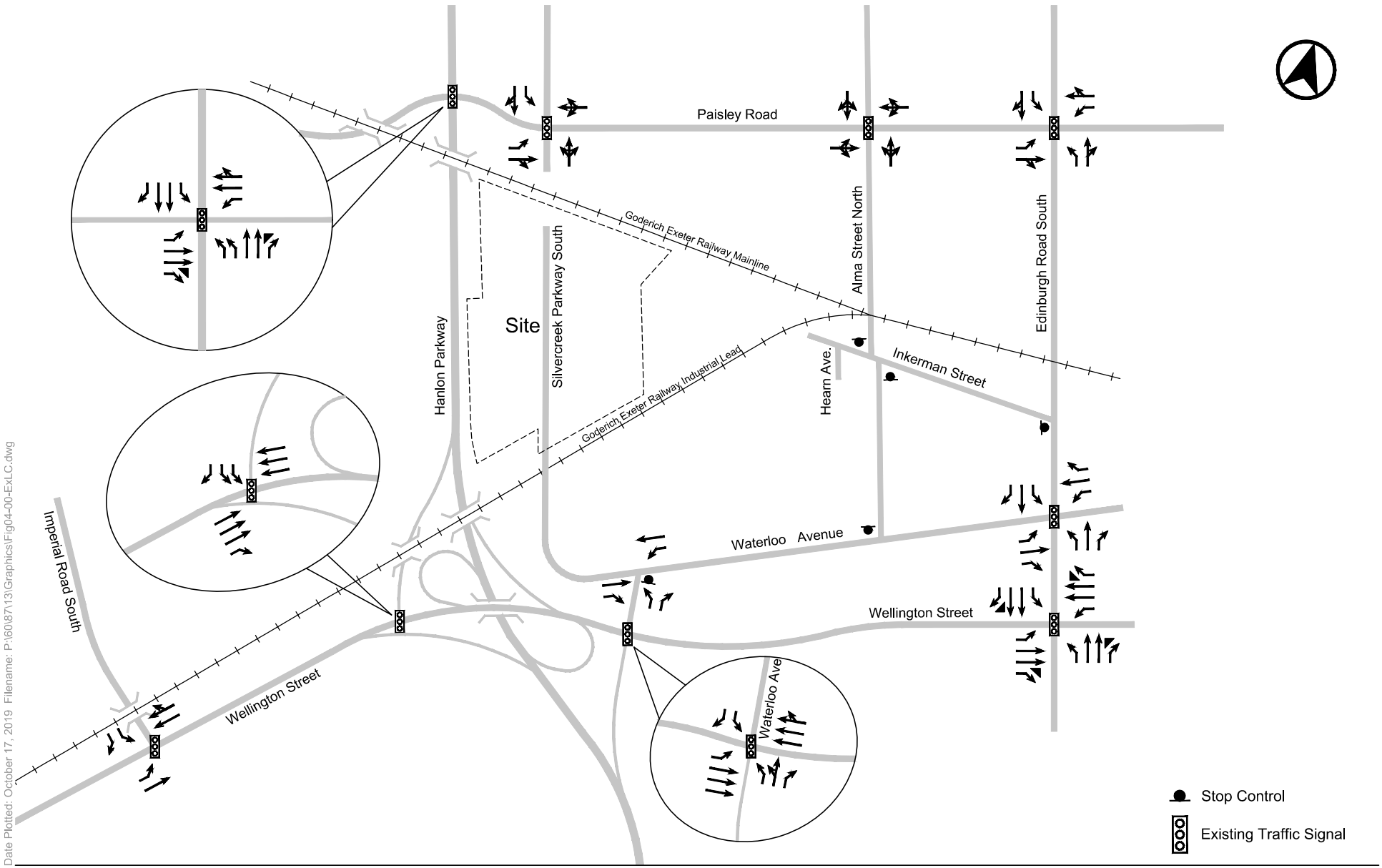
Silvercreek Parkway
6087-13 October 2019

Figure 3



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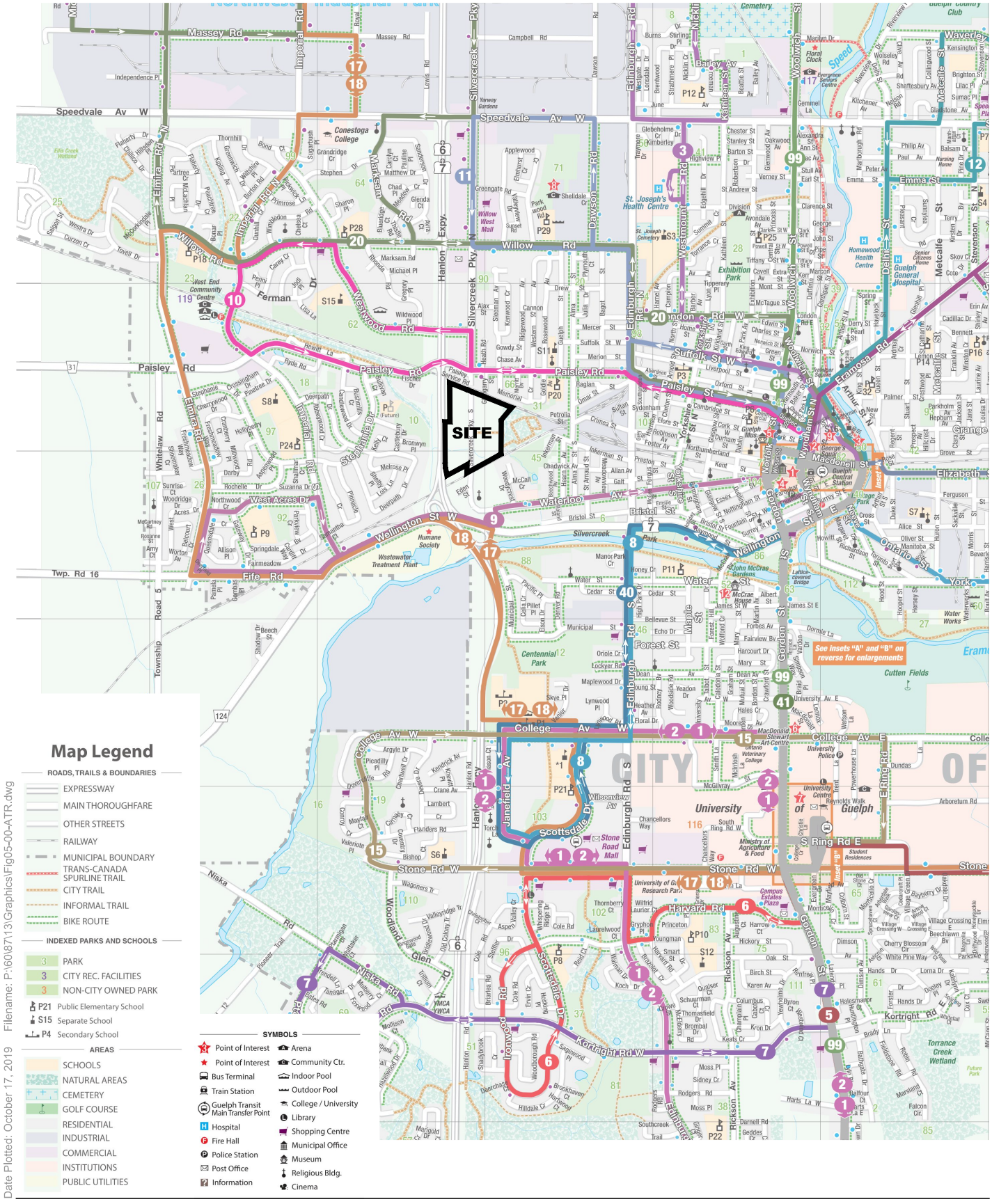
EXISTING LANE CONFIGURATIONS AND TRAFFIC CONTROL

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 4

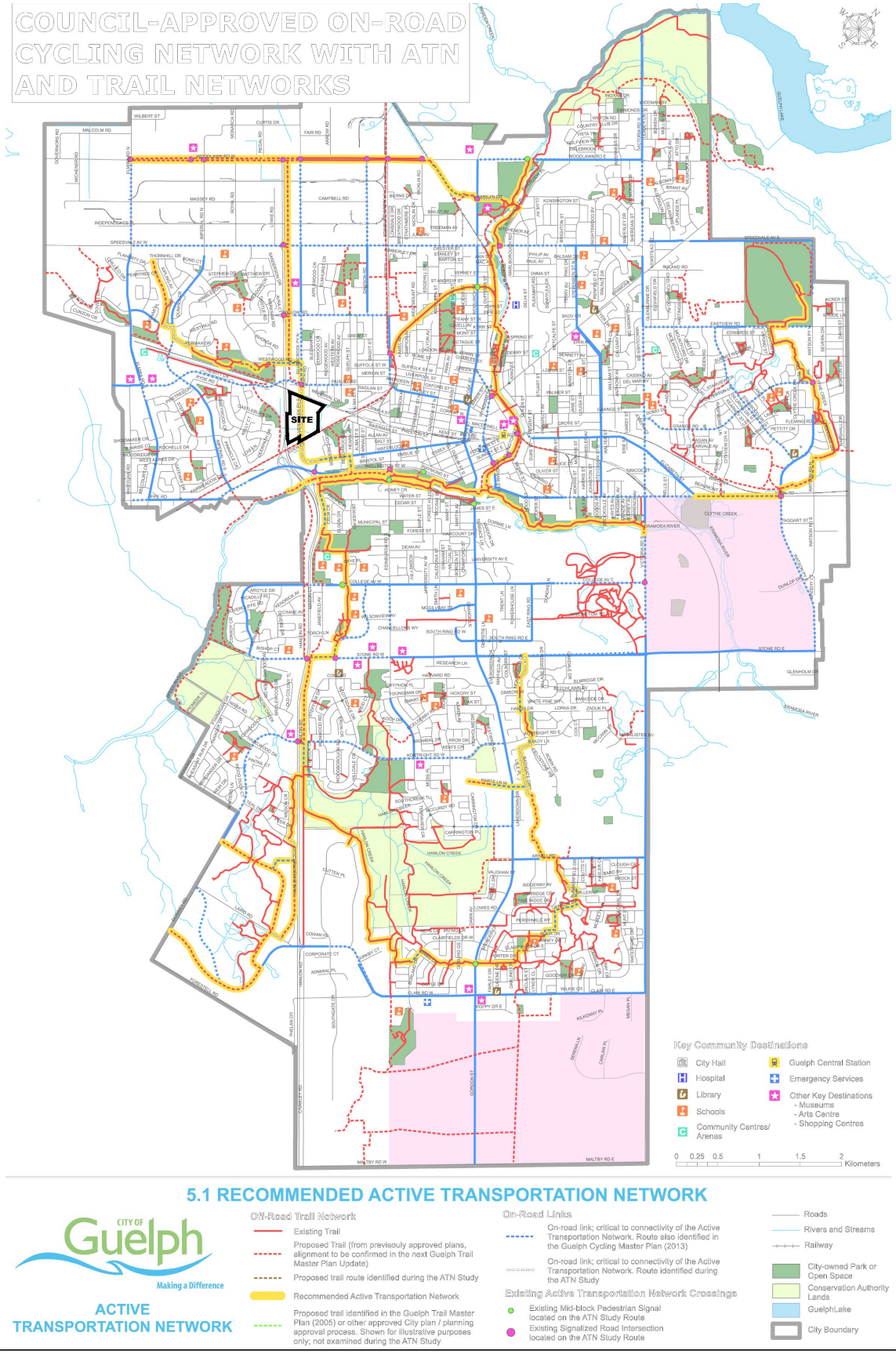


AREA TRANSIT ROUTES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 5



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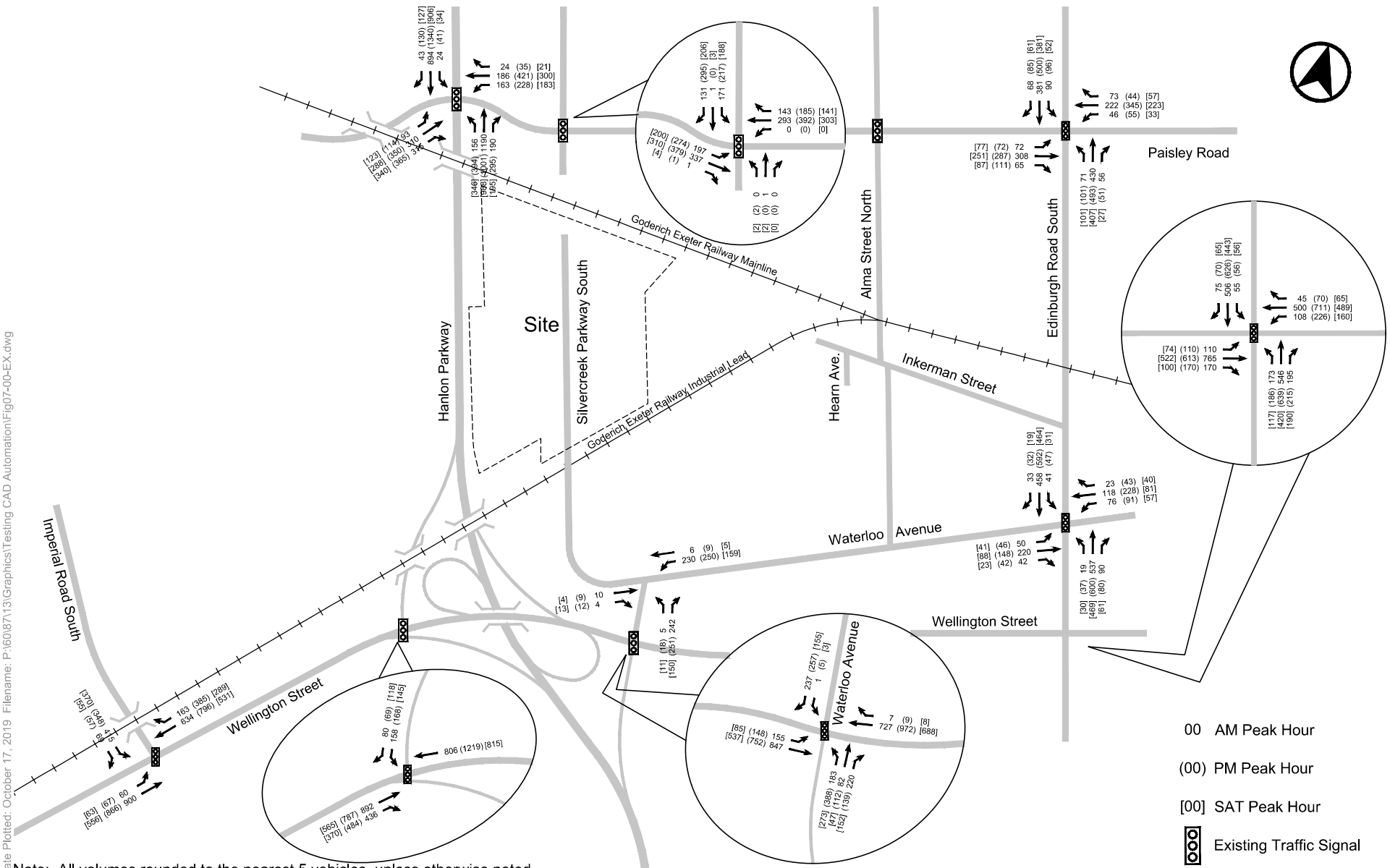
ACTIVE TRANSPORTATION CONTEXT

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 6



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Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

EXISTING TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 7

4.0 TRANSPORTATION DEMAND MANAGEMENT PLAN

The Transportation Demand Management (TDM) Plan is to guide the provision of viable alternative personal transportation options beyond the single-occupant, private automobile. This plan intends to support the proposed development by outlining Transportation Demand Management (TDM) measures and the suite of strategies under consideration to promote the use of more active and sustainable modes; respond to the mobility needs of travellers to and from the site; and to reduce the overall dependence on the private automobile. The location of the site and its surrounding uses greatly influences the viability and success of a TDM plan.

The existing site context provides for frequent public transit services, cyclist and pedestrian connectivity. While strong opportunities exist in the area infrastructure to accommodate sustainable transportation practices, the ability to fully leverage these opportunities is granted by the success of the implementation of the plan.

4.1 POTENTIAL TDM STRATEGIES

Measures from the TDM Plan will be incorporated into this site development to minimize the need to own a personal vehicle or use an automobile when travelling to and from the site. It is important to encourage and facilitate the use of non-automobile travel modes on a daily basis. A summary of the TDM Plan strategies are provided in **Table 2**.

TABLE 2 POTENTIAL TDM STRATEGIES

Category	Intent	Implementation
Land Use Integration	Propose a mixed-use development with compatible land uses to facilitate a complementary range of mutually-supportive services. These uses provide for a level of convenience that reduces the need to travel off-site by automobile for typical daily activity.	• Provide a mix of supportive land uses such as residential and commercial with good pedestrian connectivity
Transit Use	Support and promote the use of area transit services trips to/from the site to reduce vehicle usage.	• Investigate opportunities for Guelph Transit to provide service along Silvercreek Parkway through the site as well as the required transit stop facilities; • Promote transit usage through the provision of transit information to new residents and employees as part of their welcome packages; • Promote transit usage through the provision of a free month's of travel on Guelph Transit for new residents and employees; and • Provide convenient, high-quality and accessible pedestrian connections oriented towards adjacent transit stop facilities.

Bicycle Facilities	Bicycle use is a convenient and viable travel alternative to the personal automobile. The proximity of the site to the proposed bike lanes on Silvercreek Parkway South (*2012 Silvercreek Parkway EA*), Silvercreek Parkway North and Paisley Road (*2013 City Cycling Master Plan, 2017 Active Transportation Network Study*), existing bike lanes on Waterloo Avenue, and off-road trails on the south side of the Speed River provide safe, reliable pathways to connect into downtown Guelph and other areas of the City.	• As identified in the *2012 Silvercreek Parkway EA*, bike lanes would be provided on both sides of Silvercreek Parkway South; • Provide short-term bicycle parking in the Urban Square area as well as in front of the commercial buildings; • Provide long-term bicycle parking in the form of bike lockers or similar designs in the Urban Square; and • Provide bicycle repair stations in the Urban Square Area in close proximity to the short and long-term bicycle parking areas.
Pedestrian Connectivity	The quality of the public realm and pedestrian accessibility surrounding the site influences the mobility choices of residents and employees. A high-quality, safe, connection between the site and transit stops, cycling network, and public street system encourages residents and employees to travel to and from the site without the use of a vehicle.	• As identified in the *2012 Silvercreek Parkway EA*, sidewalks would be provided on both sides of Silvercreek Parkway South; • Provide high-quality, safe pedestrian-scale connections from the site to the surrounding public street network; • Maintain on-site pedestrian facilities to enable year-round pedestrian access and usage; and • Enhance the quality of the public realm through provision of pedestrian-scale landscaping and appropriate sidewalk widths.
Vehicle Parking	Parking resources will be allocated to incentivize travel by modes other than single-person car trips.	• Provide reserved parking spaces for carpool vehicles in areas around the commercial uses; and • Investigate opportunities to provide a car share on site through VRTUCAR or other providers.

5.0 TRAVEL DEMAND FORECASTING

5.1 FUTURE BACKGROUND TRAFFIC

5.1.1 Corridor Growth

In order to understand the implications of the proposed development in the context of corridor growth on the study area roadways, historical traffic volumes were reviewed. The calculated per annum growth rates for each of the roadways at representative locations are summarized in **Table 3**.

TABLE 3 HISTORICAL TRAFFIC GROWTH

Road	Section	2005 Traffic Volume Two-Way		2018 Traffic Volumes Two-Way		Growth (% p.a.)	
		PM	SAT	PM	SAT	PM	SAT
Imperial Road	North of Highway 7	835	700	857	777	0.2%	0.8%
Highway 7	West of Highway Hanlon Expressway	2460	1520	2559	1868	0.3%	1.6%
	West of Waterloo Avenue	2235	1500	2517	1738	0.9%	1.1%
Wellington Street	West of Edinburgh Road	1670	1175	1860	1367	0.8%	1.2%
Edinburgh Road South	South of Waterloo Avenue	1595	1200	1442	1104	-0.8%	-0.6%
Waterloo Avenue	East of Silvercreek Parkway	660	340	519	318	-1.8%	-0.5%
Hanlon Expressway	South of Paisley Road	3360	2490	3617	2955	0.6%	1.3%
Silvercreek Parkway	North of Paisley Road	1060	905	971	740	-0.7%	-1.5%
Paisley Road	West of Edinburgh Road	1060	730	1001	800	-0.4%	0.7%
	West of Silvercreek Parkway	1345	1040	1343	1025	0.0%	-0.1%

Notes:
1. 2005 traffic volumes obtained from Traffic Impact Study for Proposed Retail Development on Lafarge Lands, January 2006, BA Group.

Based on this information, the following rates were adopted:

- Hanlon Expressway – 1.5% per annum;
- Wellington Street – 1.5% per annum;
- Waterloo Avenue – 0.5% per annum;
- Imperial Road – 0.5% per annum;
- Paisley Road – 0.5% per annum; and
- Edinburgh Road – 0.5% per annum.

These growth rates are generally consistent with the growth rates used in the *Traffic Impact Study Update (April 2012)* and have been confirmed with City of Guelph staff.

5.1.2 Specific Development Allowances

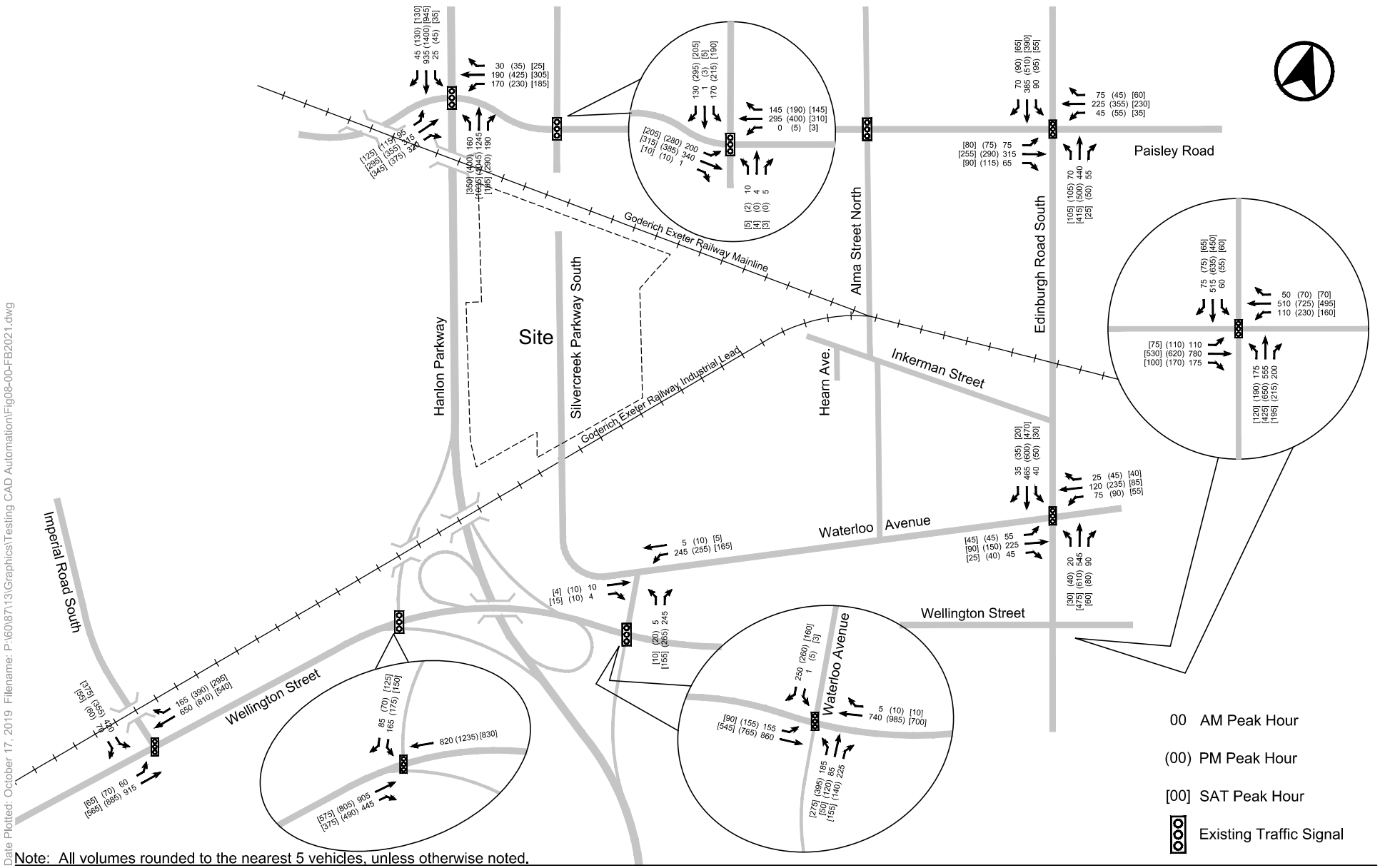
Based on discussions with City staff, an allowance was made for the traffic generated by the proposed 89 Beechwood Avenue development. Based on the letter report prepared in support of the 89 Beechwood Avenue development by Salvini Consulting and dated March 20, 2018, 23 townhouse units are proposed which would generate 11 and 14 new trips in the weekday a.m. and p.m. peak hours, respectively. This information is summarized in **Table 4**.

TABLE 4 AREA DEVELOPMENTS

Development Location	Development Statistics	Transportation Study	PM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
89 Beechwood Avenue	23 residential units	Salvini Consulting, March 20, 2018	3	8	11	9	5	14

5.1.3 Future Background Traffic Forecasts

The future background traffic forecasts comprising the existing traffic volumes with the addition of area background development traffic allowances and corridor growth are illustrated in **Figure 8**, **Figure 9**, and **Figure 10** for the 2021, 2026 and 2031 horizon years, respectively.



Date Plotted: October 17, 2019 Filename: P:\60\87\13\Graphics\Testing CAD Automation\Fig08-00-FB2021.dwg

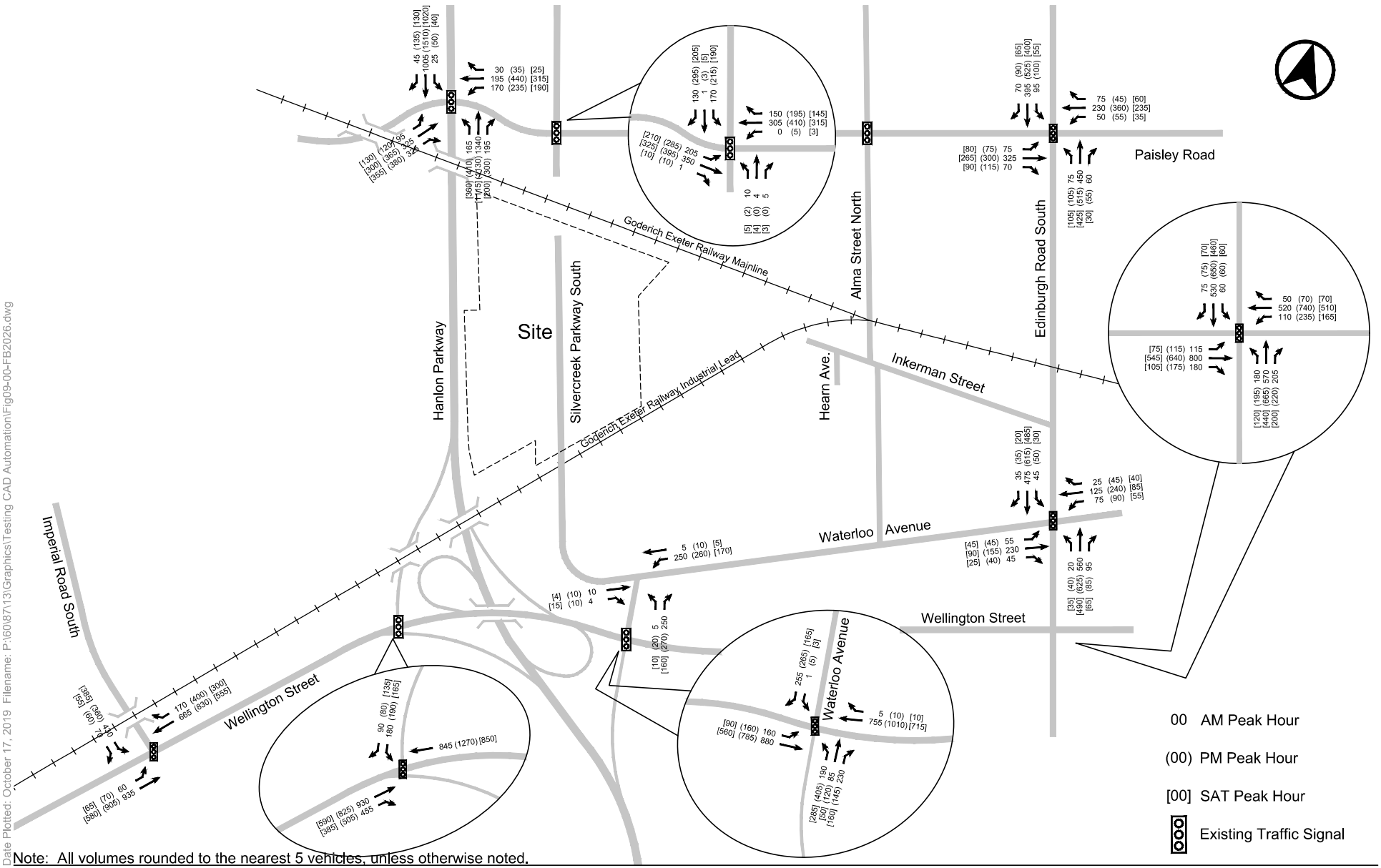
Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

2021 FUTURE BACKGROUND TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 8



Date Plotted: October 17, 2019 Filename: P:\60\87\13\Graphics\Testing CAD Automation\Fig09-00-FB2026.dwg

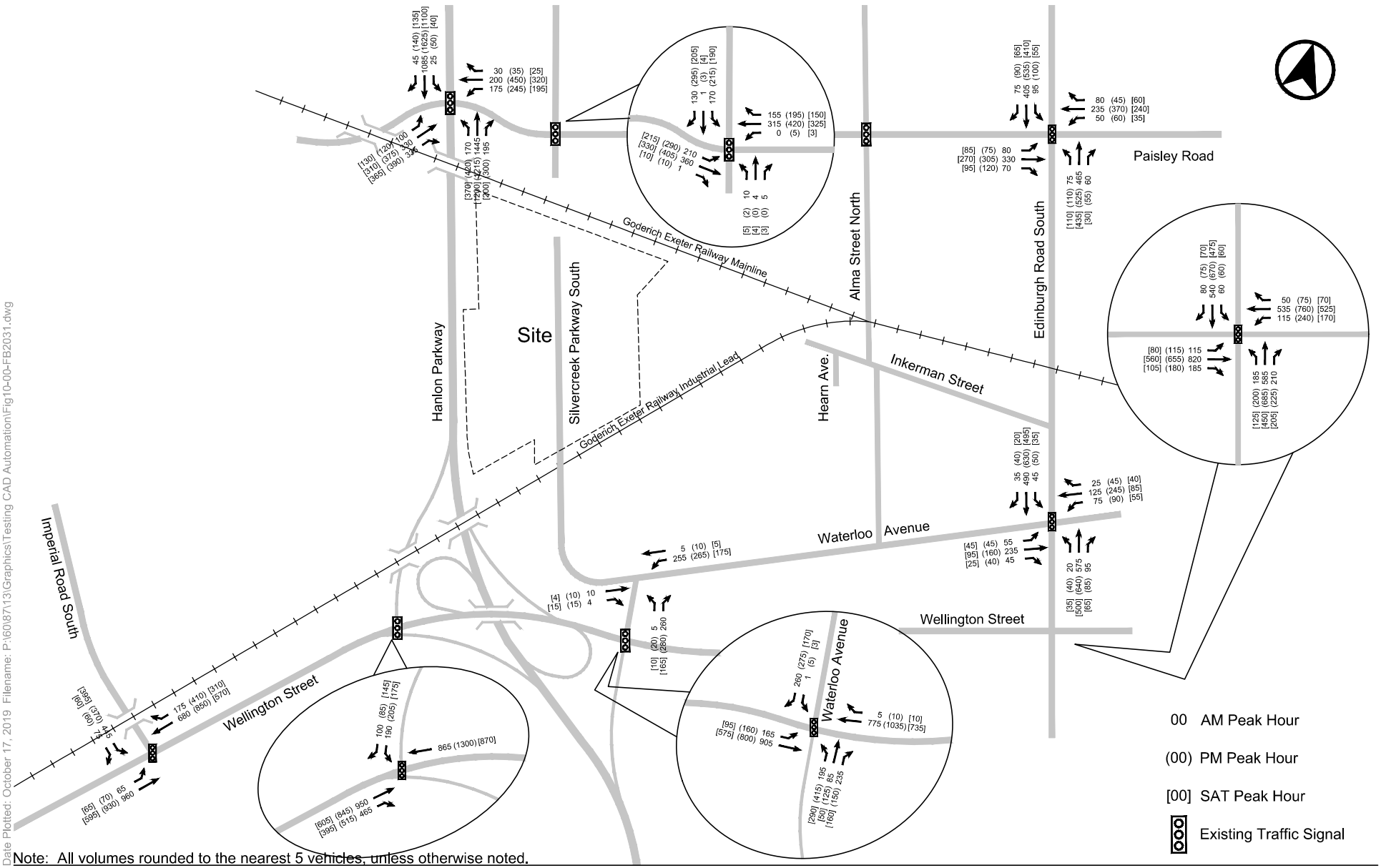
Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

2026 FUTURE BACKGROUND TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 9



Date Plotted: October 17, 2019 Filename: P:\60\87\13\Graphics\Testing CAD Automation\Fig10-00-FB2031.dwg

Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

2031 FUTURE BACKGROUND TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 10

5.2 SITE TRAFFIC

5.2.1 Trip Generation

The site traffic volumes were generated based on rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*. These rates and the resultant trips are summarized in **Table 5.**

TABLE 5 SITE TRIP GENERATION

Land Use	Size	AM Peak Hour			PM Peak Hour			Sat. Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise)[1]	*Rate (trips per unit)*	*0.11*	*0.35*	*0.46*	*0.35*	*0.21*	*0.56*	*0.34*	*0.36*	*0.70*
	202 units	25	70	95	70	45	115	70	70	140
Multifamily Housing (Mid-Rise)[2]	*Rate (trips per unit)*	*0.09*	*0.27*	*0.36*	*0.27*	*0.17*	*0.44*	*0.22*	*0.22*	*0.44*
	575 units	50	155	205	155	100	255	130	125	255
Commercial[3]	*Rate (trips per 1,000 ft²)*	*1.66*	*1.01*	*2.67*	*2.86*	*3.10*	*5.96*	*3.47*	*3.20*	*6.67*
	6,500 m² GFA (69,965 ft²)	115	70	185	200	215	415	240	225	465
Commercial Interactions	10% reduction	--	--	--	-20	-20	-40	-25	-20	-45
Net Commercial		115	70	185	180	195	375	215	205	420
Pass-by	25% PM 20% Sat.	--	--	--	-45	-45	-90	-40	-40	-80
Net New Trips		**190**	**295**	**485**	**360**	**295**	**655**	**375**	**360**	**735**
Silvercreek (2012) Phase 1, 2 & 3 (Option 1) Net New Trips		--	--	--	610	635	1,245	835	775	1,610
Difference					-250	-340	-590	-460	-415	-875

Notes:
1. ITE Land Use Code 220. Sat Inbound/Outbound split is as per ITE Land Use Code 221
2. ITE Land Use Code 221
3. ITE Land Use Code 820 Fitted Curve

The site is expected to generate 485, 655, and 735 net new trips, two-way, in the weekday a.m. and p.m. and Saturday mid-day peak hours, respectively. This represents an approximate 48% and 55% reduction in the net new trips generated from the previous 2012 concept plan in the weekday p.m. peak hour and Saturday mid-day peak hour, respectively.

5.2.2 Trip Distribution

A trip distribution for the commercial and residential trips was developed based on 2016 Transportation Tomorrow Survey (TTS) data. This distribution is summarized in **Table 6** with the TTS data attached for reference in **Appendix E**.

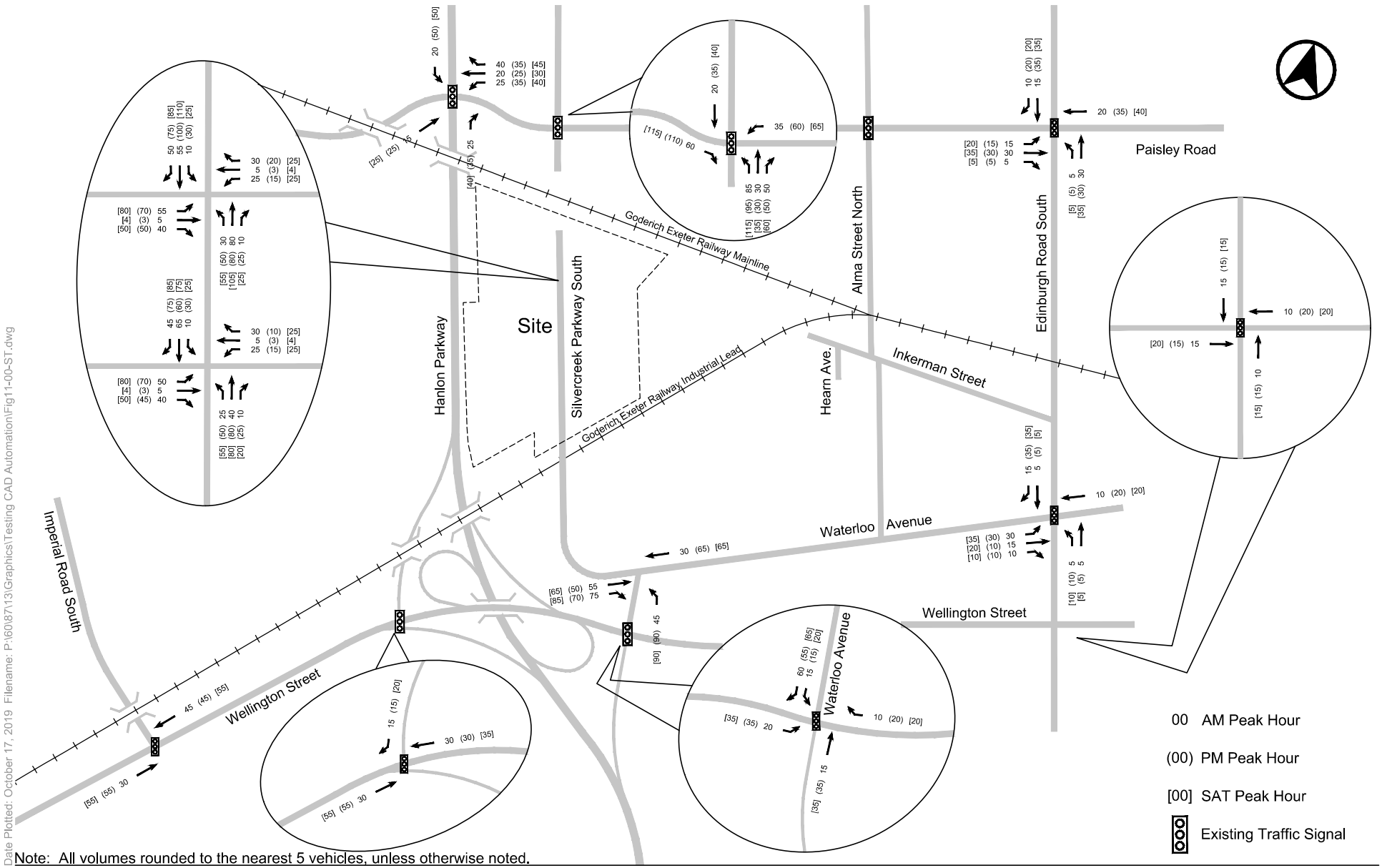
TABLE 6 TRIP DISTRIBUTION

Direction	Road	Commercial	Residential
North	Hanlon Expressway	10%	15%
	Silvercreek Parkway	10%	10%
	Edinburgh Road	15%	15%
East	Paisley Road	10%	10%
	Waterloo Avenue	5%	5%
	Wellington Street	5%	5%
South	Hanlon Expressway	15%	15%
	Edinburgh Road	5%	5%
West	Wellington Street	15%	15%
	Paisley Road	10%	5%
Total		**100%**	**100%**

The primary site traffic assignments are illustrated in **Figure 11**. The pass-by site traffic assignments are illustrated in **Figure 12.**

5.3 FUTURE TOTAL TRAFFIC FORECASTS

The future total traffic volumes were derived by combining the future background traffic and the site generated traffic. The resulting future total traffic volumes are illustrated in **Figure 13**, **Figure 14**, and **Figure 15** for the 2021, 2026 and 2031 horizon years, respectively.



Date Plotted: October 17, 2019 Filename: P:\60\87\13\Graphics\Testing CAD Automation\Fig11-00-ST.dwg

Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

SITE TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
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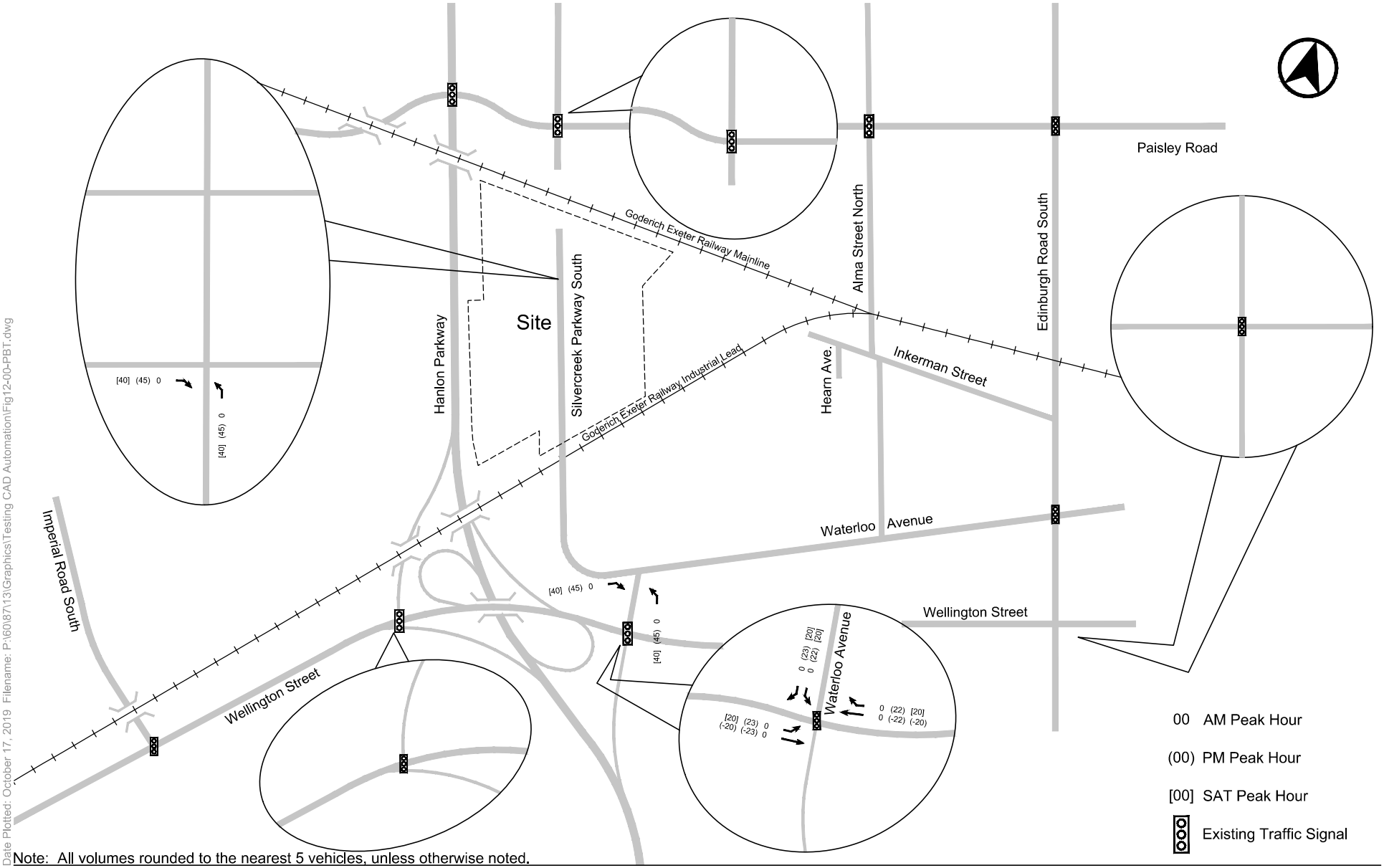
Figure 11



Date Plotted: October 17, 2019 Filename: P:\60\87\13\Graphics\Testing CAD Automation\Fig12-00-PBT.dwg

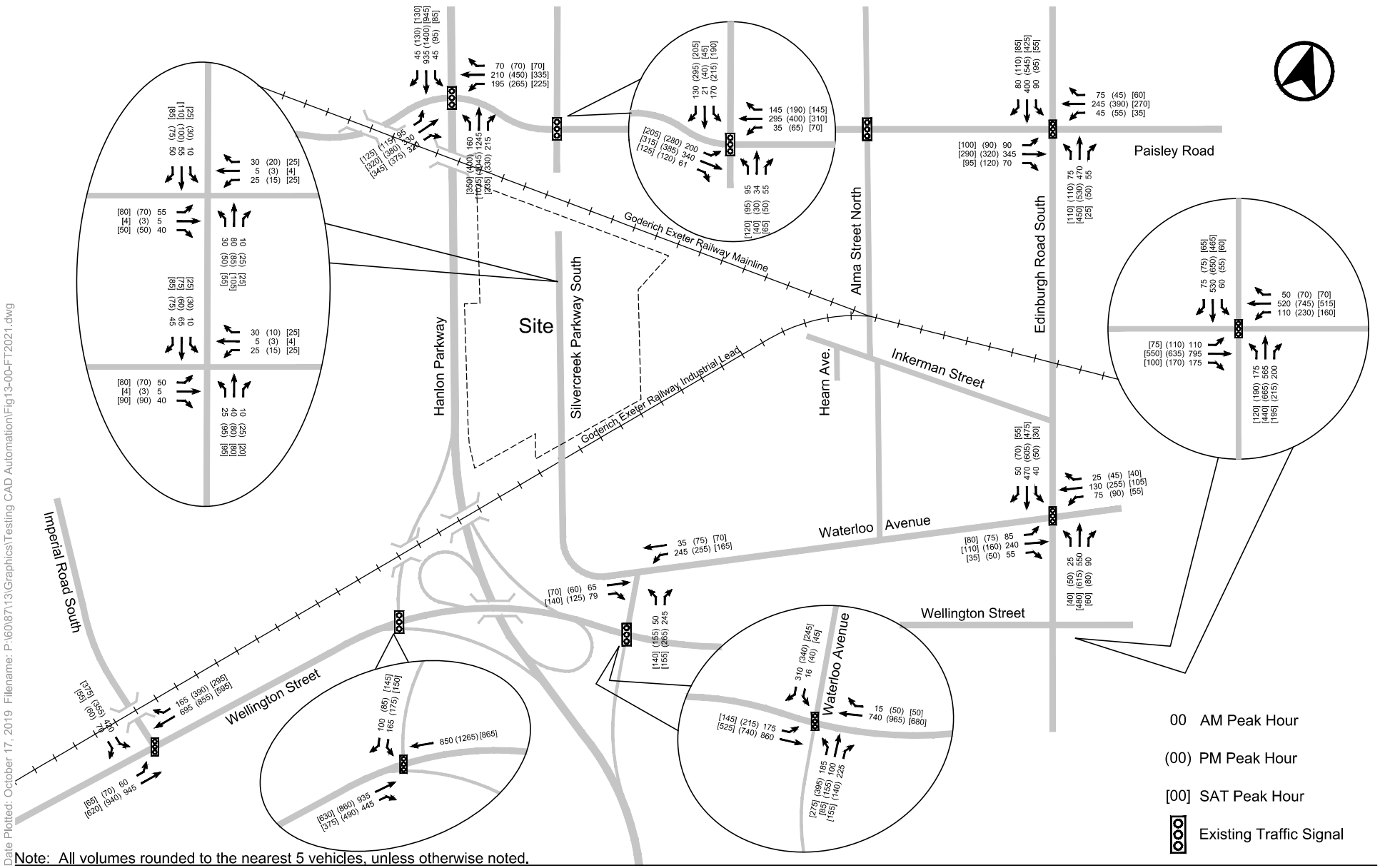
Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

PASS-BY TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 12



Date Plotted: October 17, 2019 Filename: P:\60\87\13\Graphics\Testing CAD Automation\Fig13-00-FT2021.dwg

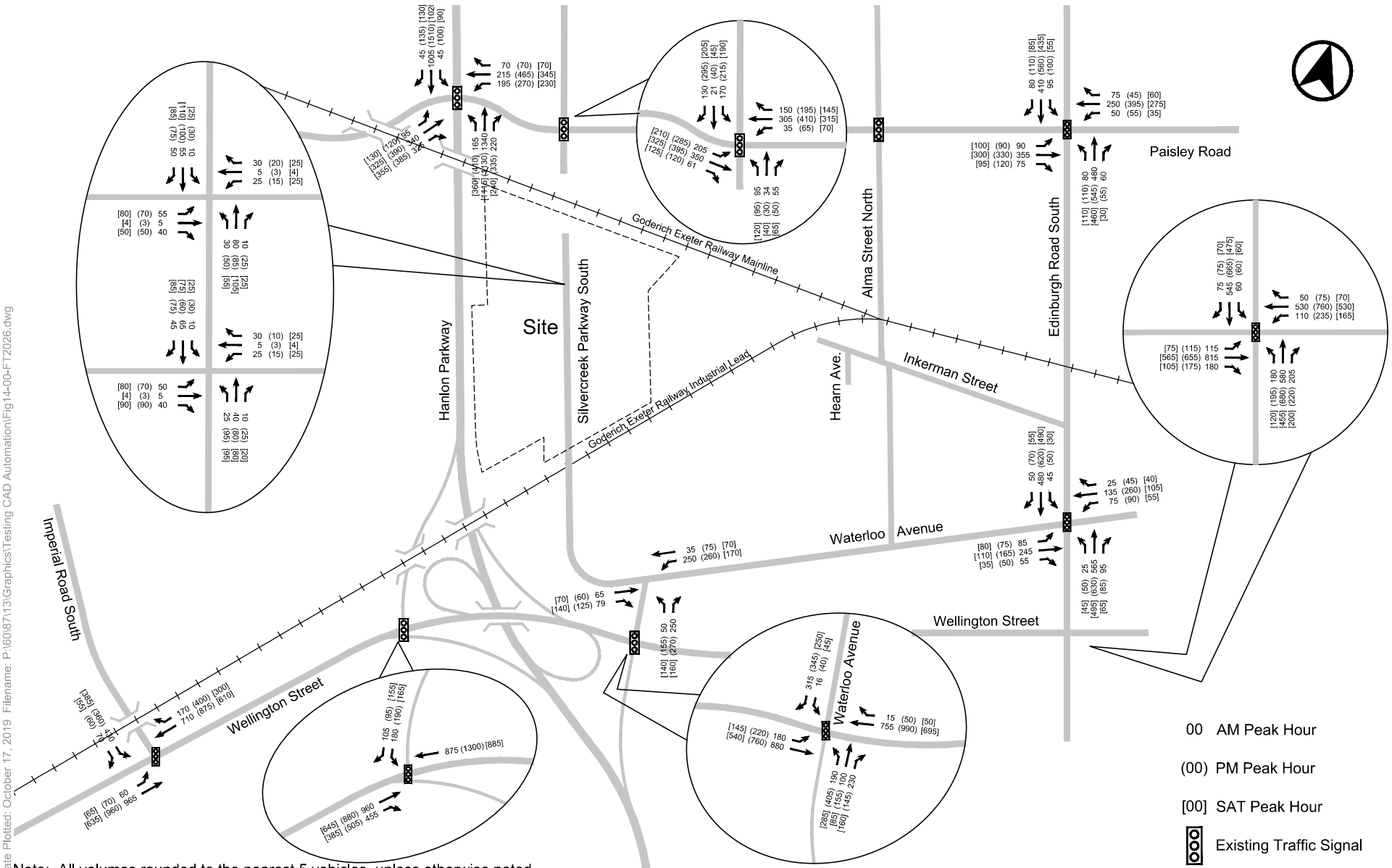
Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

2021 FUTURE TOTAL TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 13



Date Plotted: October 17, 2019 Filename: P:\60\87113\Graphics\Testing CAD Automation\Fig14-00-FT2026.dwg

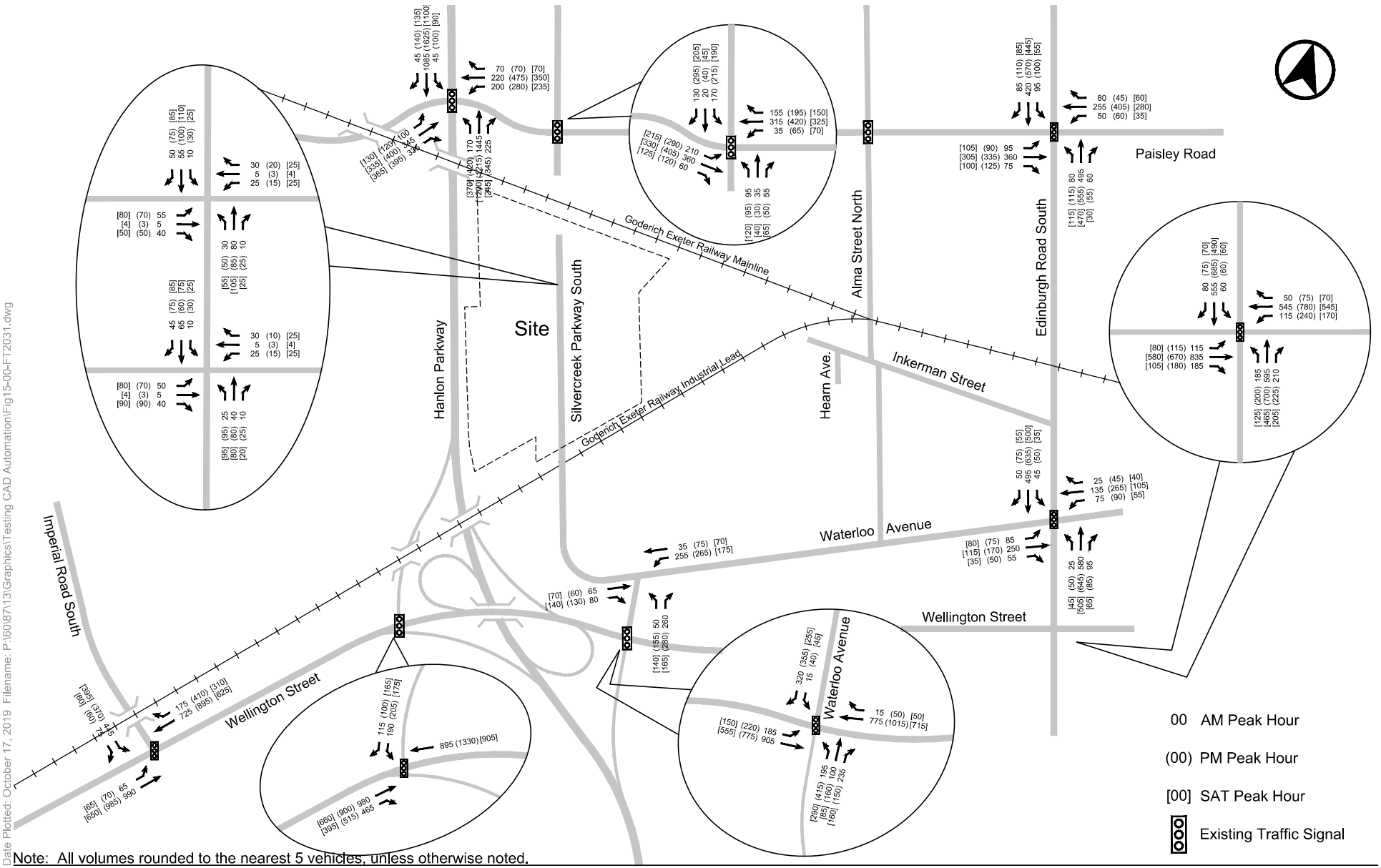
Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

2026 FUTURE TOTAL TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 14



Date Plotted: October 17, 2019 Filename: P:\60\87\13\Graphics\Testing CAD Automation\Fig15-00-FT2031.dwg

Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

2031 FUTURE TOTAL TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 15

6.0 TRAFFIC OPERATIONS

6.1 METHODOLOGY

Traffic operations analyses have been completed using the Trafficware Synchro (Version 9.2) software package in accordance with the methodologies outlined in the *Highway Capacity Manual* (HCM 2000), the City of Guelph's *Transportation Impact Study Guidelines (April 2016)*, and the Ministry of Transportation's General *Guidelines for the Preparation of Traffic Impact Studies (December 2009)*.

The key performance indicator of the signalized intersection evaluation is the volume to capacity (v/c) ratio where a v/c ratio of 1.00 indicates 'at capacity' conditions, i.e. when an intersection movement is processing its theoretical maximum number of vehicles.

The key performance indicator of the unsignalized intersection analysis is the average delay per vehicle (in seconds) and its associated level of service (LOS) designation, ranging from LOS A (minimal delay) to LOS F (extended delay), with respect to the relative time for a motorist to complete a travel movement at an unsignalized intersection or driveway.

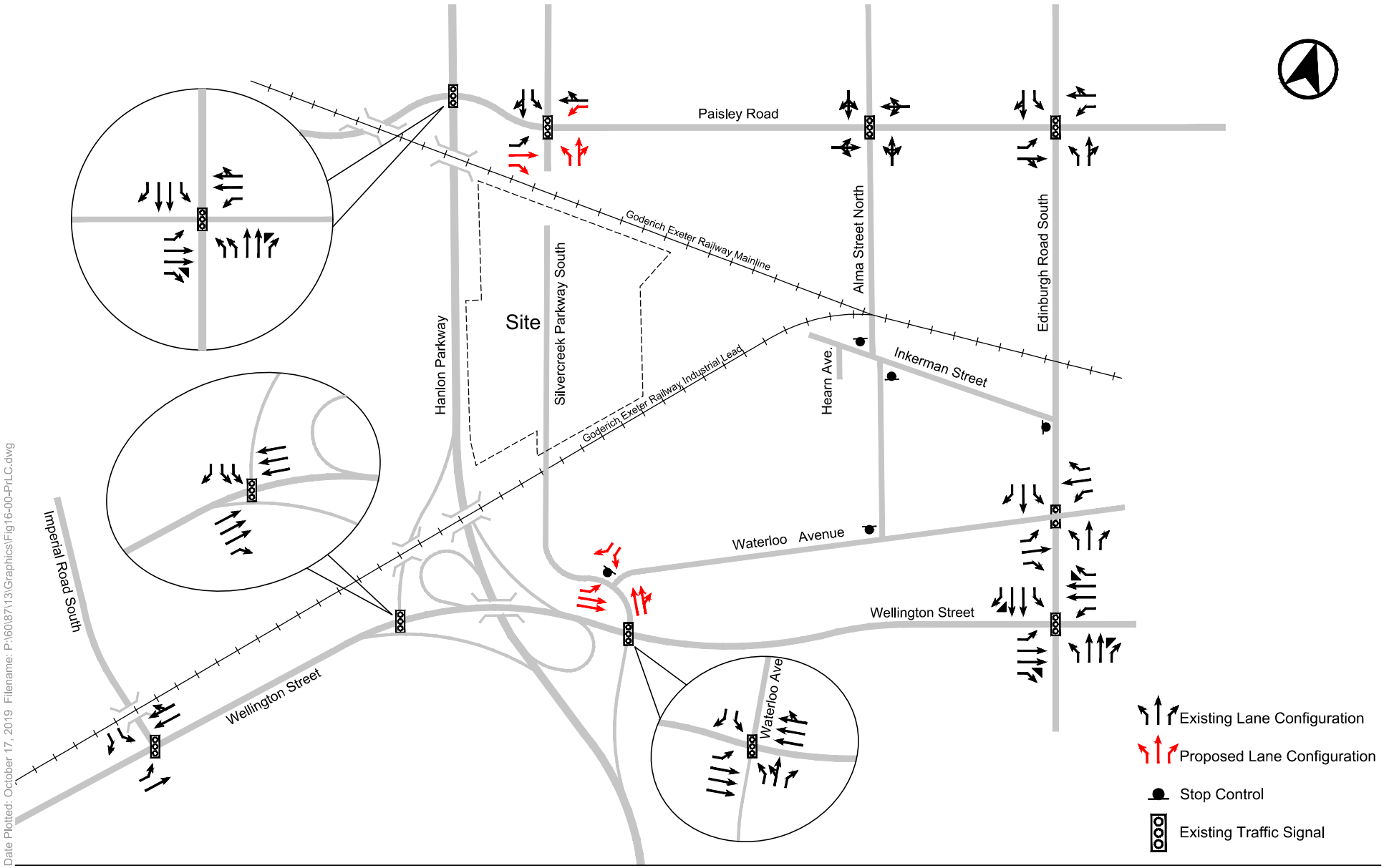
For existing conditions:

- Existing traffic signal timing plans for all signalized intersections within the study area were obtained from the City of Guelph and the Ministry of Transportation and used in the traffic analyses. The existing traffic signal timing plans are provided for reference in **Appendix F**;
- Existing lane configurations and intersection control in the area road network have been assumed in the analysis for existing conditions; and
- Existing peak-hour factors and heavy vehicle percentages calculated from the traffic counts were used in the analysis of existing conditions.

For future conditions:

- Minor changes to signal timings to optimize performance within their original cycle lengths. These changes to signal timings are documented in **Appendix F**;
- The cycle lengths for the new signalized intersection on Silvercreek Parkway have been set at 90 seconds, consistent with other study area signalized intersections under the City's jurisdiction;
- Lane configurations as shown in the *2012 Silvercreek Parkway Class EA* study and a realigned Silvercreek Parkway and Waterloo Avenue intersection as illustrated in **Figure 16**;
- Existing heavy vehicle percentages; and
- Existing peak hour factors except for intersections where existing peak hour factors were well below 0.92 (e.g. Silvercreek Parkway at Paisley Road). At these intersections, the peak hour factor was increased to the Synchro default value of 0.92. This was done to reflect the reduced variance in traffic volumes over the peak hour expected with the increased traffic volumes associated with the proposed development.

Synchro analysis worksheets are attached for reference in **Appendix G**.



PROPOSED CONFIGURATIONS AND TRAFFIC CONTROL

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 16

6.2 SIGNALIZED INTERSECTION ANALYSIS

A summary of the existing conditions and 2021 traffic analysis results for the study area signalized intersections is shown in **Table 7**. The detailed analysis results for the individual movements are included in **Appendix G**.

TABLE 7 EXISTING AND 2021 HORIZON YEAR SIGNALIZED INTERSECTION ANALYSIS

Intersection	Existing Conditions		2021 Background Traffic		2021 Total Traffic	
	LOS	v/c	LOS	v/c	LOS	v/c
Edinburgh Rd & Wellington St W	C (C) [C]	0.64 (0.69) [0.43]	C (C) [C]	0.66 (0.70) [0.44]	C (C) [C]	0.67 (0.72) [0.45]
Waterloo Ave & Wellington St W	C (C) [C]	0.36 (0.47) [0.31]	C (C) [C]	0.37 (0.48) [0.32]	C (C) [C]	0.38 (0.54) [0.35]
Hanlon Expwy & Wellington St W	B (B) [A]	0.38 (0.35) [0.26]	B (B) [A]	0.39 (0.36) [0.27]	B (B) [A]	0.40 (0.38) [0.29]
Wellington St W & Imperial Rd	B (B) [B]	0.70 (0.67) [0.52]	B (B) [B]	0.71 (0.69) [0.53]	B (B) [B]	0.73 (0.73) [0.56]
Hanlon Expwy & Paisley Rd	C (D) [D]	0.65 (0.88) [0.62]	D (D) [D]	0.67 (0.88) [0.65]	D (E) [D]	0.70 (0.92) [0.70]
Waterloo Ave & Edinburgh Rd	C (B) [B]	0.61 (0.60) [0.40]	C (B) [B]	0.62 (0.61) [0.40]	C (C) [B]	0.64 (0.63) [0.43]
Edinburgh Rd & Paisley Rd	B (C) [B]	0.63 (0.67) [0.55]	B (C) [B]	0.62 (0.69) [0.54]	C (C) [C]	0.67 (0.75) [0.61]
Silvercreek Pkwy & Paisley Rd	B (C) [B]	0.55 (0.85) [0.60]	B (B) [B]	0.55 (0.71) [0.55]	B (C) [C]	0.56 (0.76) [0.58]

Notes:
1. AM (PM) [SAT]

All of the intersections operate at acceptable levels of service and within capacity.

The Hanlon Expressway at Paisley Road intersection in the total traffic scenario for the weekday p.m. peak hour, the intersection overall, the eastbound through movement, westbound shared through/right turn, and southbound through movements operate with a v/c ratio greater than 0.85 although within capacity. The westbound and northbound left turn movements operate with a v/c ratio greater than 0.90 but within capacity.

A summary of the 2026 traffic analysis results for the study area signalized intersections is shown in **Table 8**.

TABLE 8 2026 HORIZON YEAR SIGNALIZED INTERSECTION ANALYSIS

Movement	2026 Background Traffic		2026 Total Traffic	
	LOS	v/c	LOS	v/c
Edinburgh Rd & Wellington St W	C (C) [C]	0.68 (0.73) [0.46]	C (C) [C]	0.69 (0.75) [0.47]
Waterloo Ave & Wellington St W	C (C) [C]	0.39 (0.49) [0.32]	C (C) [C]	0.40 (0.56) [0.36]
Hanlon Expwy & Wellington St W	B (B) [A]	0.41 (0.38) [0.28]	B (B) [A]	0.41 (0.39) [0.30]
Wellington St W & Imperial Rd	B (B) [B]	0.73 (0.71) [0.55]	B (B) [B]	0.74 (0.75) [0.57]
Hanlon Expwy & Paisley Rd	D (E) [D]	0.71 (0.92) [0.68]	D (E) [D]	0.74 (0.97) [0.73]
Waterloo Ave & Edinburgh Rd	C (B) [B]	0.63 (0.63) [0.42]	C (C) [B]	0.66 (0.65) [0.44]
Edinburgh Rd & Paisley Rd	B (C) [B]	0.64 (0.71) [0.56]	C (C) [C]	0.69 (0.77) [0.63]
Silvercreek Pkwy & Paisley Rd	B (C) [B]	0.56 (0.72) [0.55]	B (C) [C]	0.57 (0.78) [0.58]

Notes:
1. AM (PM) [SAT]

All of the intersections operate at acceptable levels of service and within capacity.

The Hanlon Expressway at Paisley Road intersection in the total traffic scenario for the weekday p.m. peak hour, the intersection overall, the eastbound through movement, westbound shared through/right turn, and southbound through movements operate with a v/c ratio greater than 0.85 although within capacity. The westbound and northbound left turn movements operate with a v/c ratio greater than 0.90 but within capacity.

A summary of the 2031 traffic analysis results for the study area signalized intersections is shown in **Table 9**.

TABLE 9 2031 HORIZON YEAR SIGNALIZED INTERSECTION ANALYSIS

Movement	2031 Background Traffic		2031 Total Traffic	
	LOS	v/c	LOS	v/c
Edinburgh Rd & Wellington St W	C (C) [C]	0.70 (0.76) [0.48]	C (C) [C]	0.71 (0.78) [0.49]
Waterloo Ave & Wellington St W	C (C) [C]	0.38 (0.50) [0.33]	C (C) [C]	0.41 (0.57) [0.37]
Hanlon Expwy & Wellington St W	B (B) [A]	0.42 (0.39) [0.29]	B (B) [A]	0.43 (0.41) [0.31]
Wellington St W & Imperial Rd	B (B) [B]	0.76 (0.74) [0.56]	B (B) [B]	0.78 (0.77) [0.58]
Hanlon Expwy & Paisley Rd	D (E) [D]	0.76 (0.97) [0.72]	D (E) [D]	0.79 (1.01) [0.74]
Waterloo Ave & Edinburgh Rd	C (B) [B]	0.65 (0.64) [0.43]	C (C) [B]	0.67 (0.66) [0.45]
Edinburgh Rd & Paisley Rd	B (C) [B]	0.66 (0.72) [0.57]	C (C) [C]	0.70 (0.78) [0.64]
Silvercreek Pkwy & Paisley Rd	B (B) [B]	0.57 (0.76) [0.56]	B (C) [C]	0.59 (0.80) [0.60]

Notes:
1. AM (PM) [SAT]

All of the intersections operate at acceptable levels of service and within capacity.

The Hanlon Expressway at Paisley Road intersection in the total traffic scenario for the weekday p.m. peak hour, the intersection overall, the eastbound through movement, westbound shared through/right turn, and southbound through movements operate with a v/c ratio greater than 0.85 although within capacity. While Synchro reports the overall intersection v/c ratio as overcapacity at 1.01, this is illogical as all individual movements operate within albeit approaching capacity (v/c of 0.99 or less). Nevertheless, this value has been for reported as it appears in the Synchro report for completeness. The westbound and northbound left turn movements operate with a v/c ratio greater than 0.90 but within capacity.

6.2.1 Signal Justification Warrants

Signal justification warrants have been completed for the 2031 total traffic scenario for the two driveways to Silvercreek Parkway. The warrants used the forecast peak hour volumes and estimated the off-peak hour volumes based on the existing hourly distribution for Silvercreek Parkway at Paisley Road. The results are summarized in **Table 10** with the detailed worksheets attached for reference in **Appendix H**.

TABLE 10 2031 TOTAL TRAFFIC – SIGNAL JUSTIFICATION

Intersection	Justification 1A	Justification 1B	Justification 2A	Justification 2B	Justification 3	Justified?
Silvercreek Parkway & North Driveway	56%	76%	38%	88%	NO	NO
Silvercreek Parkway & South Driveway	58%	85%	38%	88%	NO	NO

Neither of the Silvercreek Parkway intersections with site driveways meet the signal justification warrants in the 2031 horizon year. Consequently, it is proposed that these intersections remain unsignalized but designed to protect for potential future signalization.

6.2.2 Westwood Road Interchange

At the City's request, an additional scenario for the 2031 horizon year has been analyzed assuming the grade separation of the Hanlon Expressway and Paisley Road and a full interchange provided at Westwood Road with the Hanlon Expressway. The 2031 future background, site, and total traffic volumes for the Silvercreek Parkway at Paisley Road intersection are illustrated in **Figure 17**. It is not expected that there would be any changes in traffic volumes at any other study area intersections.

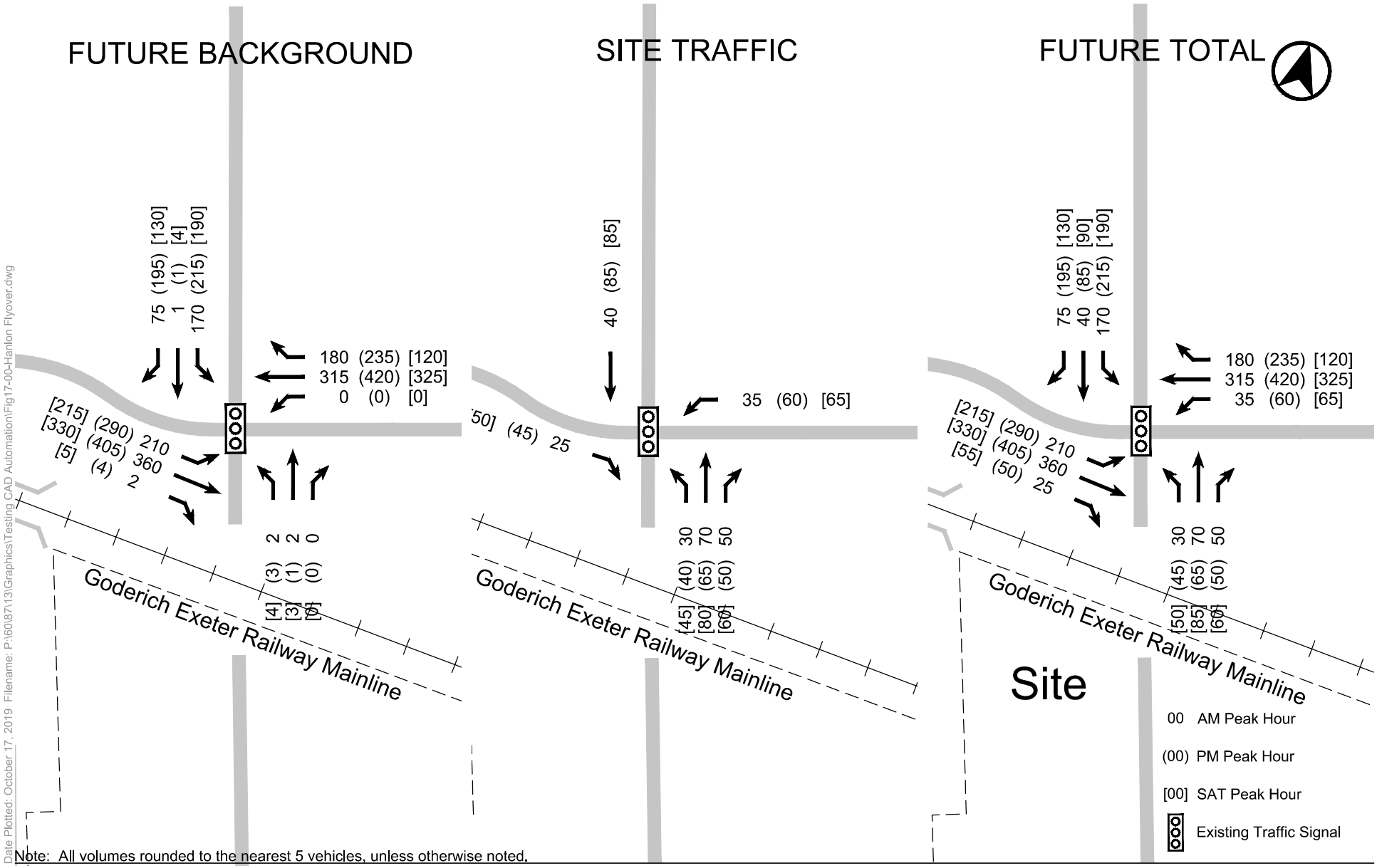
TABLE 11 2031 HORIZON YEAR – WESTWOOD INTERCHANGE, SIGNALIZED INTERSECTION ANALYSIS

Movement	2031 Background Traffic		2031 Total Traffic	
	LOS	v/c	LOS	v/c
Silvercreek Parkway & Paisley Road	B (C) [B]	0.59 (0.76) [0.58]	B (C) [C]	0.65 (0.92) [0.60]

Notes:
1. AM (PM) [SAT]

In the 2031 future background and total traffic scenarios, all movements and the intersection overall operate at acceptable levels of service and within capacity. The intersection overall and the westbound shared through/right turn movement operates with a v/c ratio greater than 0.85 but within capacity. The eastbound left turn movement operates with a v/c ratio greater than 0.90 but within capacity.

From a capacity perspective, the changes in traffic volumes due to a full movement interchange at Westwood Road with the Hanlon Expressway could be accommodated at the Silvercreek at Paisley Road intersection. However, additional information about the interchange design would be required to confirm the traffic assignments.



Note: All volumes rounded to the nearest 5 vehicles, unless otherwise noted.

Date Plotted: October 17, 2019 Filename: P:\60\87\13\Graphics\Testing CAD Automation\Fig17-00-Hanlon Flyover.dwg

WESTWOOD INTERCHANGE SCENARIO
2031 SILVERCREEK & PAISLEY TRAFFIC VOLUMES

BA Group

Silvercreek Parkway
6087-13 October 2019

Figure 17

6.3 UNSIGNALIZED INTERSECTION ANALYSIS

The results of the traffic analysis for the unsignalized intersections under existing conditions and for the 2021 horizon year is shown in **Table 12**.

TABLE 12 EXISTING AND 2021 HORIZON YEAR UNSIGNALIZED INTERSECTION ANALYSIS

Intersection	Existing Conditions		2021 Background Traffic		2021 Total Traffic	
	LOS	v/c	LOS	v/c	LOS	v/c
Waterloo Avenue & Silvercreek Parkway						
WBL	A (A) [A]	0.16 (0.19) [0.12]	A (A) [A]	0.17 (0.17) [0.11]	A (A) [A]	0.19 (0.20) [0.13]
NBLR	A (B) [A]	0.26 (0.29) [0.17]	A (A) [A]	0.25 (0.27) [0.16]	B (C) [B]	0.27 (0.52) [0.33]
Silvercreek Parkway & North Driveway						
EBLRT	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	B (B) [B]	0.15 (0.22) [0.26]
WBLRT	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	B (B) [B]	0.09 (0.06) [0.10]
NBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	A (A) [A]	0.02 (0.04) [0.04]
SBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	A (A) [A]	0.01 (0.02) [0.02]
Silvercreek Parkway & South Driveway						
EBLRT	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	B (B) [B]	0.13 (0.28) [0.32]
WBLRT	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	A (B) [B]	0.08 (0.06) [0.11]
NBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	A (A) [A]	0.02 (0.07) [0.07]
SBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	A (A) [A]	0.01 (0.02) [0.02]

Notes:
1. AM (PM) [SAT]

All movements operate at acceptable levels of service and within capacity.

The results of the traffic analysis for the unsignalized intersections in the 2026 horizon year is shown in **Table 13**.

TABLE 13 2026 HORIZON YEAR UNSIGNALIZED INTERSECTION ANALYSIS

Movement	2026 Background Traffic		2026 Total Traffic	
	LOS	v/c	LOS	v/c
Waterloo Avenue & Silvercreek Parkway				
WBL	A (A) [A]	0.17 (0.18) [0.12]	A (A) [A]	0.19 (0.21) [0.14]
NBLR	A (A) [A]	0.26 (0.27) [0.16]	B (C) [B]	0.28 (0.53) [0.34]
Silvercreek Parkway & North Driveway				
EBLRT	-- (--) [--]	-- (--) [--]	B (B) [B]	0.15 (0.22) [0.26]
WBLRT	-- (--) [--]	-- (--) [--]	B (B) [B]	0.09 (0.06) [0.10]
NBL	-- (--) [--]	-- (--) [--]	A (A) [A]	0.02 (0.04) [0.04]
SBL	-- (--) [--]	-- (--) [--]	A (A) [A]	0.01 (0.02) [0.02]
Silvercreek Parkway & South Driveway				
EBLRT	-- (--) [--]	-- (--) [--]	B (B) [B]	0.13 (0.28) [0.32]
WBLRT	-- (--) [--]	-- (--) [--]	A (B) [B]	0.08 (0.06) [0.11]
NBL	-- (--) [--]	-- (--) [--]	A (A) [A]	0.02 (0.07) [0.07]
SBL	-- (--) [--]	-- (--) [--]	A (A) [A]	0.01 (0.02) [0.02]

Notes:
1. AM (PM) [SAT]

All movements operate at acceptable levels of service and within capacity.

The results of the traffic analysis for the unsignalized intersections in the 2031 horizon year is shown in **Table 14**.

TABLE 14 2031 HORIZON YEAR UNSIGNALIZED INTERSECTION ANALYSIS

Movement	2031 Background Traffic		2031 Total Traffic	
	LOS	v/c	LOS	v/c
Waterloo Avenue & Silvercreek Parkway				
WBL	A (A) [A]	0.17 (0.18) [0.12]	A (A) [A]	0.20 (0.21) [0.14]
NBLR	A (B) [A]	0.27 (0.28) [0.17]	B (C) [B]	0.29 (0.54) [0.35]
Silvercreek Parkway & North Driveway				
EBLRT	-- (--) [--]	-- (--) [--]	B (B) [B]	0.15 (0.22) [0.26]
WBLRT	-- (--) [--]	-- (--) [--]	B (B) [B]	0.09 (0.06) [0.10]
NBL	-- (--) [--]	-- (--) [--]	A (A) [A]	0.02 (0.04) [0.04]
SBL	-- (--) [--]	-- (--) [--]	A (A) [A]	0.01 (0.02) [0.02]
Silvercreek Parkway & South Driveway				
EBLRT	-- (--) [--]	-- (--) [--]	B (B) [B]	0.13 (0.28) [0.32]
WBLRT	-- (--) [--]	-- (--) [--]	A (B) [B]	0.08 (0.06) [0.11]
NBL	-- (--) [--]	-- (--) [--]	A (A) [A]	0.02 (0.07) [0.07]
SBL	-- (--) [--]	-- (--) [--]	A (A) [A]	0.01 (0.02) [0.02]

Notes:
1. AM (PM) [SAT]

All movements operate at acceptable levels of service and within capacity.

6.3.1 Silvercreek Parkway at Waterloo Avenue Intersection Realignment

The intersection analysis indicates that the intersection of Silvercreek Parkway at Waterloo Avenue would operate at acceptable levels of service, within capacity and with queues that do not extend and block the upstream intersections with the existing intersection control and lane configuration. However, it is understood that the MTO desires to minimize any potential for queuing on the northbound approach that could extend back to the Hanlon Expressway off-ramp to Wellington Street West.

In order to achieve this, it has been assumed that the Silvercreek Parkway at Waterloo Avenue intersection such that the northbound and eastbound approaches are free-flowing and only the westbound approach is under stop control. The results of the analysis are summarized in **Table 15**. For the purposes of the analysis, the eastbound Silvercreek Parkway approach has been renamed as the southbound approach.

TABLE 15 REALIGNED SILVERCREEK PARKWAY AT WATERLOO AVENUE ANALYSIS RESULTS

Movement	2021 Total Traffic		2026 Total Traffic		2031 Total Traffic	
	LOS	v/c	LOS	v/c	LOS	v/c
WBL	C (C) [C]	0.48 (0.60) [0.36]	C (C) [C]	0.49 (0.61) [0.38]	C (C) [C]	0.50 (0.58) [0.39]
WBR	A (B) [A]	0.04 (0.11) [0.09]	A (B) [A]	0.04 (0.11) [0.09]	A (B) [A]	0.04 (0.11) [0.09]
SBL	A (A) [A]	0.06 (0.06) [0.06]	A (A) [A]	0.06 (0.06) [0.06]	A (A) [A]	0.06 (0.06) [0.06]

Notes:
1. AM (PM) [SAT]
2. Silvercreek Parkway eastbound approach renamed to the southbound approach for purposes of analysis.

As shown above, all movements are expected to operate at acceptable levels of service and within capacity.

6.4 QUEUE LENGTHS

The key queue lengths at critical study area intersections and the available storage are summarized in **Table 16**.

TABLE 16 QUEUE LENGTHS

Intersection	Movement	95th %ile Queue (m)			Available Storage (m)
		2021 Total Traffic	2026 Total Traffic	2031 Total Traffic	
Hanlon Expressway and Paisley Road	WBL	78 (#118) [91]	78 (#125) [93]	81 (#133) [95]	40 m
	WBTR	61 (#140) [#94]	62 (#149) [#102]	64 (#150) [#104]	160 m
Silvercreek Parkway and Paisley Road	EBL	25 (35) [25]	25 (#41) [26]	26 (#41) [27]	30 m
	EBT	48 (54) [43]	50 (56) [45]	51 (58) [46]	160 m
Waterloo Avenue and Wellington Street West	SBL	10 (17) [19]	10 (18) [19]	9 (18) [19]	90 m
	SBR	19 (19) [17]	19 (19) [17]	19 (20) [17]	90 m
Waterloo Avenue and Silvercreek Parkway (Realigned)	WBL	21 (31) [13]	22 (32) [14]	23 (30) [15]	110 m

Notes:
1. AM (PM) [SAT]
2. Signalized intersection queues based on Synchro queue reports.
3. #95th percentile queue volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

At the Hanlon Expressway at Paisley Road intersection, in all of the peak hours, the westbound left turn movement 95th percentile queue exceeds the available storage length in all of the peak hours. However, it should be noted that this condition is experienced in the existing conditions and all future background traffic scenarios. The shared westbound through/right turn movement queue extends short of Silvercreek Parkway in the 2026 and 2031 future total traffic scenarios in the weekday p.m. peak hour. Given that this intersection

is effectively operating at capacity, no meaningful changes to the signal timings can be made to reduce these queue lengths.

It is understood that in the past, the Ministry had explored the possibility of an interchange at Westwood Road and grade-separating the Hanlon Expressway and Paisley Road intersection. Further discussion will be required with the Ministry to understand what improvements are being contemplated and on what timeline.

At the Silvercreek Parkway and Paisley Road intersection, the eastbound left turn movement exceeds the available storage in the weekday p.m. peak hour. Once there is an understanding of how the potential Westwood Road interchange could impact the design of this intersection, the ability to increase the proposed left turn lane storage length can be assessed.

Queues between Silvercreek Parkway and Wellington Road on Waterloo Avenue fit well within the available storage between the intersections.

6.5 AT-GRADE RAIL CROSSING

The Transport Canada *Grade Crossing Standards (July 2014)* identifies the need for a warning system with gates at a public grade crossing when the forecast cross-product is 50,000 or more. The cross-product is defined as the product of the average annual daily roadway movements and the average annual daily traffic (AADT) of vehicles on the road that pass across the grade crossing.

The *2012 Detailed Safety Assessment* completed as part of the *2012 Silvercreek Parkway Class EA* study identified a volume of rail traffic of 8 freight trains per week. In the 2031 total traffic scenario, it is expected that Silvercreek Parkway will carry in the order of 3,500 vehicles per day. Assuming 1.6 trains per weekday, the resultant cross-product would be 5,600 which falls short of the threshold cross-product of 50,000.

In order to reach the cross-product of 50,000 with 3,500 vehicles per day, there would need to be approximately 14 trains per day operating on this line. While the forecast cross-product does not currently meet the threshold (barring any major changes in rail traffic), the recommendations of the *2012 Silvercreek Parkway Class EA* study, including the *2012 Detailed Safety Assessment* should still be implemented:

- Crossing warning system including lights, bells, and gates;
- Active “Prepare to Stop at Railway Crossing” signage for the north approach of the crossing;
- “No Train Whistles at this Crossing” signage;
- “Railway Advance Warning” signage indicating a skewed crossing; and
- “Pedestrians Stop Here When Lights Are Flashing” signage.

6.6 NEIGHBOURHOOD TRAFFIC INFILTRATION

The site is separated from adjacent residential neighbourhoods, located immediately to the north, east and south, the existing rail lines along the north-east and south-east site periphery. The rail lines form a barrier between the site and the neighbourhoods.

As previously noted, vehicular access to the site will be provided via the proposed Silvercreek Parkway mainline underpass at the north end and via the existing level crossing of Silvercreek Parkway with the secondary line to the south. No vehicular access points are being proposed via the existing residential neighbourhoods.

Consequently, the proposed development will have no discernable adverse impact on the residential streets, i.e. Alma Street and Inkerman Street abutting the subject site.

However, it is noteworthy that the proposed mainline underpass and connection of Silvercreek Parkway between Paisley Road and Wellington Street West creates a new alternative north-south connection across the railway mainline. As a result, traffic volumes on Alma Street and neighbouring roadways may actually decrease and divert to Silvercreek Parkway.

7.0 SUMMARY AND CONCLUSIONS

The following provides a summary overview of the key study findings and conclusions of our traffic impact study in support of the proposed draft plan of subdivision application in the City of Guelph.

Proposed Development

1. The site is currently vacant. The Draft Plan of Subdivision will create blocks to accommodate the development of 777 residential units and 6,500 m^2 (69,965 ft^2) of commercial uses.

2. The proposed development plan implements the 2009 Minutes of Settlement for this site as well as the recommendations of the 2012 Silvercreek Parkway Class EA which included:
    - An underpass of the CNR mainline;
    - Realigning Silvercreek Parkway and providing bike lanes and sidewalks throughout;
    - Identifying development driveway locations and intersection control;
    - Improvements at the intersection of Silvercreek Parkway at Paisley Road; and
    - Safety improvements for the Fergus subdivision at the CNR secondary line.

Transportation Context

3. The site is located on the west side of the City of Guelph and is generally bound by the Hanlon Expressway to the west, and on the north-east diagonal and the south-east diagonal by lines of the Goderich Exeter Railway.

4. No transit is currently provided on Silvercreek Parkway South as it is discontinuous from Silvercreek Parkway North and the site is currently vacant. However transit service is provided on Paisley Road to the north and Waterloo Avenue and Wellington Street West to the south.

5. Active transportation facilities are relatively limited on Silvercreek Parkway South but sidewalks and bike lanes are provided on both sides of Waterloo Avenue which provides a route into Downtown Guelph. The site is also located in close proximity to the recreational Eramosa River Trail.

Transportation Demand Management Plan Framework

6. A Mobility Choice Travel Plan has been developed to guide the design, development, and implementation of the proposed development as well as to reduce the single-occupant vehicle peak hour trips to and from the development. The key elements of the plan comprise land use integration, improved transit service and incentives, bicycle facilities, pedestrian connectivity, and parking management.

7. As part of the 2012 Silvercreek Parkway Class EA study, it is proposed that bike lanes and sidewalks will be provided along Silvercreek Parkway which will connect to the existing active transportation infrastructure around the site.

Travel Demand Forecasting

8. Existing weekday a.m. and p.m. and Saturday mid-day peak period traffic activity levels were established for the study area network based upon traffic counts undertaken on behalf of BA Group by Spectrum Traffic Data Inc.

9. Allowances for general corridor growth have been made for the Hanlon Parkway and Wellington Street at 1.5% per annum and 0.5% per annum for all other streets.

10. A traffic growth allowance has been made for the proposed 89 Beechwood Avenue site.

11. The proposed development is forecast to generate 485, 655 and 735 net new vehicle trips, two-way, in the weekday a.m. and p.m., and Saturday mid-day peak hours, respectively.

12. The forecast trip generation for the proposed development represents a reduction of 590 (48%) and 875 (55%) fewer net new vehicle trips, two-way, compared to the 2012 Silvercreek Phase 1, 2, & 3 (Option 1) concept plan in the weekday p.m. and Saturday mid-day peak hours, respectively.

Traffic Operations

13. For existing conditions, all intersections operate at acceptable levels of service and within capacity. The Hanlon Expressway at Paisley Road intersection operates with some movements above a v/c ratio of 0.85, but within capacity in the weekday p.m. peak hour.

14. With the implementation of the recommendations of the 2012 Silvercreek Parkway Class EA study, for the 2021, 2026 and 2031 future background conditions, all intersections operate at acceptable levels of service and within capacity. The Hanlon Expressway at Paisley Road intersection operates with some movements above a v/c ratio of 0.85 but within capacity in the weekday p.m. peak hour.

15. With the implementation of the *2012 Silvercreek Parkway Class EA* study recommendations and a realigned Silvercreek Parkway at Waterloo Avenue intersection, for the 2021, 2026 and 2031 future total traffic conditions, all intersections generally operate at acceptable levels of service and within capacity including the proposed development driveways. The Hanlon Expressway at Paisley Road intersection operates with some movements above a v/c ratio of 0.85 but within capacity in the weekday p.m. peak hour.

16. For the 2031 future total traffic scenario assuming the grade separation of the Hanlon Expressway and Paisley Road and a full interchange at Westwood Road with the Hanlon Expressway, the Silvercreek Parkway at Paisley Road intersection operates at acceptable levels of service and within capacity. The Silvercreek Parkway at Paisley Road intersection operates with some movements above a v/c ratio of 0.85 but within capacity in the weekday p.m. peak hour.

17. With the realignment of the Silvercreek Parkway and Waterloo Avenue intersection, the northbound movement is free-flowing and will not generate queues that could potentially impede the flow of traffic from the Halon Expressway off-ramp to Wellington Street West.

18. At the Silvercreek Parkway and Paisley Road intersection, the eastbound left turn movement 95th percentile queue exceeds the available storage in the weekday p.m. peak hour. Further investigation into the design of this intersection will be undertaken to assess the ability to lengthen the left turn storage lane once there is an understanding for the long term plans for this intersection and the potential Westwood Road interchange.

19. At the Hanlon Expressway at Paisley Road intersection, the westbound left turn movement 95th percentile queue exceeds the available storage length in all of the peak hours. This condition is experienced in the existing and future background traffic scenarios and exacerbated with the addition of the site-generated traffic. The westbound through movement 95th percentile queue can be accommodated without extending past the Silvercreek Parkway at Paisley Road intersection. Further discussion with the Ministry will be required to understand what improvements are feasible and the potential implementation of an interchange at Westwood Road.

Signal Justification Warrants

20. Signal justification warrants were completed at the two site driveways to Silvercreek Parkway. The signal justification warrants were not met for the 2031 total traffic scenario.

21. It is proposed that these intersections remain unsignalized but protected for potential future signalization.

At-Grade Rail Crossing

22. Based on the 2031 total traffic forecasts on Silvercreek Parkway, the forecast cross-product does not meet the warrants for a warning system with gates at the at-grade crossing. However, as improvements to this crossing, including gates, were recommended as part of the *Detailed Safety Assessment* in the *2012 Silvercreek Parkway Class EA* study, it is recommended that these improvements be implemented as part of the realignment on Silvercreek Parkway.

Neighbourhood Traffic Infiltration

23. Based on a review of the development plan in the context of the adjacent public street network, it is expected that the proposed development will have no discernable adverse impact on the residential streets, i.e. Alma Street and Inkerman Street abutting the subject site.

24. It is noteworthy that the proposed mainline underpass and connection of Silvercreek parkway between Paisley Road and Wellington Street West creates a new alternative north-south connection across the railway mainline. As a result, traffic volumes on Alma Street and neighbouring roadways may actually decrease and divert to Silvercreek Parkway.

Overall

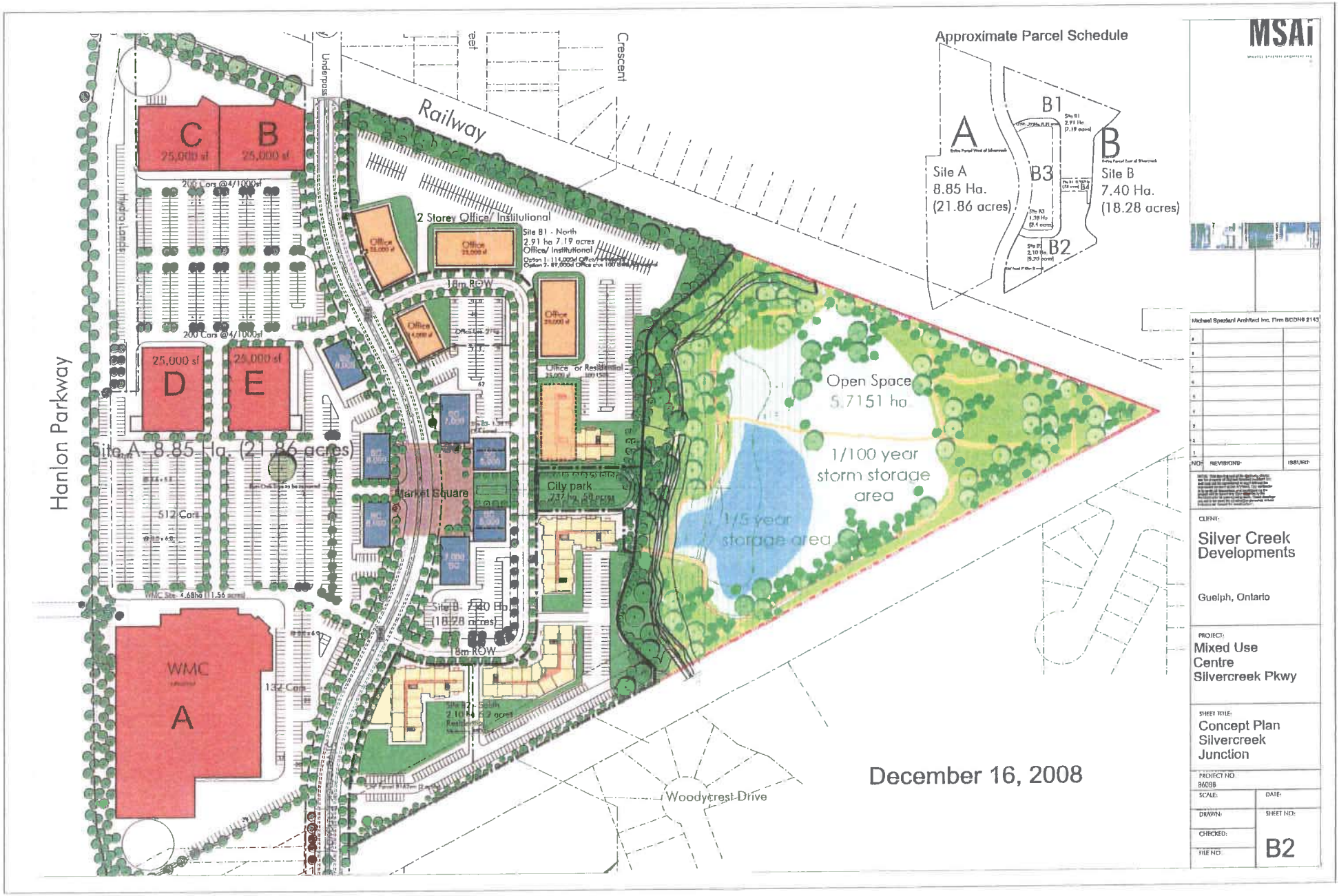
25. Based on the proceeding technical analyses, the proposed development is appropriate from a transportation perspective and implements the *2009 Minutes of Settlement* and recommendations of the *2012 Silvercreek Parkway Class EA* study.

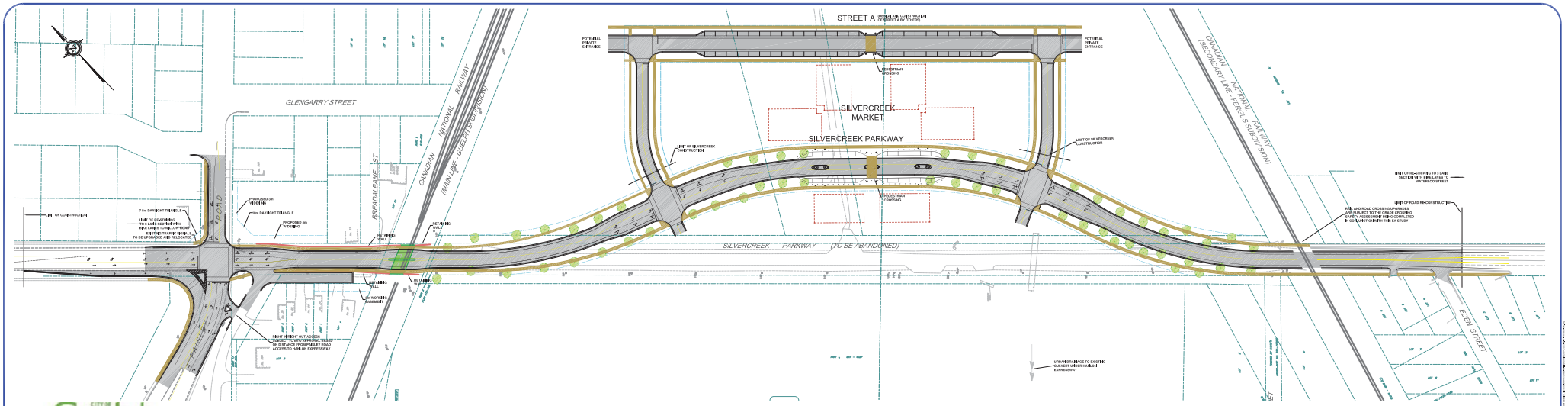
26. With the implementation of the Transportation Demand Management (TDM) plan, the realignment of the Silvercreek Parkway at Waterloo Avenue intersection and the recommendations of the 2012 *Silvercreek Parkway Class EA*, the impacts of the site-generated traffic can generally be accommodated.

27. Further discussions with the City and the Ministry will be required to understand the implications of the potential Westwood Road interchange and the grade separation of the Hanlon Expressway and Paisley Road in order to assess what improvements could be considered to improve traffic operations.

Steven Kwan, P.Eng.
Associate

APPENDIX A:
Background Documents


Approximate Parcel Schedule
A
Site A
8.85 Ha.
(21.86 acres)
B1
B3
B2
B
Site B
7.40 Ha.
(18.28 acres)
Hanlon Parkway
Railway
Crescent
Underpass
C
25,000 sf
B
25,000 sf
D
25,000 sf
E
25,000 sf
WMC
A
2 Storey Office/ Institutional
Site B1 - North
2.91 ha 7.19 acres
Office/ Institutional
18m ROW
Office or Residential
Site A 8.85 Ha. (21.86 acres)
Market Square
City park
Site B 7.40 Ha (18.28 acres)
18m ROW
Open Space
5.7151 ha
1/100 year
storm storage
area
1/5 year
storage area
Woodycrest Drive
December 16, 2008
MSAi
Michael Spadani Architect Inc. Firm BCDN# 2143
NO:
REVISIONS:
ISSUED:
CLIENT:
Silver Creek
Developments
Guelph, Ontario
PROJECT:
Mixed Use
Centre
Silvercreek Pkwy
SHEET TITLE:
Concept Plan
Silvercreek
Junction
PROJECT NO.
B6088
SCALE:
DATE:
DRAWN:
SHEET NO:
CHECKED:
FILE NO.
B2



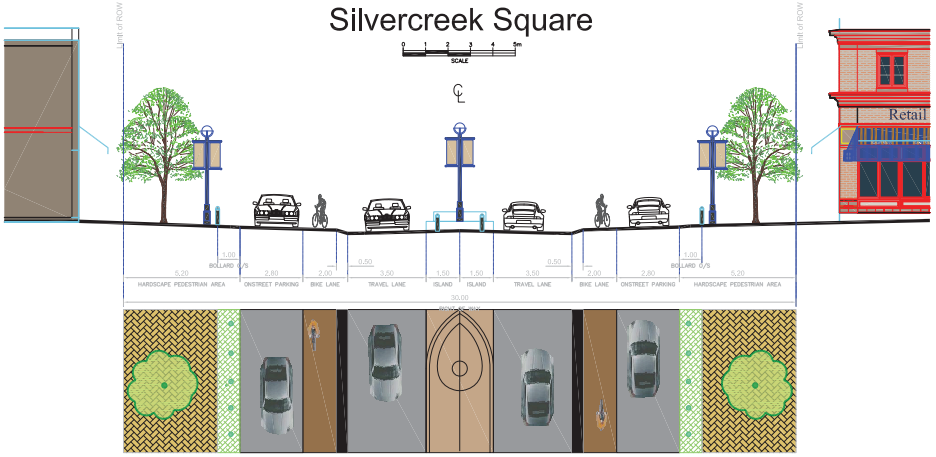
SILVERCREEK PARKWAY EA STUDY
RECOMMENDED SOLUTION - CONCEPT PLAN TO TAC STANDARDS
FROM PAISLEY ROAD TO WATERLOO STREET

SCALE: 1:500 DATE: FEBRUARY 15, 2012

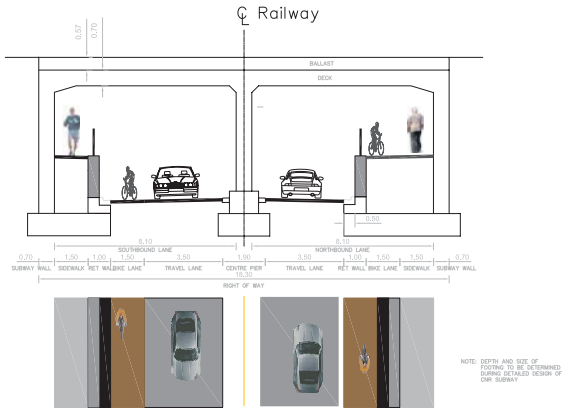
City of Guelph — Making a Difference

Delcan — Transportation · Information Technology · Water

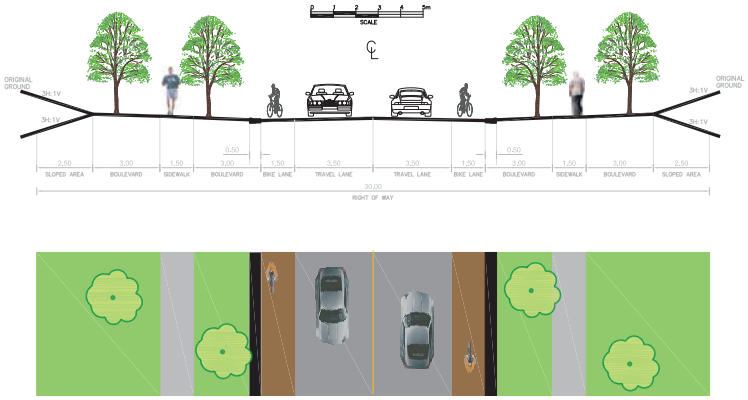
Silvercreek Square



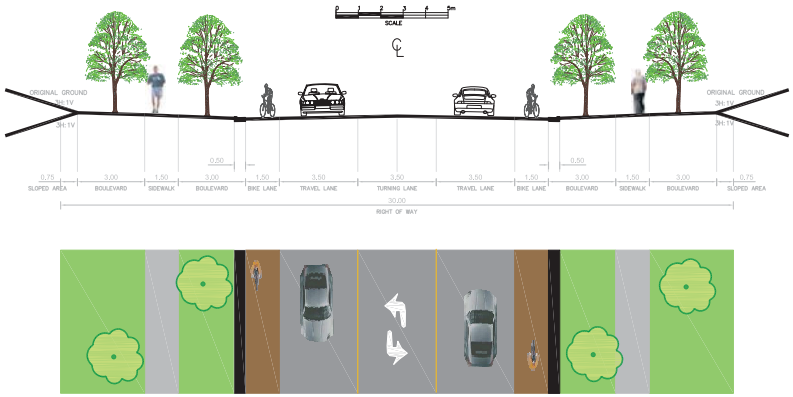
CNR Subway



Outside Silvercreek Square



Outside Silvercreek Square with Turning Lane



CITY OF Guelph
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SILVERCREEK PARKWAY EA STUDY
TYPICAL CROSS-SECTIONS

Delcan
TRANSPORTATION · INFORMATIOIN TECHNOLOGY · WATER

SCALE: 1:100 DATE: FEBRUARY 15, 2012

APPENDIX B:
TIS Terms of Reference

Memorandum

TO:
Gwen Zhang, P.Eng.
City of Guelph
1 Garden Street
Guelph, Ontario N1H 3A1

COPY:
Astrid J. Clos
Planning Consultants
423 Woolwich Street, Suite 201
Guelph, Ontario N1H 3X3

FROM:	**PROJECT:**	**DATE:**
John E. Barrington Senior Associate	6087-13 35 & 40 Silvercreek Junction Proposed Development	February 18, 2018

SUBJECT: 35 & 40 SILVERCREEK JUNCTION DEVELOPMENT
CITY OF GUELPH
TRAFFIC IMPACT STUDY – TERMS OF REFERENCE

1.0 INTRODUCTION

BA Consulting Group Ltd. (BA Group) is retained by Silvercreek Guelph to provide transportation advisory services for the proposed Silvercreek Junction development.

This memorandum summarizes the proposed scope of work for a traffic impact study update to be completed in support of the draft plan of subdivision application.

2.0 PROPOSED DEVELOPMENT

The proposed concept plan continues to be developed and refined but generally implements the 2009 OMB minutes of settlement particularly with respect to the alignment of Silvercreek Parkway. The development program generally comprises:

- 800 residential units;
- 65,000 ft^2 office; and
- 40,000 ft^2 service commercial.

3.0 STUDY PARAMETERS

The TIS update will generally follow the Traffic Impact Study Guidelines (April 2016) issued by the City of Guelph. The following sections identify specific parameters and assumptions that require confirmation or where the City may be able to provide additional information.

3.1 STUDY AREA

It is proposed that the same Study Area as the previous TIS reports be used:

- Halon Expressway / Paisley Road signalized intersection;
- Paisley Road / Silvercreek Parkway signalized intersection;
- Paisley Road / Edinburgh Road signalized intersection;
- Waterloo Avenue / Edinburgh Road signalized intersection;
- Wellington Street / Edinburgh Road signalized intersection;
- Waterloo Avenue / Silvercreek Parkway unsignalized intersection;
- Wellington Street / Silvercreek Parkway / East Ramp Terminal signalized intersection;
- Wellington Street / West Ramp Terminal signalized intersection; and
- Wellington Street / Imperial Road signalized intersection.

3.2 HORIZON YEARS

The expected build-out year for the proposed development is 2021. For all intersections under the jurisdiction of the City of Guelph, the following horizon years are proposed:

1. 2021 representing opening year; and
2. 2026 representing five years after completion of the development.

For all intersections under the jurisdiction of the MTO, an additional analysis for the 2031 horizon year, representing ten years after completion of the development will be undertaken to fulfill the requirements of the MTO's TIS guidelines.

3.3 PEAK PERIODS

Given the removal of the large big box commercial uses and the addition of the residential uses, it is proposed that the peak periods of the analysis comprise the weekday a.m. and p.m. peak hours.

3.4 EXISTING TRAFFIC CONDITIONS

Existing traffic counts have been updated in February 2018.

3.5 BACKGROUND TRAFFIC

Historical growth rates on the Study Area roads will be reviewed and compared to traffic forecasts from the City's travel demand forecasting model.

3.6 OTHER AREA DEVELOPMENTS

It is expected that the City will advise of any other developments that need to be incorporated into the traffic analysis.

3.7 TRANSPORTATION NETWORK IMPROVEMENTS

It is expected that the City will advise of any transportation network improvements that need to be incorporated into the traffic analysis.

3.8 TRANSIT CONSIDERATIONS

It is expected Guelph Transit will advise of the potential for transit routes to be rerouted along Silvercreek Parkway.

3.9 TRIP GENERATION

It is proposed to use rates identified in the Institute of Transportation Engineers (ITE) Trip Generation Manual. Transportation demand management (TDM) strategies will also be identified.

3.10 TRIP DISTRIBUTION AND ASSIGNMENT

The trip distribution will be based on the Transportation Tomorrow Survey (TTS) data. The trip assignment shall generally apply the same principles as the previous studies.

3.11 CAPACITY ANALYSIS

It is proposed that the capacity analysis be undertaken using the Trafficware Synchro 9.0 software package using the HCM 2000 methodologies.

4.0 STUDY REPORT

The TIS report will document assumptions, methodology, analysis procedures, intersection performance results (for existing, future background and future total traffic conditions), findings and recommendations. The report will also include appropriate exhibits and tables as well as copies of all relevant supporting material. Hard copies and an electronic copy of the report and 1 complete with the appropriate supporting documentation will be provided.

The report appendix will include: turning movement counts with heavy vehicle details, signal timing plans, synchro reports showing HCM 2000 results and queuing. Electronic Synchro files will also be provided.

Please feel free contact me directly at 416 961 7110, extension 151 or Steve Kwan, P.Eng at extension 126.

Steven X. Kwan

From: John E. Barrington
Sent: March 8, 2018 4:59 PM
To: Steven X. Kwan
Subject: FW: Silvercreek Junction - Traffic Impact Study Terms of Reference

Categories: Comments

Steve, here are the comments from Gwen Zhang

John

John E. Barrington
BA Consulting Group Ltd.
TEL 416 961 7110 x151
EMAIL barrington@bagroup.com

From: Gwen.Zhang@guelph.ca [mailto:Gwen.Zhang@guelph.ca]
Sent: March-08-18 4:52 PM
To: astrid.clos@ajcplanning.ca; John E. Barrington; carlo@fieldgatedevelopments.com
Cc: Julie.Tot@guelph.ca; Allister.McILveen@guelph.ca; Jennifer.Juste@guelph.ca
Subject: RE: Silvercreek Junction - Traffic Impact Study Terms of Reference

Hi Astrid,

We have reviewed the Terms of Reference for TIS, and offer the following comments.

3.1 Study Area
To add the two access intersections with Silvercreek Parkway Extension.

3.2 Horizon Years
To add one more future horizon year, i.e., 10 years after the completion of the development.

3.3 Peak Period
To add the weekend peak hour due to the commercial development component.

3.4 Existing Traffic Conditions
To include pedestrian and cyclist volumes.

3.6 Other Area Developments
To include the future developments on the east side of Silvercreek Parkway

3.11 Capacity Analysis
To provide "Lanes, Volumes, Timings Report" for signalized intersections including the length of traffic queues. The "HCM 2000 Report" for signalized intersections does not provide sufficient details for staff review so it is not required. However the "HCM 2000 Report" is required for unsignalized intersections.

Other requirements include:

- To explore a straight alignment for the Silvercreek Parkway extension;

- To explore roundabouts at the access intersections with Silvercreek Parkway Extension, alternatively to provide signal warrant analysis at these access intersections;
- To investigate whether any upgrade is warranted for the southerly CNR Secondary Line (the at-grade crossing) for all future horizon years;
- To address concerns over the potential storage deficiencies on Paisley Road between Silvercreek Parkway and Hanlon Expressway;
- To address concerns over the potential storage deficiencies on Waterloo Avenue between Silvercreek Parkway Extension and Wellington Street. Should a roundabout be contemplated for this area, the report will provide traffic simulation and report to support such a design;
- To include a future scenario in 2031 with the assumption that the Paisley intersection at Hanlon Expressway is to be converted into a flyover, and a new interchange is to be built at Westwood Road;
- To address potential traffic infiltration in the vicinity, if any;
- In the Draft Plan
    - To indicate the access to the Service Commercial Block 1 located on the west side of Silvercreek Parkway;
    - To align the southerly access with the future road on the east side of Silvercreek Parkway extension;
    - To provide sightline triangles for buildings at intersections;
    - To amend the minimum building setback from the railways from 15m to 30m;
- To dedicate a section on TDM including:
    - To provide a review of opportunities for TDM measures to support reduced trip generation and private vehicle ownership within the development with typical measures such as carshare, transit promotion, supportive bicycle storage, etc;
    - To refer to the Cycling Master Plan and Active Transportation Network (Guelph.ca/bike and Guelph.ca/atn), particularly regarding the proposed ATN connection north along Silvercreek Parkway from the Speed River corridor and bike facilities along Paisley Road and Silvercreek Parkway;
    - To provide Electric Vehicle charging stations as per future Ontario Building Code updates (the January 1, 2018 draft proposes 20% of residential parking spaces to have EV charging equipment installed at construction and 80% of spaces to be EV-ready);
    - To be fairly rigorous for this mixed-use residential-commercial development, given its proximity and transit service to nearby commercial and recreational facilities (Downtown, Paisley/Imperial node and Silvercreek/Willow node) as well as being well-connected to active transportation facilities; and
- To provide ToR to MTO for their review and approval.

Please let us know if you have any questions or need any clarifications.

Regards,

Gwen Zhang, M.Sc., P.Eng | Transportation Planning Engineer
Engineering and Capital Infrastructure Services | **Infrastructure, Development & Enterprise**
T 519-822-1260 x 2638
E gwen.zhang@guelph.ca

From: Astrid Clos [mailto:astrid.clos@ajcplanning.ca]
Sent: February 26, 2018 10:58 AM
To: 'John E. Barrington'; Gwen Zhang; 'Carlo Stefanutti'
Subject: Silvercreek Junction - Traffic Impact Study Terms of Reference

Hi Gwen,

Please find the TIS Terms of Reference attached for your review and approval.

Regards,

Astrid

Astrid J. Clos
Planning Consultants
423 Woolwich Street
Suite 201
Guelph, Ontario
N1H 3X3

Phone (519) 836-7526 (836-PLAN)
Mobile Number (519)710-7526 (519)710-PLAN
Fax (519) 836-9568

Email astrid.clos@ajcplanning.ca

From: John E. Barrington [mailto:Barrington@bagroup.com]
Sent: Friday, February 23, 2018 7:44 PM
To: Astrid Clos
Subject: RE: Silvercreek Junction - Draft Plan of Subdivision - Draft Reports due March 16, 2018

Astrid, attached is a draft copy of our Terms of Reference for your review. Please feel free to submit to Gwen Zhang..

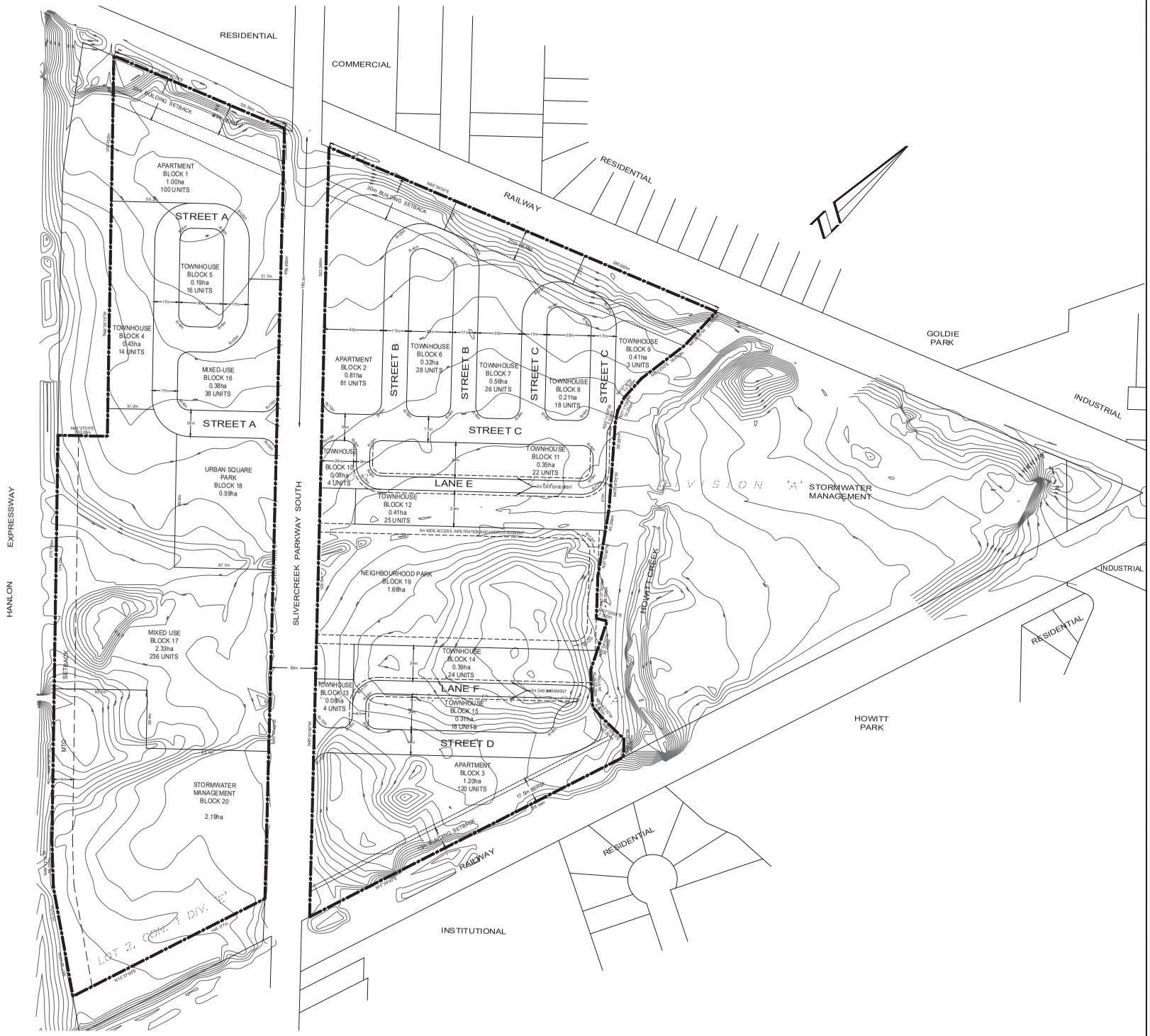
John

John E. Barrington
BA Consulting Group Ltd.
TEL 416 961 7110 x151
EMAIL barrington@bagroup.com

This e-mail message (including attachments, if any) is intended for the use of the individual to whom it is addressed and may contain information that is privileged and confidential. If you are not the intended recipient, you are notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify the sender and erase this e-mail message immediately.

APPENDIX C:
Draft Plan of Subdivision

NOVEMBER 14, 2019



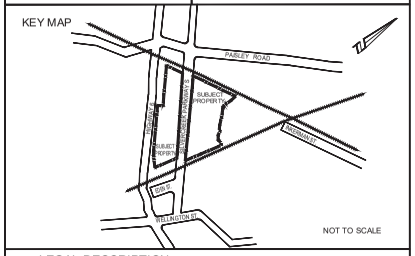
ASTRID J. CLOS
PLANNING CONSULTANTS

423 Woolwich Street, Suite 201
Guelph, Ontario N1H 3X3
Email: astrid.clos@ajcplanning.ca
Phone: (519) 836-7526 (836-PLAN)

DRAFT PLAN OF SUBDIVISION SILVERCREEK JUNCTION

DATE: OCTOBER 8, 2019	SCALE 1:1,000
PROJECT No. 1016	DRAWN BY : G.K.S. / A.R.N.

KEY MAP



NOT TO SCALE

LEGAL DESCRIPTION

PART OF LOTS 21 AND 22, DIVISION 'A'
PART OF LOTS 2 AND 3, CONCESSION 1, DIVISION 'E'
AND PART OF THE ROAD ALLOWANCE BETWEEN DIVISION 'A' AND 'E'
(KNOWN AS SILVERCREEK PARKWAY)
AND PART OF LOT E, WEST SIDE OF GUELPH & GALT RAILWAY, REGISTERED PLAN 52
(GEOGRAPHIC TOWNSHIP OF GUELPH) CITY OF GUELPH

NOTES

1. TOPOGRAPHIC INFORMATION PROVIDED BY BURNSIDE.

LAND USE SCHEDULE

DESCRIPTION	BLOCKS	UNITS	AREA (ha.)
Apartment	1-3	301	3.01
Townhouse	4-15	202	3.74
Mixed Use	16,17	274	2.71
Parks	18,19	-	2.27
Stormwater Management	20	-	2.20
Roads/Lanes	-	-	2.59
TOTAL	20	777	16.52

ADDITIONAL INFORMATION

(UNDER SECTION 51(17) OF THE PLANNING ACT)

INFORMATION REQUIRED BY CLAUSES a,b,c,d,e,f,g,j and i ARE AS SHOWN ON DRAFT PLAN.

h) Municipal Water
i) Silty Sand
k) Municipal Sewer

OWNER'S CERTIFICATE

I AUTHORIZE ASTRID J. CLOS, PLANNING CONSULTANTS TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION.

JACK EISENBERGER, ASO
SILVERCREEK GUELPH DEVELOPMENTS LIMITED

DATE

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE CORRECTLY SHOWN.

JEFFREY E. BUISMAN O.L.S.
Van Harten Surveying Inc.

DATE

(19342-10)

Oct 8, 2019 2:02:51 PM
H:\10-19\19342-10\acad\Draft Plan Subdivision Silvercreek (AE).dwg

APPENDIX D:
Traffic Data

NOVEMBER 14, 2019

Spectrum

Turning Movement Count
Location Name: ALMA ST N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (9 . ALMA ST N & PAISLEY RD)

Start Time	N Approach ALMA ST N						E Approach PAISLEY RD						S Approach ALMA ST N						W Approach PAISLEY RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	4	1	1	0	1	6	1	41	0	0	0	42	1	2	7	0	0	10	4	36	1	0	0	41	99	
07:15:00	6	0	3	0	2	9	2	57	2	0	1	61	1	2	7	0	0	10	3	49	2	0	1	54	134	
07:30:00	0	1	3	0	0	4	1	73	2	0	0	76	2	3	10	0	0	15	9	50	0	0	1	59	154	
07:45:00	3	6	1	0	0	10	0	57	1	0	1	58	2	9	9	0	1	20	10	83	4	0	2	97	185	572
08:00:00	2	9	3	0	5	14	1	80	1	0	1	82	3	7	10	0	3	20	10	91	2	0	2	103	219	692
08:15:00	4	4	2	0	10	10	2	81	2	0	13	85	1	6	12	0	17	19	13	106	1	0	19	120	234	792
08:30:00	7	7	4	0	30	18	4	80	2	0	20	86	2	10	10	0	43	22	7	95	1	0	64	103	229	867
08:45:00	8	5	4	0	9	17	2	95	3	0	16	100	5	9	12	0	28	26	16	135	6	0	33	157	300	982
09:00:00	4	6	1	0	0	11	3	81	1	0	3	85	4	9	7	0	0	20	9	75	2	0	0	86	202	965
09:15:00	3	6	0	0	0	9	5	51	1	0	0	57	3	5	8	0	1	16	8	64	3	0	0	75	157	888
09:30:00	3	8	3	0	0	14	2	59	2	0	1	63	1	2	3	0	1	6	7	63	1	0	0	71	154	813
09:45:00	2	4	2	0	1	8	4	43	1	0	2	48	3	5	5	0	0	13	8	74	5	0	0	87	156	669
10:00:00	6	2	1	0	2	9	1	56	0	0	2	57	3	5	6	0	0	14	9	79	2	0	2	90	170	637
10:15:00	5	5	1	0	1	11	3	55	0	0	0	58	0	4	5	0	0	9	10	87	2	0	1	99	177	657
10:30:00	4	2	2	0	2	8	1	66	1	0	1	68	2	5	8	0	0	15	6	75	3	0	0	84	175	678
10:45:00	2	2	2	0	0	6	1	59	2	0	3	62	4	3	7	0	2	14	13	82	0	0	0	95	177	699
11:00:00	8	4	1	0	2	13	4	52	3	0	0	59	4	5	4	0	0	13	11	73	5	0	0	89	174	703
11:15:00	2	6	4	0	1	12	4	71	1	0	2	76	1	1	6	0	1	8	11	57	6	0	0	74	170	696
11:30:00	6	1	3	0	1	10	5	77	3	0	1	85	3	2	3	0	1	8	10	73	4	0	0	87	190	711
11:45:00	2	6	2	0	1	10	1	67	6	0	1	74	1	12	7	0	0	20	10	79	1	0	0	90	194	728
12:00:00	4	4	1	0	0	9	2	63	1	0	0	66	3	4	12	0	0	19	9	76	5	0	0	90	184	738
12:15:00	4	4	2	0	2	10	2	90	0	0	0	92	5	3	5	0	1	13	11	85	4	0	1	100	215	783
12:30:00	1	4	2	0	1	7	0	67	1	0	0	68	2	6	8	0	0	16	17	73	2	0	1	92	183	776
12:45:00	6	0	0	0	2	6	1	77	2	0	3	80	3	2	8	0	0	13	14	81	1	0	0	96	195	777
13:00:00	0	5	1	0	0	6	1	73	0	0	3	74	4	4	3	0	1	11	14	83	2	0	1	99	190	783
13:15:00	4	7	0	0	0	11	1	70	1	0	0	72	2	4	9	0	0	15	13	81	1	0	0	95	193	761
13:30:00	4	3	1	0	0	8	0	67	0	0	3	67	1	3	7	0	2	11	17	90	2	0	2	109	195	773
13:45:00	4	0	3	0	2	7	0	77	2	0	3	79	0	3	10	0	3	13	7	94	4	0	0	105	204	782
14:00:00	4	1	5	0	4	10	2	82	3	0	0	87	2	2	7	0	0	11	16	83	0	0	1	99	207	799
14:15:00	2	4	2	0	0	8	1	66	2	0	0	69	0	6	11	0	1	17	5	85	5	0	0	95	189	795
14:30:00	5	4	0	0	2	9	2	79	1	0	0	82	4	7	10	0	0	21	19	81	2	0	0	102	214	814

14:45:00	2	3	2	0	0	7	1	86	2	0	0	89	2	5	10	0	1	17	12	98	4	0	0	114	227	837
15:00:00	5	8	1	0	15	14	2	90	0	0	4	92	0	1	9	0	10	10	9	79	4	0	33	92	208	838
15:15:00	7	15	3	0	31	25	3	94	2	0	14	99	4	7	11	0	37	22	14	88	4	0	78	106	252	901
15:30:00	3	14	4	0	20	21	7	89	3	0	7	99	2	16	5	0	11	23	11	108	2	0	21	121	264	951
15:45:00	7	7	3	0	3	17	1	82	0	0	3	83	3	7	6	0	2	16	21	105	2	0	5	128	244	968
16:00:00	1	9	0	0	2	10	1	111	1	0	3	113	5	5	11	0	0	21	18	83	6	0	5	107	251	1011
16:15:00	4	9	2	0	1	15	2	114	5	0	0	121	6	11	10	0	0	27	24	119	4	0	0	147	310	1069
16:30:00	6	10	5	0	2	21	7	122	1	0	0	130	8	8	9	0	1	25	22	103	3	0	1	128	304	1109
16:45:00	5	3	4	0	0	12	6	124	1	0	0	131	5	9	22	0	0	36	21	115	9	0	0	145	324	1189
17:00:00	4	4	1	0	3	9	2	131	1	0	3	134	5	4	16	0	2	25	13	117	4	0	1	134	302	1240
17:15:00	9	7	3	0	1	19	4	130	2	0	0	136	5	8	11	0	1	24	10	121	5	0	1	136	315	1245
17:30:00	5	4	2	0	1	11	0	116	1	0	1	117	3	3	11	0	0	17	17	114	3	0	1	134	279	1220
17:45:00	2	1	4	0	1	7	5	96	0	0	0	101	6	5	7	0	0	18	10	98	2	0	1	110	236	1132
Grand Total	179	215	94	0	161	488	100	3497	66	0	115	3663	126	239	374	0	171	739	528	3786	131	0	278	4445	**9335**	-
Approach%	36.7%	44.1%	19.3%	0%		-	2.7%	95.5%	1.8%	0%		-	17.1%	32.3%	50.6%	0%		-	11.9%	85.2%	2.9%	0%		-	**-**	-
Totals %	1.9%	2.3%	1%	0%		5.2%	1.1%	37.5%	0.7%	0%		39.2%	1.3%	2.6%	4%	0%		7.9%	5.7%	40.6%	1.4%	0%		47.6%	**-**	-
Heavy	4	4	12	0		-	2	94	0	0		-	2	4	6	0		-	17	77	3	0		-	**-**	-
Heavy %	2.2%	1.9%	12.8%	0%		-	2%	2.7%	0%	0%		-	1.6%	1.7%	1.6%	0%		-	3.2%	2%	2.3%	0%		-	**-**	-
Bicycles	0	3	1	0		-	0	0	0	0		-	1	4	1	0		-	1	0	0	0		-	**-**	-
Bicycle %	0%	1.4%	1.1%	0%		-	0%	0%	0%	0%		-	0.8%	1.7%	0.3%	0%		-	0.2%	0%	0%	0%		-	**-**	-

Spectrum

Turning Movement Count
Location Name: ALMA ST N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

Start Time	N Approach ALMA ST N						E Approach PAISLEY RD						S Approach ALMA ST N						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	6	10	5	0	2	21	7	122	1	0	0	130	8	8	9	0	1	25	22	103	3	0	1	128	304
16:45:00	5	3	4	0	0	12	6	124	1	0	0	131	5	9	22	0	0	36	21	115	9	0	0	145	324
17:00:00	4	4	1	0	3	9	2	131	1	0	3	134	5	4	16	0	2	25	13	117	4	0	1	134	302
17:15:00	9	7	3	0	1	19	4	130	2	0	0	136	5	8	11	0	1	24	10	121	5	0	1	136	315
Grand Total	24	24	13	0	6	61	19	507	5	0	3	531	23	29	58	0	4	110	66	456	21	0	3	543	**1245**
Approach%	39.3%	39.3%	21.3%	0%		-	3.6%	95.5%	0.9%	0%		-	20.9%	26.4%	52.7%	0%		-	12.2%	84%	3.9%	0%		-	-
Totals %	1.9%	1.9%	1%	0%		4.9%	1.5%	40.7%	0.4%	0%		42.7%	1.8%	2.3%	4.7%	0%		8.8%	5.3%	36.6%	1.7%	0%		43.6%	-
PHF	0.67	0.6	0.65	0		0.73	0.68	0.97	0.63	0		0.98	0.72	0.81	0.66	0		0.76	0.75	0.94	0.58	0		0.94	-
Heavy	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	0	6	0	0		6	-
Heavy %	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		1.1%	-
Lights	24	24	13	0		61	19	502	5	0		526	23	29	58	0		110	66	450	21	0		537	-
Lights %	100%	100%	100%	0%		100%	100%	99%	100%	0%		99.1%	100%	100%	100%	0%		100%	100%	98.7%	100%	0%		98.9%	-
Single-Unit Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	-
Buses	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	0	4	0	0		4	-
Buses %	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.7%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	3	-	-	-	-	-	4	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	37.5%		-	-	-	-	18.8%		-	-	-	-	25%		-	-	-	-	18.8%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	1	0	0	0	-	0	0	0	0	0	-	1	1	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ALMA ST N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

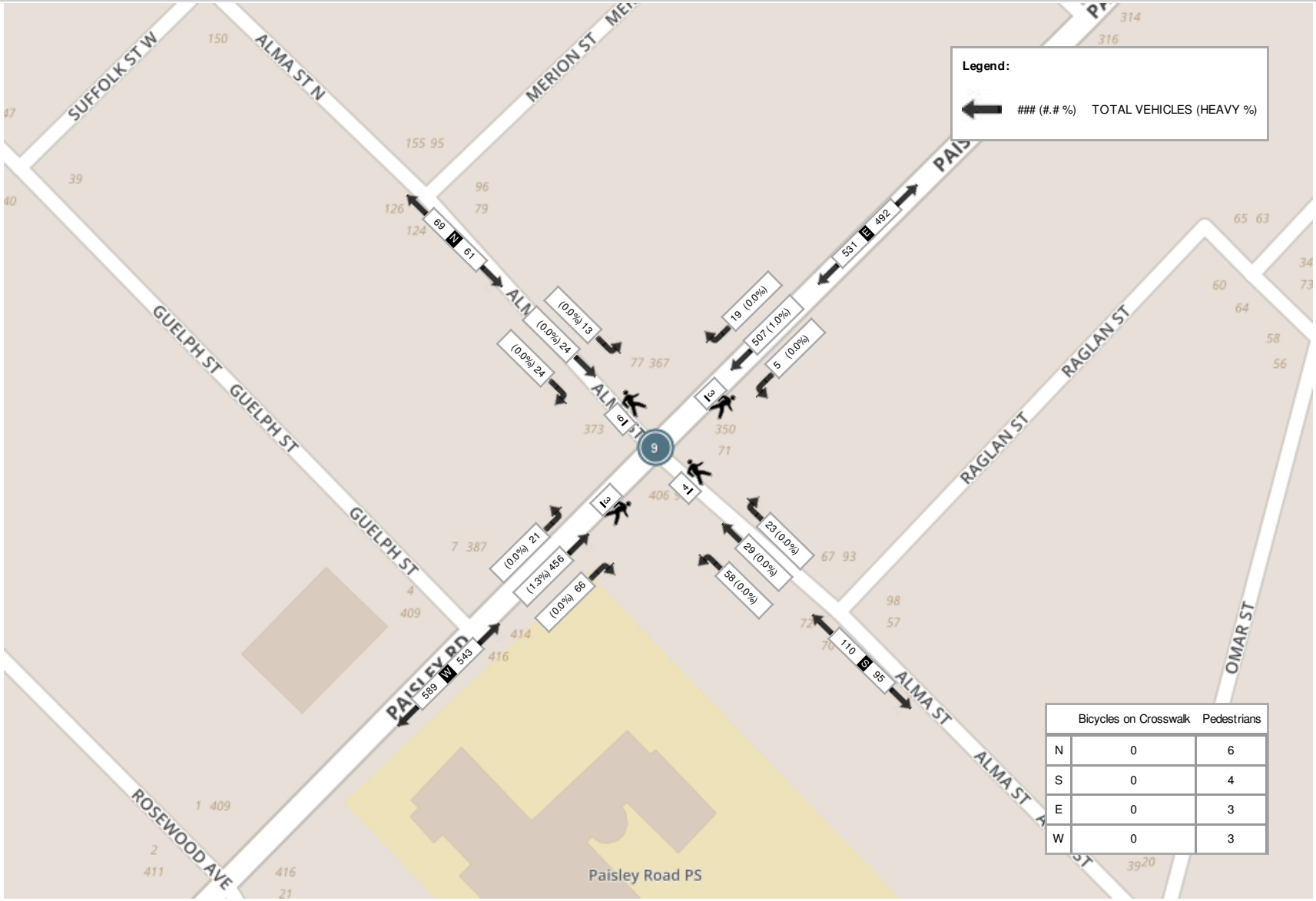
Selected Hour: 08:00 AM - 09:00 AM Weather:

Start Time	N Approach ALMA ST N						E Approach PAISLEY RD						S Approach ALMA ST N						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	2	9	3	0	5	14	1	80	1	0	1	82	3	7	10	0	3	20	10	91	2	0	2	103	219
08:15:00	4	4	2	0	10	10	2	81	2	0	13	85	1	6	12	0	17	19	13	106	1	0	19	120	234
08:30:00	7	7	4	0	30	18	4	80	2	0	20	86	2	10	10	0	43	22	7	95	1	0	64	103	229
08:45:00	8	5	4	0	9	17	2	95	3	0	16	100	5	9	12	0	28	26	16	135	6	0	33	157	300
Grand Total	21	25	13	0	54	59	9	336	8	0	50	353	11	32	44	0	91	87	46	427	10	0	118	483	**982**
Approach%	35.6%	42.4%	22%	0%		-	2.5%	95.2%	2.3%	0%		-	12.6%	36.8%	50.6%	0%		-	9.5%	88.4%	2.1%	0%		-	-
Totals %	2.1%	2.5%	1.3%	0%		6%	0.9%	34.2%	0.8%	0%		35.9%	1.1%	3.3%	4.5%	0%		8.9%	4.7%	43.5%	1%	0%		49.2%	-
PHF	0.66	0.69	0.81	0		0.82	0.56	0.88	0.67	0		0.88	0.55	0.8	0.92	0		0.84	0.72	0.79	0.42	0		0.77	-
Heavy	0	0	2	0		2	1	15	0	0		16	0	0	2	0		2	3	23	0	0		26	-
Heavy %	0%	0%	15.4%	0%		3.4%	11.1%	4.5%	0%	0%		4.5%	0%	0%	4.5%	0%		2.3%	6.5%	5.4%	0%	0%		5.4%	-
Lights	21	25	11	0		57	8	321	8	0		337	11	32	42	0		85	43	404	10	0		457	-
Lights %	100%	100%	84.6%	0%		96.6%	88.9%	95.5%	100%	0%		95.5%	100%	100%	95.5%	0%		97.7%	93.5%	94.6%	100%	0%		94.6%	-
Single-Unit Trucks	0	0	0	0		0	0	2	0	0		2	0	0	1	0		1	1	4	0	0		5	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.6%	0%	0%	2.3%	0%		1.1%	2.2%	0.9%	0%	0%		1%	-
Buses	0	0	2	0		2	1	13	0	0		14	0	0	1	0		1	2	19	0	0		21	-
Buses %	0%	0%	15.4%	0%		3.4%	11.1%	3.9%	0%	0%		4%	0%	0%	2.3%	0%		1.1%	4.3%	4.4%	0%	0%		4.3%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	54	-	-	-	-	-	50	-	-	-	-	-	91	-	-	-	-	-	117	-	-
Pedestrians%	-	-	-	-	17.3%		-	-	-	-	16%		-	-	-	-	29.1%		-	-	-	-	37.4%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0.3%		-
Bicycles on Road	0	1	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: ALMA ST N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

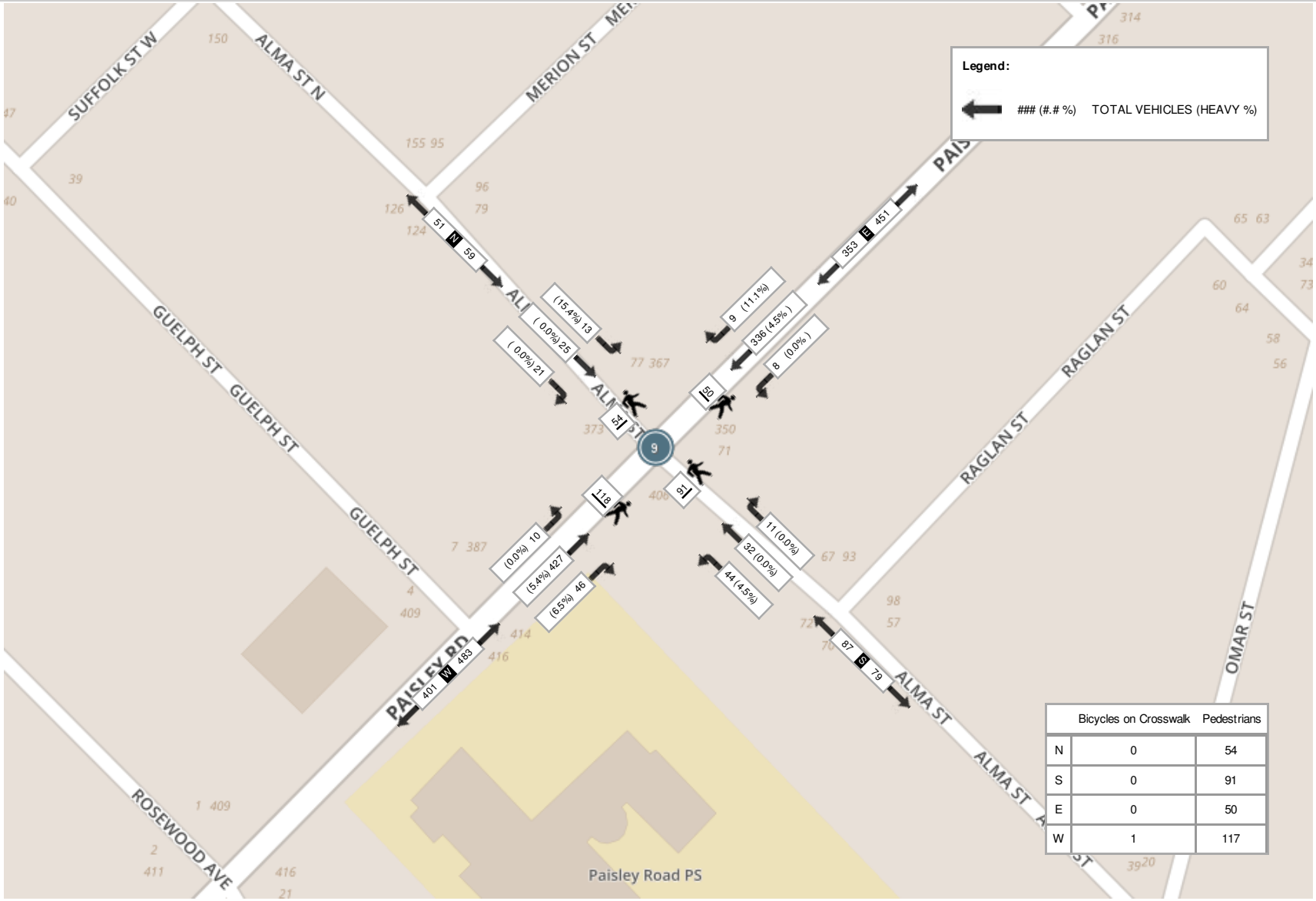
BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	6
S	0	4
E	0	3
W	0	3

Selected Hour: 08:00 AM - 09:00 AM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	54
S	0	91
E	0	50
W	1	117

Spectrum

Turning Movement Count
Location Name: ALMA ST N & PAISLEY RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (9 . ALMA ST N & PAISLEY RD)

Start Time	N Approach ALMA ST N						E Approach PAISLEY RD						S Approach ALMA ST N						W Approach PAISLEY RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
11:00:00	3	4	0	0	0	7	2	92	2	0	0	96	6	4	13	0	0	23	7	93	2	0	0	102	228	
11:15:00	2	8	5	0	2	15	1	85	2	0	7	88	1	4	7	0	4	12	18	95	2	0	2	115	230	
11:30:00	4	5	3	0	1	12	1	97	0	0	0	98	3	1	9	0	0	13	4	87	1	0	1	92	215	
11:45:00	7	7	1	0	0	15	3	97	1	0	0	101	5	9	8	0	1	22	13	124	2	0	0	139	277	950
12:00:00	7	5	0	0	0	12	2	80	1	0	0	83	1	3	6	0	0	10	8	104	7	0	0	119	224	946
12:15:00	4	3	1	0	2	8	2	105	3	0	3	110	3	4	7	0	1	14	18	96	3	0	0	117	249	965
12:30:00	8	1	1	0	0	10	1	87	0	0	0	88	6	7	6	0	0	19	14	101	1	0	0	116	233	983
12:45:00	1	3	1	0	1	5	2	92	2	0	1	96	2	7	12	0	3	21	13	98	3	0	0	114	236	942
13:00:00	2	4	3	0	4	9	2	81	1	0	5	84	5	8	6	0	3	19	14	97	3	0	0	114	226	944
13:15:00	9	2	0	0	0	11	1	89	8	0	0	98	5	5	11	0	0	21	12	107	0	0	0	119	249	944
13:30:00	4	4	1	0	2	9	2	104	1	0	0	107	0	14	6	0	0	20	14	108	2	0	1	124	260	971
13:45:00	1	2	4	0	5	7	1	99	1	0	0	101	2	2	14	0	1	18	7	95	2	0	0	104	230	965
14:00:00	7	6	1	0	0	14	5	96	0	0	1	101	1	5	6	0	0	12	13	94	1	0	0	108	235	974
14:15:00	4	4	0	0	2	8	2	90	1	0	0	93	2	2	4	0	1	8	10	95	1	0	0	106	215	940
14:30:00	4	7	2	0	4	13	1	104	2	0	7	107	2	5	9	0	0	16	13	84	4	0	1	101	237	917
14:45:00	3	4	2	0	0	9	5	94	0	0	0	99	0	3	9	0	0	12	14	126	2	0	0	142	262	949
Grand Total	70	69	25	0	23	164	33	1492	25	0	24	1550	44	83	133	0	14	260	192	1604	36	0	5	1832	**3806**	-
Approach%	42.7%	42.1%	15.2%	0%		-	2.1%	96.3%	1.6%	0%		-	16.9%	31.9%	51.2%	0%		-	10.5%	87.6%	2%	0%		-	-	-
Totals %	1.8%	1.8%	0.7%	0%		4.3%	0.9%	39.2%	0.7%	0%		40.7%	1.2%	2.2%	3.5%	0%		6.8%	5%	42.1%	0.9%	0%		48.1%	-	-
Heavy	0	0	0	0		-	0	16	0	0		-	0	0	0	0		-	1	16	0	0		-	-	-
Heavy %	0%	0%	0%	0%		-	0%	1.1%	0%	0%		-	0%	0%	0%	0%		-	0.5%	1%	0%	0%		-	-	-
Bicycles	0	1	0	0		-	0	0	0	0		-	0	1	0	0		-	0	2	0	0		-	-	-
Bicycle %	0%	1.4%	0%	0%		-	0%	0%	0%	0%		-	0%	1.2%	0%	0%		-	0%	0.1%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: ALMA ST N & PAISLEY RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

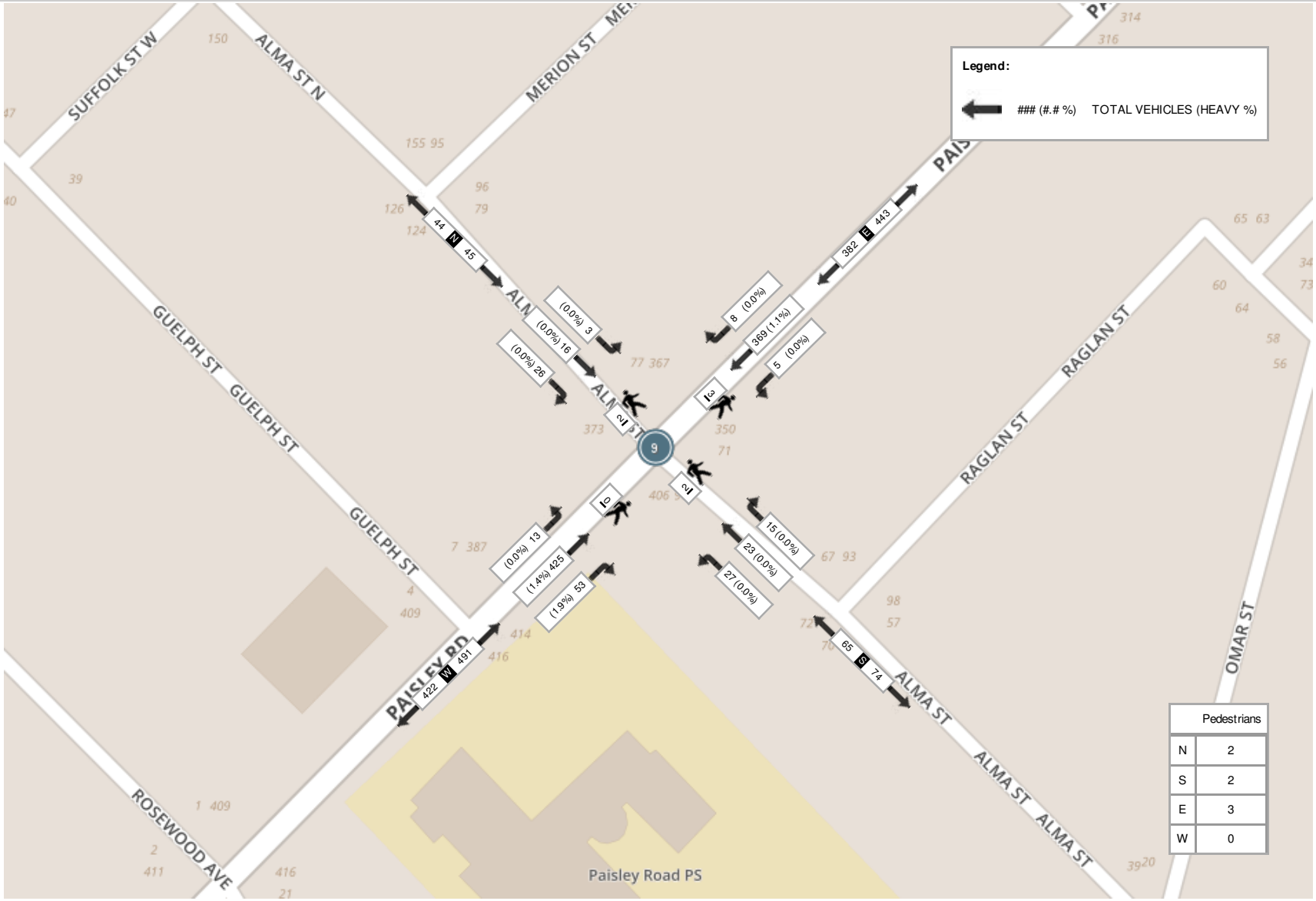
Peak Hour: 11:45 AM - 12:45 PM Weather:

Start Time	N Approach ALMA ST N						E Approach PAISLEY RD						S Approach ALMA ST N						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
11:45:00	7	7	1	0	0	15	3	97	1	0	0	101	5	9	8	0	1	22	13	124	2	0	0	139	277
12:00:00	7	5	0	0	0	12	2	80	1	0	0	83	1	3	6	0	0	10	8	104	7	0	0	119	224
12:15:00	4	3	1	0	2	8	2	105	3	0	3	110	3	4	7	0	1	14	18	96	3	0	0	117	249
12:30:00	8	1	1	0	0	10	1	87	0	0	0	88	6	7	6	0	0	19	14	101	1	0	0	116	233
Grand Total	26	16	3	0	2	45	8	369	5	0	3	382	15	23	27	0	2	65	53	425	13	0	0	491	**983**
Approach%	57.8%	35.6%	6.7%	0%		-	2.1%	96.6%	1.3%	0%		-	23.1%	35.4%	41.5%	0%		-	10.8%	86.6%	2.6%	0%		-	-
Totals %	2.6%	1.6%	0.3%	0%		4.6%	0.8%	37.5%	0.5%	0%		38.9%	1.5%	2.3%	2.7%	0%		6.6%	5.4%	43.2%	1.3%	0%		49.9%	-
PHF	0.81	0.57	0.75	0		0.75	0.67	0.88	0.42	0		0.87	0.63	0.64	0.84	0		0.74	0.74	0.86	0.46	0		0.88	-
Heavy	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	1	6	0	0		7	-
Heavy %	0%	0%	0%	0%		0%	0%	1.1%	0%	0%		1%	0%	0%	0%	0%		0%	1.9%	1.4%	0%	0%		1.4%	-
Lights	26	16	3	0		45	8	365	5	0		378	15	23	27	0		65	52	419	13	0		484	-
Lights %	100%	100%	100%	0%		100%	100%	98.9%	100%	0%		99%	100%	100%	100%	0%		100%	98.1%	98.6%	100%	0%		98.6%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	1	4	0	0		5	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	1.9%	0.9%	0%	0%		1%	-
Buses	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	2	0	0		2	-
Buses %	0%	0%	0%	0%		0%	0%	1.1%	0%	0%		1%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	28.6%		-	-	-	-	42.9%		-	-	-	-	28.6%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: ALMA ST N & PAISLEY RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 11:45 AM - 12:45 PM Weather:



	Pedestrians
N	2
S	2
E	3
W	0

Spectrum

Turning Movement Count
Location Name: EDINBURGH RD N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (8 . EDINBURGH RD N & PAISLEY RD)

Start Time	N Approach EDINBURGH RD N						E Approach PAISLEY RD						S Approach EDINBURGH RD N						W Approach PAISLEY RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	12	44	10	0	1	66	3	20	5	0	0	28	3	47	5	0	1	55	5	28	3	0	1	36	185	
07:15:00	16	39	11	0	0	66	13	31	3	0	1	47	3	39	2	0	3	44	17	34	6	0	1	57	214	
07:30:00	19	55	5	0	0	79	7	34	0	0	0	41	2	69	12	0	0	83	20	29	7	0	0	56	259	
07:45:00	5	67	9	0	1	81	11	36	14	0	0	61	9	124	14	0	0	147	12	53	25	0	0	90	379	1037
08:00:00	15	81	16	0	3	112	7	49	10	0	0	66	11	100	15	0	10	126	13	57	19	0	4	89	393	1245
08:15:00	16	99	12	0	5	127	18	52	12	0	3	82	21	116	17	0	3	154	18	78	16	0	11	112	475	1506
08:30:00	10	101	24	0	16	135	19	60	11	0	3	90	15	138	19	0	3	172	8	73	18	0	7	99	496	1743
08:45:00	18	106	33	0	7	157	21	66	13	0	1	100	12	95	10	1	2	118	22	93	19	0	0	134	509	1873
09:00:00	24	75	21	0	1	120	15	44	10	0	0	69	8	81	25	0	1	114	17	64	19	0	2	100	403	1883
09:15:00	9	61	12	0	1	82	15	31	6	0	0	52	5	84	12	0	2	101	16	43	12	0	5	71	306	1714
09:30:00	9	80	17	0	0	106	16	50	9	0	1	75	7	70	9	0	2	86	16	51	8	0	0	75	342	1560
09:45:00	4	88	15	0	1	107	13	31	9	0	0	53	8	76	9	0	0	93	20	52	11	0	0	83	336	1387
10:00:00	10	56	17	0	1	83	12	30	6	0	0	48	3	68	8	0	0	79	12	43	20	1	0	76	286	1270
10:15:00	11	82	20	0	0	113	13	38	14	0	1	65	10	103	12	0	2	125	17	55	9	0	2	81	384	1348
10:30:00	10	76	13	0	1	99	7	49	8	0	2	64	5	82	12	0	1	99	18	54	6	0	1	78	340	1346
10:45:00	9	84	22	0	0	115	11	35	4	0	0	50	3	87	20	0	2	110	15	51	12	0	0	78	353	1363
11:00:00	9	89	11	0	1	109	18	46	4	0	1	68	3	72	15	0	1	90	25	49	15	0	0	89	356	1433
11:15:00	11	92	16	0	1	119	23	47	9	0	0	79	7	74	22	0	1	103	18	35	2	0	2	55	356	1405
11:30:00	10	71	12	0	4	93	19	55	7	0	1	81	4	84	19	0	1	107	17	53	10	1	4	81	362	1427
11:45:00	16	69	14	0	0	99	19	40	10	0	0	69	1	82	10	0	1	93	15	46	11	0	0	72	333	1407
12:00:00	7	91	25	0	0	123	13	47	14	0	1	74	2	103	16	0	3	121	19	59	10	0	0	88	406	1457
12:15:00	8	91	18	0	2	117	12	55	4	0	1	71	8	91	19	0	0	118	20	61	15	0	0	96	402	1503
12:30:00	13	70	18	0	2	101	17	46	7	0	2	70	5	86	12	0	0	103	12	54	8	0	2	74	348	1489
12:45:00	7	90	9	0	1	106	13	47	6	0	0	66	6	87	20	0	0	113	22	55	9	0	1	86	371	1527
13:00:00	5	76	20	0	2	101	14	45	6	0	2	65	11	101	23	0	0	135	22	49	16	0	2	87	388	1509
13:15:00	11	85	9	0	1	105	19	45	4	0	2	68	10	87	12	0	1	109	14	47	15	0	1	76	358	1465
13:30:00	5	91	18	0	3	114	16	49	7	0	0	72	10	89	18	0	0	117	22	54	14	0	0	90	393	1510
13:45:00	9	90	16	0	2	115	16	48	12	0	1	76	7	97	17	0	0	121	21	58	13	0	1	92	404	1543
14:00:00	14	103	17	0	3	134	10	60	10	0	0	80	5	95	13	0	0	113	17	56	18	0	2	91	418	1573
14:15:00	16	82	7	0	0	105	14	35	10	0	1	59	3	81	19	0	2	103	23	49	17	0	0	89	356	1571
14:30:00	15	96	14	0	5	125	15	44	10	0	0	69	6	111	17	0	0	134	13	55	14	0	4	82	410	1588

14:45:00	16	87	23	0	1	126	12	54	6	0	0	72	9	132	22	0	4	163	22	60	18	0	1	100	461	1645
15:00:00	21	119	18	0	4	158	9	55	9	0	1	73	8	112	20	0	1	140	19	50	16	0	4	85	456	1683
15:15:00	15	145	20	0	28	180	23	66	12	0	9	101	18	123	23	0	8	164	15	64	16	0	10	95	540	1867
15:30:00	7	122	21	0	2	150	20	73	14	0	7	107	14	90	15	0	4	119	25	73	23	0	1	121	497	1954
15:45:00	10	139	24	0	3	173	18	53	10	0	1	81	10	130	17	0	3	157	18	71	16	0	0	105	516	2009
16:00:00	15	134	21	0	1	170	7	78	14	0	2	99	3	112	13	0	0	128	14	62	16	0	1	92	489	2042
16:15:00	21	117	21	0	3	159	7	83	6	0	1	96	11	137	19	0	0	167	26	63	18	0	5	107	529	2031
16:30:00	16	126	14	0	4	156	10	79	11	0	0	100	9	125	28	0	0	162	25	65	18	0	1	108	526	2060
16:45:00	24	119	19	0	4	162	9	77	12	0	1	98	15	128	28	0	1	171	28	73	12	0	4	113	544	2088
17:00:00	16	116	29	0	3	161	13	93	12	0	2	118	9	126	27	0	6	162	30	64	19	0	2	113	554	2153
17:15:00	17	136	30	0	2	183	14	99	13	0	1	126	13	125	27	0	1	165	23	87	21	0	1	131	605	2229
17:30:00	28	129	18	0	4	175	8	76	18	0	1	102	14	114	19	0	1	147	30	63	20	0	1	113	537	2240
17:45:00	11	102	15	0	0	128	9	59	14	0	0	82	9	116	31	0	1	156	22	65	29	0	0	116	482	2178
Grand Total	570	4071	754	0	124	5395	598	2310	405	0	50	3313	355	4289	742	1	72	5387	823	2498	639	2	84	3962	**18057**	-
Approach%	10.6%	75.5%	14%	0%		-	18.1%	69.7%	12.2%	0%		-	6.6%	79.6%	13.8%	0%		-	20.8%	63%	16.1%	0.1%		-	-	-
Totals %	3.2%	22.5%	4.2%	0%		29.9%	3.3%	12.8%	2.2%	0%		18.3%	2%	23.8%	4.1%	0%		29.8%	4.6%	13.8%	3.5%	0%		21.9%	-	-
Heavy	18	56	61	0		-	11	57	13	0		-	7	47	18	0		-	15	63	13	1		-	-	-
Heavy %	3.2%	1.4%	8.1%	0%		-	1.8%	2.5%	3.2%	0%		-	2%	1.1%	2.4%	0%		-	1.8%	2.5%	2%	50%		-	-	-
Bicycles	0	2	0	0		-	1	1	0	0		-	0	2	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0.2%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: EDINBURGH RD N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:45 PM - 05:45 PM Weather: Mostly Cloudy (-11.2 °C)

Start Time	N Approach EDINBURGH RD N						E Approach PAISLEY RD						S Approach EDINBURGH RD N						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	24	119	19	0	4	162	9	77	12	0	1	98	15	128	28	0	1	171	28	73	12	0	4	113	544
17:00:00	16	116	29	0	3	161	13	93	12	0	2	118	9	126	27	0	6	162	30	64	19	0	2	113	554
17:15:00	17	136	30	0	2	183	14	99	13	0	1	126	13	125	27	0	1	165	23	87	21	0	1	131	605
17:30:00	28	129	18	0	4	175	8	76	18	0	1	102	14	114	19	0	1	147	30	63	20	0	1	113	537
Grand Total	85	500	96	0	13	681	44	345	55	0	5	444	51	493	101	0	9	645	111	287	72	0	8	470	**2240**
Approach%	12.5%	73.4%	14.1%	0%		-	9.9%	77.7%	12.4%	0%		-	7.9%	76.4%	15.7%	0%		-	23.6%	61.1%	15.3%	0%		-	-
Totals %	3.8%	22.3%	4.3%	0%		30.4%	2%	15.4%	2.5%	0%		19.8%	2.3%	22%	4.5%	0%		28.8%	5%	12.8%	3.2%	0%		21%	-
PHF	0.76	0.92	0.8	0		0.93	0.79	0.87	0.76	0		0.88	0.85	0.96	0.9	0		0.94	0.93	0.82	0.86	0		0.9	-
Heavy	1	0	4	0		5	0	4	0	0		4	1	2	0	0		3	0	3	0	0		3	-
Heavy %	1.2%	0%	4.2%	0%		0.7%	0%	1.2%	0%	0%		0.9%	2%	0.4%	0%	0%		0.5%	0%	1%	0%	0%		0.6%	-
Lights	84	500	92	0		676	44	341	55	0		440	50	491	101	0		642	111	284	72	0		467	-
Lights %	98.8%	100%	95.8%	0%		99.3%	100%	98.8%	100%	0%		99.1%	98%	99.6%	100%	0%		99.5%	100%	99%	100%	0%		99.4%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	1	2	0	0		3	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	2%	0.4%	0%	0%		0.5%	0%	0%	0%	0%		0%	-
Buses	0	0	4	0		4	0	4	0	0		4	0	0	0	0		0	0	3	0	0		3	-
Buses %	0%	0%	4.2%	0%		0.6%	0%	1.2%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.6%	-
Articulated Trucks	1	0	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	1.2%	0%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	5	-	-	-	-	-	9	-	-	-	-	-	8	-	-
Pedestrians%	-	-	-	-	37.1%		-	-	-	-	14.3%		-	-	-	-	25.7%		-	-	-	-	22.9%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

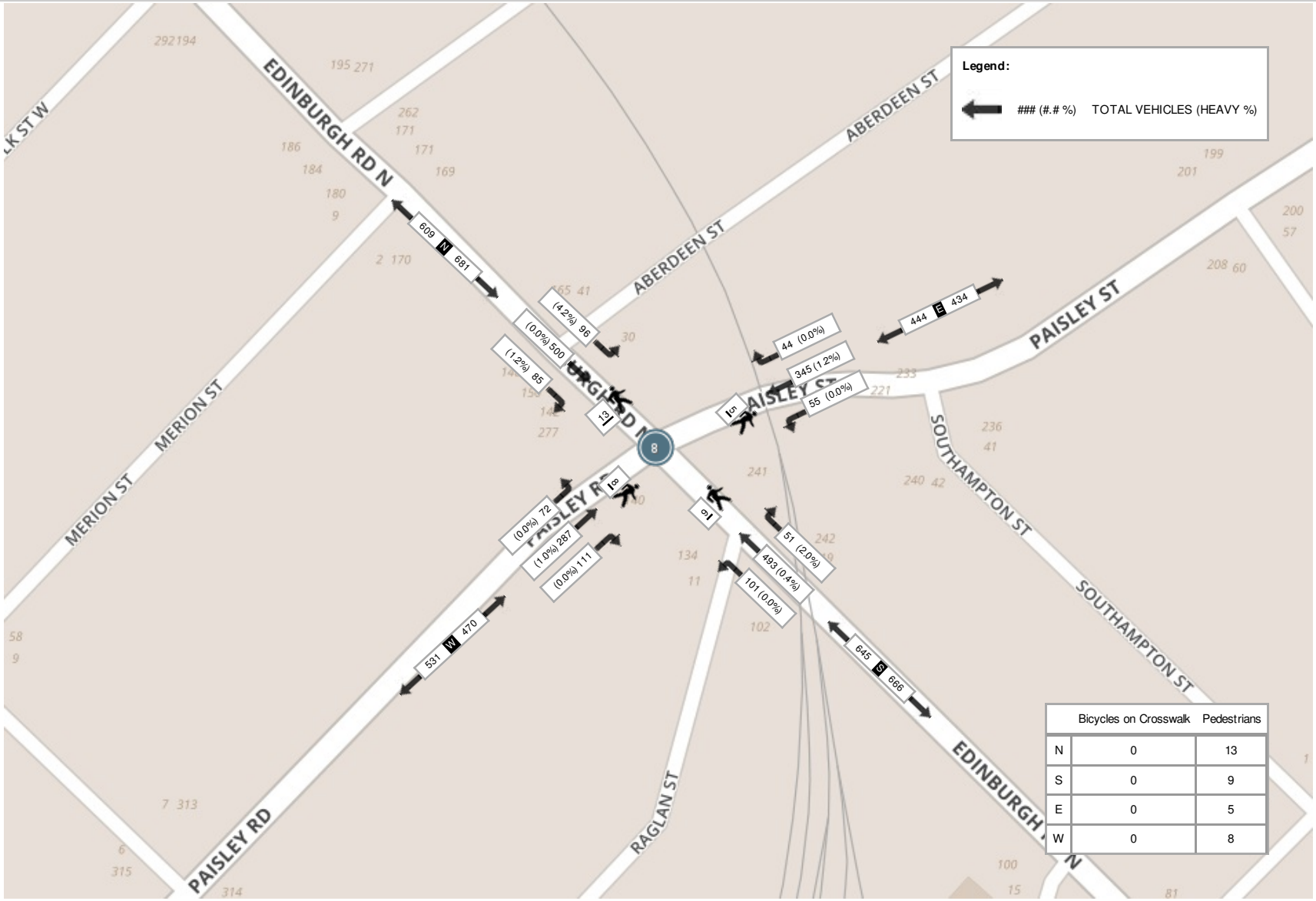
Turning Movement Count
Location Name: EDINBURGH RD N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Selected Hour: 08:15 AM - 09:15 AM Weather:

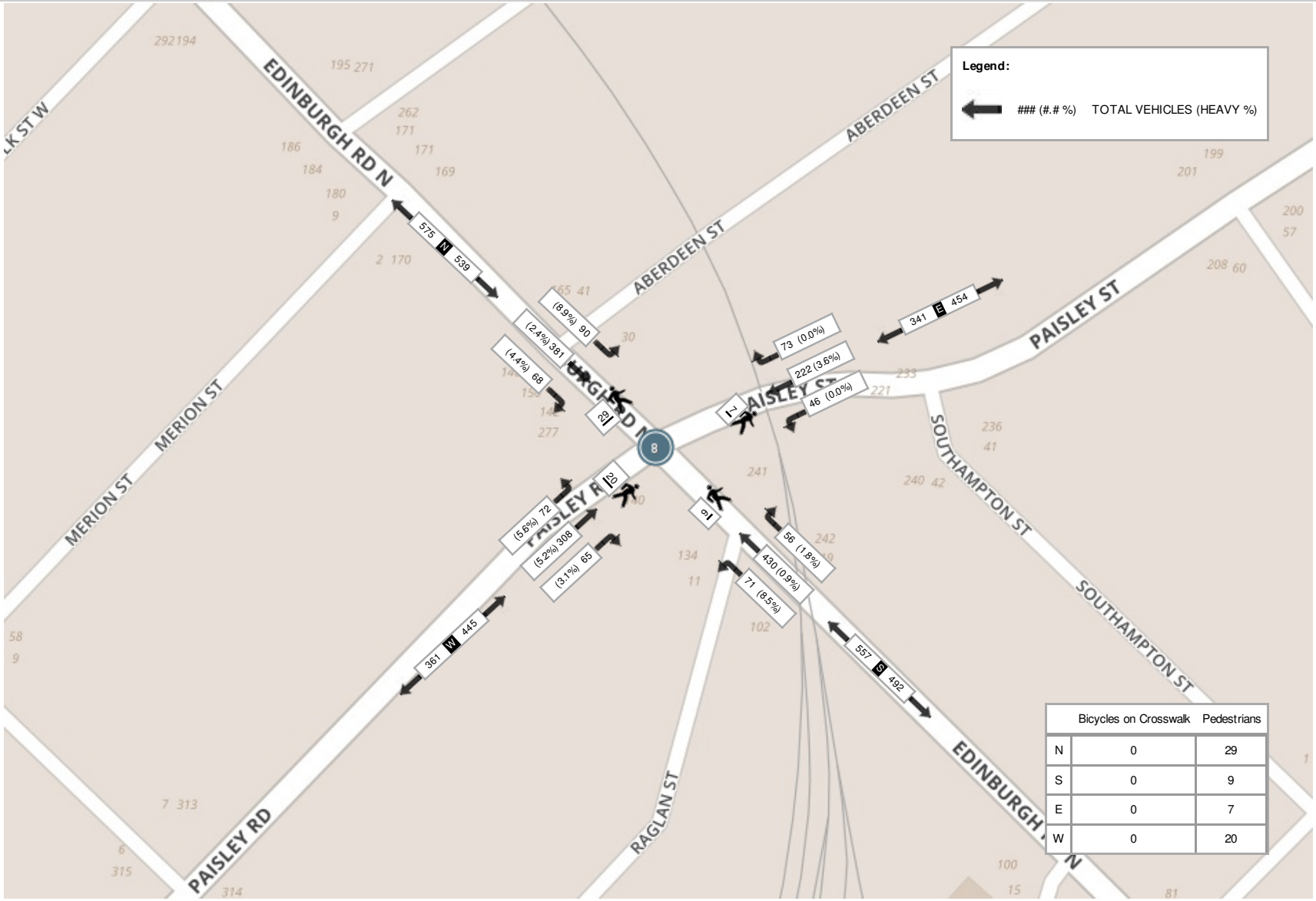
Start Time	N Approach EDINBURGH RD N						E Approach PAISLEY RD						S Approach EDINBURGH RD N						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	16	99	12	0	5	127	18	52	12	0	3	82	21	116	17	0	3	154	18	78	16	0	11	112	475
08:30:00	10	101	24	0	16	135	19	60	11	0	3	90	15	138	19	0	3	172	8	73	18	0	7	99	496
08:45:00	18	106	33	0	7	157	21	66	13	0	1	100	12	95	10	1	2	118	22	93	19	0	0	134	509
09:00:00	24	75	21	0	1	120	15	44	10	0	0	69	8	81	25	0	1	114	17	64	19	0	2	100	403
Grand Total	68	381	90	0	29	539	73	222	46	0	7	341	56	430	71	1	9	558	65	308	72	0	20	445	**1883**
Approach%	12.6%	70.7%	16.7%	0%		-	21.4%	65.1%	13.5%	0%		-	10%	77.1%	12.7%	0.2%		-	14.6%	69.2%	16.2%	0%		-	-
Totals %	3.6%	20.2%	4.8%	0%		28.6%	3.9%	11.8%	2.4%	0%		18.1%	3%	22.8%	3.8%	0.1%		29.6%	3.5%	16.4%	3.8%	0%		23.6%	-
PHF	0.71	0.9	0.68	0		0.86	0.87	0.84	0.88	0		0.85	0.67	0.78	0.71	0.25		0.81	0.74	0.83	0.95	0		0.83	-
Heavy	3	9	8	0		20	0	8	0	0		8	1	4	6	0		11	2	16	4	0		22	-
Heavy %	4.4%	2.4%	8.9%	0%		3.7%	0%	3.6%	0%	0%		2.3%	1.8%	0.9%	8.5%	0%		2%	3.1%	5.2%	5.6%	0%		4.9%	-
Lights	65	372	82	0		519	73	214	46	0		333	55	426	65	1		547	63	292	68	0		423	-
Lights %	95.6%	97.6%	91.1%	0%		96.3%	100%	96.4%	100%	0%		97.7%	98.2%	99.1%	91.5%	100%		98%	96.9%	94.8%	94.4%	0%		95.1%	-
Single-Unit Trucks	1	5	1	0		7	0	0	0	0		0	1	1	1	0		3	0	2	0	0		2	-
Single-Unit Trucks %	1.5%	1.3%	1.1%	0%		1.3%	0%	0%	0%	0%		0%	1.8%	0.2%	1.4%	0%		0.5%	0%	0.6%	0%	0%		0.4%	-
Buses	2	3	7	0		12	0	8	0	0		8	0	2	5	0		7	2	14	4	0		20	-
Buses %	2.9%	0.8%	7.8%	0%		2.2%	0%	3.6%	0%	0%		2.3%	0%	0.5%	7%	0%		1.3%	3.1%	4.5%	5.6%	0%		4.5%	-
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Articulated Trucks %	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	29	-	-	-	-	-	7	-	-	-	-	-	9	-	-	-	-	-	20	-	-
Pedestrians%	-	-	-	-	44.6%		-	-	-	-	10.8%		-	-	-	-	13.8%		-	-	-	-	30.8%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 04:45 PM - 05:45 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	13
S	0	9
E	0	5
W	0	8

Selected Hour: 08:15 AM - 09:15 AM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	29
S	0	9
E	0	7
W	0	20

Spectrum

Turning Movement Count
Location Name: EDINBURGH RD N & PAISLEY RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (8 . EDINBURGH RD N & PAISLEY RD)

Start Time	N Approach EDINBURGH RD N						E Approach PAISLEY RD						S Approach EDINBURGH RD N						W Approach PAISLEY RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
11:00:00	17	117	16	0	2	150	13	58	9	0	2	80	7	98	14	0	0	119	22	59	30	0	0	111	460	
11:15:00	19	85	15	0	2	119	6	54	3	0	6	63	7	83	16	0	0	106	18	58	17	0	0	93	381	
11:30:00	16	75	18	0	1	109	13	61	8	0	3	82	9	88	21	0	0	118	21	58	14	0	0	93	402	
11:45:00	14	89	11	0	1	114	9	70	7	0	4	86	7	101	18	0	0	126	29	81	12	0	0	122	448	1691
12:00:00	18	120	20	0	3	158	11	48	10	0	4	69	3	87	15	0	2	105	29	69	18	0	1	116	448	1679
12:15:00	20	87	12	0	3	119	13	64	4	0	1	81	3	104	18	0	2	125	22	58	17	0	0	97	422	1720
12:30:00	14	74	13	0	0	101	10	61	11	0	0	82	18	94	19	0	2	131	30	71	15	0	2	116	430	1748
12:45:00	15	73	20	0	1	108	19	56	10	0	1	85	1	117	24	0	4	142	27	60	11	0	0	98	433	1733
13:00:00	16	96	22	0	1	134	17	57	11	0	5	85	12	84	17	0	2	113	29	68	13	0	2	110	442	1727
13:15:00	13	69	9	1	0	92	15	57	5	0	1	77	4	61	15	0	2	80	26	56	25	0	0	107	356	1661
13:30:00	22	107	17	0	1	146	9	57	9	0	6	75	6	104	24	0	4	134	31	67	21	0	0	119	474	1705
13:45:00	22	88	14	0	5	124	18	48	10	0	1	76	8	111	29	0	0	148	18	58	16	0	0	92	440	1712
14:00:00	8	90	14	0	7	112	9	56	7	0	1	72	9	105	25	0	2	139	19	64	24	0	1	107	430	1700
14:15:00	9	96	7	0	2	112	21	62	7	0	1	90	4	87	23	0	1	114	19	62	16	0	0	97	413	1757
14:30:00	25	91	12	0	0	128	14	65	11	0	3	90	2	101	17	0	1	120	17	62	4	0	1	83	421	1704
14:45:00	14	87	16	0	1	117	15	68	13	0	4	96	9	107	20	0	4	136	25	87	17	0	1	129	478	1742
Grand Total	262	1444	236	1	30	1943	212	942	135	0	43	1289	109	1532	315	0	26	1956	382	1038	270	0	8	1690	**6878**	-
Approach%	13.5%	74.3%	12.1%	0.1%		-	16.4%	73.1%	10.5%	0%		-	5.6%	78.3%	16.1%	0%		-	22.6%	61.4%	16%	0%		-	-	-
Totals %	3.8%	21%	3.4%	0%		28.2%	3.1%	13.7%	2%	0%		18.7%	1.6%	22.3%	4.6%	0%		28.4%	5.6%	15.1%	3.9%	0%		24.6%	-	-
Heavy	0	4	18	0		-	2	14	0	0		-	0	8	1	0		-	3	12	1	0		-	-	-
Heavy %	0%	0.3%	7.6%	0%		-	0.9%	1.5%	0%	0%		-	0%	0.5%	0.3%	0%		-	0.8%	1.2%	0.4%	0%		-	-	-
Bicycles	0	1	1	0		-	0	0	1	0		-	0	1	0	0		-	1	1	0	0		-	-	-
Bicycle %	0%	0.1%	0.4%	0%		-	0%	0%	0.7%	0%		-	0%	0.1%	0%	0%		-	0.3%	0.1%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: EDINBURGH RD N & PAISLEY RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 01:30 PM - 02:30 PM Weather:

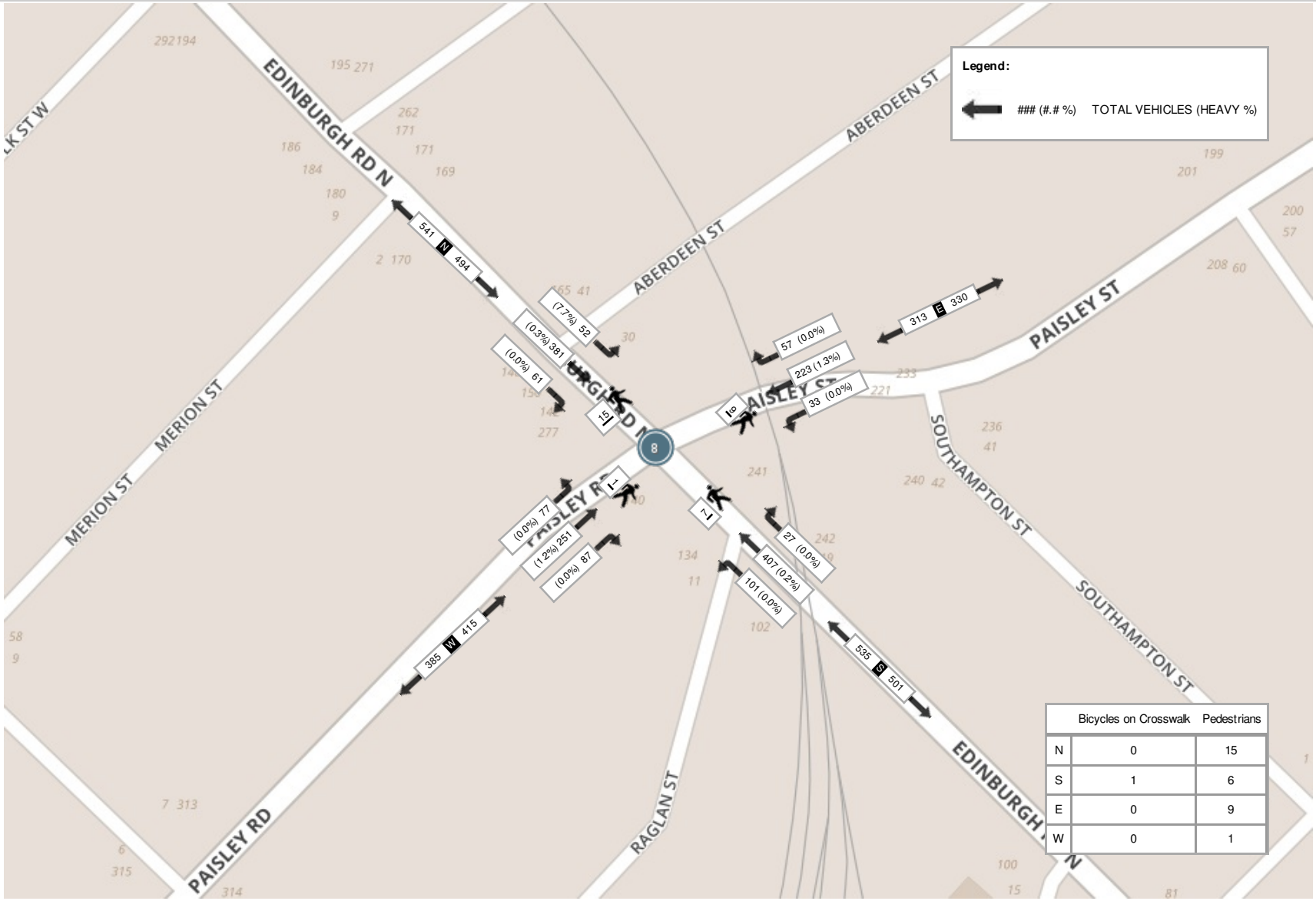
Start Time	N Approach EDINBURGH RD N						E Approach PAISLEY RD						S Approach EDINBURGH RD N						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
13:30:00	22	107	17	0	1	146	9	57	9	0	6	75	6	104	24	0	4	134	31	67	21	0	0	119	474
13:45:00	22	88	14	0	5	124	18	48	10	0	1	76	8	111	29	0	0	148	18	58	16	0	0	92	440
14:00:00	8	90	14	0	7	112	9	56	7	0	1	72	9	105	25	0	2	139	19	64	24	0	1	107	430
14:15:00	9	96	7	0	2	112	21	62	7	0	1	90	4	87	23	0	1	114	19	62	16	0	0	97	413
Grand Total	61	381	52	0	15	494	57	223	33	0	9	313	27	407	101	0	7	535	87	251	77	0	1	415	**1757**
Approach%	12.3%	77.1%	10.5%	0%		-	18.2%	71.2%	10.5%	0%		-	5%	76.1%	18.9%	0%		-	21%	60.5%	18.6%	0%		-	-
Totals %	3.5%	21.7%	3%	0%		28.1%	3.2%	12.7%	1.9%	0%		17.8%	1.5%	23.2%	5.7%	0%		30.4%	5%	14.3%	4.4%	0%		23.6%	-
PHF	0.69	0.89	0.76	0		0.85	0.68	0.9	0.83	0		0.87	0.75	0.92	0.87	0		0.9	0.7	0.94	0.8	0		0.87	-
Heavy	0	1	4	0		5	0	3	0	0		3	0	1	0	0		1	0	3	0	0		3	-
Heavy %	0%	0.3%	7.7%	0%		1%	0%	1.3%	0%	0%		1%	0%	0.2%	0%	0%		0.2%	0%	1.2%	0%	0%		0.7%	-
Lights	61	380	48	0		489	57	220	33	0		310	27	406	101	0		534	87	248	77	0		412	-
Lights %	100%	99.7%	92.3%	0%		99%	100%	98.7%	100%	0%		99%	100%	99.8%	100%	0%		99.8%	100%	98.8%	100%	0%		99.3%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	1	0	0		1	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0.4%	0%	0%		0.2%	-
Buses	0	1	4	0		5	0	3	0	0		3	0	0	0	0		0	0	2	0	0		2	-
Buses %	0%	0.3%	7.7%	0%		1%	0%	1.3%	0%	0%		1%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.5%	-
Pedestrians	-	-	-	-	15	-	-	-	-	-	9	-	-	-	-	-	6	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	46.9%		-	-	-	-	28.1%		-	-	-	-	18.8%		-	-	-	-	3.1%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	3.1%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: EDINBURGH RD N & PAISLEY RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 01:30 PM - 02:30 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	15
S	1	6
E	0	9
W	0	1

Spectrum

Turning Movement Count
Location Name: HWY 6 / HANLON PARKWAY & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (5 . HWY 6 / HANLON PARKWAY & PAISLEY RD)

Start Time	N Approach HWY 6 / HANLON PARKWAY						E Approach PAISLEY RD						S Approach HWY 6 / HANLON PARKWAY						W Approach PAISLEY RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	11	153	3	0	0	167	4	33	52	0	0	89	27	159	26	0	0	212	47	13	15	0	0	75	543	
07:15:00	15	209	4	0	0	228	8	40	39	0	0	87	23	217	18	0	0	258	47	30	22	0	0	99	672	
07:30:00	14	203	1	0	0	218	4	41	50	0	0	95	29	288	36	0	0	353	88	53	26	0	0	167	833	
07:45:00	7	203	6	0	0	216	2	47	39	0	0	88	55	311	36	0	0	402	66	69	33	0	0	168	874	2922
08:00:00	12	246	8	0	0	266	4	40	51	0	0	95	37	296	33	0	0	366	84	58	16	1	0	159	886	3265
08:15:00	8	230	5	0	0	243	10	48	34	0	0	92	35	311	47	1	0	394	80	87	21	0	0	188	917	3510
08:30:00	16	215	5	0	0	236	8	51	39	0	0	98	61	272	40	0	0	373	84	96	23	0	0	203	910	3587
08:45:00	14	177	7	0	0	198	12	68	52	0	0	132	58	238	32	0	0	328	88	69	36	0	0	193	851	3564
09:00:00	8	194	5	1	0	208	13	54	42	0	0	109	37	247	44	0	0	328	50	44	13	0	0	107	752	3430
09:15:00	16	153	4	0	1	173	5	39	31	0	0	75	35	209	33	0	0	277	45	32	20	0	0	97	622	3135
09:30:00	14	192	9	0	0	215	2	43	35	0	0	80	16	225	30	0	0	271	38	41	27	0	0	106	672	2897
09:45:00	13	155	7	0	0	175	7	20	27	0	0	54	26	208	33	0	1	267	53	49	17	0	0	119	615	2661
10:00:00	19	156	4	0	0	179	6	35	29	0	0	70	31	187	48	1	0	267	36	43	9	0	0	88	604	2513
10:15:00	9	154	8	0	0	171	1	52	39	0	0	92	31	166	40	1	0	238	38	58	16	1	0	113	614	2505
10:30:00	19	168	9	0	1	196	3	41	37	0	0	81	24	190	46	0	1	260	47	40	25	0	0	112	649	2482
10:45:00	15	177	7	0	1	199	8	39	18	0	0	65	31	180	54	0	0	265	44	41	17	0	0	102	631	2498
11:00:00	14	183	14	0	0	211	2	26	21	0	0	49	38	163	56	0	0	257	45	55	19	0	0	119	636	2530
11:15:00	15	162	10	1	1	188	7	53	35	0	0	95	27	179	51	0	0	257	61	38	16	0	0	115	655	2571
11:30:00	14	229	7	0	0	250	8	53	23	0	0	84	40	197	63	1	0	301	37	49	23	0	0	109	744	2666
11:45:00	28	193	12	0	0	233	5	46	39	0	0	90	24	191	73	0	0	288	59	44	25	0	0	128	739	2774
12:00:00	32	210	8	0	2	250	8	61	33	0	0	102	41	169	52	0	0	262	52	56	26	0	0	134	748	2886
12:15:00	22	207	6	0	0	235	7	41	28	0	0	76	36	225	53	0	0	314	60	52	22	0	0	134	759	2990
12:30:00	23	199	7	0	0	229	3	46	25	0	0	74	38	198	54	0	1	290	61	61	28	0	0	150	743	2989
12:45:00	21	183	3	0	0	207	7	63	30	0	0	100	29	202	49	0	0	280	58	69	34	0	0	161	748	2998
13:00:00	21	208	9	0	0	238	9	50	29	0	0	88	33	232	38	0	0	303	67	48	17	0	0	132	761	3011
13:15:00	11	207	11	0	0	229	9	65	34	0	0	108	44	193	58	0	0	295	53	60	33	0	0	146	778	3030
13:30:00	20	180	4	0	0	204	3	54	28	0	0	85	40	241	69	0	0	350	56	58	18	0	0	132	771	3058
13:45:00	16	203	11	0	0	230	9	41	38	0	0	88	48	199	51	0	0	298	63	66	27	0	0	156	772	3082
14:00:00	23	217	10	0	0	250	10	49	32	0	0	91	35	223	71	0	0	329	67	49	25	0	0	141	811	3132
14:15:00	11	212	11	0	0	234	3	56	39	0	0	98	50	247	65	3	0	365	58	53	38	0	0	149	846	3200
14:30:00	18	222	6	0	0	246	4	62	34	0	0	100	56	267	67	0	0	390	71	73	36	0	0	180	916	3345

14:45:00	19	227	5	0	0	251	6	72	38	0	0	116	66	266	59	0	0	391	42	72	24	0	0	138	896	3469
15:00:00	36	297	9	0	1	342	4	72	33	0	0	109	52	234	48	0	0	334	59	68	22	0	0	149	934	3592
15:15:00	28	282	4	0	0	314	4	83	46	0	0	133	46	233	68	1	0	348	70	72	24	0	0	166	961	3707
15:30:00	35	277	12	0	0	324	2	86	48	0	0	136	47	216	78	1	7	342	63	64	32	0	0	159	961	3752
15:45:00	26	337	7	0	0	370	9	82	40	0	0	131	70	275	79	1	0	425	65	68	28	0	0	161	1087	3943
16:00:00	35	258	6	0	2	299	3	105	49	0	0	157	50	227	94	0	3	371	76	69	31	0	0	176	1003	4012
16:15:00	29	332	8	0	0	369	4	92	43	0	0	139	72	257	98	0	0	427	77	71	22	0	0	170	1105	4156
16:30:00	30	318	7	0	0	355	9	97	52	0	0	158	65	263	101	0	0	429	80	80	27	0	0	187	1129	4324
16:45:00	30	309	10	0	0	349	9	105	52	0	0	166	77	258	114	1	1	450	93	76	38	0	0	207	1172	4409
17:00:00	37	344	9	0	1	390	9	118	62	0	0	189	77	234	85	0	0	396	101	92	32	0	0	225	1200	4606
17:15:00	33	369	15	0	0	417	8	101	62	0	0	171	68	246	94	0	0	408	93	102	17	0	0	212	1208	4709
17:30:00	44	217	8	0	0	269	6	81	50	0	0	137	63	242	94	0	0	399	90	77	28	0	0	195	1000	4580
17:45:00	44	225	5	0	0	274	5	83	32	0	0	120	50	228	89	0	0	367	92	75	35	0	0	202	963	4371
Grand Total	925	9792	326	2	10	11045	269	2634	1689	0	0	4592	1938	10009	2567	11	14	14525	2804	2640	1083	2	0	6529	**36691**	-
Approach%	8.4%	88.7%	3%	0%		-	5.9%	57.4%	36.8%	0%		-	13.3%	68.9%	17.7%	0.1%		-	42.9%	40.4%	16.6%	0%		-	-	-
Totals %	2.5%	26.7%	0.9%	0%		30.1%	0.7%	7.2%	4.6%	0%		12.5%	5.3%	27.3%	7%	0%		39.6%	7.6%	7.2%	3%	0%		17.8%	-	-
Heavy	15	1083	10	0		-	11	28	25	0		-	29	1078	45	0		-	45	54	18	0		-	-	-
Heavy %	1.6%	11.1%	3.1%	0%		-	4.1%	1.1%	1.5%	0%		-	1.5%	10.8%	1.8%	0%		-	1.6%	2%	1.7%	0%		-	-	-
Bicycles	0	0	0	0		-	0	0	1	0		-	0	0	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0.1%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: HWY 6 / HANLON PARKWAY & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

Start Time	N Approach HWY 6 / HANLON PARKWAY						E Approach PAISLEY RD						S Approach HWY 6 / HANLON PARKWAY						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	30	318	7	0	0	355	9	97	52	0	0	158	65	263	101	0	0	429	80	80	27	0	0	187	1129
16:45:00	30	309	10	0	0	349	9	105	52	0	0	166	77	258	114	1	1	450	93	76	38	0	0	207	1172
17:00:00	37	344	9	0	1	390	9	118	62	0	0	189	77	234	85	0	0	396	101	92	32	0	0	225	1200
17:15:00	33	369	15	0	0	417	8	101	62	0	0	171	68	246	94	0	0	408	93	102	17	0	0	212	1208
Grand Total	130	1340	41	0	1	1511	35	421	228	0	0	684	287	1001	394	1	1	1683	367	350	114	0	0	831	**4709**
Approach%	8.6%	88.7%	2.7%	0%		-	5.1%	61.5%	33.3%	0%		-	17.1%	59.5%	23.4%	0.1%		-	44.2%	42.1%	13.7%	0%		-	-
Totals %	2.8%	28.5%	0.9%	0%		32.1%	0.7%	8.9%	4.8%	0%		14.5%	6.1%	21.3%	8.4%	0%		35.7%	7.8%	7.4%	2.4%	0%		17.6%	-
PHF	0.88	0.91	0.68	0		0.91	0.97	0.89	0.92	0		0.9	0.93	0.95	0.86	0.25		0.94	0.91	0.86	0.75	0		0.92	-
Heavy	0	56	0	0		56	0	0	1	0		1	2	68	2	0		72	0	4	1	0		5	-
Heavy %	0%	4.2%	0%	0%		3.7%	0%	0%	0.4%	0%		0.1%	0.7%	6.8%	0.5%	0%		4.3%	0%	1.1%	0.9%	0%		0.6%	-
Lights	130	1284	41	0		1455	35	421	227	0		683	285	933	392	1		1611	367	346	113	0		826	-
Lights %	100%	95.8%	100%	0%		96.3%	100%	100%	99.6%	0%		99.9%	99.3%	93.2%	99.5%	100%		95.7%	100%	98.9%	99.1%	0%		99.4%	-
Single-Unit Trucks	0	11	0	0		11	0	0	1	0		1	2	27	0	0		29	0	1	0	0		1	-
Single-Unit Trucks %	0%	0.8%	0%	0%		0.7%	0%	0%	0.4%	0%		0.1%	0.7%	2.7%	0%	0%		1.7%	0%	0.3%	0%	0%		0.1%	-
Buses	0	1	0	0		1	0	0	0	0		0	0	4	1	0		5	0	3	1	0		4	-
Buses %	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.4%	0.3%	0%		0.3%	0%	0.9%	0.9%	0%		0.5%	-
Articulated Trucks	0	44	0	0		44	0	0	0	0		0	0	37	1	0		38	0	0	0	0		0	-
Articulated Trucks %	0%	3.3%	0%	0%		2.9%	0%	0%	0%	0%		0%	0%	3.7%	0.3%	0%		2.3%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	50%		-	-	-	-	0%		-	-	-	-	50%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: HWY 6 / HANLON PARKWAY & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

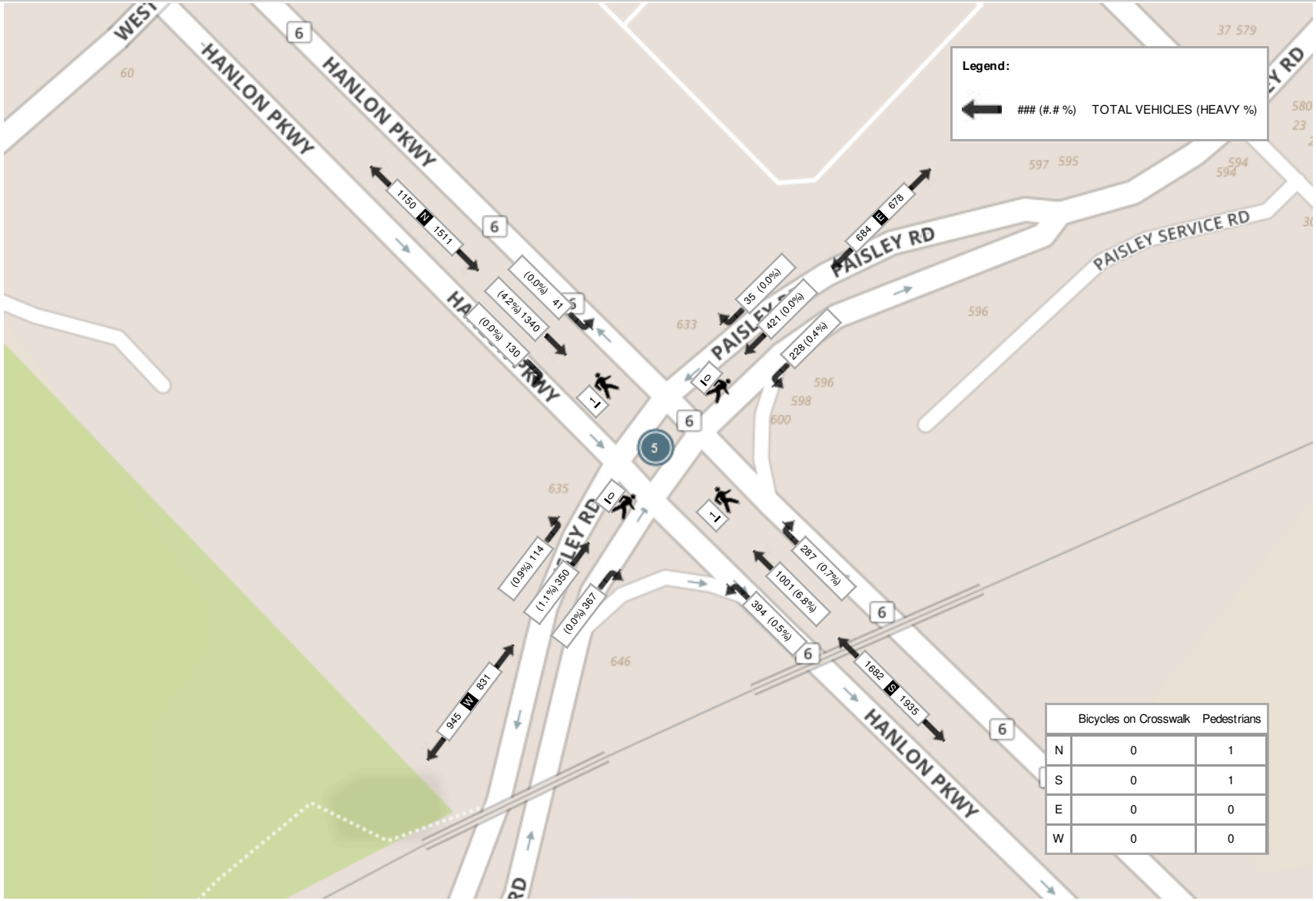
BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Selected Hour: 07:45 AM - 08:45 AM Weather:

Start Time	N Approach HWY 6 / HANLON PARKWAY						E Approach PAISLEY RD						S Approach HWY 6 / HANLON PARKWAY						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	7	203	6	0	0	216	2	47	39	0	0	88	55	311	36	0	0	402	66	69	33	0	0	168	874
08:00:00	12	246	8	0	0	266	4	40	51	0	0	95	37	296	33	0	0	366	84	58	16	1	0	159	886
08:15:00	8	230	5	0	0	243	10	48	34	0	0	92	35	311	47	1	0	394	80	87	21	0	0	188	917
08:30:00	16	215	5	0	0	236	8	51	39	0	0	98	61	272	40	0	0	373	84	96	23	0	0	203	910
Grand Total	43	894	24	0	0	961	24	186	163	0	0	373	188	1190	156	1	0	1535	314	310	93	1	0	718	**3587**
Approach%	4.5%	93%	2.5%	0%		-	6.4%	49.9%	43.7%	0%		-	12.2%	77.5%	10.2%	0.1%		-	43.7%	43.2%	13%	0.1%		-	-
Totals %	1.2%	24.9%	0.7%	0%		26.8%	0.7%	5.2%	4.5%	0%		10.4%	5.2%	33.2%	4.3%	0%		42.8%	8.8%	8.6%	2.6%	0%		20%	-
PHF	0.67	0.91	0.75	0		0.9	0.6	0.91	0.8	0		0.95	0.77	0.96	0.83	0.25		0.95	0.93	0.81	0.7	0.25		0.88	-
Heavy	4	87	3	0		94	1	4	2	0		7	6	96	9	0		111	5	15	6	0		26	-
Heavy %	9.3%	9.7%	12.5%	0%		9.8%	4.2%	2.2%	1.2%	0%		1.9%	3.2%	8.1%	5.8%	0%		7.2%	1.6%	4.8%	6.5%	0%		3.6%	-
Lights	39	807	21	0		867	23	182	161	0		366	182	1094	147	1		1424	309	295	87	1		692	-
Lights %	90.7%	90.3%	87.5%	0%		90.2%	95.8%	97.8%	98.8%	0%		98.1%	96.8%	91.9%	94.2%	100%		92.8%	98.4%	95.2%	93.5%	100%		96.4%	-
Single-Unit Trucks	1	32	2	0		35	1	2	1	0		4	2	28	3	0		33	1	2	2	0		5	-
Single-Unit Trucks %	2.3%	3.6%	8.3%	0%		3.6%	4.2%	1.1%	0.6%	0%		1.1%	1.1%	2.4%	1.9%	0%		2.1%	0.3%	0.6%	2.2%	0%		0.7%	-
Buses	3	9	1	0		13	0	2	1	0		3	4	3	6	0		13	4	13	3	0		20	-
Buses %	7%	1%	4.2%	0%		1.4%	0%	1.1%	0.6%	0%		0.8%	2.1%	0.3%	3.8%	0%		0.8%	1.3%	4.2%	3.2%	0%		2.8%	-
Articulated Trucks	0	46	0	0		46	0	0	0	0		0	0	65	0	0		65	0	0	1	0		1	-
Articulated Trucks %	0%	5.1%	0%	0%		4.8%	0%	0%	0%	0%		0%	0%	5.5%	0%	0%		4.2%	0%	0%	1.1%	0%		0.1%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

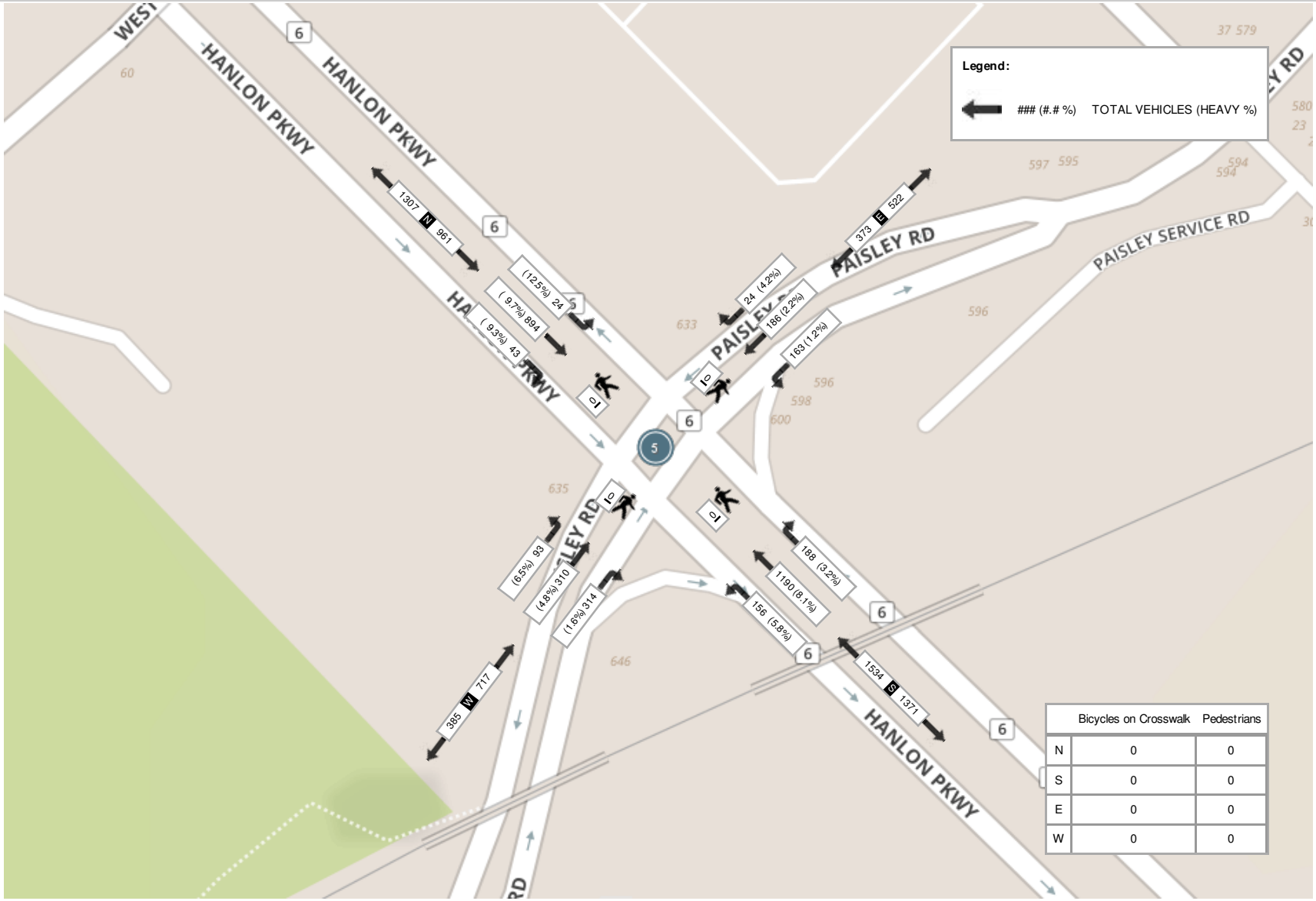
BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	1
E	0	0
W	0	0

Selected Hour: 07:45 AM - 08:45 AM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	0	0
W	0	0

Spectrum

Turning Movement Count
Location Name: HWY 6 / HANLON PARKWAY & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (5 . HWY 6 / HANLON PARKWAY & PAISLEY RD)

Start Time	N Approach HWY 6 / HANLON PARKWAY						E Approach PAISLEY RD						S Approach HWY 6 / HANLON PARKWAY						W Approach PAISLEY RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	11	153	3	0	0	167	4	33	52	0	0	89	27	159	26	0	0	212	47	13	15	0	0	75	543	
07:15:00	15	209	4	0	0	228	8	40	39	0	0	87	23	217	18	0	0	258	47	30	22	0	0	99	672	
07:30:00	14	203	1	0	0	218	4	41	50	0	0	95	29	288	36	0	0	353	88	53	26	0	0	167	833	
07:45:00	7	203	6	0	0	216	2	47	39	0	0	88	55	311	36	0	0	402	66	69	33	0	0	168	874	2922
08:00:00	12	246	8	0	0	266	4	40	51	0	0	95	37	296	33	0	0	366	84	58	16	1	0	159	886	3265
08:15:00	8	230	5	0	0	243	10	48	34	0	0	92	35	311	47	1	0	394	80	87	21	0	0	188	917	3510
08:30:00	16	215	5	0	0	236	8	51	39	0	0	98	61	272	40	0	0	373	84	96	23	0	0	203	910	3587
08:45:00	14	177	7	0	0	198	12	68	52	0	0	132	58	238	32	0	0	328	88	69	36	0	0	193	851	3564
09:00:00	8	194	5	1	0	208	13	54	42	0	0	109	37	247	44	0	0	328	50	44	13	0	0	107	752	3430
09:15:00	16	153	4	0	1	173	5	39	31	0	0	75	35	209	33	0	0	277	45	32	20	0	0	97	622	3135
09:30:00	14	192	9	0	0	215	2	43	35	0	0	80	16	225	30	0	0	271	38	41	27	0	0	106	672	2897
09:45:00	13	155	7	0	0	175	7	20	27	0	0	54	26	208	33	0	1	267	53	49	17	0	0	119	615	2661
10:00:00	19	156	4	0	0	179	6	35	29	0	0	70	31	187	48	1	0	267	36	43	9	0	0	88	604	2513
10:15:00	9	154	8	0	0	171	1	52	39	0	0	92	31	166	40	1	0	238	38	58	16	1	0	113	614	2505
10:30:00	19	168	9	0	1	196	3	41	37	0	0	81	24	190	46	0	1	260	47	40	25	0	0	112	649	2482
10:45:00	15	177	7	0	1	199	8	39	18	0	0	65	31	180	54	0	0	265	44	41	17	0	0	102	631	2498
11:00:00	14	183	14	0	0	211	2	26	21	0	0	49	38	163	56	0	0	257	45	55	19	0	0	119	636	2530
11:15:00	15	162	10	1	1	188	7	53	35	0	0	95	27	179	51	0	0	257	61	38	16	0	0	115	655	2571
11:30:00	14	229	7	0	0	250	8	53	23	0	0	84	40	197	63	1	0	301	37	49	23	0	0	109	744	2666
11:45:00	28	193	12	0	0	233	5	46	39	0	0	90	24	191	73	0	0	288	59	44	25	0	0	128	739	2774
12:00:00	32	210	8	0	2	250	8	61	33	0	0	102	41	169	52	0	0	262	52	56	26	0	0	134	748	2886
12:15:00	22	207	6	0	0	235	7	41	28	0	0	76	36	225	53	0	0	314	60	52	22	0	0	134	759	2990
12:30:00	23	199	7	0	0	229	3	46	25	0	0	74	38	198	54	0	1	290	61	61	28	0	0	150	743	2989
12:45:00	21	183	3	0	0	207	7	63	30	0	0	100	29	202	49	0	0	280	58	69	34	0	0	161	748	2998
13:00:00	21	208	9	0	0	238	9	50	29	0	0	88	33	232	38	0	0	303	67	48	17	0	0	132	761	3011
13:15:00	11	207	11	0	0	229	9	65	34	0	0	108	44	193	58	0	0	295	53	60	33	0	0	146	778	3030
13:30:00	20	180	4	0	0	204	3	54	28	0	0	85	40	241	69	0	0	350	56	58	18	0	0	132	771	3058
13:45:00	16	203	11	0	0	230	9	41	38	0	0	88	48	199	51	0	0	298	63	66	27	0	0	156	772	3082
14:00:00	23	217	10	0	0	250	10	49	32	0	0	91	35	223	71	0	0	329	67	49	25	0	0	141	811	3132
14:15:00	11	212	11	0	0	234	3	56	39	0	0	98	50	247	65	3	0	365	58	53	38	0	0	149	846	3200
14:30:00	18	222	6	0	0	246	4	62	34	0	0	100	56	267	67	0	0	390	71	73	36	0	0	180	916	3345

14:45:00	19	227	5	0	0	251	6	72	38	0	0	116	66	266	59	0	0	391	42	72	24	0	0	138	896	3469
15:00:00	36	297	9	0	1	342	4	72	33	0	0	109	52	234	48	0	0	334	59	68	22	0	0	149	934	3592
15:15:00	28	282	4	0	0	314	4	83	46	0	0	133	46	233	68	1	0	348	70	72	24	0	0	166	961	3707
15:30:00	35	277	12	0	0	324	2	86	48	0	0	136	47	216	78	1	7	342	63	64	32	0	0	159	961	3752
15:45:00	26	337	7	0	0	370	9	82	40	0	0	131	70	275	79	1	0	425	65	68	28	0	0	161	1087	3943
16:00:00	35	258	6	0	2	299	3	105	49	0	0	157	50	227	94	0	3	371	76	69	31	0	0	176	1003	4012
16:15:00	29	332	8	0	0	369	4	92	43	0	0	139	72	257	98	0	0	427	77	71	22	0	0	170	1105	4156
16:30:00	30	318	7	0	0	355	9	97	52	0	0	158	65	263	101	0	0	429	80	80	27	0	0	187	1129	4324
16:45:00	30	309	10	0	0	349	9	105	52	0	0	166	77	258	114	1	1	450	93	76	38	0	0	207	1172	4409
17:00:00	37	344	9	0	1	390	9	118	62	0	0	189	77	234	85	0	0	396	101	92	32	0	0	225	1200	4606
17:15:00	33	369	15	0	0	417	8	101	62	0	0	171	68	246	94	0	0	408	93	102	17	0	0	212	1208	4709
17:30:00	44	217	8	0	0	269	6	81	50	0	0	137	63	242	94	0	0	399	90	77	28	0	0	195	1000	4580
17:45:00	44	225	5	0	0	274	5	83	32	0	0	120	50	228	89	0	0	367	92	75	35	0	0	202	963	4371
Grand Total	925	9792	326	2	10	11045	269	2634	1689	0	0	4592	1938	10009	2567	11	14	14525	2804	2640	1083	2	0	6529	**36691**	-
Approach%	8.4%	88.7%	3%	0%		-	5.9%	57.4%	36.8%	0%		-	13.3%	68.9%	17.7%	0.1%		-	42.9%	40.4%	16.6%	0%		-	-	-
Totals %	2.5%	26.7%	0.9%	0%		30.1%	0.7%	7.2%	4.6%	0%		12.5%	5.3%	27.3%	7%	0%		39.6%	7.6%	7.2%	3%	0%		17.8%	-	-
Heavy	15	1083	10	0		-	11	28	25	0		-	29	1078	45	0		-	45	54	18	0		-	-	-
Heavy %	1.6%	11.1%	3.1%	0%		-	4.1%	1.1%	1.5%	0%		-	1.5%	10.8%	1.8%	0%		-	1.6%	2%	1.7%	0%		-	-	-
Bicycles	0	0	0	0		-	0	0	1	0		-	0	0	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0.1%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: HWY 6 / HANLON PARKWAY & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

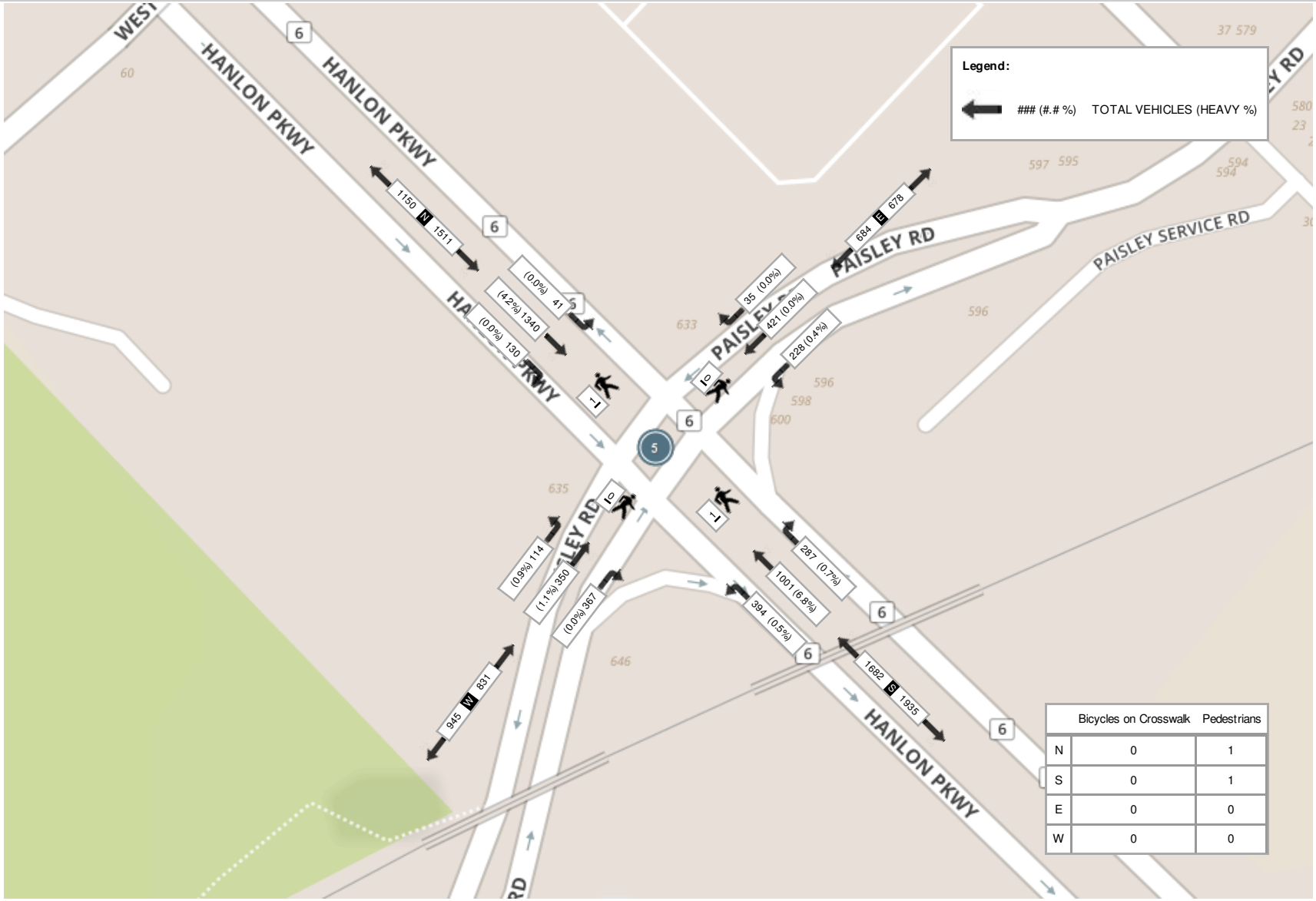
Start Time	N Approach HWY 6 / HANLON PARKWAY						E Approach PAISLEY RD						S Approach HWY 6 / HANLON PARKWAY						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	30	318	7	0	0	355	9	97	52	0	0	158	65	263	101	0	0	429	80	80	27	0	0	187	1129
16:45:00	30	309	10	0	0	349	9	105	52	0	0	166	77	258	114	1	1	450	93	76	38	0	0	207	1172
17:00:00	37	344	9	0	1	390	9	118	62	0	0	189	77	234	85	0	0	396	101	92	32	0	0	225	1200
17:15:00	33	369	15	0	0	417	8	101	62	0	0	171	68	246	94	0	0	408	93	102	17	0	0	212	1208
Grand Total	130	1340	41	0	1	1511	35	421	228	0	0	684	287	1001	394	1	1	1683	367	350	114	0	0	831	**4709**
Approach%	8.6%	88.7%	2.7%	0%		-	5.1%	61.5%	33.3%	0%		-	17.1%	59.5%	23.4%	0.1%		-	44.2%	42.1%	13.7%	0%		-	-
Totals %	2.8%	28.5%	0.9%	0%		32.1%	0.7%	8.9%	4.8%	0%		14.5%	6.1%	21.3%	8.4%	0%		35.7%	7.8%	7.4%	2.4%	0%		17.6%	-
PHF	0.88	0.91	0.68	0		0.91	0.97	0.89	0.92	0		0.9	0.93	0.95	0.86	0.25		0.94	0.91	0.86	0.75	0		0.92	-
Heavy	0	56	0	0		56	0	0	1	0		1	2	68	2	0		72	0	4	1	0		5	-
Heavy %	0%	4.2%	0%	0%		3.7%	0%	0%	0.4%	0%		0.1%	0.7%	6.8%	0.5%	0%		4.3%	0%	1.1%	0.9%	0%		0.6%	-
Lights	130	1284	41	0		1455	35	421	227	0		683	285	933	392	1		1611	367	346	113	0		826	-
Lights %	100%	95.8%	100%	0%		96.3%	100%	100%	99.6%	0%		99.9%	99.3%	93.2%	99.5%	100%		95.7%	100%	98.9%	99.1%	0%		99.4%	-
Single-Unit Trucks	0	11	0	0		11	0	0	1	0		1	2	27	0	0		29	0	1	0	0		1	-
Single-Unit Trucks %	0%	0.8%	0%	0%		0.7%	0%	0%	0.4%	0%		0.1%	0.7%	2.7%	0%	0%		1.7%	0%	0.3%	0%	0%		0.1%	-
Buses	0	1	0	0		1	0	0	0	0		0	0	4	1	0		5	0	3	1	0		4	-
Buses %	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.4%	0.3%	0%		0.3%	0%	0.9%	0.9%	0%		0.5%	-
Articulated Trucks	0	44	0	0		44	0	0	0	0		0	0	37	1	0		38	0	0	0	0		0	-
Articulated Trucks %	0%	3.3%	0%	0%		2.9%	0%	0%	0%	0%		0%	0%	3.7%	0.3%	0%		2.3%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	50%		-	-	-	-	0%		-	-	-	-	50%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: HWY 6 / HANLON PARKWAY & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	1
E	0	0
W	0	0

Spectrum

Turning Movement Count
Location Name: SILVERCREEK PARKWAY N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (10 . SILVERCREEK PARKWAY N & PAISLEY RD)

Start Time	N Approach SILVERCREEK PARKWAY N						E Approach PAISLEY RD						S Approach SILVERCREEK PARKWAY N						W Approach PAISLEY RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	34	0	18	0	0	52	13	54	0	0	0	67	0	1	1	0	0	2	2	24	23	0	0	49	170	
07:15:00	28	3	17	0	0	48	20	61	0	0	0	81	2	0	2	0	0	4	0	29	29	0	0	58	191	
07:30:00	36	0	20	0	0	56	30	60	0	0	0	90	0	1	1	0	0	2	0	41	42	0	0	83	231	
07:45:00	24	1	19	0	2	44	22	57	0	0	1	79	0	1	0	0	0	1	0	70	51	0	0	121	245	837
08:00:00	29	1	27	0	0	57	18	77	0	0	1	95	0	1	0	0	0	1	0	81	33	0	0	114	267	934
08:15:00	29	0	47	0	11	76	25	61	0	0	11	86	0	0	0	0	3	0	0	86	39	0	3	125	287	1030
08:30:00	34	0	53	0	6	87	35	64	0	0	6	99	0	0	0	0	1	0	0	84	64	0	2	148	334	1133
08:45:00	39	0	44	0	1	83	65	91	0	0	0	156	0	0	0	0	1	0	1	86	61	0	1	148	387	1275
09:00:00	32	0	23	0	0	55	37	79	0	0	2	116	0	0	1	0	0	1	0	48	46	0	0	94	266	1274
09:15:00	33	0	26	0	1	59	28	39	0	0	0	67	0	1	0	0	1	1	0	40	30	0	1	70	197	1184
09:30:00	30	0	37	0	1	67	21	52	0	0	1	73	0	0	0	0	0	0	0	39	30	0	0	69	209	1059
09:45:00	23	0	39	0	0	62	22	29	0	0	0	51	0	1	0	0	1	1	2	45	31	0	0	78	192	864
10:00:00	31	0	32	0	0	63	24	43	0	0	0	67	0	0	0	0	0	0	1	57	25	0	1	83	213	811
10:15:00	37	0	34	0	0	71	31	52	0	0	0	83	0	0	0	0	0	0	0	59	32	0	1	91	245	859
10:30:00	29	0	36	0	0	65	28	52	0	0	1	80	0	0	0	0	1	0	0	48	25	0	0	73	218	868
10:45:00	22	0	41	0	0	63	31	45	0	0	1	76	0	0	0	0	0	0	0	50	34	0	0	84	223	899
11:00:00	23	0	36	0	1	59	22	26	0	0	1	48	1	0	0	0	0	1	0	64	38	0	0	102	210	896
11:15:00	32	0	27	0	0	59	31	62	1	1	0	95	2	0	0	0	0	2	1	42	32	0	0	75	231	882
11:30:00	29	0	30	0	0	59	23	57	0	0	3	80	1	0	0	0	0	1	0	55	42	0	0	97	237	901
11:45:00	41	1	35	0	0	77	22	49	0	0	1	71	0	0	0	0	0	0	0	51	32	0	0	83	231	909
12:00:00	47	1	39	0	0	87	29	52	0	0	0	81	1	0	0	0	0	1	0	53	40	0	0	93	262	961
12:15:00	25	1	45	0	0	71	35	55	2	0	0	92	1	1	1	0	0	3	0	65	37	0	4	102	268	998
12:30:00	31	0	32	0	1	63	25	50	0	0	0	75	0	0	0	0	0	0	0	54	49	0	2	103	241	1002
12:45:00	32	0	35	0	2	67	29	57	0	0	0	86	0	0	0	0	0	0	0	50	37	0	0	87	240	1011
13:00:00	46	0	39	0	1	85	30	47	0	0	1	77	0	0	0	0	0	0	0	56	51	0	0	107	269	1018
13:15:00	43	2	34	0	0	79	30	66	1	0	0	97	0	0	0	0	0	0	1	62	47	0	0	110	286	1036
13:30:00	46	0	57	0	0	103	30	49	0	0	0	79	0	1	2	0	0	3	0	53	54	0	1	107	292	1087
13:45:00	34	0	36	0	1	70	40	49	1	0	0	90	1	0	0	0	1	1	3	60	58	0	2	121	282	1129
14:00:00	37	0	42	0	1	79	35	57	1	0	1	93	0	1	0	0	0	1	0	53	42	0	1	95	268	1128
14:15:00	38	1	45	0	2	84	32	53	0	0	0	85	2	0	3	0	0	5	2	63	49	0	0	114	288	1130
14:30:00	38	1	45	0	0	84	38	57	0	0	0	95	0	0	1	0	0	1	1	67	62	1	1	131	311	1149

14:45:00	59	0	51	0	1	110	32	54	0	0	1	86	0	0	0	0	1	0	0	78	53	0	1	131	327	1194
15:00:00	58	1	56	0	3	115	42	59	0	0	0	101	0	2	1	0	0	3	1	84	52	0	0	137	356	1282
15:15:00	73	0	44	0	7	117	60	54	0	0	1	114	0	0	0	0	3	0	0	70	54	0	1	124	355	1349
15:30:00	70	0	47	0	16	117	31	75	0	0	8	106	0	0	0	0	13	0	0	62	51	0	11	113	336	1374
15:45:00	54	0	51	0	3	105	37	78	0	0	1	115	1	0	1	0	0	2	0	91	71	0	1	162	384	1431
16:00:00	72	1	45	0	6	118	41	83	0	0	0	124	0	0	0	0	0	0	0	63	45	0	3	108	350	1425
16:15:00	65	2	69	0	0	136	41	83	0	0	0	124	0	1	0	0	0	1	0	92	73	0	0	165	426	1496
16:30:00	83	0	56	0	0	139	51	83	0	0	1	134	0	0	1	0	0	1	1	80	64	0	0	145	419	1579
16:45:00	54	0	54	0	1	108	45	103	0	0	0	148	0	0	1	0	1	1	0	86	66	0	1	152	409	1604
17:00:00	78	0	61	0	2	139	40	111	0	0	1	151	0	0	0	0	0	0	0	85	72	0	0	157	447	1701
17:15:00	80	0	46	0	0	126	49	95	0	0	0	144	0	0	0	0	0	0	0	128	72	0	0	200	470	1745
17:30:00	59	0	43	0	1	102	50	84	0	0	0	134	0	0	0	0	0	0	1	97	64	0	0	162	398	1724
17:45:00	44	0	47	0	1	91	36	72	0	0	0	108	0	1	0	0	0	1	0	79	52	0	0	131	331	1646
Grand Total	1881	16	1760	0	72	3657	1456	2736	6	1	44	4199	12	13	16	0	27	41	17	2830	2054	1	38	4902	**12799**	-
Approach%	51.4%	0.4%	48.1%	0%		-	34.7%	65.2%	0.1%	0%		-	29.3%	31.7%	39%	0%		-	0.3%	57.7%	41.9%	0%		-	-	-
Totals %	14.7%	0.1%	13.8%	0%		28.6%	11.4%	21.4%	0%	0%		32.8%	0.1%	0.1%	0.1%	0%		0.3%	0.1%	22.1%	16%	0%		38.3%	-	-
Heavy	19	0	17	0		-	57	43	0	1		-	0	0	0	0		-	0	73	20	0		-	-	-
Heavy %	1%	0%	1%	0%		-	3.9%	1.6%	0%	100%		-	0%	0%	0%	0%		-	0%	2.6%	1%	0%		-	-	-
Bicycles	0	1	5	0		-	1	0	0	0		-	0	3	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	6.3%	0.3%	0%		-	0.1%	0%	0%	0%		-	0%	23.1%	0%	0%		-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: SILVERCREEK PARKWAY N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

Start Time	N Approach SILVERCREEK PARKWAY N						E Approach PAISLEY RD						S Approach SILVERCREEK PARKWAY N						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	83	0	56	0	0	139	51	83	0	0	1	134	0	0	1	0	0	1	1	80	64	0	0	145	419
16:45:00	54	0	54	0	1	108	45	103	0	0	0	148	0	0	1	0	1	1	0	86	66	0	1	152	409
17:00:00	78	0	61	0	2	139	40	111	0	0	1	151	0	0	0	0	0	0	0	85	72	0	0	157	447
17:15:00	80	0	46	0	0	126	49	95	0	0	0	144	0	0	0	0	0	0	0	128	72	0	0	200	470
Grand Total	295	0	217	0	3	512	185	392	0	0	2	577	0	0	2	0	1	2	1	379	274	0	1	654	**1745**
Approach%	57.6%	0%	42.4%	0%		-	32.1%	67.9%	0%	0%		-	0%	0%	100%	0%		-	0.2%	58%	41.9%	0%		-	-
Totals %	16.9%	0%	12.4%	0%		29.3%	10.6%	22.5%	0%	0%		33.1%	0%	0%	0.1%	0%		0.1%	0.1%	21.7%	15.7%	0%		37.5%	-
PHF	0.89	0	0.89	0		0.92	0.91	0.88	0	0		0.96	0	0	0.5	0		0.5	0.25	0.74	0.95	0		0.82	-
Heavy	0	0	1	0		1	4	1	0	0		5	0	0	0	0		0	0	5	1	0		6	-
Heavy %	0%	0%	0.5%	0%		0.2%	2.2%	0.3%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	1.3%	0.4%	0%		0.9%	-
Lights	295	0	216	0		511	181	391	0	0		572	0	0	2	0		2	1	374	273	0		648	-
Lights %	100%	0%	99.5%	0%		99.8%	97.8%	99.7%	0%	0%		99.1%	0%	0%	100%	0%		100%	100%	98.7%	99.6%	0%		99.1%	-
Single-Unit Trucks	0	0	0	0		0	1	1	0	0		2	0	0	0	0		0	0	2	1	0		3	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0.5%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.5%	0.4%	0%		0.5%	-
Buses	0	0	1	0		1	3	0	0	0		3	0	0	0	0		0	0	3	0	0		3	-
Buses %	0%	0%	0.5%	0%		0.2%	1.6%	0%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.5%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	42.9%		-	-	-	-	28.6%		-	-	-	-	14.3%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	14.3%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: SILVERCREEK PARKWAY N & PAISLEY RD
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

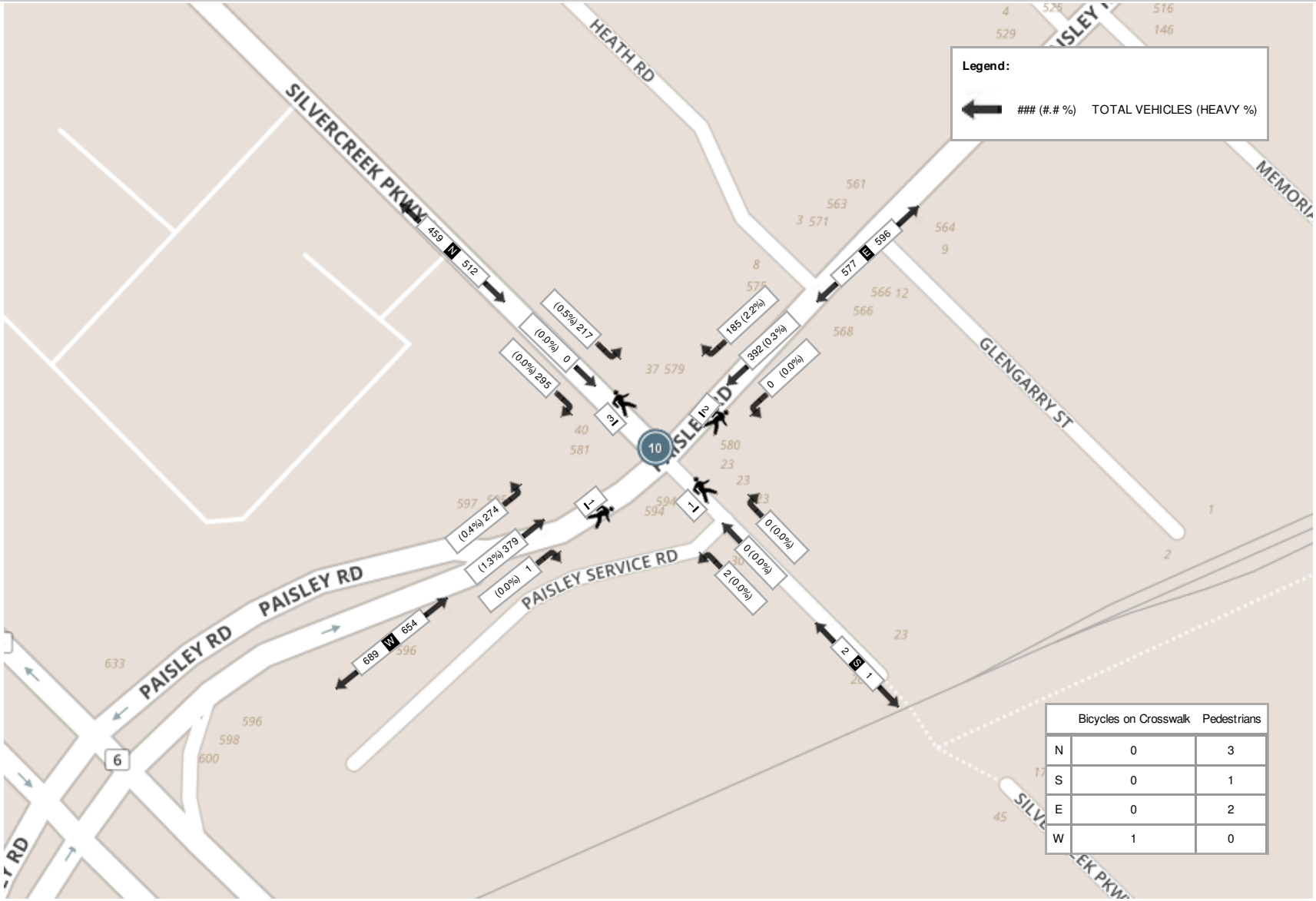
BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Selected Hour: 08:00 AM - 09:00 AM Weather:

Start Time	N Approach SILVERCREEK PARKWAY N						E Approach PAISLEY RD						S Approach SILVERCREEK PARKWAY N						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	29	1	27	0	0	57	18	77	0	0	1	95	0	1	0	0	0	1	0	81	33	0	0	114	267
08:15:00	29	0	47	0	11	76	25	61	0	0	11	86	0	0	0	0	3	0	0	86	39	0	3	125	287
08:30:00	34	0	53	0	6	87	35	64	0	0	6	99	0	0	0	0	1	0	0	84	64	0	2	148	334
08:45:00	39	0	44	0	1	83	65	91	0	0	0	156	0	0	0	0	1	0	1	86	61	0	1	148	387
Grand Total	131	1	171	0	18	303	143	293	0	0	18	436	0	1	0	0	5	1	1	337	197	0	6	535	**1275**
Approach%	43.2%	0.3%	56.4%	0%		-	32.8%	67.2%	0%	0%		-	0%	100%	0%	0%		-	0.2%	63%	36.8%	0%		-	-
Totals %	10.3%	0.1%	13.4%	0%		23.8%	11.2%	23%	0%	0%		34.2%	0%	0.1%	0%	0%		0.1%	0.1%	26.4%	15.5%	0%		42%	-
PHF	0.84	0.25	0.81	0		0.87	0.55	0.8	0	0		0.7	0	0.25	0	0		0.25	0.25	0.98	0.77	0		0.9	-
Heavy	5	0	4	0		9	10	6	0	0		16	0	0	0	0		0	0	19	6	0		25	-
Heavy %	3.8%	0%	2.3%	0%		3%	7%	2%	0%	0%		3.7%	0%	0%	0%	0%		0%	0%	5.6%	3%	0%		4.7%	-
Lights	126	1	167	0		294	133	287	0	0		420	0	1	0	0		1	1	318	191	0		510	-
Lights %	96.2%	100%	97.7%	0%		97%	93%	98%	0%	0%		96.3%	0%	100%	0%	0%		100%	100%	94.4%	97%	0%		95.3%	-
Single-Unit Trucks	1	0	1	0		2	1	2	0	0		3	0	0	0	0		0	0	3	2	0		5	-
Single-Unit Trucks %	0.8%	0%	0.6%	0%		0.7%	0.7%	0.7%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	0.9%	1%	0%		0.9%	-
Buses	4	0	3	0		7	9	3	0	0		12	0	0	0	0		0	0	16	4	0		20	-
Buses %	3.1%	0%	1.8%	0%		2.3%	6.3%	1%	0%	0%		2.8%	0%	0%	0%	0%		0%	0%	4.7%	2%	0%		3.7%	-
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	18	-	-	-	-	-	18	-	-	-	-	-	5	-	-	-	-	-	6	-	-
Pedestrians%	-	-	-	-	38.3%		-	-	-	-	38.3%		-	-	-	-	10.6%		-	-	-	-	12.8%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

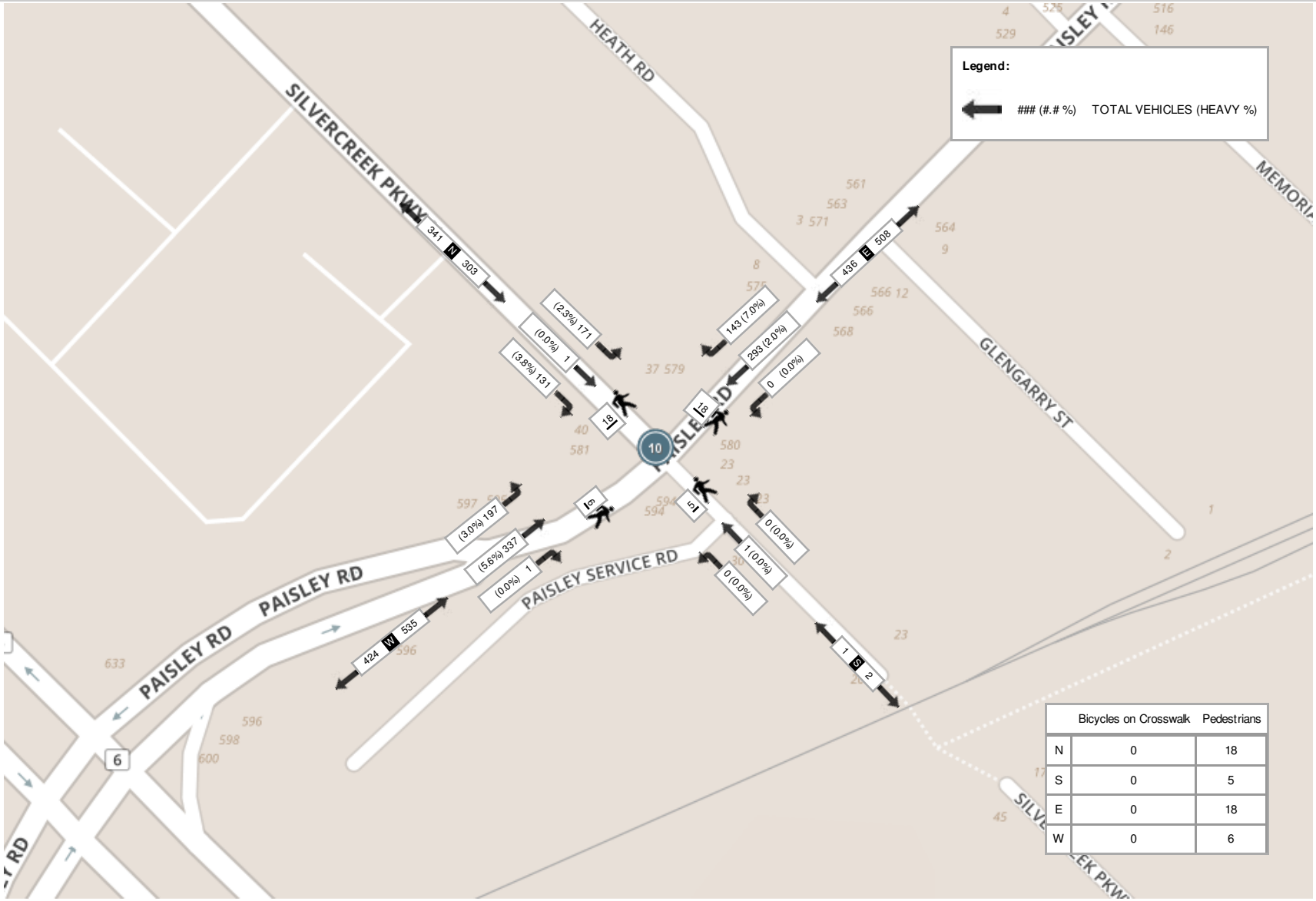
BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	3
S	0	1
E	0	2
W	1	0

Selected Hour: 08:00 AM - 09:00 AM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	18
S	0	5
E	0	18
W	0	6

Spectrum

Turning Movement Count
Location Name: SILVERCREEK PARKWAY N & PAISLEY RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (10 . SILVERCREEK PARKWAY N & PAISLEY RD)

Start Time	N Approach SILVERCREEK PARKWAY N						E Approach PAISLEY RD						S Approach SILVERCREEK PARKWAY N						W Approach PAISLEY RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
11:00:00	39	0	45	0	2	84	40	76	0	0	1	116	0	0	0	0	0	0	1	59	37	0	0	97	297	
11:15:00	47	0	39	0	0	86	32	57	0	0	0	89	0	0	1	0	0	1	0	70	56	0	1	126	302	
11:30:00	52	1	34	0	2	87	36	67	0	0	0	103	1	0	0	0	1	1	1	67	45	0	0	113	304	
11:45:00	47	1	53	0	0	101	44	75	0	0	0	119	0	0	1	0	0	1	2	85	44	0	0	131	352	1255
12:00:00	55	0	46	0	0	101	28	70	0	0	1	98	0	1	0	0	1	1	0	81	60	0	1	141	341	1299
12:15:00	55	0	45	0	0	100	41	84	0	0	0	125	0	0	1	1	0	2	2	75	50	0	0	127	354	1351
12:30:00	49	2	44	0	0	95	28	74	0	0	0	102	0	1	0	0	1	1	0	69	46	0	1	115	313	1360
12:45:00	38	1	58	0	1	97	40	85	0	0	0	125	1	1	1	1	0	4	2	64	55	0	1	121	347	1355
13:00:00	58	2	51	0	0	111	29	68	0	0	0	97	0	1	0	0	0	1	0	79	47	0	1	126	335	1349
13:15:00	44	0	46	0	0	90	26	76	0	0	0	102	0	0	0	0	0	0	1	61	65	0	0	127	319	1314
13:30:00	42	1	58	0	4	101	50	71	0	0	1	121	0	0	0	0	2	0	1	72	51	0	2	124	346	1347
13:45:00	45	0	48	0	0	93	54	67	0	0	0	121	0	1	1	0	0	2	0	68	53	0	0	121	337	1337
14:00:00	57	0	39	0	0	96	44	68	1	0	0	113	1	1	1	0	0	3	2	58	59	0	0	119	331	1333
14:15:00	37	1	57	0	1	95	36	57	0	0	0	93	1	0	0	0	0	1	0	62	49	0	0	111	300	1314
14:30:00	50	1	52	0	0	103	39	67	0	0	1	106	0	0	0	0	1	0	1	58	69	0	0	128	337	1305
14:45:00	49	0	59	0	0	108	35	80	0	0	1	115	0	0	3	0	0	3	1	73	52	0	1	126	352	1320
Grand Total	764	10	774	0	10	1548	602	1142	1	0	5	1745	4	6	9	2	6	21	14	1101	838	0	8	1953	**5267**	-
Approach%	49.4%	0.6%	50%	0%		-	34.5%	65.4%	0.1%	0%		-	19%	28.6%	42.9%	9.5%		-	0.7%	56.4%	42.9%	0%		-	-	-
Totals %	14.5%	0.2%	14.7%	0%		29.4%	11.4%	21.7%	0%	0%		33.1%	0.1%	0.1%	0.2%	0%		0.4%	0.3%	20.9%	15.9%	0%		37.1%	-	-
Heavy	2	0	4	0		-	14	2	0	0		-	0	0	0	0		-	0	13	0	0		-	-	-
Heavy %	0.3%	0%	0.5%	0%		-	2.3%	0.2%	0%	0%		-	0%	0%	0%	0%		-	0%	1.2%	0%	0%		-	-	-
Bicycles	0	2	1	0		-	0	0	0	0		-	0	2	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	20%	0.1%	0%		-	0%	0%	0%	0%		-	0%	33.3%	0%	0%		-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: SILVERCREEK PARKWAY N & PAISLEY RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 11:45 AM - 12:45 PM Weather:

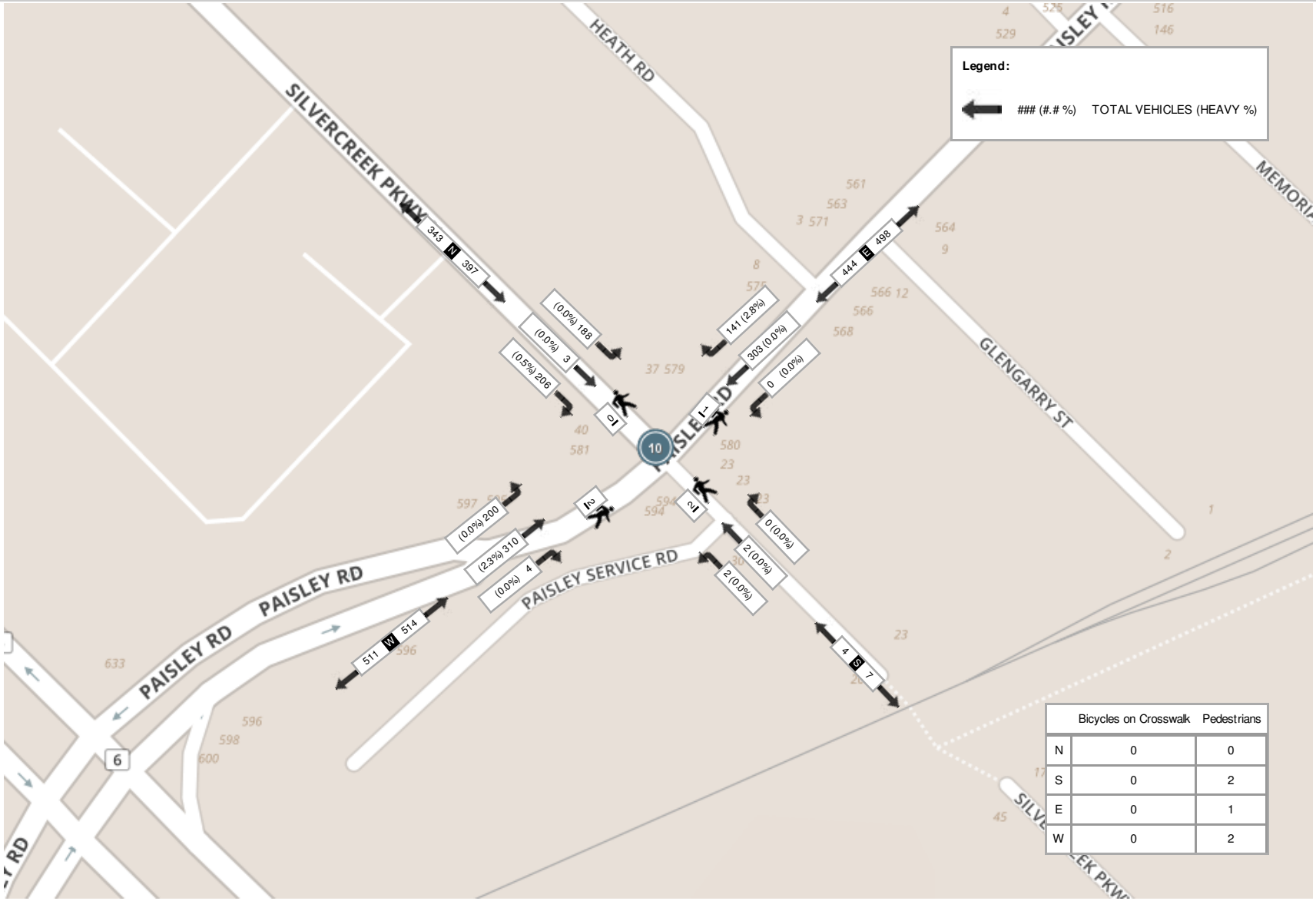
Start Time	N Approach SILVERCREEK PARKWAY N						E Approach PAISLEY RD						S Approach SILVERCREEK PARKWAY N						W Approach PAISLEY RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
11:45:00	47	1	53	0	0	101	44	75	0	0	0	119	0	0	1	0	0	1	2	85	44	0	0	131	352
12:00:00	55	0	46	0	0	101	28	70	0	0	1	98	0	1	0	0	1	1	0	81	60	0	1	141	341
12:15:00	55	0	45	0	0	100	41	84	0	0	0	125	0	0	1	1	0	2	2	75	50	0	0	127	354
12:30:00	49	2	44	0	0	95	28	74	0	0	0	102	0	1	0	0	1	1	0	69	46	0	1	115	313
Grand Total	206	3	188	0	0	397	141	303	0	0	1	444	0	2	2	1	2	5	4	310	200	0	2	514	**1360**
Approach%	51.9%	0.8%	47.4%	0%		-	31.8%	68.2%	0%	0%		-	0%	40%	40%	20%		-	0.8%	60.3%	38.9%	0%		-	-
Totals %	15.1%	0.2%	13.8%	0%		29.2%	10.4%	22.3%	0%	0%		32.6%	0%	0.1%	0.1%	0.1%		0.4%	0.3%	22.8%	14.7%	0%		37.8%	-
PHF	0.94	0.38	0.89	0		0.98	0.8	0.9	0	0		0.89	0	0.5	0.5	0.25		0.63	0.5	0.91	0.83	0		0.91	-
Heavy	1	0	0	0		1	4	0	0	0		4	0	0	0	0		0	0	7	0	0		7	-
Heavy %	0.5%	0%	0%	0%		0.3%	2.8%	0%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	2.3%	0%	0%		1.4%	-
Lights	205	3	188	0		396	137	303	0	0		440	0	2	2	1		5	4	303	200	0		507	-
Lights %	99.5%	100%	100%	0%		99.7%	97.2%	100%	0%	0%		99.1%	0%	100%	100%	100%		100%	100%	97.7%	100%	0%		98.6%	-
Single-Unit Trucks	1	0	0	0		1	0	0	0	0		0	0	0	0	0		0	0	4	0	0		4	-
Single-Unit Trucks %	0.5%	0%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		0.8%	-
Buses	0	0	0	0		0	4	0	0	0		4	0	0	0	0		0	0	3	0	0		3	-
Buses %	0%	0%	0%	0%		0%	2.8%	0%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.6%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	20%		-	-	-	-	40%		-	-	-	-	40%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: SILVERCREEK PARKWAY N & PAISLEY RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 11:45 AM - 12:45 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	2
E	0	1
W	0	2

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (7 . SILVERCREEK PARKWAY S & WATERLOO AVE)

Start Time	E Approach WATERLOO AVE					S Approach WATERLOO AVE					W Approach SILVERCREEK PARKWAY S					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	U-Turn W:W	Peds W:	Approach Total		
07:00:00	1	41	0	0	42	25	2	0	0	27	2	2	0	0	4	73	
07:15:00	2	43	0	0	45	29	6	0	0	35	2	1	0	0	3	83	
07:30:00	1	55	0	0	56	34	1	0	0	35	5	0	0	0	5	96	
07:45:00	0	57	0	0	57	47	1	0	0	48	1	3	0	0	4	109	361
08:00:00	2	64	0	1	66	43	3	0	7	46	2	2	0	0	4	116	404
08:15:00	2	58	0	0	60	61	0	0	0	61	1	5	0	0	6	127	448
08:30:00	2	57	0	0	59	79	1	0	0	80	0	1	0	0	1	140	492
08:45:00	0	51	0	0	51	59	1	0	0	60	1	2	0	0	3	114	497
09:00:00	1	44	0	0	45	59	1	0	0	60	1	2	0	0	3	108	489
09:15:00	2	22	0	0	24	40	1	0	0	41	2	0	0	0	2	67	429
09:30:00	0	19	0	0	19	26	2	0	0	28	1	2	0	0	3	50	339
09:45:00	2	22	0	0	24	28	1	0	1	29	1	2	0	0	3	56	281
10:00:00	4	24	0	0	28	19	2	0	1	21	2	2	0	0	4	53	226
10:15:00	7	18	0	0	25	21	1	0	0	22	1	6	0	0	7	54	213
10:30:00	1	32	0	1	33	31	3	0	0	34	3	2	0	0	5	72	235
10:45:00	2	26	0	0	28	33	3	0	0	36	1	1	0	0	2	66	245
11:00:00	2	31	0	0	33	33	2	0	0	35	2	5	0	0	7	75	267
11:15:00	3	33	0	0	36	23	1	0	2	24	4	1	0	0	5	65	278
11:30:00	3	29	0	0	32	16	3	0	0	19	3	3	0	0	6	57	263
11:45:00	1	29	0	0	30	26	1	0	1	27	0	2	0	0	2	59	256
12:00:00	2	39	0	0	41	35	2	0	0	37	0	2	0	0	2	80	261
12:15:00	1	22	0	0	23	18	3	0	0	21	5	2	0	0	7	51	247
12:30:00	2	30	0	0	32	26	2	0	0	28	1	1	0	0	2	62	252

12:45:00	1	33	0	0	34	26	2	1	0	29	0	2	0	0	2	65	258
13:00:00	3	37	0	0	40	31	1	0	0	32	2	2	0	0	4	76	254
13:15:00	0	39	0	0	39	27	2	0	0	29	3	0	0	0	3	71	274
13:30:00	1	33	0	0	34	32	2	0	0	34	0	6	0	0	6	74	286
13:45:00	2	19	0	0	21	28	3	0	0	31	1	5	0	0	6	58	279
14:00:00	4	29	0	0	33	28	2	0	0	30	0	5	0	0	5	68	271
14:15:00	1	24	0	0	25	39	1	0	1	40	4	0	0	0	4	69	269
14:30:00	3	35	0	0	38	29	3	0	0	32	0	0	0	0	0	70	265
14:45:00	5	23	0	0	28	35	2	0	0	37	4	2	0	0	6	71	278
15:00:00	3	33	0	0	36	52	5	1	0	58	4	2	0	0	6	100	310
15:15:00	6	50	0	0	56	48	1	0	0	49	3	3	0	0	6	111	352
15:30:00	2	66	0	0	68	59	3	0	0	62	4	3	0	0	7	137	419
15:45:00	1	46	0	0	47	63	5	0	1	68	2	1	0	0	3	118	466
16:00:00	3	60	0	0	63	35	6	0	0	41	1	3	0	0	4	108	474
16:15:00	5	61	0	0	66	71	3	0	0	74	3	6	0	0	9	149	512
16:30:00	4	55	0	0	59	65	1	0	0	66	3	2	0	0	5	130	505
16:45:00	3	70	0	0	73	55	5	0	0	60	4	1	0	0	5	138	525
17:00:00	0	55	0	0	55	52	4	0	1	56	0	3	0	0	3	114	531
17:15:00	2	70	0	0	72	79	8	0	0	87	5	3	0	0	8	167	549
17:30:00	1	50	0	0	51	52	4	0	0	56	4	2	0	0	6	113	532
17:45:00	6	35	0	0	41	62	2	0	1	64	0	4	0	0	4	109	503
Grand Total	99	1769	0	2	1868	1779	108	2	16	1889	88	104	0	0	192	**3949**	-
Approach%	5.3%	94.7%	0%		-	94.2%	5.7%	0.1%		-	45.8%	54.2%	0%		-	**-**	-
Totals %	2.5%	44.8%	0%		47.3%	45%	2.7%	0.1%		47.8%	2.2%	2.6%	0%		4.9%	**-**	-
Heavy	2	51	0		-	49	4	0		-	0	5	0		-	**-**	-
Heavy %	2%	2.9%	0%		-	2.8%	3.7%	0%		-	0%	4.8%	0%		-	**-**	-
Bicycles	3	0	0		-	3	0	0		-	0	1	0		-	**-**	-
Bicycle %	3%	0%	0%		-	0.2%	0%	0%		-	0%	1%	0%		-	**-**	-

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

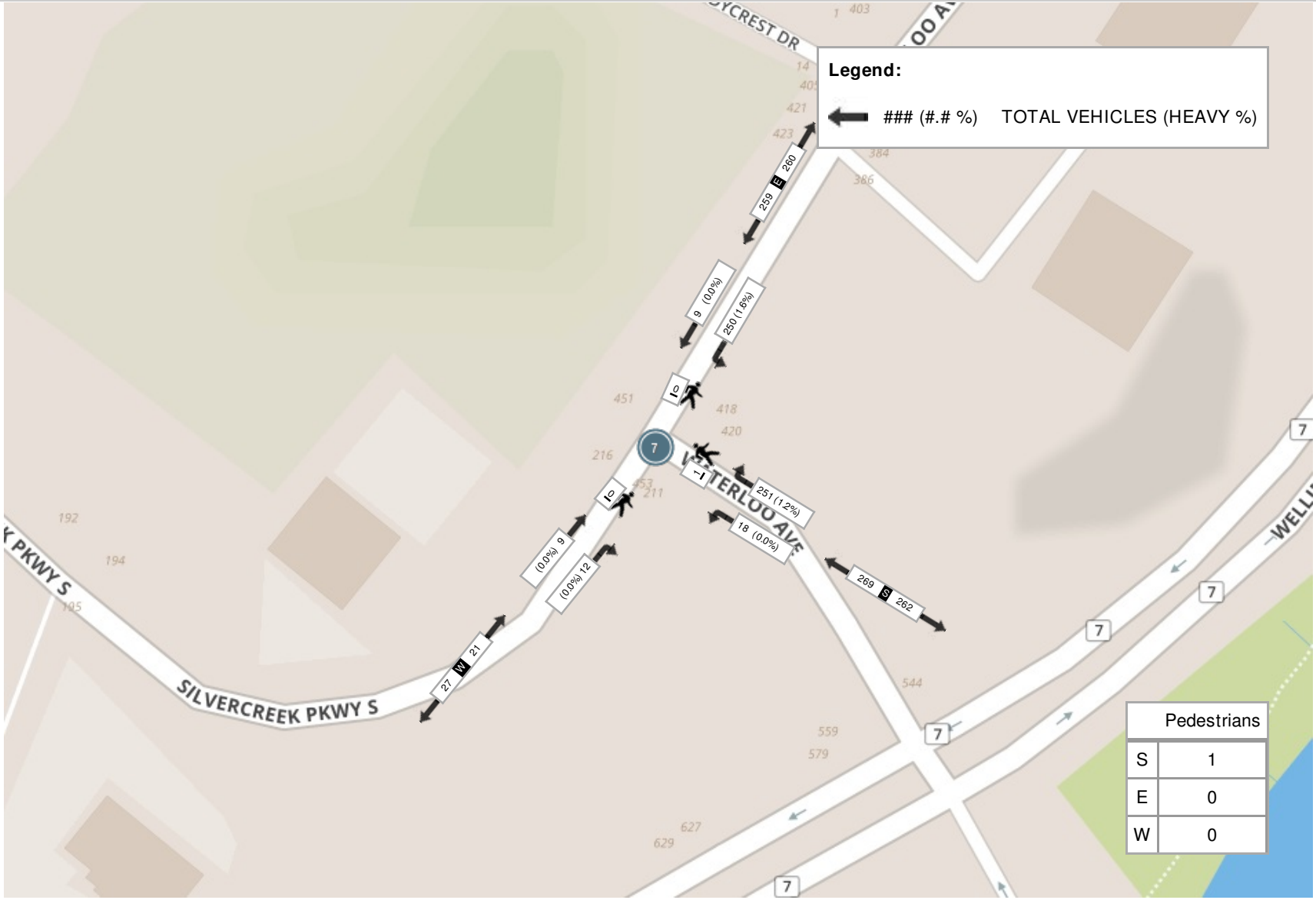
Start Time	E Approach WATERLOO AVE					S Approach WATERLOO AVE					W Approach SILVERCREEK PARKWAY S					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:30:00	4	55	0	0	59	65	1	0	0	66	3	2	0	0	5	130
16:45:00	3	70	0	0	73	55	5	0	0	60	4	1	0	0	5	138
17:00:00	0	55	0	0	55	52	4	0	1	56	0	3	0	0	3	114
17:15:00	2	70	0	0	72	79	8	0	0	87	5	3	0	0	8	167
Grand Total	9	250	0	0	259	251	18	0	1	269	12	9	0	0	21	**549**
Approach%	3.5%	96.5%	0%		-	93.3%	6.7%	0%		-	57.1%	42.9%	0%		-	-
Totals %	1.6%	45.5%	0%		47.2%	45.7%	3.3%	0%		49%	2.2%	1.6%	0%		3.8%	-
PHF	0.56	0.89	0		0.89	0.79	0.56	0		0.77	0.6	0.75	0		0.66	-
Heavy	0	4	0		4	3	0	0		3	0	0	0		0	-
Heavy %	0%	1.6%	0%		1.5%	1.2%	0%	0%		1.1%	0%	0%	0%		0%	-
Lights	9	246	0		255	248	18	0		266	12	9	0		21	-
Lights %	100%	98.4%	0%		98.5%	98.8%	100%	0%		98.9%	100%	100%	0%		100%	-
Single-Unit Trucks	0	2	0		2	1	0	0		1	0	0	0		0	-
Single-Unit Trucks %	0%	0.8%	0%		0.8%	0.4%	0%	0%		0.4%	0%	0%	0%		0%	-
Buses	0	2	0		2	2	0	0		2	0	0	0		0	-
Buses %	0%	0.8%	0%		0.8%	0.8%	0%	0%		0.7%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	100%		-	-	-	0%		-
Bicycles on Road	2	0	0	0	-	2	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Selected Hour: 08:00 AM - 09:00 AM Weather:

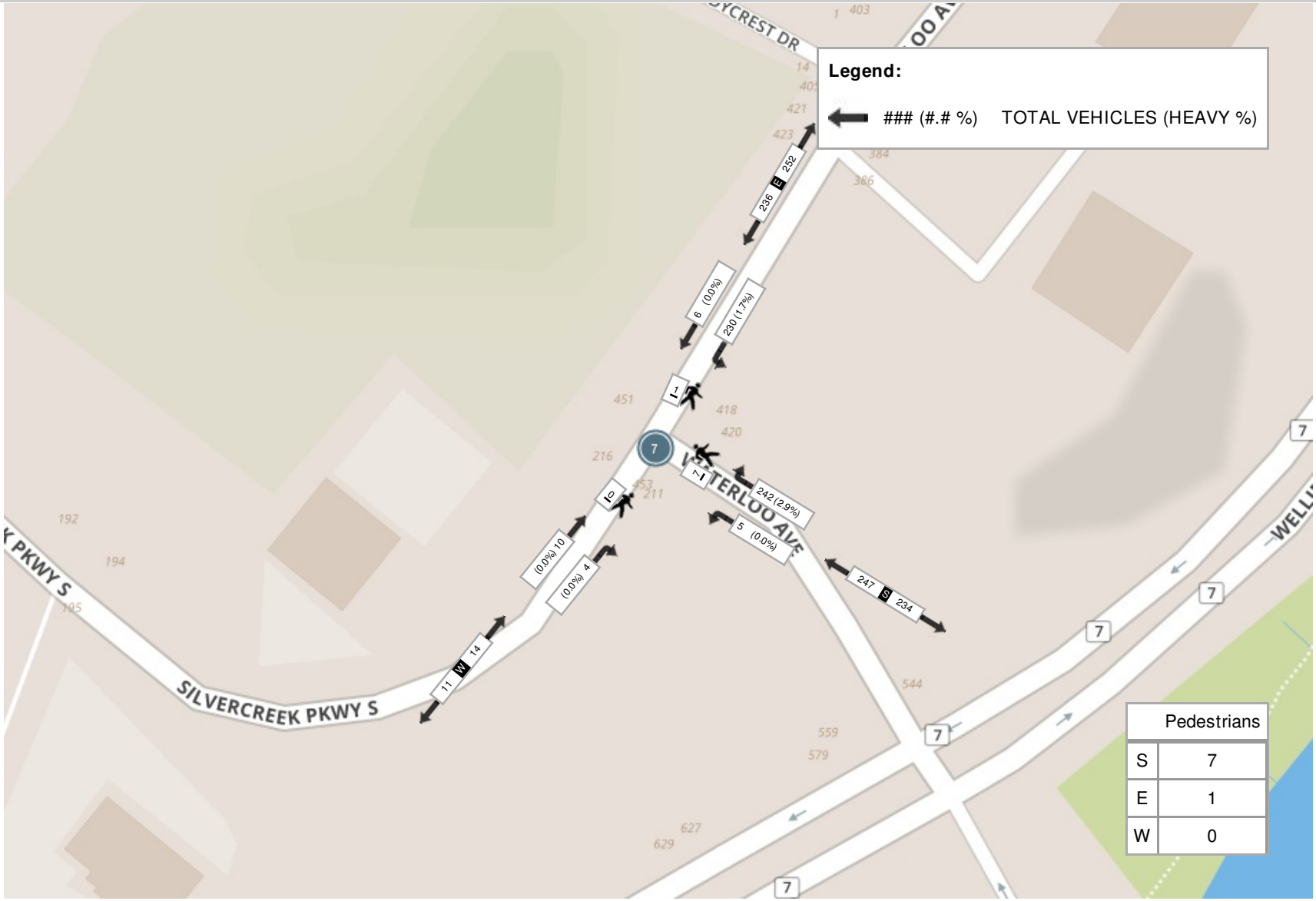
Start Time	E Approach WATERLOO AVE					S Approach WATERLOO AVE					W Approach SILVERCREEK PARKWAY S					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
08:00:00	2	64	0	1	66	43	3	0	7	46	2	2	0	0	4	116
08:15:00	2	58	0	0	60	61	0	0	0	61	1	5	0	0	6	127
08:30:00	2	57	0	0	59	79	1	0	0	80	0	1	0	0	1	140
08:45:00	0	51	0	0	51	59	1	0	0	60	1	2	0	0	3	114
Grand Total	6	230	0	1	236	242	5	0	7	247	4	10	0	0	14	**497**
Approach%	2.5%	97.5%	0%		-	98%	2%	0%		-	28.6%	71.4%	0%		-	-
Totals %	1.2%	46.3%	0%		47.5%	48.7%	1%	0%		49.7%	0.8%	2%	0%		2.8%	-
PHF	0.75	0.9	0		0.89	0.77	0.42	0		0.77	0.5	0.5	0		0.58	-
Heavy	0	4	0		4	7	0	0		7	0	0	0		0	-
Heavy %	0%	1.7%	0%		1.7%	2.9%	0%	0%		2.8%	0%	0%	0%		0%	-
Lights	6	226	0		232	235	5	0		240	4	10	0		14	-
Lights %	100%	98.3%	0%		98.3%	97.1%	100%	0%		97.2%	100%	100%	0%		100%	-
Single-Unit Trucks	0	0	0		0	1	0	0		1	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%		0%	0.4%	0%	0%		0.4%	0%	0%	0%		0%	-
Buses	0	3	0		3	6	0	0		6	0	0	0		0	-
Buses %	0%	1.3%	0%		1.3%	2.5%	0%	0%		2.4%	0%	0%	0%		0%	-
Articulated Trucks	0	1	0		1	0	0	0		0	0	0	0		0	-
Articulated Trucks %	0%	0.4%	0%		0.4%	0%	0%	0%		0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	1	-	-	-	-	7	-	-	-	-	0	-	-
Pedestrians%	-	-	-	12.5%		-	-	-	87.5%		-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



Selected Hour: 08:00 AM - 09:00 AM Weather:



	Pedestrians
S	7
E	1
W	0

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (7 . SILVERCREEK PARKWAY S & WATERLOO AVE)

Start Time	E Approach WATERLOO AVE					S Approach WATERLOO AVE					W Approach SILVERCREEK PARKWAY S					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	U-Turn W:W	Peds W:	Approach Total		
11:00:00	0	36	0	0	36	24	0	0	2	24	0	0	0	0	0	60	
11:15:00	1	50	0	0	51	33	2	0	0	35	1	1	0	0	2	88	
11:30:00	2	20	0	0	22	41	3	0	0	44	1	1	0	0	2	68	
11:45:00	2	35	0	0	37	31	5	0	1	36	5	2	0	0	7	80	296
12:00:00	1	31	0	0	32	36	4	0	0	40	3	3	0	0	6	78	314
12:15:00	1	41	0	0	42	32	3	0	2	35	5	1	0	0	6	83	309
12:30:00	0	33	0	0	33	28	2	0	0	30	7	0	0	0	7	70	311
12:45:00	0	34	0	0	34	37	2	0	0	39	1	0	0	0	1	74	305
13:00:00	1	42	0	0	43	32	2	2	0	36	3	1	0	0	4	83	310
13:15:00	1	50	0	0	51	32	2	0	0	34	2	0	0	0	2	87	314
13:30:00	1	32	0	0	33	35	3	0	0	38	3	3	0	0	6	77	321
13:45:00	2	35	0	0	37	51	4	0	1	55	5	0	0	0	5	97	344
14:00:00	0	41	0	0	41	34	5	0	0	39	1	0	0	0	1	81	342
14:15:00	1	27	0	0	28	22	2	0	0	24	3	0	0	0	3	55	310
14:30:00	3	31	0	0	34	33	2	0	0	35	3	1	0	0	4	73	306
14:45:00	2	33	0	3	35	37	4	1	1	42	2	6	0	1	8	85	294
Grand Total	18	571	0	3	589	538	45	3	7	586	45	19	0	1	64	**1239**	-
Approach%	3.1%	96.9%	0%		-	91.8%	7.7%	0.5%		-	70.3%	29.7%	0%		-	-	-
Totals %	1.5%	46.1%	0%		47.5%	43.4%	3.6%	0.2%		47.3%	3.6%	1.5%	0%		5.2%	-	-
Heavy	0	9	0		-	8	0	0		-	0	0	0		-	-	-
Heavy %	0%	1.6%	0%		-	1.5%	0%	0%		-	0%	0%	0%		-	-	-
Bicycles	2	1	0		-	2	0	0		-	0	2	0		-	-	-
Bicycle %	11.1%	0.2%	0%		-	0.4%	0%	0%		-	0%	10.5%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: SILVERCREEK PARKWAY S & WATERLOO AVE
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 01:00 PM - 02:00 PM Weather:

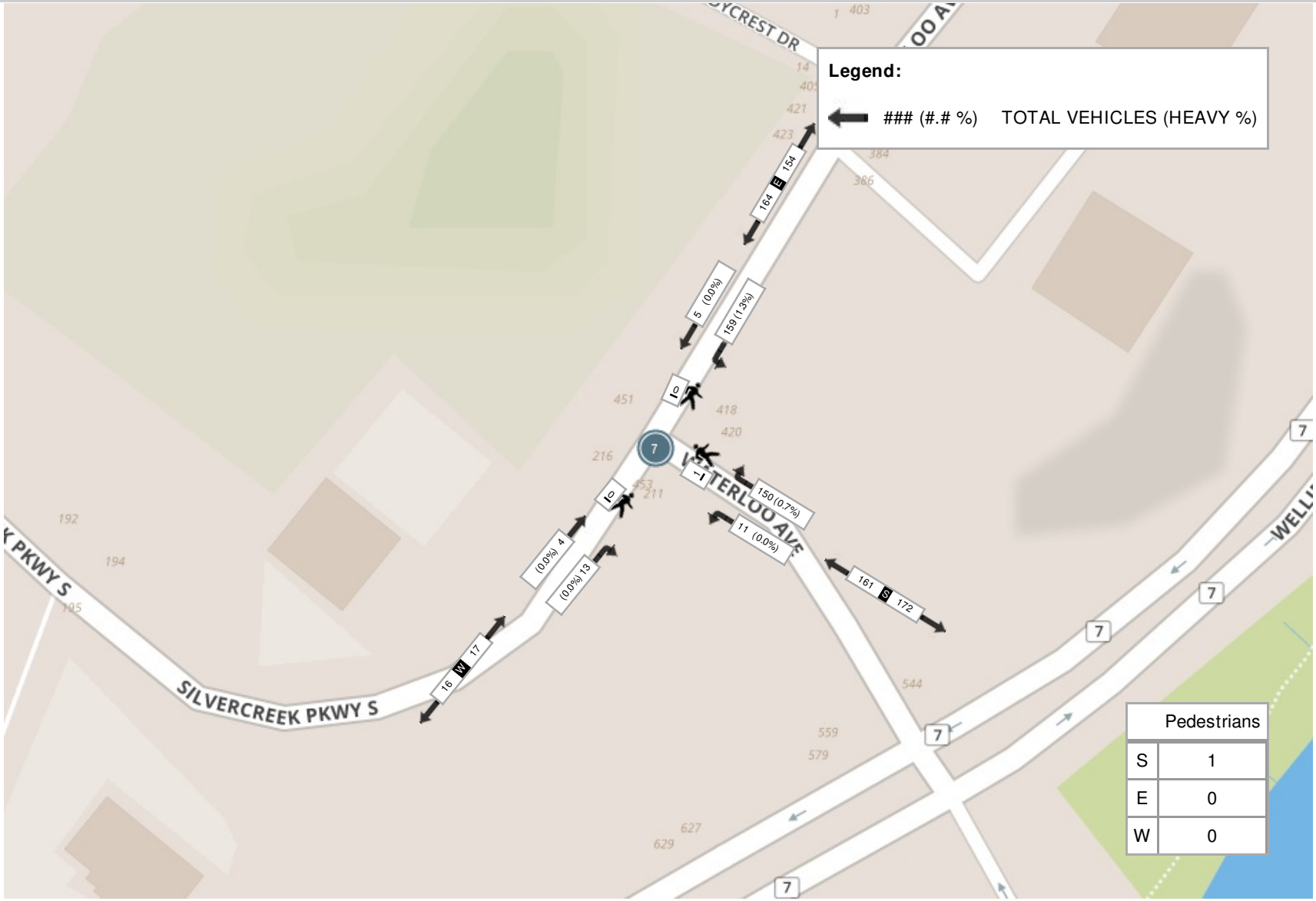
Start Time	E Approach WATERLOO AVE					S Approach WATERLOO AVE					W Approach SILVERCREEK PARKWAY S					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
13:00:00	1	42	0	0	43	32	2	2	0	36	3	1	0	0	4	83
13:15:00	1	50	0	0	51	32	2	0	0	34	2	0	0	0	2	87
13:30:00	1	32	0	0	33	35	3	0	0	38	3	3	0	0	6	77
13:45:00	2	35	0	0	37	51	4	0	1	55	5	0	0	0	5	97
Grand Total	5	159	0	0	164	150	11	2	1	163	13	4	0	0	17	**344**
Approach%	3%	97%	0%		-	92%	6.7%	1.2%		-	76.5%	23.5%	0%		-	-
Totals %	1.5%	46.2%	0%		47.7%	43.6%	3.2%	0.6%		47.4%	3.8%	1.2%	0%		4.9%	-
PHF	0.63	0.8	0		0.8	0.74	0.69	0.25		0.74	0.65	0.33	0		0.71	-
Heavy	0	2	0		2	1	0	0		1	0	0	0		0	-
Heavy %	0%	1.3%	0%		1.2%	0.7%	0%	0%		0.6%	0%	0%	0%		0%	-
Lights	5	157	0		162	149	11	2		162	13	4	0		17	-
Lights %	100%	98.7%	0%		98.8%	99.3%	100%	100%		99.4%	100%	100%	0%		100%	-
Single-Unit Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Buses	0	2	0		2	1	0	0		1	0	0	0		0	-
Buses %	0%	1.3%	0%		1.2%	0.7%	0%	0%		0.6%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	100%		-	-	-	0%		-
Bicycles on Road	1	0	0	0	-	2	0	0	0	-	0	1	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: SILVERCREEK PARKWAY S & WATERLOO AVE
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 01:00 PM - 02:00 PM Weather:



	Pedestrians
S	1
E	0
W	0

Spectrum

Turning Movement Count
Location Name: WATERLOO AVE & EDINBURGH RD S
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (6 . WATERLOO AVE & EDINBURGH RD S)

Start Time	N Approach EDINBURGH RD S						E Approach WATERLOO AVE						S Approach EDINBURGH RD S						W Approach WATERLOO AVE						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	8	44	1	0	0	53	4	17	2	0	2	23	7	43	2	0	0	52	3	11	4	0	1	18	146	
07:15:00	4	57	4	0	1	65	8	22	5	0	0	35	11	50	2	0	2	63	8	19	3	0	1	30	193	
07:30:00	9	75	7	0	0	91	8	24	9	0	1	41	7	76	2	0	0	85	9	24	5	0	1	38	255	
07:45:00	11	87	8	0	1	106	8	27	7	0	1	42	15	123	5	0	3	143	6	52	11	0	0	69	360	954
08:00:00	9	106	7	0	1	122	5	26	12	0	2	43	15	118	5	0	4	138	15	39	6	0	6	60	363	1171
08:15:00	6	142	10	0	2	158	7	28	22	0	3	57	21	153	3	0	2	177	8	46	16	0	2	70	462	1440
08:30:00	8	100	6	0	2	114	6	30	17	0	3	53	27	149	6	0	1	182	9	74	19	0	1	102	451	1636
08:45:00	10	110	18	0	3	138	5	34	25	0	2	64	27	117	5	0	5	149	10	61	9	0	2	80	431	1707
09:00:00	2	80	16	0	0	98	6	18	6	0	4	30	12	94	3	0	3	109	5	47	9	0	1	61	298	1642
09:15:00	3	71	6	0	0	80	4	13	8	0	0	25	11	81	5	0	0	97	12	29	6	0	0	47	249	1429
09:30:00	5	87	11	0	2	103	3	9	9	0	1	21	11	87	5	0	2	103	7	28	5	0	0	40	267	1245
09:45:00	6	112	8	0	1	126	8	13	11	0	2	32	18	82	5	0	0	105	6	19	5	0	1	30	293	1107
10:00:00	5	65	9	0	0	79	6	11	7	0	0	24	12	81	3	0	0	96	7	18	9	0	1	34	233	1042
10:15:00	5	108	9	0	2	122	13	11	12	0	0	36	11	98	5	0	1	114	9	15	8	0	1	32	304	1097
10:30:00	6	85	7	0	2	98	16	14	12	0	2	42	15	94	5	0	1	114	4	29	4	0	0	37	291	1121
10:45:00	4	92	8	0	1	104	5	20	15	0	0	40	11	96	3	0	1	110	11	24	9	0	2	44	298	1126
11:00:00	6	98	9	0	5	113	7	26	16	0	1	49	8	75	4	0	2	87	11	22	10	0	0	43	292	1185
11:15:00	2	117	10	0	3	129	11	21	13	0	2	45	16	91	6	0	1	113	10	16	8	0	0	34	321	1202
11:30:00	3	92	9	0	0	104	12	25	15	0	0	52	10	96	7	0	2	113	5	21	4	0	1	30	299	1210
11:45:00	9	78	14	0	1	101	13	32	22	0	1	67	10	103	4	0	2	117	6	26	6	0	0	38	323	1235
12:00:00	7	112	9	0	0	128	5	21	13	0	0	39	12	108	8	0	1	128	7	27	8	0	0	42	337	1280
12:15:00	3	98	8	0	1	109	14	23	14	0	0	51	10	94	7	0	4	111	6	15	4	0	0	25	296	1255
12:30:00	2	77	13	0	2	92	12	23	15	0	1	50	13	81	5	0	2	99	3	19	6	0	0	28	269	1225
12:45:00	6	106	14	0	4	126	14	24	15	0	0	53	11	108	1	0	0	120	13	20	6	0	0	39	338	1240
13:00:00	3	97	10	0	2	110	9	26	9	0	2	44	6	128	2	0	2	136	6	23	5	0	1	34	324	1227
13:15:00	6	93	6	0	1	105	3	31	24	0	1	58	14	96	4	0	2	114	10	30	6	0	3	46	323	1254
13:30:00	4	109	10	0	1	123	8	16	16	0	1	40	9	96	9	0	3	114	10	16	10	0	2	36	313	1298
13:45:00	6	108	9	0	2	123	5	12	17	0	1	34	11	111	4	0	1	126	8	26	9	0	2	43	326	1286
14:00:00	8	114	18	0	4	140	3	16	15	0	3	34	10	100	6	0	1	116	6	28	2	0	1	36	326	1288
14:15:00	4	98	11	0	2	113	13	15	21	0	1	49	16	97	3	0	0	116	6	23	7	0	1	36	314	1279
14:30:00	6	101	9	0	4	116	12	24	13	0	2	49	13	119	4	0	3	136	2	23	13	0	0	38	339	1305

14:45:00	9	90	13	0	4	112	18	18	16	0	1	52	19	127	9	0	1	155	4	33	12	0	0	49	368	1347
15:00:00	11	118	5	0	1	134	9	18	8	0	4	35	17	127	8	0	0	152	6	31	12	0	2	49	370	1391
15:15:00	9	144	9	0	2	162	11	44	22	0	2	77	18	149	7	0	2	174	6	21	19	0	2	46	459	1536
15:30:00	10	123	12	0	6	145	10	39	35	0	9	84	15	107	5	0	7	127	6	46	8	0	6	60	416	1613
15:45:00	11	159	8	0	0	178	6	49	23	0	2	78	14	124	4	0	2	142	7	41	9	0	2	57	455	1700
16:00:00	2	144	12	0	2	158	18	45	21	0	2	84	4	121	7	0	5	132	7	27	12	0	4	46	420	1750
16:15:00	10	137	11	0	2	158	21	46	21	0	1	88	16	147	14	0	0	177	7	45	11	0	0	63	486	1777
16:30:00	7	151	9	0	2	167	10	52	22	0	1	84	12	146	7	0	0	165	15	38	12	0	0	65	481	1842
16:45:00	12	133	11	0	1	156	11	64	22	0	2	97	32	157	10	0	0	199	14	35	10	0	2	59	511	1898
17:00:00	5	143	18	0	5	166	12	44	31	0	2	87	20	148	8	0	4	176	8	39	10	0	0	57	486	1964
17:15:00	8	165	9	0	2	182	10	68	16	0	4	94	16	149	12	0	3	177	5	36	14	0	2	55	508	1986
17:30:00	4	158	7	0	1	169	11	40	18	0	1	69	23	137	9	0	3	169	5	30	9	0	1	44	451	1956
17:45:00	9	110	12	0	0	131	4	38	20	0	1	62	16	131	9	0	6	156	9	31	11	0	1	51	400	1845
Grand Total	283	4694	430	0	78	5407	404	1217	692	0	71	2313	622	4815	247	0	84	5684	337	1323	381	0	53	2041	**15445**	-
Approach%	5.2%	86.8%	8%	0%		-	17.5%	52.6%	29.9%	0%		-	10.9%	84.7%	4.3%	0%		-	16.5%	64.8%	18.7%	0%		-	-	-
Totals %	1.8%	30.4%	2.8%	0%		35%	2.6%	7.9%	4.5%	0%		15%	4%	31.2%	1.6%	0%		36.8%	2.2%	8.6%	2.5%	0%		13.2%	-	-
Heavy	8	74	7	0		-	5	40	9	0		-	6	70	3	0		-	11	39	9	0		-	-	-
Heavy %	2.8%	1.6%	1.6%	0%		-	1.2%	3.3%	1.3%	0%		-	1%	1.5%	1.2%	0%		-	3.3%	2.9%	2.4%	0%		-	-	-
Bicycles	0	5	1	0		-	1	3	1	0		-	0	3	1	0		-	1	5	0	0		-	-	-
Bicycle %	0%	0.1%	0.2%	0%		-	0.2%	0.2%	0.1%	0%		-	0%	0.1%	0.4%	0%		-	0.3%	0.4%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: WATERLOO AVE & EDINBURGH RD S
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

Start Time	N Approach EDINBURGH RD S						E Approach WATERLOO AVE						S Approach EDINBURGH RD S						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	7	151	9	0	2	167	10	52	22	0	1	84	12	146	7	0	0	165	15	38	12	0	0	65	481
16:45:00	12	133	11	0	1	156	11	64	22	0	2	97	32	157	10	0	0	199	14	35	10	0	2	59	511
17:00:00	5	143	18	0	5	166	12	44	31	0	2	87	20	148	8	0	4	176	8	39	10	0	0	57	486
17:15:00	8	165	9	0	2	182	10	68	16	0	4	94	16	149	12	0	3	177	5	36	14	0	2	55	508
Grand Total	32	592	47	0	10	671	43	228	91	0	9	362	80	600	37	0	7	717	42	148	46	0	4	236	**1986**
Approach%	4.8%	88.2%	7%	0%		-	11.9%	63%	25.1%	0%		-	11.2%	83.7%	5.2%	0%		-	17.8%	62.7%	19.5%	0%		-	-
Totals %	1.6%	29.8%	2.4%	0%		33.8%	2.2%	11.5%	4.6%	0%		18.2%	4%	30.2%	1.9%	0%		36.1%	2.1%	7.5%	2.3%	0%		11.9%	-
PHF	0.67	0.9	0.65	0		0.92	0.9	0.84	0.73	0		0.93	0.63	0.96	0.77	0		0.9	0.7	0.95	0.82	0		0.91	-
Heavy	0	2	1	0		3	0	3	0	0		3	1	2	0	0		3	1	2	1	0		4	-
Heavy %	0%	0.3%	2.1%	0%		0.4%	0%	1.3%	0%	0%		0.8%	1.3%	0.3%	0%	0%		0.4%	2.4%	1.4%	2.2%	0%		1.7%	-
Lights	32	590	46	0		668	43	225	91	0		359	79	598	37	0		714	41	146	45	0		232	-
Lights %	100%	99.7%	97.9%	0%		99.6%	100%	98.7%	100%	0%		99.2%	98.8%	99.7%	100%	0%		99.6%	97.6%	98.6%	97.8%	0%		98.3%	-
Single-Unit Trucks	0	1	1	0		2	0	0	0	0		0	1	2	0	0		3	0	0	1	0		1	-
Single-Unit Trucks %	0%	0.2%	2.1%	0%		0.3%	0%	0%	0%	0%		0%	1.3%	0.3%	0%	0%		0.4%	0%	0%	2.2%	0%		0.4%	-
Buses	0	1	0	0		1	0	3	0	0		3	0	0	0	0		0	1	2	0	0		3	-
Buses %	0%	0.2%	0%	0%		0.1%	0%	1.3%	0%	0%		0.8%	0%	0%	0%	0%		0%	2.4%	1.4%	0%	0%		1.3%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	10	-	-	-	-	-	9	-	-	-	-	-	6	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	33.3%		-	-	-	-	30%		-	-	-	-	20%		-	-	-	-	13.3%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	3.3%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	2	0	0	0	-	0	2	1	0	0	-	0	2	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

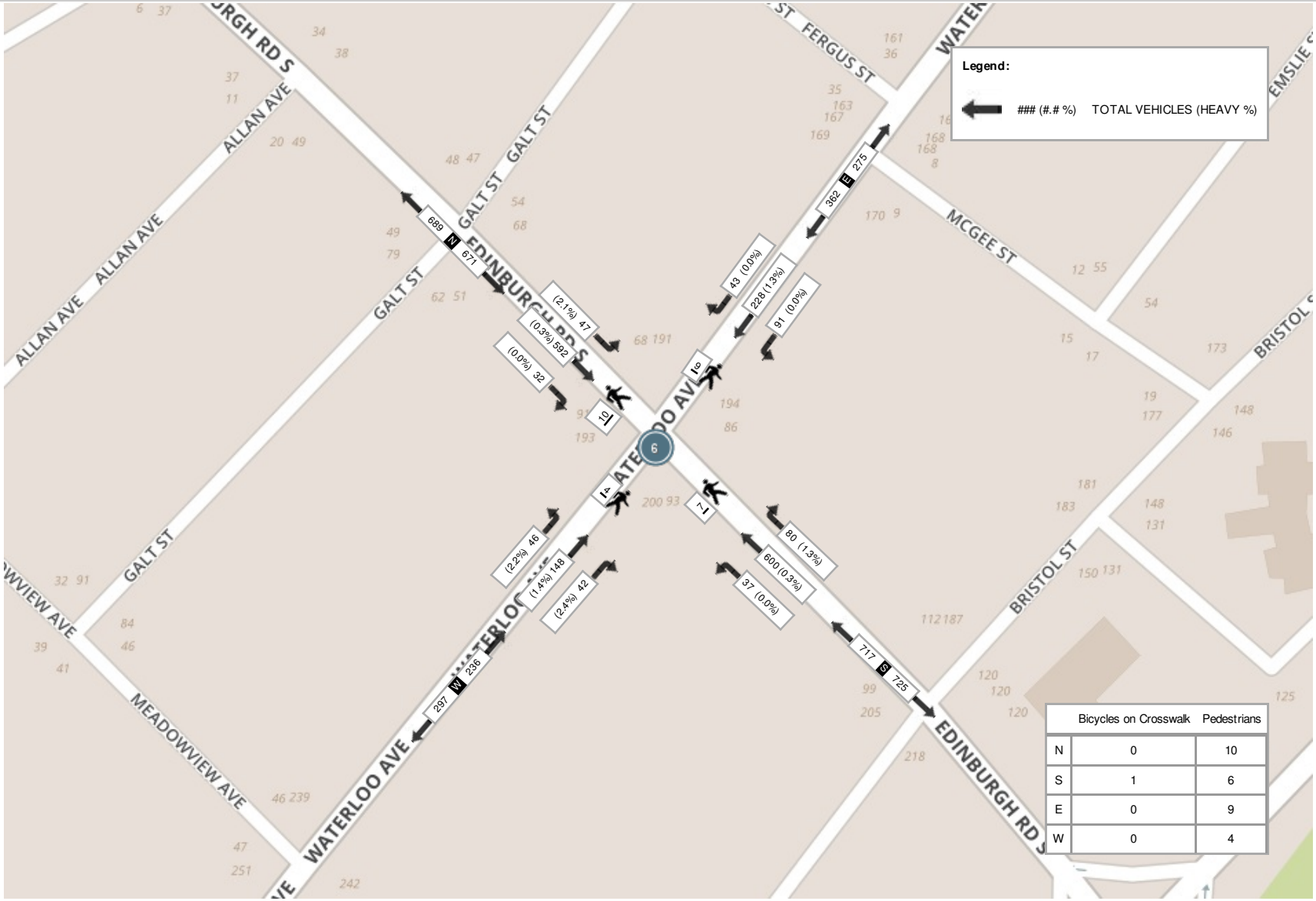
Turning Movement Count
Location Name: WATERLOO AVE & EDINBURGH RD S
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Selected Hour: 08:00 AM - 09:00 AM Weather:

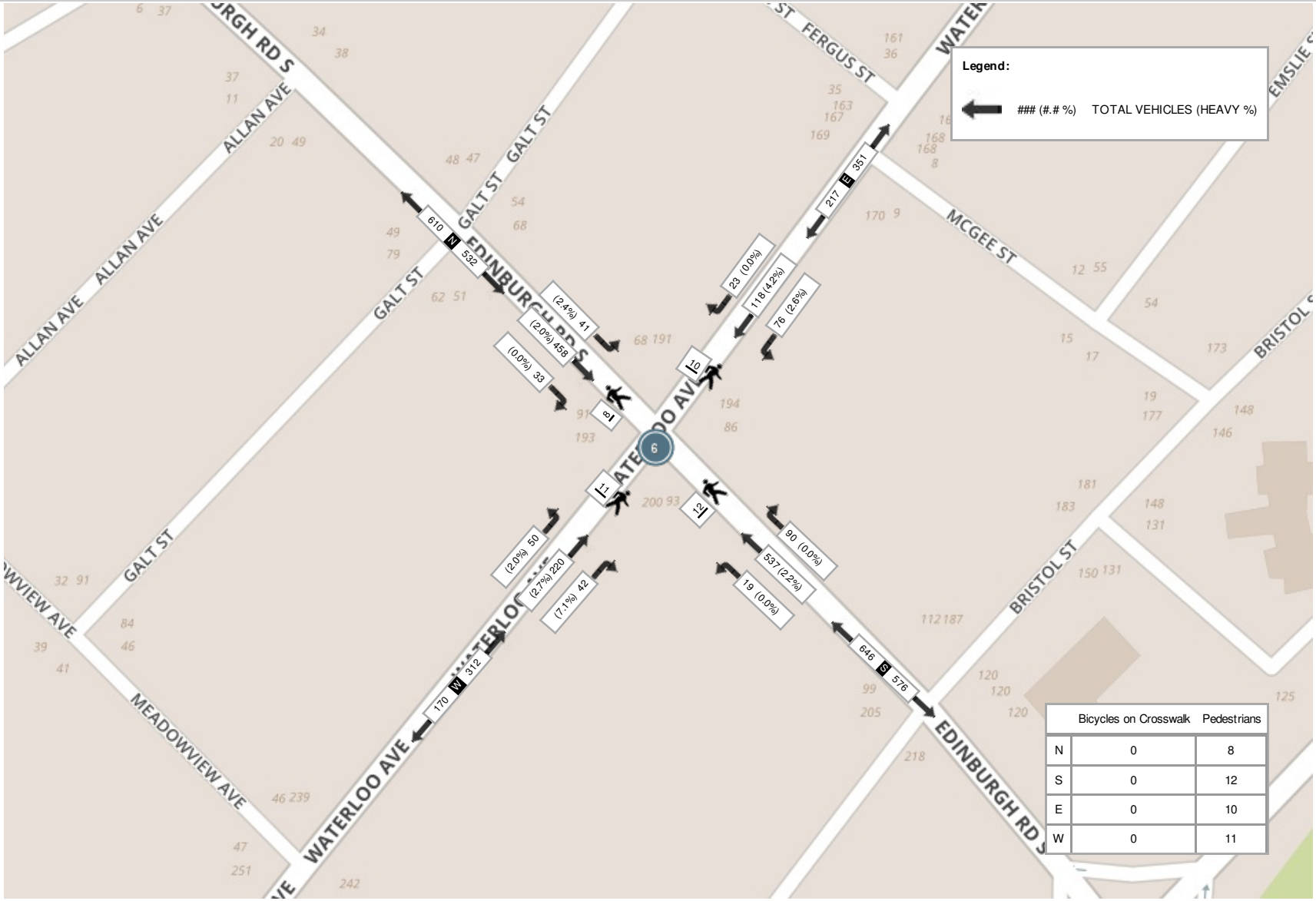
Start Time	N Approach EDINBURGH RD S						E Approach WATERLOO AVE						S Approach EDINBURGH RD S						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	9	106	7	0	1	122	5	26	12	0	2	43	15	118	5	0	4	138	15	39	6	0	6	60	363
08:15:00	6	142	10	0	2	158	7	28	22	0	3	57	21	153	3	0	2	177	8	46	16	0	2	70	462
08:30:00	8	100	6	0	2	114	6	30	17	0	3	53	27	149	6	0	1	182	9	74	19	0	1	102	451
08:45:00	10	110	18	0	3	138	5	34	25	0	2	64	27	117	5	0	5	149	10	61	9	0	2	80	431
Grand Total	33	458	41	0	8	532	23	118	76	0	10	217	90	537	19	0	12	646	42	220	50	0	11	312	**1707**
Approach%	6.2%	86.1%	7.7%	0%		-	10.6%	54.4%	35%	0%		-	13.9%	83.1%	2.9%	0%		-	13.5%	70.5%	16%	0%		-	-
Totals %	1.9%	26.8%	2.4%	0%		31.2%	1.3%	6.9%	4.5%	0%		12.7%	5.3%	31.5%	1.1%	0%		37.8%	2.5%	12.9%	2.9%	0%		18.3%	-
PHF	0.83	0.81	0.57	0		0.84	0.82	0.87	0.76	0		0.85	0.83	0.88	0.79	0		0.89	0.7	0.74	0.66	0		0.76	-
Heavy	0	9	1	0		10	0	5	2	0		7	0	12	0	0		12	3	6	1	0		10	-
Heavy %	0%	2%	2.4%	0%		1.9%	0%	4.2%	2.6%	0%		3.2%	0%	2.2%	0%	0%		1.9%	7.1%	2.7%	2%	0%		3.2%	-
Lights	33	449	40	0		522	23	113	74	0		210	90	525	19	0		634	39	214	49	0		302	-
Lights %	100%	98%	97.6%	0%		98.1%	100%	95.8%	97.4%	0%		96.8%	100%	97.8%	100%	0%		98.1%	92.9%	97.3%	98%	0%		96.8%	-
Single-Unit Trucks	0	6	0	0		6	0	1	0	0		1	0	3	0	0		3	0	0	0	0		0	-
Single-Unit Trucks %	0%	1.3%	0%	0%		1.1%	0%	0.8%	0%	0%		0.5%	0%	0.6%	0%	0%		0.5%	0%	0%	0%	0%		0%	-
Buses	0	2	1	0		3	0	4	2	0		6	0	8	0	0		8	3	6	1	0		10	-
Buses %	0%	0.4%	2.4%	0%		0.6%	0%	3.4%	2.6%	0%		2.8%	0%	1.5%	0%	0%		1.2%	7.1%	2.7%	2%	0%		3.2%	-
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Articulated Trucks %	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	10	-	-	-	-	-	12	-	-	-	-	-	11	-	-
Pedestrians%	-	-	-	-	19.5%		-	-	-	-	24.4%		-	-	-	-	29.3%		-	-	-	-	26.8%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	10
S	1	6
E	0	9
W	0	4

Selected Hour: 08:00 AM - 09:00 AM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	8
S	0	12
E	0	10
W	0	11

Spectrum

Turning Movement Count
Location Name: WATERLOO AVE & EDINBURGH RD S
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (6 . WATERLOO AVE & EDINBURGH RD S)

Start Time	N Approach EDINBURGH RD S						E Approach WATERLOO AVE						S Approach EDINBURGH RD S						W Approach WATERLOO AVE						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
11:00:00	4	119	14	0	0	137	10	28	16	0	0	54	17	101	11	0	1	129	9	22	7	0	1	38	358	
11:15:00	8	102	4	0	1	114	5	28	12	0	3	45	12	99	4	0	3	115	4	21	9	0	1	34	308	
11:30:00	3	94	7	0	1	104	7	14	8	0	4	29	11	108	4	0	1	123	5	26	7	0	0	38	294	
11:45:00	4	122	7	0	1	133	10	19	7	0	4	36	10	106	6	0	2	122	7	22	8	0	1	37	328	1288
12:00:00	15	126	12	0	1	153	12	27	4	0	1	43	11	100	3	0	6	114	3	26	5	0	1	34	344	1274
12:15:00	6	107	7	0	2	120	10	31	16	0	0	57	17	113	4	0	3	134	10	25	7	0	1	42	353	1319
12:30:00	2	109	8	0	2	119	7	31	11	0	2	49	13	117	5	0	2	135	8	19	6	0	0	33	336	1361
12:45:00	7	96	9	0	2	112	9	16	20	0	1	45	12	131	8	0	2	151	6	25	7	0	2	38	346	1379
13:00:00	7	129	7	0	0	143	13	22	18	0	3	53	13	96	4	0	2	113	10	24	10	0	2	44	353	1388
13:15:00	7	92	7	0	1	106	7	24	12	0	3	43	16	92	7	0	1	115	11	21	8	0	0	40	304	1339
13:30:00	5	143	5	0	2	153	14	20	17	0	2	51	15	122	8	0	1	145	7	20	11	0	1	38	387	1390
13:45:00	3	97	10	0	0	110	11	23	13	0	2	47	14	116	11	0	9	141	7	24	11	0	0	42	340	1384
14:00:00	3	115	7	0	0	125	8	25	15	0	1	48	18	119	6	0	2	143	4	30	10	0	3	44	360	1391
14:15:00	8	109	9	0	1	126	7	13	12	0	0	32	14	112	5	0	2	131	5	14	9	0	1	28	317	1404
14:30:00	6	116	4	0	5	126	8	16	14	0	5	38	16	109	7	0	1	132	11	23	9	0	1	43	339	1356
14:45:00	8	112	8	0	2	128	9	23	12	0	3	44	8	141	7	0	1	156	6	22	4	0	0	32	360	1376
Grand Total	96	1788	125	0	21	2009	147	360	207	0	34	714	217	1782	100	0	39	2099	113	364	128	0	15	605	**5427**	-
Approach%	4.8%	89%	6.2%	0%		-	20.6%	50.4%	29%	0%		-	10.3%	84.9%	4.8%	0%		-	18.7%	60.2%	21.2%	0%		-	-	-
Totals %	1.8%	32.9%	2.3%	0%		37%	2.7%	6.6%	3.8%	0%		13.2%	4%	32.8%	1.8%	0%		38.7%	2.1%	6.7%	2.4%	0%		11.1%	-	-
Heavy	2	4	2	0		-	0	10	1	0		-	1	10	1	0		-	1	8	2	0		-	-	-
Heavy %	2.1%	0.2%	1.6%	0%		-	0%	2.8%	0.5%	0%		-	0.5%	0.6%	1%	0%		-	0.9%	2.2%	1.6%	0%		-	-	-
Bicycles	0	1	1	0		-	0	0	0	0		-	0	0	1	0		-	0	3	0	0		-	-	-
Bicycle %	0%	0.1%	0.8%	0%		-	0%	0%	0%	0%		-	0%	0%	1%	0%		-	0%	0.8%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: WATERLOO AVE & EDINBURGH RD S
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 01:30 PM - 02:30 PM Weather:

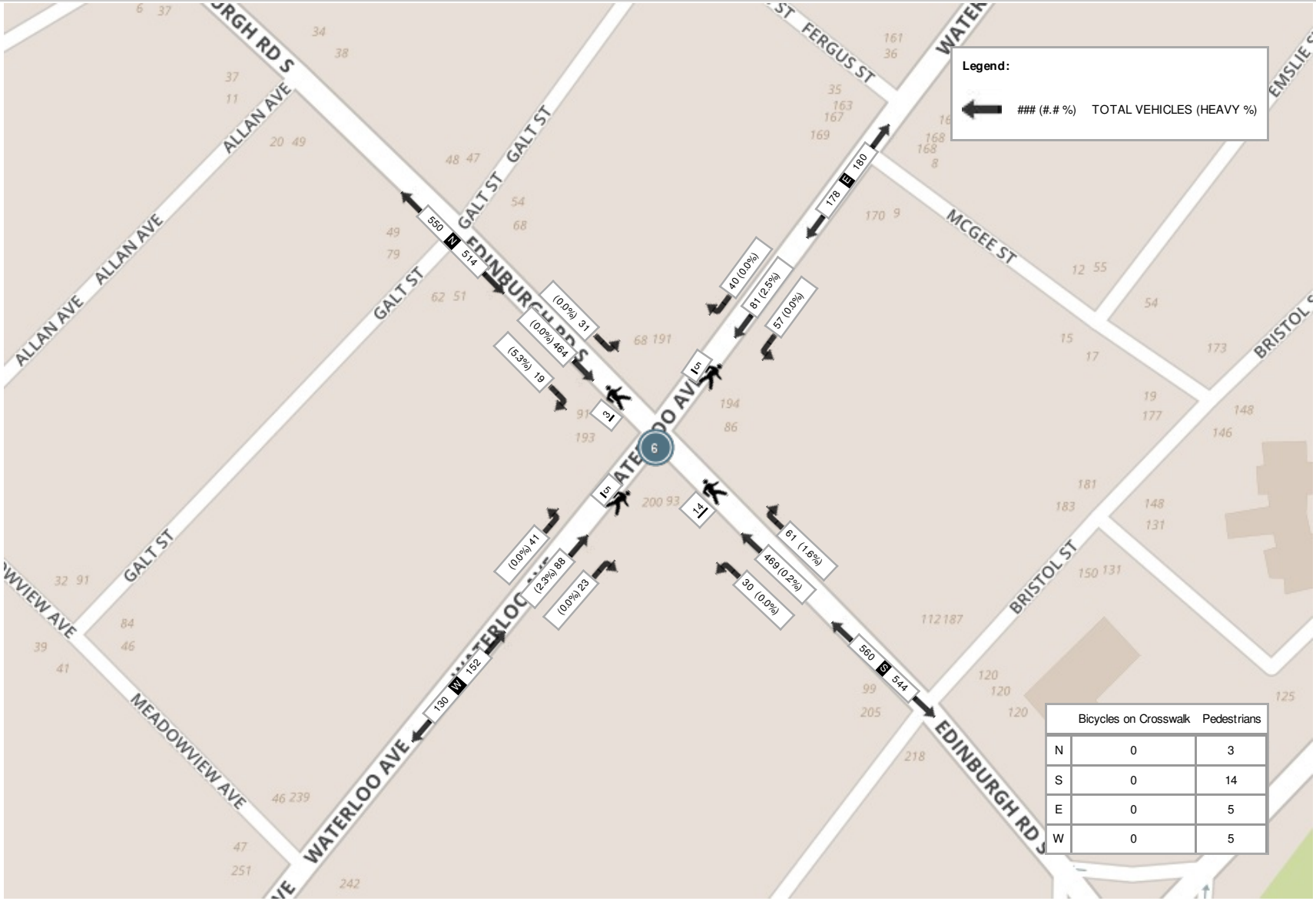
Start Time	N Approach EDINBURGH RD S						E Approach WATERLOO AVE						S Approach EDINBURGH RD S						W Approach WATERLOO AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
13:30:00	5	143	5	0	2	153	14	20	17	0	2	51	15	122	8	0	1	145	7	20	11	0	1	38	387
13:45:00	3	97	10	0	0	110	11	23	13	0	2	47	14	116	11	0	9	141	7	24	11	0	0	42	340
14:00:00	3	115	7	0	0	125	8	25	15	0	1	48	18	119	6	0	2	143	4	30	10	0	3	44	360
14:15:00	8	109	9	0	1	126	7	13	12	0	0	32	14	112	5	0	2	131	5	14	9	0	1	28	317
Grand Total	19	464	31	0	3	514	40	81	57	0	5	178	61	469	30	0	14	560	23	88	41	0	5	152	**1404**
Approach%	3.7%	90.3%	6%	0%		-	22.5%	45.5%	32%	0%		-	10.9%	83.8%	5.4%	0%		-	15.1%	57.9%	27%	0%		-	-
Totals %	1.4%	33%	2.2%	0%		36.6%	2.8%	5.8%	4.1%	0%		12.7%	4.3%	33.4%	2.1%	0%		39.9%	1.6%	6.3%	2.9%	0%		10.8%	-
PHF	0.59	0.81	0.78	0		0.84	0.71	0.81	0.84	0		0.87	0.85	0.96	0.68	0		0.97	0.82	0.73	0.93	0		0.86	-
Heavy	1	0	0	0		1	0	2	0	0		2	1	1	0	0		2	0	2	0	0		2	-
Heavy %	5.3%	0%	0%	0%		0.2%	0%	2.5%	0%	0%		1.1%	1.6%	0.2%	0%	0%		0.4%	0%	2.3%	0%	0%		1.3%	-
Lights	18	464	31	0		513	40	79	57	0		176	60	468	30	0		558	23	86	41	0		150	-
Lights %	94.7%	100%	100%	0%		99.8%	100%	97.5%	100%	0%		98.9%	98.4%	99.8%	100%	0%		99.6%	100%	97.7%	100%	0%		98.7%	-
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	1	1	0	0		2	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	1.6%	0.2%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Buses	1	0	0	0		1	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	-
Buses %	5.3%	0%	0%	0%		0.2%	0%	2.5%	0%	0%		1.1%	0%	0%	0%	0%		0%	0%	2.3%	0%	0%		1.3%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	5	-	-	-	-	-	14	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	11.1%		-	-	-	-	18.5%		-	-	-	-	51.9%		-	-	-	-	18.5%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	2	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: WATERLOO AVE & EDINBURGH RD S
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 01:30 PM - 02:30 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	3
S	0	14
E	0	5
W	0	5

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & EDINBURGH RD S
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (1 . WELLINGTON ST / HWY 7 & EDINBURGH RD S)

Start Time	N Approach EDINBURGH RD S						E Approach WELLINGTON ST / HWY 7						S Approach EDINBURGH RD S						W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	12	33	5	0	0	50	4	98	9	0	1	111	17	41	14	0	2	72	12	90	8	0	2	110	343	
07:15:00	17	59	4	0	1	80	7	127	10	0	2	144	17	50	44	0	0	111	24	107	10	0	0	141	476	
07:30:00	14	71	16	0	1	101	9	112	19	0	1	140	28	73	48	0	1	149	22	147	11	0	1	180	570	
07:45:00	15	81	7	0	0	103	13	134	16	0	3	163	31	111	49	0	1	191	37	155	19	0	1	211	668	2057
08:00:00	14	115	13	0	0	142	10	131	14	0	4	155	35	109	38	0	2	182	37	166	20	0	2	223	702	2416
08:15:00	30	148	15	0	1	193	9	132	27	0	9	168	50	153	47	0	0	250	60	211	33	0	2	304	915	2855
08:30:00	15	117	16	0	2	148	16	126	37	0	8	179	55	165	52	0	3	272	33	209	26	0	1	268	867	3152
08:45:00	14	126	11	0	0	151	12	111	30	0	3	153	55	119	36	0	0	210	42	179	31	0	3	252	766	3250
09:00:00	7	87	13	0	1	107	15	102	39	0	3	156	30	75	20	0	0	125	22	122	16	0	1	160	548	3096
09:15:00	12	86	7	0	1	105	12	97	32	0	0	141	26	72	26	0	0	124	25	92	17	0	2	134	504	2685
09:30:00	9	79	14	0	0	102	13	75	31	0	0	119	31	83	18	0	0	132	23	106	13	0	0	142	495	2313
09:45:00	14	107	17	0	0	138	11	99	31	0	1	141	23	82	22	0	1	127	17	111	17	0	1	145	551	2098
10:00:00	6	66	9	0	0	81	14	90	27	0	2	131	32	68	20	0	0	120	19	74	18	0	0	111	443	1993
10:15:00	14	105	13	0	0	132	12	90	31	0	1	133	29	88	18	0	1	135	13	82	14	0	1	109	509	1998
10:30:00	14	92	8	0	0	114	13	78	33	0	3	124	35	103	26	0	0	164	9	93	8	0	0	110	512	2015
10:45:00	11	92	15	0	1	118	9	99	44	0	1	152	34	96	26	0	1	156	30	100	18	0	1	148	574	2038
11:00:00	12	97	17	0	1	126	12	105	40	0	1	157	33	72	18	0	0	123	28	76	12	0	1	116	522	2117
11:15:00	14	113	18	0	0	145	14	107	34	0	0	155	30	92	22	0	0	144	24	81	18	0	1	123	567	2175
11:30:00	20	91	14	0	0	125	12	100	41	0	2	153	30	103	22	0	0	155	24	95	8	0	0	127	560	2223
11:45:00	15	87	6	0	0	108	9	101	37	0	0	147	47	105	30	0	0	182	21	116	9	0	0	146	583	2232
12:00:00	11	110	15	0	0	136	19	86	31	0	0	136	31	107	23	0	0	161	20	82	11	0	0	113	546	2256
12:15:00	9	94	15	0	0	118	15	105	31	0	1	151	43	97	23	0	1	163	11	94	6	0	1	111	543	2232
12:30:00	13	87	7	0	0	107	13	99	44	0	2	156	45	79	30	0	1	154	26	82	9	0	0	117	534	2206
12:45:00	15	113	19	0	1	147	13	100	58	0	2	171	46	107	24	0	0	177	23	112	11	0	0	146	641	2264
13:00:00	14	93	10	0	0	117	10	91	37	0	1	138	38	117	34	0	1	189	24	117	10	0	1	151	595	2313
13:15:00	12	100	11	0	0	123	14	94	44	0	2	152	44	95	23	0	1	162	23	96	12	0	3	131	568	2338
13:30:00	10	113	14	0	0	137	17	99	32	0	2	148	32	88	27	0	1	147	23	103	12	0	1	138	570	2374
13:45:00	15	106	11	0	0	132	14	94	33	0	0	141	46	111	26	0	1	183	17	97	11	0	2	125	581	2314
14:00:00	21	105	14	0	0	140	14	106	42	0	4	162	33	88	31	0	0	152	25	107	14	0	0	146	600	2319
14:15:00	13	111	17	0	0	141	14	100	42	0	4	156	30	85	35	0	2	150	26	118	18	0	1	162	609	2360
14:30:00	16	107	8	0	0	131	9	89	40	0	0	138	46	117	28	0	0	191	23	120	8	0	0	151	611	2401

14:45:00	10	97	5	0	0	112	15	127	30	0	2	172	41	131	43	0	1	215	34	111	18	0	1	163	662	2482
15:00:00	9	113	12	0	0	134	18	137	34	0	2	189	54	131	29	0	1	214	33	107	10	0	0	150	687	2569
15:15:00	11	146	10	0	0	167	20	132	44	0	9	196	44	154	37	0	0	235	34	63	18	0	3	115	713	2673
15:30:00	15	130	10	0	0	155	16	149	51	0	4	216	47	115	44	0	4	206	39	112	14	0	5	165	742	2804
15:45:00	8	190	16	0	0	214	7	147	46	0	3	200	47	132	38	0	0	217	39	130	24	0	2	193	824	2966
16:00:00	14	130	23	0	2	167	16	180	38	0	3	234	40	111	52	0	0	203	36	128	14	0	4	178	782	3061
16:15:00	19	146	12	0	0	177	21	191	52	0	2	264	57	149	51	0	1	257	41	137	22	0	3	200	898	3246
16:30:00	19	155	14	0	1	188	14	203	40	0	2	257	51	146	51	0	0	248	27	147	27	0	0	201	894	3398
16:45:00	14	147	12	0	1	173	24	175	56	0	2	255	59	182	50	0	0	291	44	158	19	0	2	221	940	3514
17:00:00	20	153	17	0	0	190	9	172	67	0	3	248	52	160	46	0	0	258	50	140	28	0	1	218	914	3646
17:15:00	19	171	13	0	1	203	22	161	63	0	3	246	51	151	39	0	1	241	47	168	36	0	3	251	941	3689
17:30:00	12	147	17	0	3	176	16	141	45	0	4	202	39	151	36	0	0	226	46	139	17	0	3	202	806	3601
17:45:00	17	119	13	0	0	149	21	143	46	0	0	210	52	135	28	0	0	215	44	148	23	0	2	215	789	3450
Grand Total	615	4835	553	0	18	6003	597	5235	1628	0	102	7460	1736	4799	1444	0	28	7979	1277	5228	718	0	58	7223	**28665**	-
Approach%	10.2%	80.5%	9.2%	0%		-	8%	70.2%	21.8%	0%		-	21.8%	60.1%	18.1%	0%		-	17.7%	72.4%	9.9%	0%		-	-	-
Totals %	2.1%	16.9%	1.9%	0%		20.9%	2.1%	18.3%	5.7%	0%		26%	6.1%	16.7%	5%	0%		27.8%	4.5%	18.2%	2.5%	0%		25.2%	-	-
Heavy	15	66	18	0		-	15	262	70	0		-	65	51	37	0		-	39	279	15	0		-	-	-
Heavy %	2.4%	1.4%	3.3%	0%		-	2.5%	5%	4.3%	0%		-	3.7%	1.1%	2.6%	0%		-	3.1%	5.3%	2.1%	0%		-	-	-
Bicycles	0	7	0	0		-	0	1	0	0		-	0	9	1	0		-	2	1	0	0		-	-	-
Bicycle %	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	0%	0.2%	0.1%	0%		-	0.2%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & EDINBURGH RD S
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

Start Time	N Approach EDINBURGH RD S						E Approach WELLINGTON ST / HWY 7						S Approach EDINBURGH RD S						W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	19	155	14	0	1	188	14	203	40	0	2	257	51	146	51	0	0	248	27	147	27	0	0	201	894
16:45:00	14	147	12	0	1	173	24	175	56	0	2	255	59	182	50	0	0	291	44	158	19	0	2	221	940
17:00:00	20	153	17	0	0	190	9	172	67	0	3	248	52	160	46	0	0	258	50	140	28	0	1	218	914
17:15:00	19	171	13	0	1	203	22	161	63	0	3	246	51	151	39	0	1	241	47	168	36	0	3	251	941
Grand Total	72	626	56	0	3	754	69	711	226	0	10	1006	213	639	186	0	1	1038	168	613	110	0	6	891	**3689**
Approach%	9.5%	83%	7.4%	0%		-	6.9%	70.7%	22.5%	0%		-	20.5%	61.6%	17.9%	0%		-	18.9%	68.8%	12.3%	0%		-	-
Totals %	2%	17%	1.5%	0%		20.4%	1.9%	19.3%	6.1%	0%		27.3%	5.8%	17.3%	5%	0%		28.1%	4.6%	16.6%	3%	0%		24.2%	-
PHF	0.9	0.92	0.82	0		0.93	0.72	0.88	0.84	0		0.98	0.9	0.88	0.91	0		0.89	0.84	0.91	0.76	0		0.89	-
Heavy	1	1	1	0		3	1	13	5	0		19	4	2	0	0		6	1	9	0	0		10	-
Heavy %	1.4%	0.2%	1.8%	0%		0.4%	1.4%	1.8%	2.2%	0%		1.9%	1.9%	0.3%	0%	0%		0.6%	0.6%	1.5%	0%	0%		1.1%	-
Lights	71	625	55	0		751	68	698	221	0		987	209	637	186	0		1032	167	604	110	0		881	-
Lights %	98.6%	99.8%	98.2%	0%		99.6%	98.6%	98.2%	97.8%	0%		98.1%	98.1%	99.7%	100%	0%		99.4%	99.4%	98.5%	100%	0%		98.9%	-
Single-Unit Trucks	1	0	0	0		1	1	8	0	0		9	0	2	0	0		2	0	4	0	0		4	-
Single-Unit Trucks %	1.4%	0%	0%	0%		0.1%	1.4%	1.1%	0%	0%		0.9%	0%	0.3%	0%	0%		0.2%	0%	0.7%	0%	0%		0.4%	-
Buses	0	1	1	0		2	0	2	4	0		6	4	0	0	0		4	1	1	0	0		2	-
Buses %	0%	0.2%	1.8%	0%		0.3%	0%	0.3%	1.8%	0%		0.6%	1.9%	0%	0%	0%		0.4%	0.6%	0.2%	0%	0%		0.2%	-
Articulated Trucks	0	0	0	0		0	0	3	1	0		4	0	0	0	0		0	0	4	0	0		4	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.4%	0.4%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.4%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	10	-	-	-	-	-	1	-	-	-	-	-	6	-	-
Pedestrians%	-	-	-	-	15%		-	-	-	-	50%		-	-	-	-	5%		-	-	-	-	30%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	3	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & EDINBURGH RD S
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

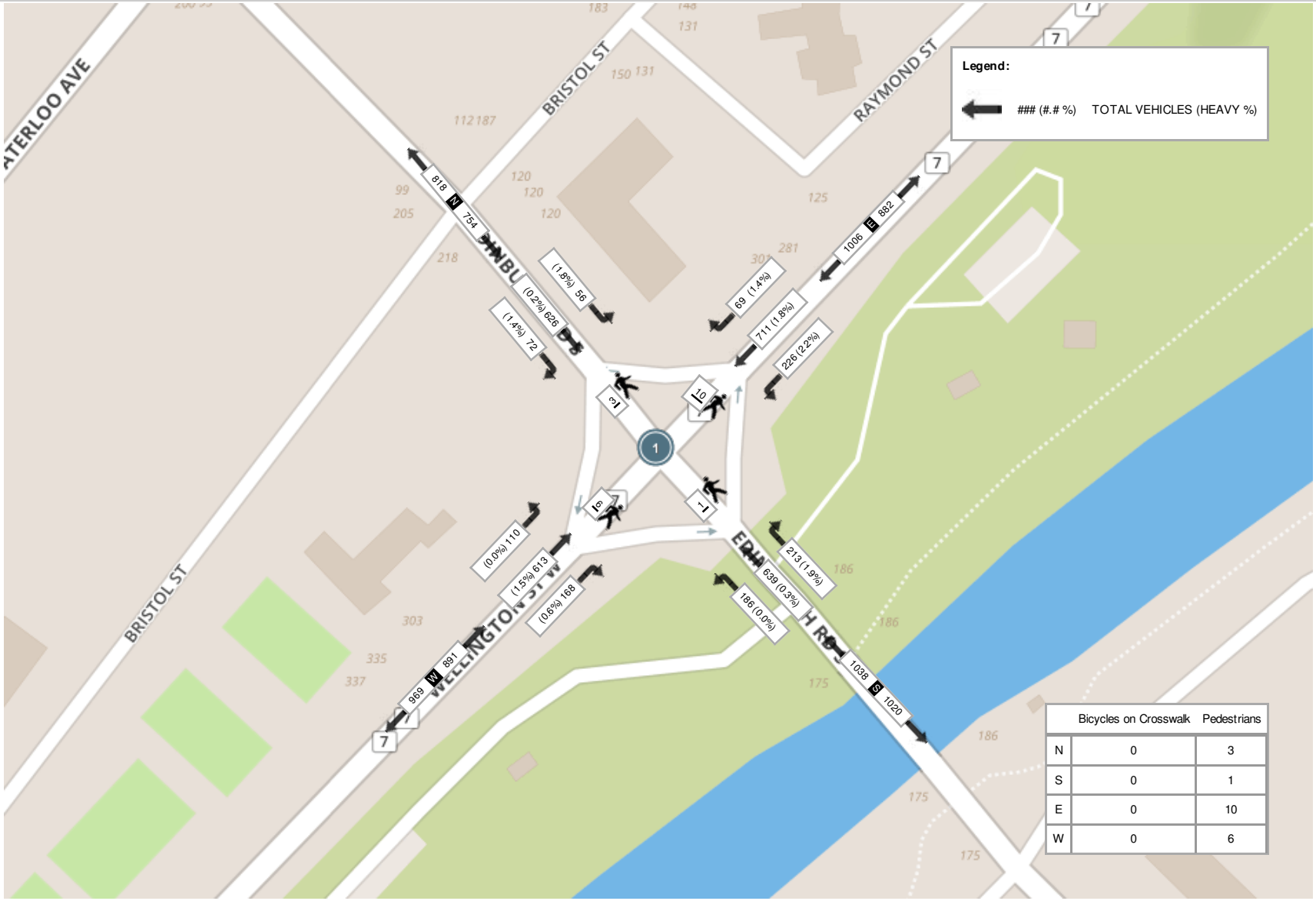
Selected Hour: 08:00 AM - 09:00 AM Weather:

Start Time	N Approach EDINBURGH RD S						E Approach WELLINGTON ST / HWY 7						S Approach EDINBURGH RD S						W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	14	115	13	0	0	142	10	131	14	0	4	155	35	109	38	0	2	182	37	166	20	0	2	223	702
08:15:00	30	148	15	0	1	193	9	132	27	0	9	168	50	153	47	0	0	250	60	211	33	0	2	304	915
08:30:00	15	117	16	0	2	148	16	126	37	0	8	179	55	165	52	0	3	272	33	209	26	0	1	268	867
08:45:00	14	126	11	0	0	151	12	111	30	0	3	153	55	119	36	0	0	210	42	179	31	0	3	252	766
Grand Total	73	506	55	0	3	634	47	500	108	0	24	655	195	546	173	0	5	914	172	765	110	0	8	1047	**3250**
Approach%	11.5%	79.8%	8.7%	0%		-	7.2%	76.3%	16.5%	0%		-	21.3%	59.7%	18.9%	0%		-	16.4%	73.1%	10.5%	0%		-	-
Totals %	2.2%	15.6%	1.7%	0%		19.5%	1.4%	15.4%	3.3%	0%		20.2%	6%	16.8%	5.3%	0%		28.1%	5.3%	23.5%	3.4%	0%		32.2%	-
PHF	0.61	0.85	0.86	0		0.82	0.73	0.95	0.73	0		0.91	0.89	0.83	0.83	0		0.84	0.72	0.91	0.83	0		0.86	-
Heavy	0	17	3	0		20	0	27	6	0		33	8	10	5	0		23	9	29	1	0		39	-
Heavy %	0%	3.4%	5.5%	0%		3.2%	0%	5.4%	5.6%	0%		5%	4.1%	1.8%	2.9%	0%		2.5%	5.2%	3.8%	0.9%	0%		3.7%	-
Lights	73	489	52	0		614	47	473	102	0		622	187	536	168	0		891	163	736	109	0		1008	-
Lights %	100%	96.6%	94.5%	0%		96.8%	100%	94.6%	94.4%	0%		95%	95.9%	98.2%	97.1%	0%		97.5%	94.8%	96.2%	99.1%	0%		96.3%	-
Single-Unit Trucks	0	9	1	0		10	0	14	1	0		15	3	1	0	0		4	3	16	1	0		20	-
Single-Unit Trucks %	0%	1.8%	1.8%	0%		1.6%	0%	2.8%	0.9%	0%		2.3%	1.5%	0.2%	0%	0%		0.4%	1.7%	2.1%	0.9%	0%		1.9%	-
Buses	0	7	2	0		9	0	5	5	0		10	5	8	1	0		14	4	1	0	0		5	-
Buses %	0%	1.4%	3.6%	0%		1.4%	0%	1%	4.6%	0%		1.5%	2.6%	1.5%	0.6%	0%		1.5%	2.3%	0.1%	0%	0%		0.5%	-
Articulated Trucks	0	1	0	0		1	0	8	0	0		8	0	1	4	0		5	2	12	0	0		14	-
Articulated Trucks %	0%	0.2%	0%	0%		0.2%	0%	1.6%	0%	0%		1.2%	0%	0.2%	2.3%	0%		0.5%	1.2%	1.6%	0%	0%		1.3%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	23	-	-	-	-	-	5	-	-	-	-	-	8	-	-
Pedestrians%	-	-	-	-	5%		-	-	-	-	57.5%		-	-	-	-	12.5%		-	-	-	-	20%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	2.5%		-	-	-	-	2.5%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	2	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & EDINBURGH RD S
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

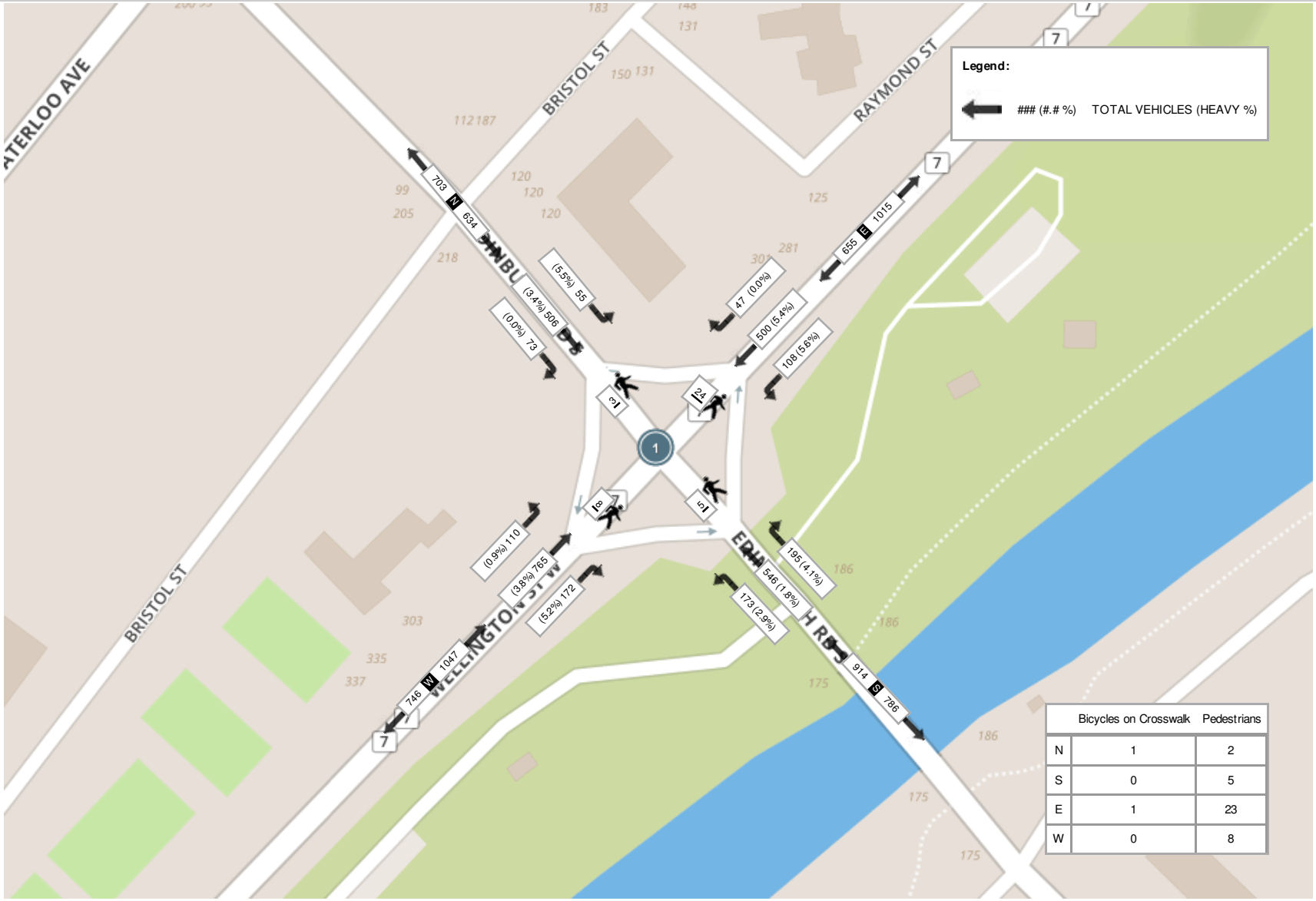
BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	3
S	0	1
E	0	10
W	0	6

Selected Hour: 08:00 AM - 09:00 AM Weather:



	Bicycles on Crosswalk	Pedestrians
N	1	2
S	0	5
E	1	23
W	0	8

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & EDINBURGH RD S
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (1 . WELLINGTON ST / HWY 7 & EDINBURGH RD S)

Start Time	N Approach EDINBURGH RD S						E Approach WELLINGTON ST / HWY 7						S Approach EDINBURGH RD S						W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
11:00:00	14	118	13	0	0	145	20	110	42	0	0	172	29	99	34	0	3	162	22	107	25	0	1	154	633	
11:15:00	13	111	10	0	0	134	11	104	36	0	0	151	49	103	28	0	1	180	24	121	17	0	0	162	627	
11:30:00	17	88	13	0	1	118	17	127	45	0	0	189	44	102	32	0	2	178	27	120	17	0	2	164	649	
11:45:00	14	115	14	0	0	143	12	134	48	0	0	194	43	103	34	0	0	180	25	110	15	0	0	150	667	2576
12:00:00	19	110	17	0	0	146	15	126	42	0	0	183	31	89	26	0	0	146	28	136	15	0	0	179	654	2597
12:15:00	7	119	15	0	2	141	20	112	37	0	0	169	40	102	37	0	0	179	25	135	17	0	0	177	666	2636
12:30:00	19	105	14	0	0	138	15	131	36	0	0	182	59	108	21	0	1	188	21	110	22	0	0	153	661	2648
12:45:00	24	98	9	0	3	131	17	122	43	0	0	182	41	119	31	0	0	191	19	146	22	0	0	187	691	2672
13:00:00	16	121	18	0	0	155	15	124	44	0	0	183	52	91	28	0	1	171	34	131	13	0	0	178	687	2705
13:15:00	22	90	15	0	0	127	13	121	39	0	0	173	65	84	30	0	0	179	26	119	18	0	0	163	642	2681
13:30:00	18	146	11	0	0	175	18	98	47	0	0	163	42	122	22	0	4	186	27	95	13	0	0	135	659	2679
13:45:00	13	100	9	0	0	122	22	106	34	0	0	162	40	120	29	0	0	189	29	123	13	0	0	165	638	2626
14:00:00	18	115	14	0	0	147	19	115	45	0	1	179	45	122	27	0	0	194	22	88	12	0	2	122	642	2581
14:15:00	14	99	16	0	0	129	8	115	48	0	0	171	44	115	39	0	0	198	23	115	13	0	0	151	649	2588
14:30:00	10	129	10	0	0	149	13	124	28	0	0	165	48	117	35	0	2	200	28	115	16	0	0	159	673	2602
14:45:00	13	111	14	0	0	138	19	117	52	0	0	188	51	128	44	0	2	223	27	117	13	0	1	157	706	2670
Grand Total	251	1775	212	0	6	2238	254	1886	666	0	1	2806	723	1724	497	0	16	2944	407	1888	261	0	6	2556	**10544**	-
Approach%	11.2%	79.3%	9.5%	0%		-	9.1%	67.2%	23.7%	0%		-	24.6%	58.6%	16.9%	0%		-	15.9%	73.9%	10.2%	0%		-	-	-
Totals %	2.4%	16.8%	2%	0%		21.2%	2.4%	17.9%	6.3%	0%		26.6%	6.9%	16.4%	4.7%	0%		27.9%	3.9%	17.9%	2.5%	0%		24.2%	-	-
Heavy	1	3	2	0		-	4	34	13	0		-	16	2	1	0		-	4	28	4	0		-	-	-
Heavy %	0.4%	0.2%	0.9%	0%		-	1.6%	1.8%	2%	0%		-	2.2%	0.1%	0.2%	0%		-	1%	1.5%	1.5%	0%		-	-	-
Bicycles	0	2	0	0		-	0	0	0	0		-	0	2	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & EDINBURGH RD S
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

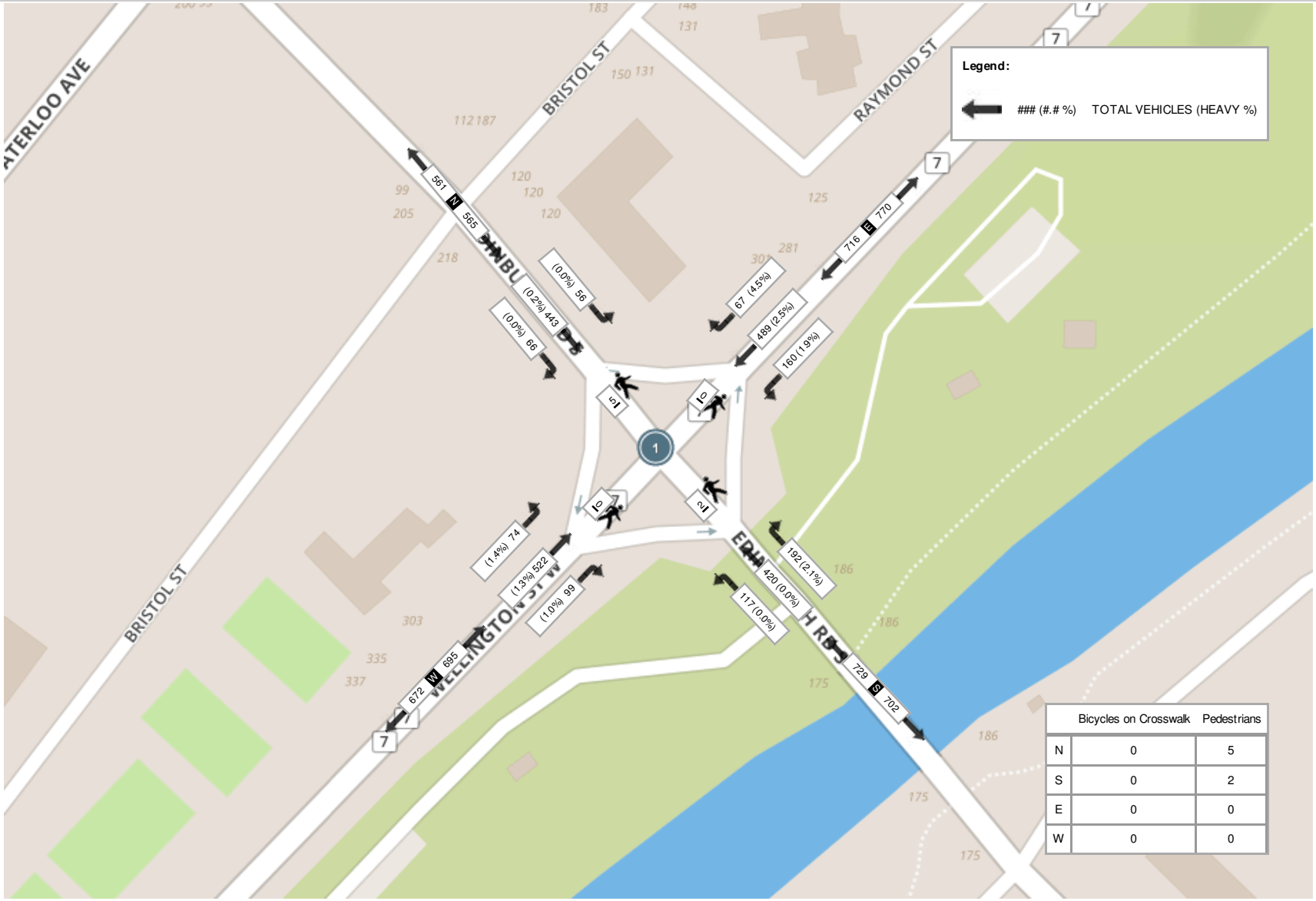
Peak Hour: 12:15 PM - 01:15 PM Weather:

Start Time	N Approach EDINBURGH RD S						E Approach WELLINGTON ST / HWY 7						S Approach EDINBURGH RD S						W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:15:00	7	119	15	0	2	141	20	112	37	0	0	169	40	102	37	0	0	179	25	135	17	0	0	177	666
12:30:00	19	105	14	0	0	138	15	131	36	0	0	182	59	108	21	0	1	188	21	110	22	0	0	153	661
12:45:00	24	98	9	0	3	131	17	122	43	0	0	182	41	119	31	0	0	191	19	146	22	0	0	187	691
13:00:00	16	121	18	0	0	155	15	124	44	0	0	183	52	91	28	0	1	171	34	131	13	0	0	178	687
Grand Total	66	443	56	0	5	565	67	489	160	0	0	716	192	420	117	0	2	729	99	522	74	0	0	695	**2705**
Approach%	11.7%	78.4%	9.9%	0%		-	9.4%	68.3%	22.3%	0%		-	26.3%	57.6%	16%	0%		-	14.2%	75.1%	10.6%	0%		-	-
Totals %	2.4%	16.4%	2.1%	0%		20.9%	2.5%	18.1%	5.9%	0%		26.5%	7.1%	15.5%	4.3%	0%		27%	3.7%	19.3%	2.7%	0%		25.7%	-
PHF	0.69	0.92	0.78	0		0.91	0.84	0.93	0.91	0		0.98	0.81	0.88	0.79	0		0.95	0.73	0.89	0.84	0		0.93	-
Heavy	0	1	0	0		1	3	12	3	0		18	4	0	0	0		4	1	7	1	0		9	-
Heavy %	0%	0.2%	0%	0%		0.2%	4.5%	2.5%	1.9%	0%		2.5%	2.1%	0%	0%	0%		0.5%	1%	1.3%	1.4%	0%		1.3%	-
Lights	66	442	56	0		564	64	477	157	0		698	188	420	117	0		725	98	515	73	0		686	-
Lights %	100%	99.8%	100%	0%		99.8%	95.5%	97.5%	98.1%	0%		97.5%	97.9%	100%	100%	0%		99.5%	99%	98.7%	98.6%	0%		98.7%	-
Single-Unit Trucks	0	1	0	0		1	1	3	0	0		4	1	0	0	0		1	1	3	1	0		5	-
Single-Unit Trucks %	0%	0.2%	0%	0%		0.2%	1.5%	0.6%	0%	0%		0.6%	0.5%	0%	0%	0%		0.1%	1%	0.6%	1.4%	0%		0.7%	-
Buses	0	0	0	0		0	1	2	3	0		6	3	0	0	0		3	0	2	0	0		2	-
Buses %	0%	0%	0%	0%		0%	1.5%	0.4%	1.9%	0%		0.8%	1.6%	0%	0%	0%		0.4%	0%	0.4%	0%	0%		0.3%	-
Articulated Trucks	0	0	0	0		0	1	7	0	0		8	0	0	0	0		0	0	2	0	0		2	-
Articulated Trucks %	0%	0%	0%	0%		0%	1.5%	1.4%	0%	0%		1.1%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.3%	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	71.4%		-	-	-	-	0%		-	-	-	-	28.6%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & EDINBURGH RD S
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 12:15 PM - 01:15 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	5
S	0	2
E	0	0
W	0	0

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (3 . WELLINGTON ST / HWY 7 & HWY 6 / HANLON PARKWAY SB OFF-RAMP)

Start Time	N Approach HWY 6 / HALON PARKWAY SB OFF-RAMP					E Approach WELLINGTON ST / HWY 7				S Approach HWY 6 / HALON PARKWAY SB OFF-RAMP		W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	U-Turn N:N	Peds N:	Approach Total	Thru E:W	U-Turn E:E	Peds E:	Approach Total	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
11:00:00	34	24	0	2	58	185	0	0	185	0	0	74	109	0	0	0	183	426	
11:15:00	27	31	0	0	58	184	0	0	184	0	0	86	149	0	0	0	235	477	
11:30:00	20	24	0	0	44	182	0	0	182	0	0	89	138	0	0	0	227	453	
11:45:00	38	28	0	1	66	198	0	0	198	0	0	82	141	0	0	0	223	487	1843
12:00:00	30	35	0	2	65	213	0	0	213	0	0	97	145	0	0	0	242	520	1937
12:15:00	39	43	0	0	82	201	0	0	201	0	0	100	137	0	0	0	237	520	1980
12:30:00	25	37	0	0	62	200	0	0	200	0	0	88	128	0	0	0	216	478	2005
12:45:00	24	30	0	0	54	201	0	0	201	0	0	85	155	0	0	0	240	495	2013
13:00:00	44	34	0	0	78	189	0	0	189	0	0	77	145	0	0	0	222	489	1982
13:15:00	37	39	0	0	76	198	0	0	198	0	0	81	131	0	0	0	212	486	1948
13:30:00	27	22	0	2	49	177	0	0	177	0	0	91	144	0	0	0	235	461	1931
13:45:00	30	31	0	1	61	190	0	0	190	0	0	81	141	0	0	0	222	473	1909
14:00:00	41	23	0	1	64	178	0	0	178	0	0	104	133	0	0	0	237	479	1899
14:15:00	32	29	0	0	61	221	0	0	221	0	0	90	140	0	0	0	230	512	1925
14:30:00	32	37	0	0	69	196	0	0	196	0	0	96	138	0	0	0	234	499	1963
14:45:00	30	36	0	3	66	209	0	0	209	0	0	71	151	0	0	0	222	497	1987
Grand Total	510	503	0	12	1013	3122	0	0	3122	0	0	1392	2225	0	0	0	3617	**7752**	-
Approach%	50.3%	49.7%	0%		-	100%	0%		-		-	38.5%	61.5%	0%	0%		-	-	-
Totals %	6.6%	6.5%	0%		13.1%	40.3%	0%		40.3%		0%	18%	28.7%	0%	0%		46.7%	-	-
Heavy	12	7	0		-	62	0		-		-	17	41	0	0		-	-	-
Heavy %	2.4%	1.4%	0%		-	2%	0%		-		-	1.2%	1.8%	0%	0%		-	-	-
Bicycles	0	0	0		-	1	0		-		-	0	2	0	0		-	-	-
Bicycle %	0%	0%	0%		-	0%	0%		-		-	0%	0.1%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & HWY 6 / HANLON PARKWAY SB OFF-RAMP
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

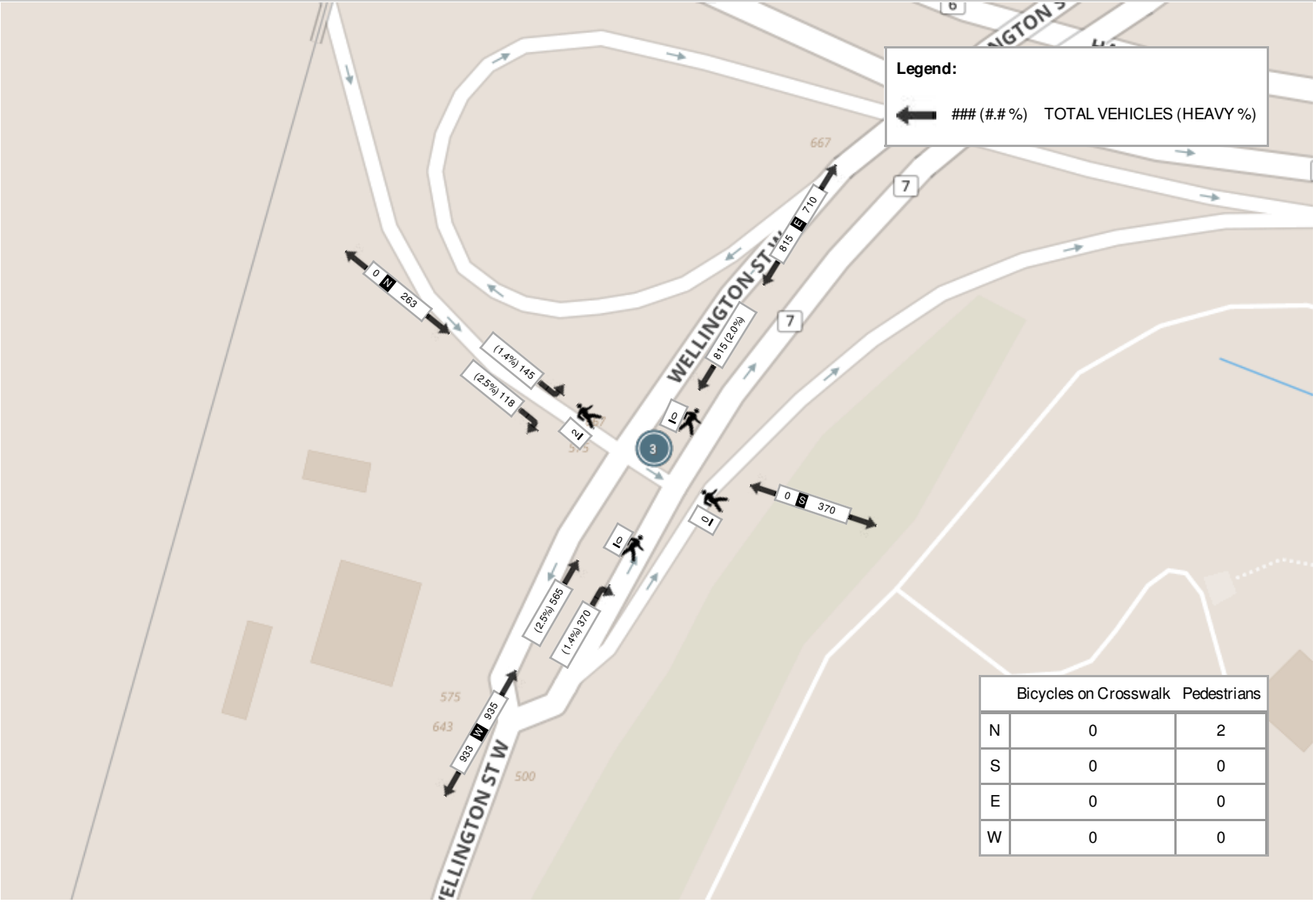
Peak Hour: 12:00 PM - 01:00 PM Weather:

Start Time	N Approach HWY 6 / HALON PARKWAY SB OFF-RAMP					E Approach WELLINGTON ST / HWY 7				S Approach HWY 6 / HALON PARKWAY SB OFF-RAMP		W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)
	Right	Left	U-Turn	Peds	Approach Total	Thru	U-Turn	Peds	Approach Total	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	30	35	0	2	65	213	0	0	213	0	0	97	145	0	0	0	242	520
12:15:00	39	43	0	0	82	201	0	0	201	0	0	100	137	0	0	0	237	520
12:30:00	25	37	0	0	62	200	0	0	200	0	0	88	128	0	0	0	216	478
12:45:00	24	30	0	0	54	201	0	0	201	0	0	85	155	0	0	0	240	495
Grand Total	118	145	0	2	263	815	0	0	815	0	0	370	565	0	0	0	935	**2013**
Approach%	44.9%	55.1%	0%		-	100%	0%		-		-	39.6%	60.4%	0%	0%		-	-
Totals %	5.9%	7.2%	0%		13.1%	40.5%	0%		40.5%		0%	18.4%	28.1%	0%	0%		46.4%	-
PHF	0.76	0.84	0		0.8	0.96	0		0.96		0	0.93	0.91	0	0		0.97	-
Heavy	3	2	0		5	16	0		16		0	5	14	0	0		19	-
Heavy %	2.5%	1.4%	0%		1.9%	2%	0%		2%		0%	1.4%	2.5%	0%	0%		2%	-
Lights	115	143	0		258	799	0		799		0	365	551	0	0		916	-
Lights %	97.5%	98.6%	0%		98.1%	98%	0%		98%		0%	98.6%	97.5%	0%	0%		98%	-
Single-Unit Trucks	1	2	0		3	5	0		5		0	1	2	0	0		3	-
Single-Unit Trucks %	0.8%	1.4%	0%		1.1%	0.6%	0%		0.6%		0%	0.3%	0.4%	0%	0%		0.3%	-
Buses	0	0	0		0	5	0		5		0	2	5	0	0		7	-
Buses %	0%	0%	0%		0%	0.6%	0%		0.6%		0%	0.5%	0.9%	0%	0%		0.7%	-
Articulated Trucks	2	0	0		2	6	0		6		0	2	7	0	0		9	-
Articulated Trucks %	1.7%	0%	0%		0.8%	0.7%	0%		0.7%		0%	0.5%	1.2%	0%	0%		1%	-
Pedestrians	-	-	-	2	-	-	-	0	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	100%		-	-	0%		0%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	0%		0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	0	0	0	-	0	-	0	1	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	0%		0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & HWY 6 / HANLON PARKWAY SB OFF-RAMP
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 12:00 PM - 01:00 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	2
S	0	0
E	0	0
W	0	0

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (3 . WELLINGTON ST / HWY 7 & HWY 6 / HANLON PKWY SB OFF-RAMP)

Start Time	N Approach HWY 6 / HANLON PKWY SB OFF-RAMP					E Approach WELLINGTON ST W / HWY 7					S Approach HWY 6 / HANLON PKWY SB ON-RAMP	W Approach WELLINGTON ST W / HWY 7					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	U-Turn E:E	Peds E:	Approach Total	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	36	18	0	0	54	0	143	0	0	143	0	72	104	0	0	0	176	373	
07:15:00	23	27	0	0	50	0	225	0	0	225	0	61	121	0	0	0	182	457	
07:30:00	12	27	0	0	39	0	195	0	0	195	0	89	183	0	0	0	272	506	
07:45:00	23	29	0	0	52	0	197	0	0	197	0	94	217	0	0	0	311	560	1896
08:00:00	20	21	0	1	41	0	207	0	0	207	0	114	210	0	0	0	324	572	2095
08:15:00	16	62	0	0	78	0	211	0	0	211	0	107	230	0	0	0	337	626	2264
08:30:00	21	46	0	0	67	0	191	0	0	191	0	121	235	0	0	0	356	614	2372
08:45:00	23	37	0	2	60	0	155	0	0	155	0	103	226	0	0	0	329	544	2356
09:00:00	16	31	0	0	47	0	155	0	0	155	0	65	123	0	0	0	188	390	2174
09:15:00	25	27	0	0	52	0	120	0	0	120	0	79	144	0	0	0	223	395	1943
09:30:00	28	17	0	0	45	0	119	0	0	119	0	58	109	0	0	0	167	331	1660
09:45:00	19	30	0	0	49	0	123	0	0	123	0	67	115	0	0	0	182	354	1470
10:00:00	32	20	0	1	52	0	143	0	0	143	0	39	100	0	0	0	139	334	1414
10:15:00	28	29	0	0	57	0	131	0	0	131	0	43	95	0	0	0	138	326	1345
10:30:00	25	14	0	0	39	0	120	0	0	120	0	57	111	0	0	0	168	327	1341
10:45:00	20	22	0	0	42	0	148	0	0	148	0	60	122	0	0	0	182	372	1359
11:00:00	25	32	0	1	57	0	134	0	0	134	0	55	101	0	0	0	156	347	1372
11:15:00	25	23	0	0	48	0	174	0	0	174	0	49	110	0	0	0	159	381	1427
11:30:00	26	26	0	0	52	0	132	0	0	132	0	54	113	0	0	0	167	351	1451
11:45:00	27	32	0	0	59	0	157	0	0	157	0	65	114	0	0	0	179	395	1474
12:00:00	30	33	0	1	63	0	123	0	0	123	0	54	96	0	0	0	150	336	1463
12:15:00	28	23	0	0	51	0	168	0	0	168	0	64	81	0	0	0	145	364	1446
12:30:00	21	16	0	0	37	0	139	0	0	139	0	63	130	0	0	0	193	369	1464
12:45:00	25	29	0	0	54	0	157	0	0	157	0	60	140	0	0	0	200	411	1480

13:00:00	25	30	0	0	55	0	149	0	0	149	0	66	128	0	0	0	194	398	1542
13:15:00	33	29	0	0	62	0	156	0	0	156	0	51	117	0	0	0	168	386	1564
13:30:00	27	25	0	0	52	0	170	0	0	170	0	56	125	0	0	0	181	403	1598
13:45:00	29	26	0	0	55	0	139	0	0	139	0	59	121	0	0	0	180	374	1561
14:00:00	24	32	0	0	56	0	152	0	0	152	0	69	130	0	0	0	199	407	1570
14:15:00	32	33	0	2	65	0	159	0	0	159	0	60	144	0	0	0	204	428	1612
14:30:00	27	36	0	0	63	0	166	0	0	166	0	71	146	0	0	0	217	446	1655
14:45:00	28	23	0	1	51	0	180	0	0	180	0	67	151	0	0	0	218	449	1730
15:00:00	26	40	0	1	66	0	194	0	0	194	0	67	147	0	0	0	214	474	1797
15:15:00	31	35	0	0	66	0	210	0	0	210	0	89	147	0	0	0	236	512	1881
15:30:00	30	40	0	0	70	0	269	0	0	269	0	89	152	0	0	0	241	580	2015
15:45:00	29	46	0	0	75	0	242	0	0	242	0	78	170	0	0	0	248	565	2131
16:00:00	23	28	0	1	51	0	259	0	0	259	0	86	157	0	0	0	243	553	2210
16:15:00	24	38	0	0	62	0	311	0	0	311	0	82	188	0	0	0	270	643	2341
16:30:00	19	31	0	0	50	0	320	0	0	320	0	107	192	0	0	0	299	669	2430
16:45:00	21	43	0	0	64	0	303	0	0	303	0	118	189	0	0	0	307	674	2539
17:00:00	16	46	0	1	62	0	298	0	0	298	0	143	211	0	0	0	354	714	2700
17:15:00	13	48	0	1	61	0	298	0	0	298	0	116	195	0	0	0	311	670	2727
17:30:00	13	27	0	0	40	0	248	0	0	248	0	107	198	0	0	0	305	593	2651
17:45:00	14	36	0	0	50	0	228	0	0	228	0	88	173	0	0	0	261	539	2516
Grand Total	1058	1363	0	13	2421	0	8218	0	0	8218	0	3362	6511	0	0	0	9873	**20512**	-
Approach%	43.7%	56.3%	0%		-	0%	100%	0%		-	-	34.1%	65.9%	0%	0%		-	-	-
Totals %	5.2%	6.6%	0%		11.8%	0%	40.1%	0%		40.1%	0%	16.4%	31.7%	0%	0%		48.1%	-	-
Heavy	119	79	0		-	0	369	0		-	-	161	332	0	0		-	-	-
Heavy %	11.2%	5.8%	0%		-	0%	4.5%	0%		-	-	4.8%	5.1%	0%	0%		-	-	-
Bicycles	0	0	0		-	0	1	0		-	-	0	3	0	0		-	-	-
Bicycle %	0%	0%	0%		-	0%	0%	0%		-	-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & HWY 6 / HANLON PKWY SB OFF-RAMP
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

Start Time	N Approach HWY 6 / HANLON PKWY SB OFF-RAMP					E Approach WELLINGTON ST W / HWY 7					S Approach HWY 6 / HANLON PKWY SB ON-RAMP	W Approach WELLINGTON ST W / HWY 7						Int. Total (15 min)
	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	19	31	0	0	50	0	320	0	0	320	0	107	192	0	0	0	299	669
16:45:00	21	43	0	0	64	0	303	0	0	303	0	118	189	0	0	0	307	674
17:00:00	16	46	0	1	62	0	298	0	0	298	0	143	211	0	0	0	354	714
17:15:00	13	48	0	1	61	0	298	0	0	298	0	116	195	0	0	0	311	670
Grand Total	69	168	0	2	237	0	1219	0	0	1219	0	484	787	0	0	0	1271	**2727**
Approach%	29.1%	70.9%	0%		-	0%	100%	0%		-	-	38.1%	61.9%	0%	0%		-	-
Totals %	2.5%	6.2%	0%		8.7%	0%	44.7%	0%		44.7%	0%	17.7%	28.9%	0%	0%		46.6%	-
PHF	0.82	0.88	0		0.93	0	0.95	0		0.95	0	0.85	0.93	0	0		0.9	-
Heavy	4	2	0		6	0	17	0		17	0	5	13	0	0		18	-
Heavy %	5.8%	1.2%	0%		2.5%	0%	1.4%	0%		1.4%	0%	1%	1.7%	0%	0%		1.4%	-
Lights	65	166	0		231	0	1202	0		1202	0	479	774	0	0		1253	-
Lights %	94.2%	98.8%	0%		97.5%	0%	98.6%	0%		98.6%	0%	99%	98.3%	0%	0%		98.6%	-
Single-Unit Trucks	1	1	0		2	0	12	0		12	0	1	4	0	0		5	-
Single-Unit Trucks %	1.4%	0.6%	0%		0.8%	0%	1%	0%		1%	0%	0.2%	0.5%	0%	0%		0.4%	-
Buses	0	0	0		0	0	5	0		5	0	2	5	0	0		7	-
Buses %	0%	0%	0%		0%	0%	0.4%	0%		0.4%	0%	0.4%	0.6%	0%	0%		0.6%	-
Articulated Trucks	3	1	0		4	0	0	0		0	0	2	4	0	0		6	-
Articulated Trucks %	4.3%	0.6%	0%		1.7%	0%	0%	0%		0%	0%	0.4%	0.5%	0%	0%		0.5%	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	100%		-	-	-	0%			-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%			-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	-	0	2	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%			-	-	-	-	0%		-

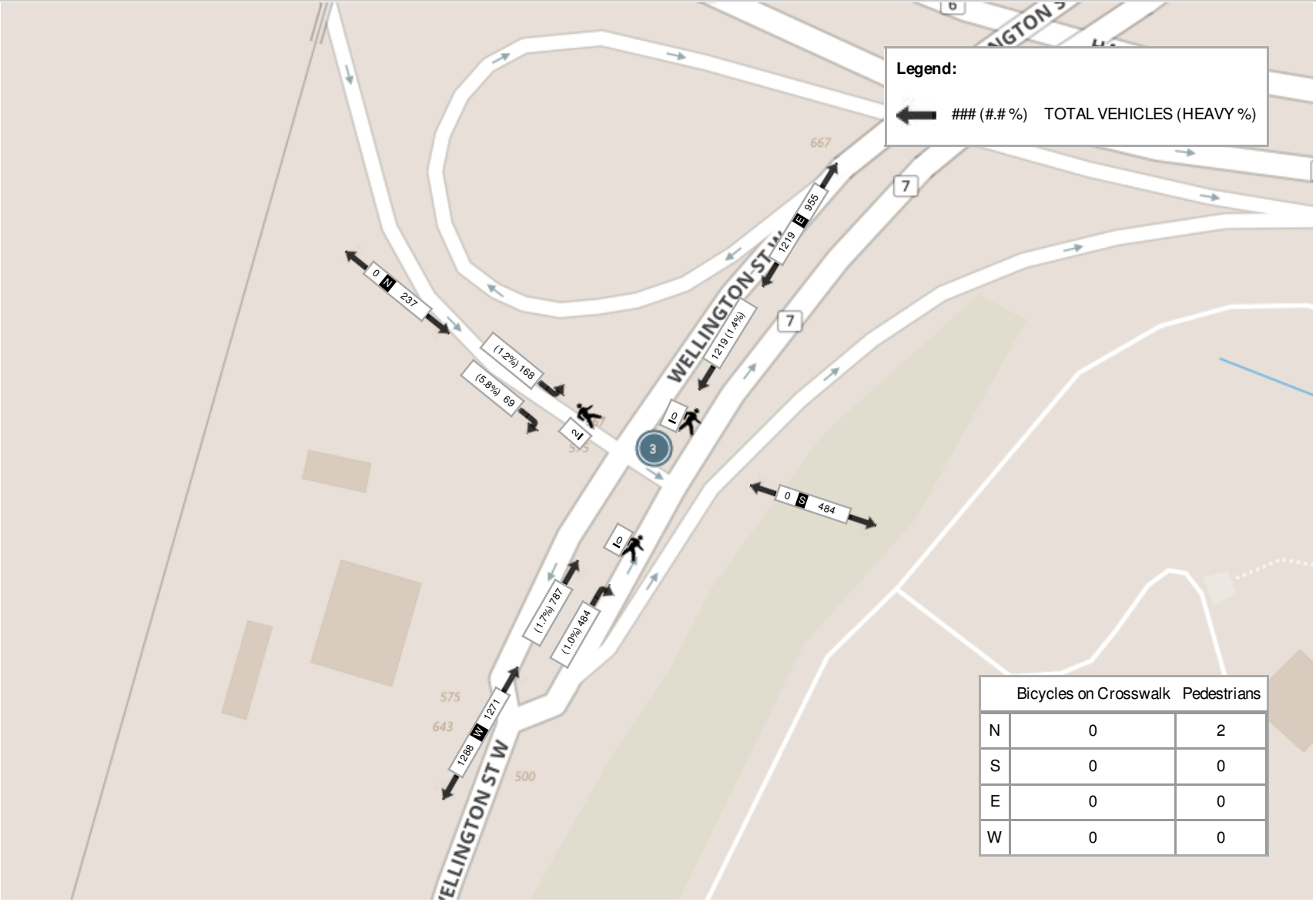
BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Selected Hour: 07:45 AM - 08:45 AM Weather:

Start Time	N Approach HWY 6 / HANLON PKWY SB OFF-RAMP					E Approach WELLINGTON ST W / HWY 7					S Approach HWY 6 / HANLON PKWY SB ON-RAMP	W Approach WELLINGTON ST W / HWY 7						Int. Total (15 min)
	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	23	29	0	0	52	0	197	0	0	197	0	94	217	0	0	0	311	560
08:00:00	20	21	0	1	41	0	207	0	0	207	0	114	210	0	0	0	324	572
08:15:00	16	62	0	0	78	0	211	0	0	211	0	107	230	0	0	0	337	626
08:30:00	21	46	0	0	67	0	191	0	0	191	0	121	235	0	0	0	356	614
Grand Total	80	158	0	1	238	0	806	0	0	806	0	436	892	0	0	0	1328	**2372**
Approach%	33.6%	66.4%	0%		-	0%	100%	0%		-	-	32.8%	67.2%	0%	0%		-	-
Totals %	3.4%	6.7%	0%		10%	0%	34%	0%		34%	0%	18.4%	37.6%	0%	0%		56%	-
PHF	0.87	0.64	0		0.76	0	0.95	0		0.95	0	0.9	0.95	0	0		0.93	-
Heavy	9	12	0		21	0	28	0		28	0	21	40	0	0		61	-
Heavy %	11.3%	7.6%	0%		8.8%	0%	3.5%	0%		3.5%	0%	4.8%	4.5%	0%	0%		4.6%	-
Lights	71	146	0		217	0	778	0		778	0	415	852	0	0		1267	-
Lights %	88.8%	92.4%	0%		91.2%	0%	96.5%	0%		96.5%	0%	95.2%	95.5%	0%	0%		95.4%	-
Single-Unit Trucks	3	3	0		6	0	10	0		10	0	6	17	0	0		23	-
Single-Unit Trucks %	3.8%	1.9%	0%		2.5%	0%	1.2%	0%		1.2%	0%	1.4%	1.9%	0%	0%		1.7%	-
Buses	0	6	0		6	0	8	0		8	0	5	6	0	0		11	-
Buses %	0%	3.8%	0%		2.5%	0%	1%	0%		1%	0%	1.1%	0.7%	0%	0%		0.8%	-
Articulated Trucks	6	3	0		9	0	10	0		10	0	10	17	0	0		27	-
Articulated Trucks %	7.5%	1.9%	0%		3.8%	0%	1.2%	0%		1.2%	0%	2.3%	1.9%	0%	0%		2%	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	100%		-	-	-	0%			-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%			-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%			-	-	-	-	0%		-

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

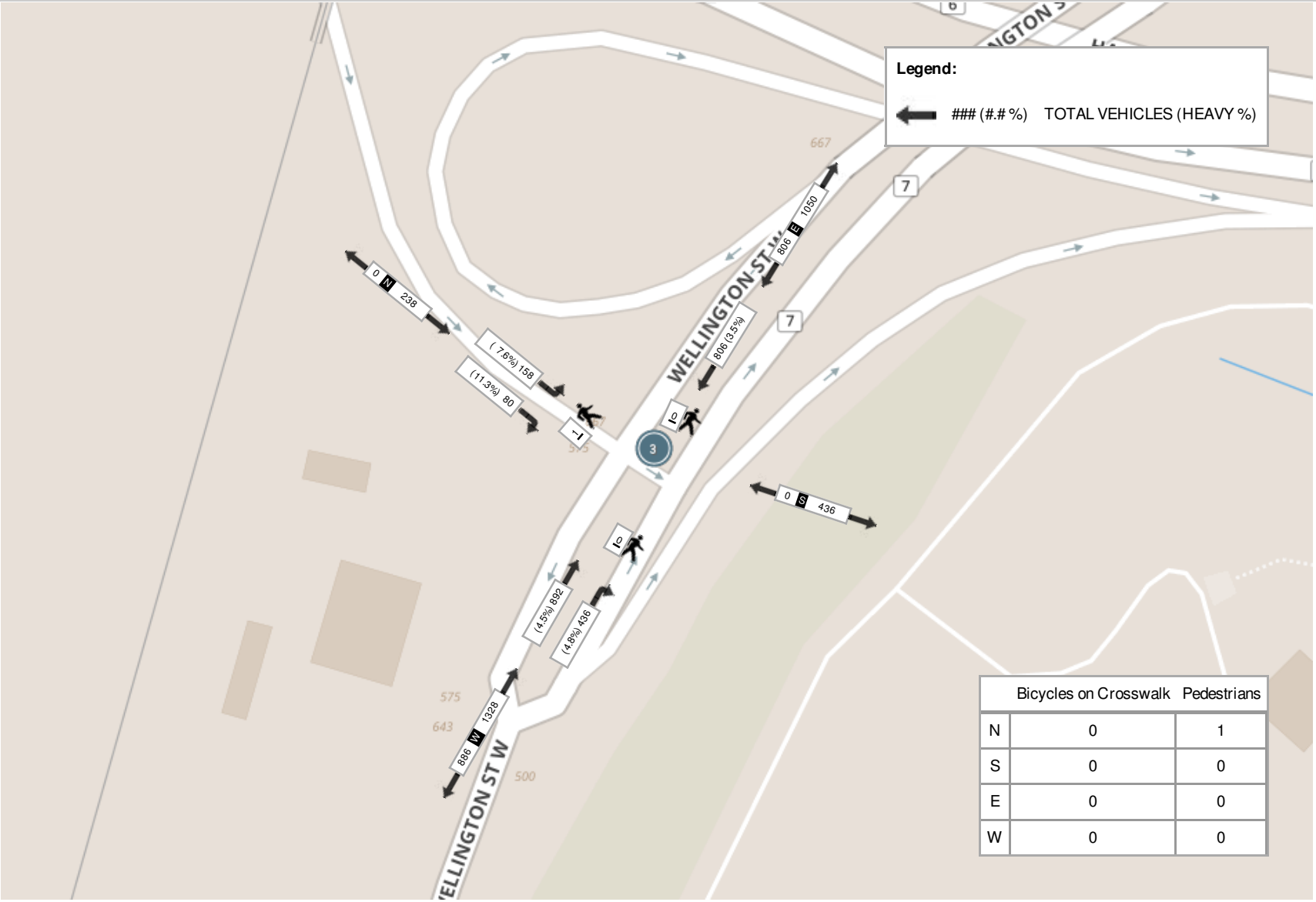
Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	2
S	0	0
E	0	0
W	0	0

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Selected Hour: 07:45 AM - 08:45 AM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	0
E	0	0
W	0	0

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (4 . WELLINGTON ST / HWY 7 & IMPERIAL RD)

Start Time	N Approach HWY 7 & IMPERIAL RD					E Approach WELLINGTON ST					W Approach WELLINGTON ST					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	U-Turn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	27	53	0	0	80	16	142	0	0	158	103	13	0	0	116	354	
07:15:00	28	65	0	3	93	27	200	0	0	227	120	10	0	0	130	450	
07:30:00	24	81	0	0	105	34	156	0	0	190	187	9	0	0	196	491	
07:45:00	22	90	0	0	112	42	155	0	0	197	219	19	0	0	238	547	1842
08:00:00	19	103	0	0	122	42	166	0	0	208	206	11	0	0	217	547	2035
08:15:00	19	108	0	0	127	41	167	0	0	208	235	16	0	0	251	586	2171
08:30:00	9	114	0	1	123	38	146	0	0	184	240	14	0	0	254	561	2241
08:45:00	25	106	0	2	131	39	110	0	0	149	198	14	0	0	212	492	2186
09:00:00	19	52	0	1	71	36	111	0	0	147	127	12	0	0	139	357	1996
09:15:00	18	79	0	2	97	34	105	0	0	139	129	19	0	0	148	384	1794
09:30:00	13	56	0	0	69	23	103	0	0	126	104	11	0	0	115	310	1543
09:45:00	14	59	0	0	73	26	96	0	0	122	116	8	0	0	124	319	1370
10:00:00	10	43	0	4	53	32	111	0	0	143	89	12	0	0	101	297	1310
10:15:00	15	34	0	0	49	30	106	0	0	136	89	20	0	0	109	294	1220
10:30:00	20	58	0	0	78	32	85	0	0	117	109	15	0	0	124	319	1229
10:45:00	13	54	0	1	67	37	98	0	0	135	105	12	0	0	117	319	1229
11:00:00	22	54	0	0	76	43	86	0	0	129	95	14	0	0	109	314	1246
11:15:00	21	53	0	0	74	59	123	0	0	182	112	11	0	0	123	379	1331
11:30:00	9	54	0	0	63	36	110	0	0	146	110	15	0	0	125	334	1346
11:45:00	12	49	0	0	61	50	108	0	0	158	113	15	0	0	128	347	1374
12:00:00	7	36	0	0	43	38	103	0	0	141	98	20	0	0	118	302	1362
12:15:00	23	38	0	0	61	43	109	0	0	152	92	17	0	0	109	322	1305
12:30:00	21	55	0	0	76	42	99	0	0	141	128	23	0	0	151	368	1339

12:45:00	13	58	0	2	71	44	92	0	0	136	125	15	0	0	140	347	1339
13:00:00	22	55	0	0	77	37	114	0	0	151	119	19	0	0	138	366	1403
13:15:00	16	49	0	0	65	42	124	0	0	166	99	19	0	0	118	349	1430
13:30:00	13	46	0	0	59	48	130	0	0	178	121	9	0	0	130	367	1429
13:45:00	9	57	0	0	66	49	107	0	0	156	119	14	0	0	133	355	1437
14:00:00	13	62	0	0	75	46	103	0	0	149	124	16	0	0	140	364	1435
14:15:00	22	55	0	1	77	39	108	0	0	147	124	16	0	0	140	364	1450
14:30:00	14	62	0	0	76	51	127	0	1	178	155	17	0	0	172	426	1509
14:45:00	18	51	0	1	69	55	119	0	0	174	144	16	0	0	160	403	1557
15:00:00	11	58	0	1	69	60	143	0	0	203	130	11	0	0	141	413	1606
15:15:00	24	72	0	1	96	64	152	0	0	216	157	20	0	0	177	489	1731
15:30:00	25	79	0	2	104	81	174	0	0	255	157	11	0	0	168	527	1832
15:45:00	8	66	0	1	74	85	170	0	0	255	164	8	0	0	172	501	1930
16:00:00	21	75	0	0	96	64	174	0	0	238	163	14	0	0	177	511	2028
16:15:00	17	69	0	1	86	83	231	0	0	314	199	13	0	0	212	612	2151
16:30:00	11	88	0	1	99	99	201	0	0	300	199	15	0	0	214	613	2237
16:45:00	19	87	0	0	106	95	206	0	0	301	208	14	0	0	222	629	2365
17:00:00	14	93	0	0	107	96	190	0	0	286	237	17	0	0	254	647	2501
17:15:00	13	80	0	0	93	95	199	0	0	294	222	21	0	0	243	630	2519
17:30:00	9	67	0	0	76	96	143	0	0	239	215	7	0	0	222	537	2443
17:45:00	7	91	0	1	98	73	143	0	0	216	172	16	0	0	188	502	2316
Grand Total	729	2914	0	26	3643	2242	5945	0	1	8187	6477	638	0	0	7115	**18945**	-
Approach%	20%	80%	0%		-	27.4%	72.6%	0%		-	91%	9%	0%		-	-	-
Totals %	3.8%	15.4%	0%		19.2%	11.8%	31.4%	0%		43.2%	34.2%	3.4%	0%		37.6%	-	-
Heavy	16	86	0		-	47	443	0		-	404	14	0		-	-	-
Heavy %	2.2%	3%	0%		-	2.1%	7.5%	0%		-	6.2%	2.2%	0%		-	-	-
Bicycles	0	2	0		-	1	1	0		-	2	0	0		-	-	-
Bicycle %	0%	0.1%	0%		-	0%	0%	0%		-	0%	0%	0%		-	-	-

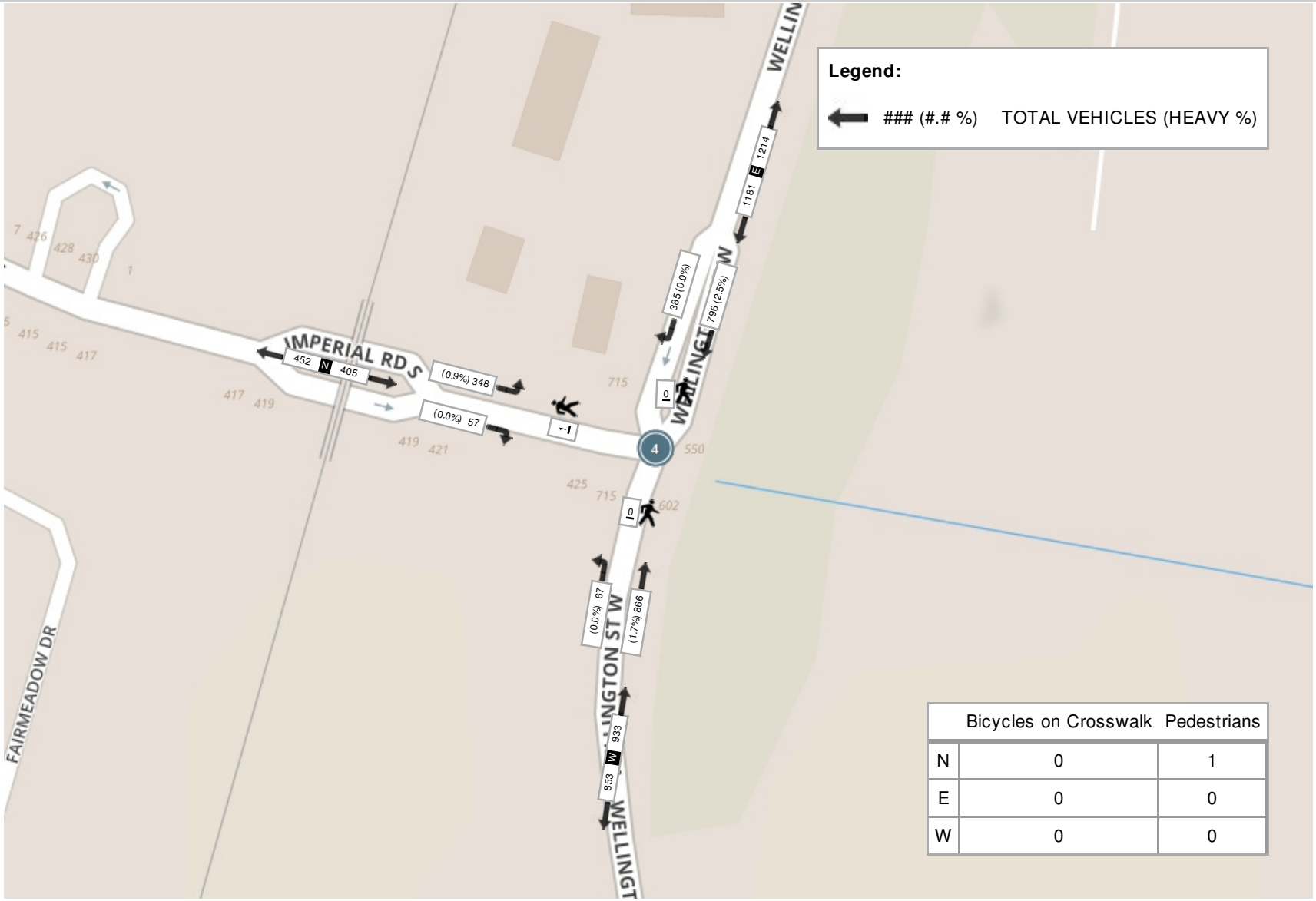
Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

Start Time	N Approach HWY 7 & IMPERIAL RD					E Approach WELLINGTON ST					W Approach WELLINGTON ST					Int. Total (15 min)
	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	11	88	0	1	99	99	201	0	0	300	199	15	0	0	214	613
16:45:00	19	87	0	0	106	95	206	0	0	301	208	14	0	0	222	629
17:00:00	14	93	0	0	107	96	190	0	0	286	237	17	0	0	254	647
17:15:00	13	80	0	0	93	95	199	0	0	294	222	21	0	0	243	630
Grand Total	57	348	0	1	405	385	796	0	0	1181	866	67	0	0	933	**2519**
Approach%	14.1%	85.9%	0%		-	32.6%	67.4%	0%		-	92.8%	7.2%	0%		-	-
Totals %	2.3%	13.8%	0%		16.1%	15.3%	31.6%	0%		46.9%	34.4%	2.7%	0%		37%	-
PHF	0.75	0.94	0		0.95	0.97	0.97	0		0.98	0.91	0.8	0		0.92	-
Heavy	0	3	0		3	0	20	0		20	15	0	0		15	-
Heavy %	0%	0.9%	0%		0.7%	0%	2.5%	0%		1.7%	1.7%	0%	0%		1.6%	-
Lights	57	345	0		402	385	776	0		1161	851	67	0		918	-
Lights %	100%	99.1%	0%		99.3%	100%	97.5%	0%		98.3%	98.3%	100%	0%		98.4%	-
Single-Unit Trucks	0	1	0		1	0	9	0		9	4	0	0		4	-
Single-Unit Trucks %	0%	0.3%	0%		0.2%	0%	1.1%	0%		0.8%	0.5%	0%	0%		0.4%	-
Buses	0	2	0		2	0	5	0		5	4	0	0		4	-
Buses %	0%	0.6%	0%		0.5%	0%	0.6%	0%		0.4%	0.5%	0%	0%		0.4%	-
Articulated Trucks	0	0	0		0	0	6	0		6	7	0	0		7	-
Articulated Trucks %	0%	0%	0%		0%	0%	0.8%	0%		0.5%	0.8%	0%	0%		0.8%	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	100%		-	-	-	0%		-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-
Bicycles on Road	0	1	0	0	-	0	0	0	0	-	1	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Selected Hour: 07:45 AM - 08:45 AM Weather:

Start Time	N Approach HWY 7 & IMPERIAL RD					E Approach WELLINGTON ST					W Approach WELLINGTON ST					Int. Total (15 min)
	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	22	90	0	0	112	42	155	0	0	197	219	19	0	0	238	547
08:00:00	19	103	0	0	122	42	166	0	0	208	206	11	0	0	217	547
08:15:00	19	108	0	0	127	41	167	0	0	208	235	16	0	0	251	586
08:30:00	9	114	0	1	123	38	146	0	0	184	240	14	0	0	254	561
Grand Total	69	415	0	1	484	163	634	0	0	797	900	60	0	0	960	**2241**
Approach%	14.3%	85.7%	0%		-	20.5%	79.5%	0%		-	93.8%	6.3%	0%		-	-
Totals %	3.1%	18.5%	0%		21.6%	7.3%	28.3%	0%		35.6%	40.2%	2.7%	0%		42.8%	-
PHF	0.78	0.91	0		0.95	0.97	0.95	0		0.96	0.94	0.79	0		0.94	-
Heavy	1	8	0		9	9	29	0		38	54	3	0		57	-
Heavy %	1.4%	1.9%	0%		1.9%	5.5%	4.6%	0%		4.8%	6%	5%	0%		5.9%	-
Lights	68	407	0		475	154	605	0		759	846	57	0		903	-
Lights %	98.6%	98.1%	0%		98.1%	94.5%	95.4%	0%		95.2%	94%	95%	0%		94.1%	-
Single-Unit Trucks	0	4	0		4	7	9	0		16	20	1	0		21	-
Single-Unit Trucks %	0%	1%	0%		0.8%	4.3%	1.4%	0%		2%	2.2%	1.7%	0%		2.2%	-
Buses	1	4	0		5	2	6	0		8	7	2	0		9	-
Buses %	1.4%	1%	0%		1%	1.2%	0.9%	0%		1%	0.8%	3.3%	0%		0.9%	-
Articulated Trucks	0	0	0		0	0	14	0		14	27	0	0		27	-
Articulated Trucks %	0%	0%	0%		0%	0%	2.2%	0%		1.8%	3%	0%	0%		2.8%	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	100%		-	-	-	0%		-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

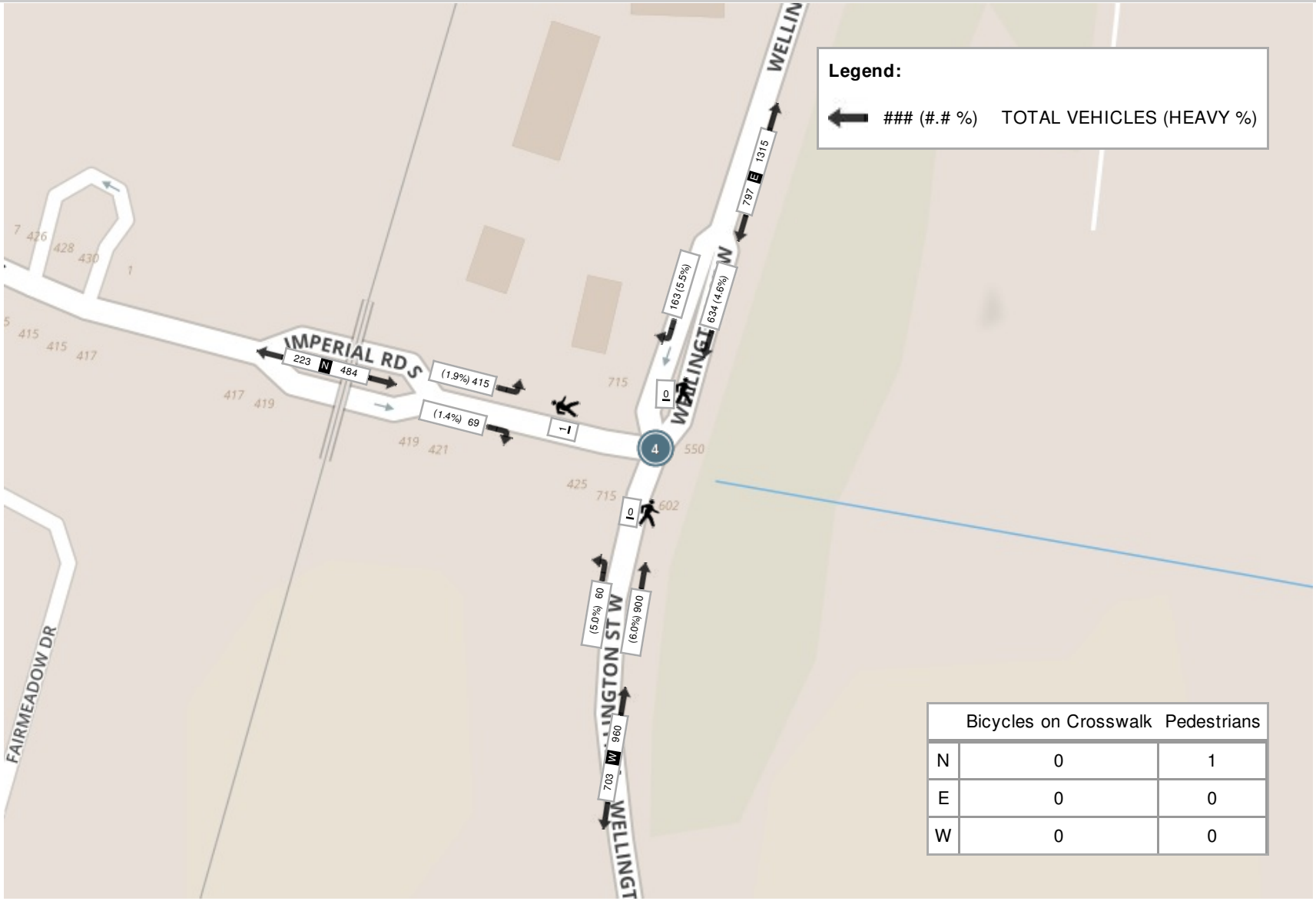
Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	1
E	0	0
W	0	0

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Selected Hour: 07:45 AM - 08:45 AM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	1
E	0	0
W	0	0

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & WATERLOO AVE
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (2 . WELLINGTON ST / HWY 7 & WATERLOO AVE)

Start Time	N Approach WATERLOO AVE						E Approach WELLINGTON ST / HWY 7						S Approach WATERLOO AVE						W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	44	0	0	0	0	44	0	123	0	0	0	123	22	11	36	0	0	69	0	90	16	0	0	106	342	
07:15:00	43	0	0	0	0	43	2	204	0	0	0	206	29	12	54	0	0	95	0	111	22	0	0	133	477	
07:30:00	59	0	1	0	0	60	0	184	0	0	0	184	35	7	46	0	0	88	0	163	28	0	0	191	523	
07:45:00	54	0	1	0	0	55	1	206	0	0	0	207	35	12	50	0	0	97	0	171	37	0	0	208	567	1909
08:00:00	67	0	0	0	0	67	0	164	0	0	0	164	44	16	61	0	0	121	0	195	27	0	0	222	574	2141
08:15:00	57	0	0	0	0	57	4	219	0	0	0	223	59	25	41	0	0	125	0	240	34	0	0	274	679	2343
08:30:00	61	0	0	0	0	61	1	184	0	0	0	185	62	19	40	0	0	121	0	209	57	0	0	266	633	2453
08:45:00	52	0	1	0	1	53	2	160	0	0	0	162	55	22	41	0	0	118	0	203	37	0	0	240	573	2459
09:00:00	42	0	0	0	0	42	2	139	0	0	0	141	48	22	55	0	0	125	0	108	37	0	0	145	453	2338
09:15:00	24	0	0	0	0	24	0	136	0	0	0	136	27	16	33	0	0	76	0	118	25	0	0	143	379	2038
09:30:00	21	0	0	0	0	21	1	103	0	0	0	104	30	11	41	0	0	82	0	106	15	0	0	121	328	1733
09:45:00	25	0	0	0	0	25	1	133	0	0	0	134	35	12	31	0	0	78	0	107	17	0	0	124	361	1521
10:00:00	24	0	0	0	0	24	0	122	0	0	0	122	29	10	37	0	0	76	0	93	11	0	0	104	326	1394
10:15:00	20	0	0	0	0	20	2	125	0	0	0	127	33	7	34	0	0	74	0	90	12	0	0	102	323	1338
10:30:00	35	0	0	0	0	35	4	112	0	0	0	116	23	12	40	0	0	75	0	87	18	0	0	105	331	1341
10:45:00	28	0	0	0	0	28	2	136	0	0	0	138	36	14	31	0	0	81	0	110	21	1	0	132	379	1359
11:00:00	31	0	1	0	0	32	2	132	0	0	0	134	18	11	39	0	0	68	0	92	21	0	0	113	347	1380
11:15:00	35	0	3	0	0	38	2	142	0	0	1	144	28	5	47	0	0	80	0	103	19	1	0	123	385	1442
11:30:00	34	0	0	0	0	34	0	130	0	0	0	130	23	3	40	0	0	66	0	97	15	0	0	112	342	1453
11:45:00	28	0	0	0	0	28	1	147	0	0	0	148	35	8	48	0	0	91	0	114	15	0	0	129	396	1470
12:00:00	38	0	0	0	0	38	0	105	0	0	0	105	22	17	43	0	0	82	0	86	21	0	0	107	332	1455
12:15:00	25	0	2	0	0	27	3	148	0	0	0	151	28	5	43	0	0	76	0	86	11	0	0	97	351	1421
12:30:00	27	0	0	0	0	27	2	138	0	0	0	140	19	7	44	0	0	70	0	103	19	0	0	122	359	1438
12:45:00	35	0	1	0	0	36	0	141	0	0	0	141	24	8	48	0	0	80	0	120	23	0	0	143	400	1442
13:00:00	38	0	1	0	0	39	2	124	0	0	0	126	26	20	49	0	0	95	0	120	13	0	0	133	393	1503
13:15:00	40	0	0	0	1	40	0	144	0	0	0	144	20	9	52	0	0	81	0	114	15	0	0	129	394	1546
13:30:00	34	0	0	0	0	34	3	137	0	0	0	140	24	12	62	0	0	98	0	113	18	0	0	131	403	1590
13:45:00	21	0	1	0	0	22	2	134	0	0	0	136	27	9	53	0	0	89	0	100	19	0	0	119	366	1556
14:00:00	29	0	0	0	0	29	3	155	0	0	0	158	23	6	43	0	0	72	0	126	21	1	0	148	407	1570
14:15:00	28	0	0	0	1	28	2	153	0	0	0	155	37	11	46	0	0	94	0	118	26	0	0	144	421	1597
14:30:00	31	0	1	0	0	32	2	129	0	0	0	131	25	9	58	0	0	92	0	135	22	0	0	157	412	1606

14:45:00	31	0	0	0	1	31	2	181	0	0	0	183	40	18	68	0	0	126	0	128	17	0	0	145	485	1725
15:00:00	38	0	0	0	1	38	2	159	0	0	0	161	21	18	58	0	0	97	0	121	39	0	0	160	456	1774
15:15:00	49	0	0	0	0	49	2	174	0	0	0	176	19	19	75	0	0	113	0	124	26	0	0	150	488	1841
15:30:00	71	0	3	0	0	74	3	208	0	0	0	211	27	23	75	0	0	125	0	146	37	0	0	183	593	2022
15:45:00	46	0	2	0	0	48	1	194	0	0	0	195	38	25	78	0	0	141	0	155	42	0	0	197	581	2118
16:00:00	61	0	0	0	0	61	3	238	0	0	0	241	35	11	68	0	0	114	0	150	25	0	0	175	591	2253
16:15:00	62	0	0	0	0	62	2	275	0	0	0	277	36	27	102	0	0	165	0	154	43	0	0	197	701	2466
16:30:00	57	0	2	0	0	59	3	265	0	0	0	268	26	25	86	0	0	137	0	185	40	0	0	225	689	2562
16:45:00	74	0	1	0	0	75	2	251	0	0	0	253	38	26	94	0	0	158	0	177	31	0	0	208	694	2675
17:00:00	56	0	0	0	1	56	1	229	0	0	0	230	23	21	106	0	0	150	0	208	36	0	0	244	680	2764
17:15:00	70	0	2	0	0	72	3	227	0	0	0	230	52	40	102	0	0	194	0	182	41	0	0	223	719	2782
17:30:00	56	0	0	0	0	56	2	176	0	0	0	178	37	15	92	0	0	144	0	171	38	0	0	209	587	2680
17:45:00	36	0	0	0	0	36	2	195	0	0	0	197	37	29	79	0	0	145	0	171	33	0	0	204	582	2568
Grand Total	1837	0	23	0	6	1860	74	7281	0	0	1	7355	1410	665	2469	0	0	4544	0	5900	1140	3	0	7043	**20802**	-
Approach%	98.8%	0%	1.2%	0%		-	1%	99%	0%	0%		-	31%	14.6%	54.3%	0%		-	0%	83.8%	16.2%	0%		-	-	-
Totals %	8.8%	0%	0.1%	0%		8.9%	0.4%	35%	0%	0%		35.4%	6.8%	3.2%	11.9%	0%		21.8%	0%	28.4%	5.5%	0%		33.9%	-	-
Heavy	51	0	1	0		-	1	317	0	0		-	57	6	125	0		-	0	267	40	0		-	-	-
Heavy %	2.8%	0%	4.3%	0%		-	1.4%	4.4%	0%	0%		-	4%	0.9%	5.1%	0%		-	0%	4.5%	3.5%	0%		-	-	-
Bicycles	0	0	0	0		-	0	2	0	0		-	0	0	0	0		-	0	2	2	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0.2%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & WATERLOO AVE
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)

Start Time	N Approach WATERLOO AVE						E Approach WELLINGTON ST / HWY 7						S Approach WATERLOO AVE						W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	57	0	2	0	0	59	3	265	0	0	0	268	26	25	86	0	0	137	0	185	40	0	0	225	689
16:45:00	74	0	1	0	0	75	2	251	0	0	0	253	38	26	94	0	0	158	0	177	31	0	0	208	694
17:00:00	56	0	0	0	1	56	1	229	0	0	0	230	23	21	106	0	0	150	0	208	36	0	0	244	680
17:15:00	70	0	2	0	0	72	3	227	0	0	0	230	52	40	102	0	0	194	0	182	41	0	0	223	719
Grand Total	257	0	5	0	1	262	9	972	0	0	0	981	139	112	388	0	0	639	0	752	148	0	0	900	**2782**
Approach%	98.1%	0%	1.9%	0%		-	0.9%	99.1%	0%	0%		-	21.8%	17.5%	60.7%	0%		-	0%	83.6%	16.4%	0%		-	-
Totals %	9.2%	0%	0.2%	0%		9.4%	0.3%	34.9%	0%	0%		35.3%	5%	4%	13.9%	0%		23%	0%	27%	5.3%	0%		32.4%	-
PHF	0.87	0	0.63	0		0.87	0.75	0.92	0	0		0.92	0.67	0.7	0.92	0		0.82	0	0.9	0.9	0		0.92	-
Heavy	3	0	0	0		3	0	14	0	0		14	2	0	4	0		6	0	10	2	0		12	-
Heavy %	1.2%	0%	0%	0%		1.1%	0%	1.4%	0%	0%		1.4%	1.4%	0%	1%	0%		0.9%	0%	1.3%	1.4%	0%		1.3%	-
Lights	254	0	5	0		259	9	958	0	0		967	137	112	384	0		633	0	742	146	0		888	-
Lights %	98.8%	0%	100%	0%		98.9%	100%	98.6%	0%	0%		98.6%	98.6%	100%	99%	0%		99.1%	0%	98.7%	98.6%	0%		98.7%	-
Single-Unit Trucks	1	0	0	0		1	0	8	0	0		8	0	0	2	0		2	0	4	0	0		4	-
Single-Unit Trucks %	0.4%	0%	0%	0%		0.4%	0%	0.8%	0%	0%		0.8%	0%	0%	0.5%	0%		0.3%	0%	0.5%	0%	0%		0.4%	-
Buses	2	0	0	0		2	0	2	0	0		2	0	0	2	0		2	0	2	2	0		4	-
Buses %	0.8%	0%	0%	0%		0.8%	0%	0.2%	0%	0%		0.2%	0%	0%	0.5%	0%		0.3%	0%	0.3%	1.4%	0%		0.4%	-
Articulated Trucks	0	0	0	0		0	0	4	0	0		4	2	0	0	0		2	0	4	0	0		4	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	1.4%	0%	0%	0%		0.3%	0%	0.5%	0%	0%		0.4%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	100%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

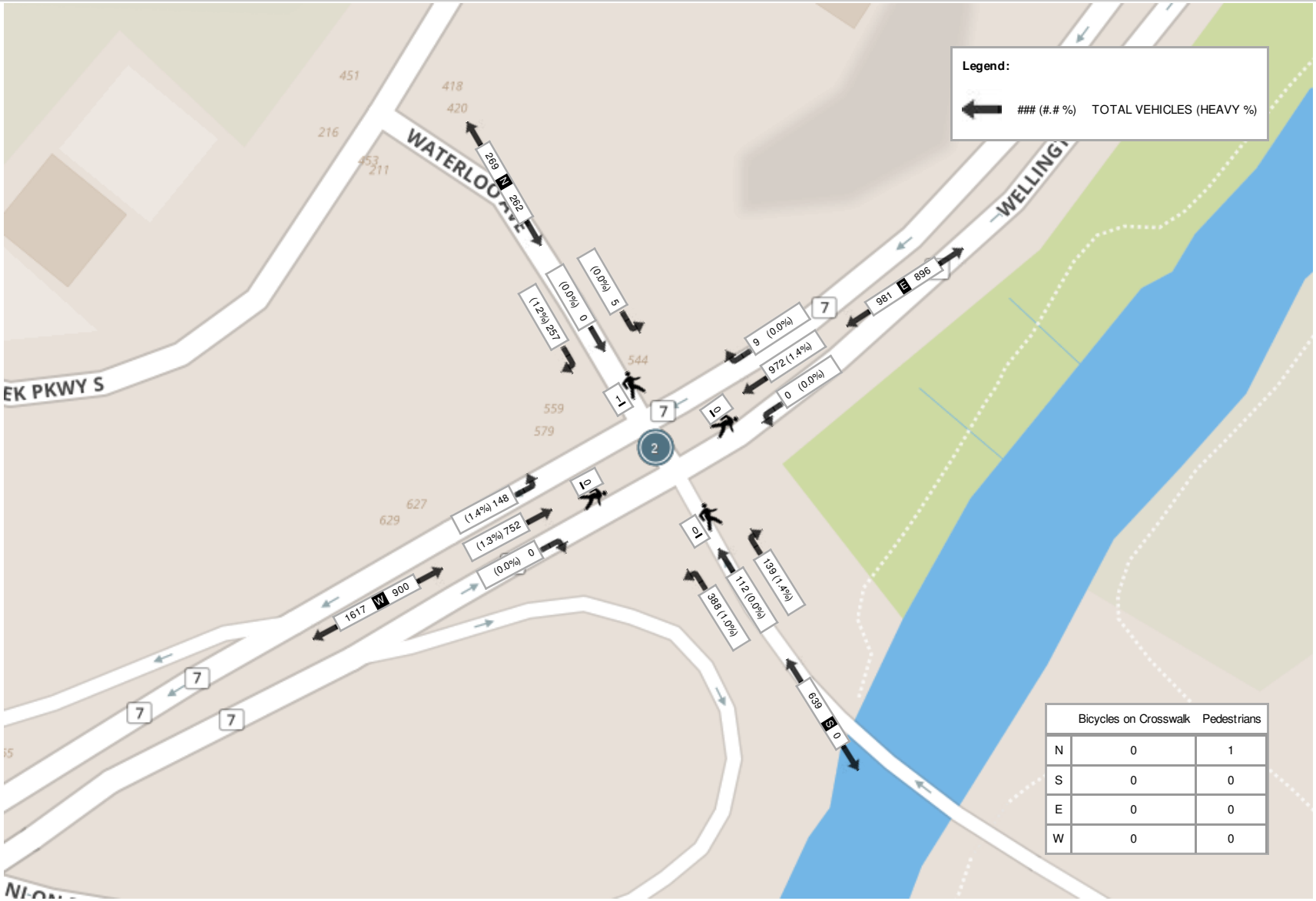
Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & WATERLOO AVE
Date: Tue, Feb 13, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Selected Hour: 08:00 AM - 09:00 AM Weather:

Start Time	N Approach WATERLOO AVE						E Approach WELLINGTON ST / HWY 7						S Approach WATERLOO AVE						W Approach WELLINGTON ST / HWY 7						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	67	0	0	0	0	67	0	164	0	0	0	164	44	16	61	0	0	121	0	195	27	0	0	222	574
08:15:00	57	0	0	0	0	57	4	219	0	0	0	223	59	25	41	0	0	125	0	240	34	0	0	274	679
08:30:00	61	0	0	0	0	61	1	184	0	0	0	185	62	19	40	0	0	121	0	209	57	0	0	266	633
08:45:00	52	0	1	0	1	53	2	160	0	0	0	162	55	22	41	0	0	118	0	203	37	0	0	240	573
Grand Total	237	0	1	0	1	238	7	727	0	0	0	734	220	82	183	0	0	485	0	847	155	0	0	1002	**2459**
Approach%	99.6%	0%	0.4%	0%		-	1%	99%	0%	0%		-	45.4%	16.9%	37.7%	0%		-	0%	84.5%	15.5%	0%		-	-
Totals %	9.6%	0%	0%	0%		9.7%	0.3%	29.6%	0%	0%		29.8%	8.9%	3.3%	7.4%	0%		19.7%	0%	34.4%	6.3%	0%		40.7%	-
PHF	0.88	0	0.25	0		0.89	0.44	0.83	0	0		0.82	0.89	0.82	0.75	0		0.97	0	0.88	0.68	0		0.91	-
Heavy	4	0	0	0		4	0	32	0	0		32	3	1	9	0		13	0	33	6	0		39	-
Heavy %	1.7%	0%	0%	0%		1.7%	0%	4.4%	0%	0%		4.4%	1.4%	1.2%	4.9%	0%		2.7%	0%	3.9%	3.9%	0%		3.9%	-
Lights	233	0	1	0		234	7	695	0	0		702	217	81	174	0		472	0	814	149	0		963	-
Lights %	98.3%	0%	100%	0%		98.3%	100%	95.6%	0%	0%		95.6%	98.6%	98.8%	95.1%	0%		97.3%	0%	96.1%	96.1%	0%		96.1%	-
Single-Unit Trucks	0	0	0	0		0	0	14	0	0		14	2	0	2	0		4	0	16	1	0		17	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1.9%	0%	0%		1.9%	0.9%	0%	1.1%	0%		0.8%	0%	1.9%	0.6%	0%		1.7%	-
Buses	3	0	0	0		3	0	6	0	0		6	0	1	5	0		6	0	4	5	0		9	-
Buses %	1.3%	0%	0%	0%		1.3%	0%	0.8%	0%	0%		0.8%	0%	1.2%	2.7%	0%		1.2%	0%	0.5%	3.2%	0%		0.9%	-
Articulated Trucks	1	0	0	0		1	0	12	0	0		12	1	0	2	0		3	0	13	0	0		13	-
Articulated Trucks %	0.4%	0%	0%	0%		0.4%	0%	1.7%	0%	0%		1.6%	0.5%	0%	1.1%	0%		0.6%	0%	1.5%	0%	0%		1.3%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	100%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

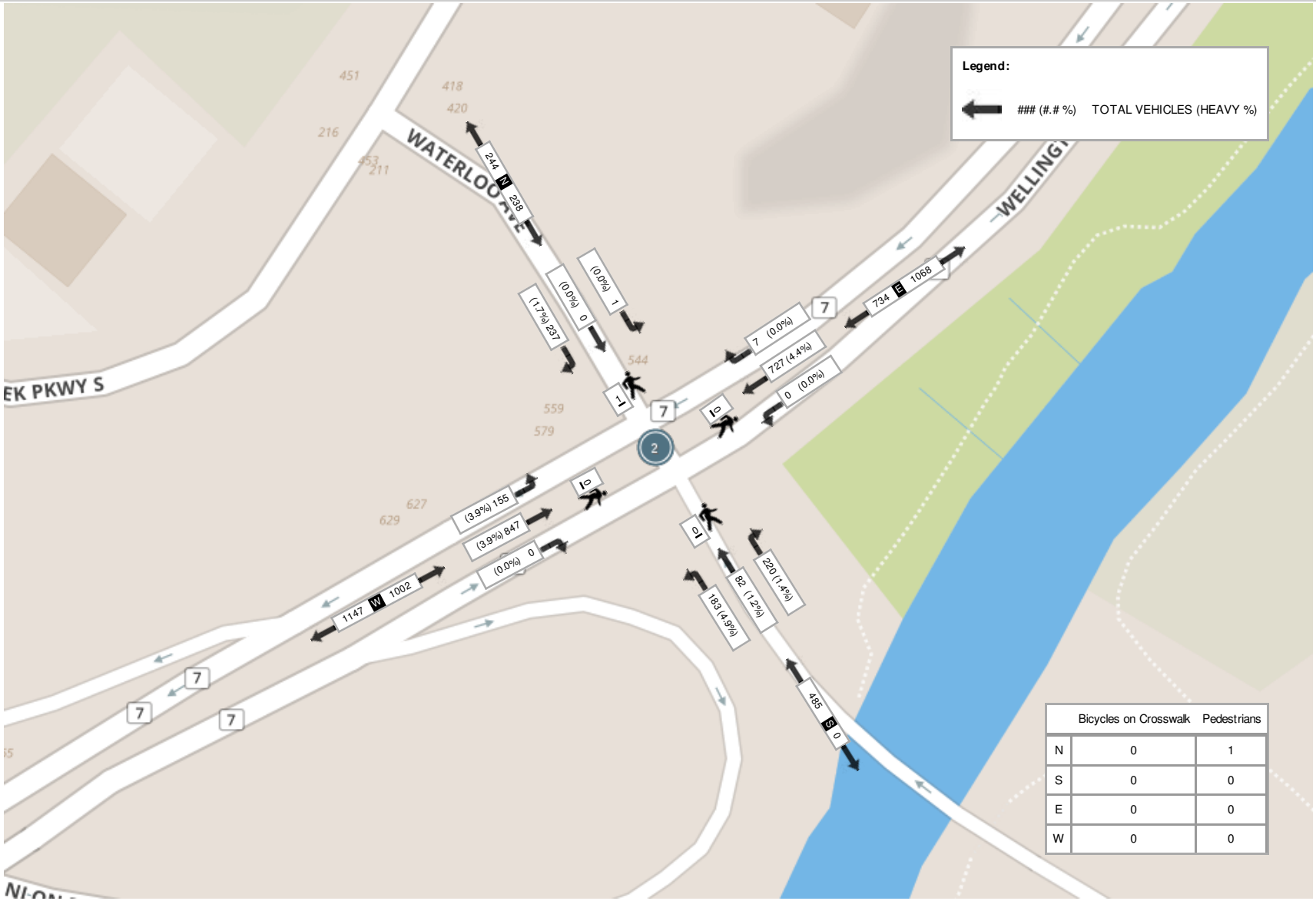
Peak Hour: 04:30 PM - 05:30 PM Weather: Mostly Cloudy (-11.2 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	0
E	0	0
W	0	0

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Selected Hour: 08:00 AM - 09:00 AM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	0
E	0	0
W	0	0

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & WATERLOO AVE
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Turning Movement Count (2 . WELLINGTON ST / HWY 7 & WATERLOO AVE)

Start Time	N Approach HWY 7 & WATERLOO AVE						E Approach WELLINGTON ST						S Approach HWY 7 & WATERLOO AVE						W Approach WELLINGTON ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
11:00:00	37	0	1	0	0	38	1	160	0	0	0	161	34	11	53	0	0	98	0	119	10	0	0	129	426	
11:15:00	50	1	0	0	0	51	3	141	0	0	0	144	24	14	64	0	0	102	0	137	18	0	0	155	452	
11:30:00	22	0	0	0	0	22	1	176	0	0	0	177	40	15	54	0	0	109	0	130	26	0	0	156	464	
11:45:00	39	0	1	0	0	40	2	178	0	0	0	180	23	16	66	0	0	105	0	128	22	0	0	150	475	1817
12:00:00	30	0	0	0	0	30	2	174	0	0	0	176	36	19	73	0	0	128	0	150	15	0	0	165	499	1890
12:15:00	48	0	2	0	0	50	2	167	0	0	0	169	33	8	64	0	0	105	0	127	26	0	0	153	477	1915
12:30:00	41	0	1	0	0	42	3	171	0	0	0	174	25	9	78	0	0	112	0	138	18	0	0	156	484	1935
12:45:00	36	0	0	0	0	36	1	176	0	0	0	177	58	11	58	0	0	127	0	122	26	0	0	148	488	1948
13:00:00	44	0	2	0	1	46	5	167	0	0	0	172	23	10	72	0	0	105	0	154	19	0	0	173	496	1945
13:15:00	48	0	2	0	0	50	4	169	0	0	0	173	31	11	57	0	0	99	0	126	17	0	0	143	465	1933
13:30:00	36	0	1	0	0	37	1	141	0	0	0	142	32	13	64	0	0	109	0	125	26	0	0	151	439	1888
13:45:00	37	0	2	0	1	39	0	144	0	0	0	144	31	16	73	0	0	120	0	117	38	0	0	155	458	1858
14:00:00	41	0	0	0	1	41	1	157	0	0	0	158	19	8	60	0	0	87	0	103	25	0	0	128	414	1776
14:15:00	29	0	1	0	0	30	1	169	0	0	0	170	19	6	75	0	0	100	0	123	17	0	0	140	440	1751
14:30:00	32	0	1	0	0	33	3	157	0	0	0	160	29	6	81	0	0	116	0	132	19	1	0	152	461	1773
14:45:00	37	0	1	0	0	38	3	181	0	0	0	184	29	18	77	0	0	124	0	139	23	0	0	162	508	1823
Grand Total	607	1	15	0	3	623	33	2628	0	0	0	2661	486	191	1069	0	0	1746	0	2070	345	1	0	2416	**7446**	-
Approach%	97.4%	0.2%	2.4%	0%		-	1.2%	98.8%	0%	0%		-	27.8%	10.9%	61.2%	0%		-	0%	85.7%	14.3%	0%		-	-	-
Totals %	8.2%	0%	0.2%	0%		8.4%	0.4%	35.3%	0%	0%		35.7%	6.5%	2.6%	14.4%	0%		23.4%	0%	27.8%	4.6%	0%		32.4%	-	-
Heavy	9	0	0	0		-	0	35	0	0		-	8	0	21	0		-	0	27	8	0		-	-	-
Heavy %	1.5%	0%	0%	0%		-	0%	1.3%	0%	0%		-	1.6%	0%	2%	0%		-	0%	1.3%	2.3%	0%		-	-	-
Bicycles	1	0	0	0		-	0	0	0	0		-	0	0	0	0		-	0	3	2	0		-	-	-
Bicycle %	0.2%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0.6%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & WATERLOO AVE
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 12:00 PM - 01:00 PM Weather:

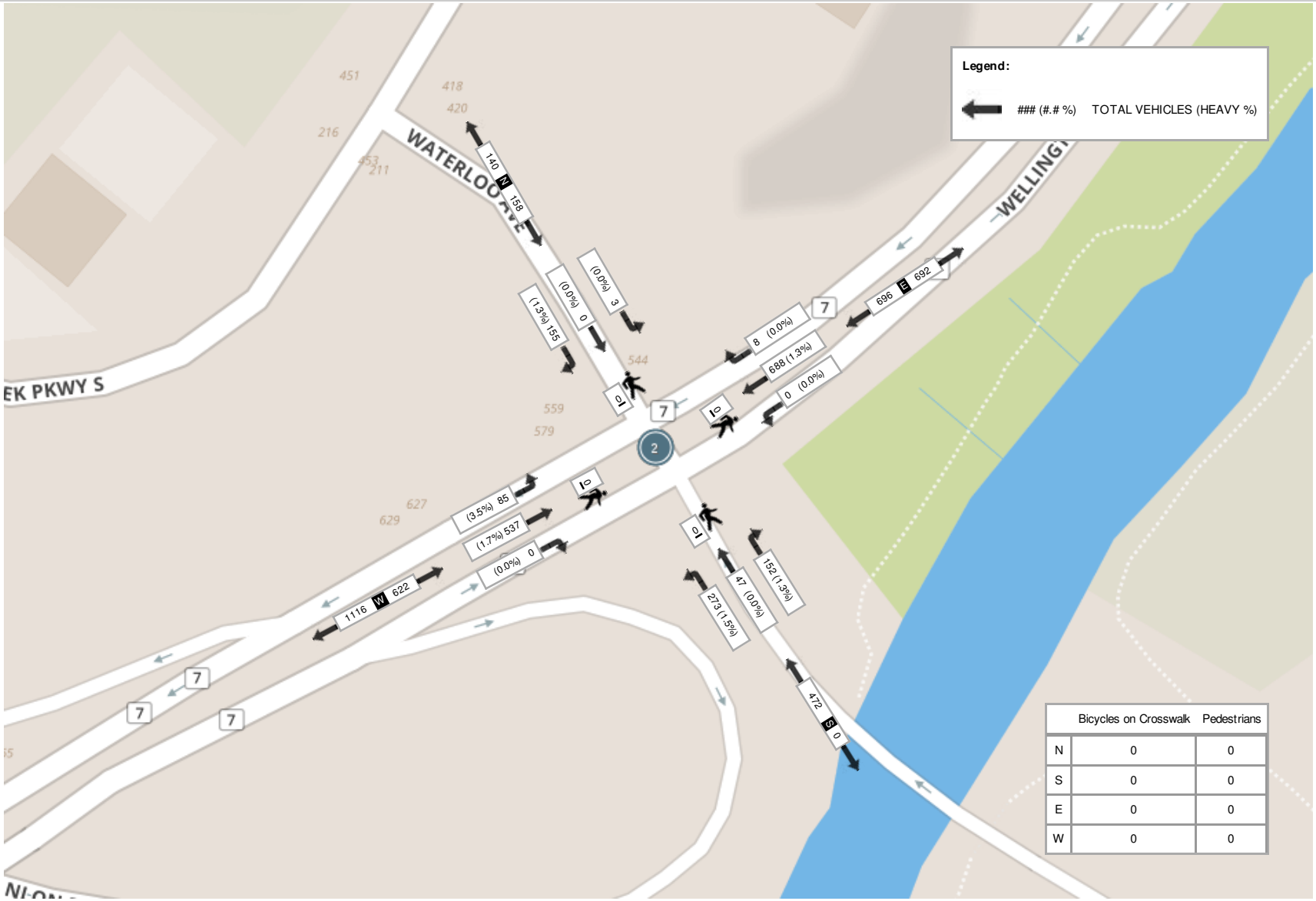
Start Time	N Approach HWY 7 & WATERLOO AVE						E Approach WELLINGTON ST						S Approach HWY 7 & WATERLOO AVE						W Approach WELLINGTON ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	30	0	0	0	0	30	2	174	0	0	0	176	36	19	73	0	0	128	0	150	15	0	0	165	499
12:15:00	48	0	2	0	0	50	2	167	0	0	0	169	33	8	64	0	0	105	0	127	26	0	0	153	477
12:30:00	41	0	1	0	0	42	3	171	0	0	0	174	25	9	78	0	0	112	0	138	18	0	0	156	484
12:45:00	36	0	0	0	0	36	1	176	0	0	0	177	58	11	58	0	0	127	0	122	26	0	0	148	488
Grand Total	155	0	3	0	0	158	8	688	0	0	0	696	152	47	273	0	0	472	0	537	85	0	0	622	**1948**
Approach%	98.1%	0%	1.9%	0%		-	1.1%	98.9%	0%	0%		-	32.2%	10%	57.8%	0%		-	0%	86.3%	13.7%	0%		-	-
Totals %	8%	0%	0.2%	0%		8.1%	0.4%	35.3%	0%	0%		35.7%	7.8%	2.4%	14%	0%		24.2%	0%	27.6%	4.4%	0%		31.9%	-
PHF	0.81	0	0.38	0		0.79	0.67	0.98	0	0		0.98	0.66	0.62	0.88	0		0.92	0	0.9	0.82	0		0.94	-
Heavy	2	0	0	0		2	0	9	0	0		9	2	0	4	0		6	0	9	3	0		12	-
Heavy %	1.3%	0%	0%	0%		1.3%	0%	1.3%	0%	0%		1.3%	1.3%	0%	1.5%	0%		1.3%	0%	1.7%	3.5%	0%		1.9%	-
Lights	153	0	3	0		156	8	679	0	0		687	150	47	269	0		466	0	528	82	0		610	-
Lights %	98.7%	0%	100%	0%		98.7%	100%	98.7%	0%	0%		98.7%	98.7%	100%	98.5%	0%		98.7%	0%	98.3%	96.5%	0%		98.1%	-
Single-Unit Trucks	0	0	0	0		0	0	3	0	0		3	1	0	2	0		3	0	3	0	0		3	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	0.7%	0%	0.7%	0%		0.6%	0%	0.6%	0%	0%		0.5%	-
Buses	2	0	0	0		2	0	1	0	0		1	1	0	2	0		3	0	2	3	0		5	-
Buses %	1.3%	0%	0%	0%		1.3%	0%	0.1%	0%	0%		0.1%	0.7%	0%	0.7%	0%		0.6%	0%	0.4%	3.5%	0%		0.8%	-
Articulated Trucks	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	0	4	0	0		4	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.6%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST / HWY 7 & WATERLOO AVE
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 12:00 PM - 01:00 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	0	0
W	0	0

BA Group
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Toronto ON, CANADA, M4V 1K9

Turning Movement Count (4 . WELLINGTON ST/ HWY 7 & IMPERIAL RD)

Start Time	N Approach IMPERIAL RD					E Approach WELLINGTON ST/ HWY 7					W Approach WELLINGTON ST/ HWY 7					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	U-Turn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
11:00:00	19	75	0	6	94	56	113	0	0	169	103	18	0	0	121	384	
11:15:00	19	85	0	0	104	70	120	0	0	190	119	17	0	0	136	430	
11:30:00	14	94	0	1	108	55	117	0	0	172	113	16	0	0	129	409	
11:45:00	22	61	0	1	83	68	128	0	0	196	136	7	0	0	143	422	1645
12:00:00	17	122	0	3	139	79	135	0	0	214	127	21	0	0	148	501	1762
12:15:00	17	92	0	0	109	66	147	0	0	213	145	7	0	0	152	474	1806
12:30:00	12	74	0	0	86	60	127	0	0	187	127	15	0	0	142	415	1812
12:45:00	9	82	0	0	91	84	122	0	0	206	157	20	0	0	177	474	1864
13:00:00	17	79	0	2	96	63	143	0	0	206	125	17	0	0	142	444	1807
13:15:00	6	80	0	3	86	53	120	0	0	173	125	16	0	0	141	400	1733
13:30:00	10	78	0	1	88	51	130	0	0	181	124	16	0	0	140	409	1727
13:45:00	11	88	0	0	99	45	134	0	0	179	124	15	0	0	139	417	1670
14:00:00	10	73	0	1	83	50	140	0	0	190	144	28	1	0	173	446	1672
14:15:00	22	87	0	0	109	73	139	0	0	212	123	21	0	0	144	465	1737
14:30:00	22	75	0	1	97	69	120	0	0	189	132	24	0	0	156	442	1770
14:45:00	21	75	0	1	96	62	136	0	0	198	135	16	0	0	151	445	1798
Grand Total	248	1320	0	20	1568	1004	2071	0	0	3075	2059	274	1	0	2334	**6977**	-
Approach%	15.8%	84.2%	0%		-	32.7%	67.3%	0%		-	88.2%	11.7%	0%		-	-	-
Totals %	3.6%	18.9%	0%		22.5%	14.4%	29.7%	0%		44.1%	29.5%	3.9%	0%		33.5%	-	-
Heavy	3	9	0		-	2	64	0		-	45	2	0		-	-	-
Heavy %	1.2%	0.7%	0%		-	0.2%	3.1%	0%		-	2.2%	0.7%	0%		-	-	-
Bicycles	0	0	0		-	0	0	0		-	3	0	0		-	-	-
Bicycle %	0%	0%	0%		-	0%	0%	0%		-	0.1%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: WELLINGTON ST/ HWY 7 & IMPERIAL RD
Date: Sat, Feb 24, 2018 Deployment Lead: Theo Daglis

BA Group
45 St. Clair Avenue West, Suite 300
Toronto ON, CANADA, M4V 1K9

Peak Hour: 12:00 PM - 01:00 PM Weather:

Start Time	N Approach IMPERIAL RD					E Approach WELLINGTON ST/ HWY 7					W Approach WELLINGTON ST/ HWY 7					Int. Total (15 min)
	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	17	122	0	3	139	79	135	0	0	214	127	21	0	0	148	501
12:15:00	17	92	0	0	109	66	147	0	0	213	145	7	0	0	152	474
12:30:00	12	74	0	0	86	60	127	0	0	187	127	15	0	0	142	415
12:45:00	9	82	0	0	91	84	122	0	0	206	157	20	0	0	177	474
Grand Total	55	370	0	3	425	289	531	0	0	820	556	63	0	0	619	**1864**
Approach%	12.9%	87.1%	0%		-	35.2%	64.8%	0%		-	89.8%	10.2%	0%		-	-
Totals %	3%	19.8%	0%		22.8%	15.5%	28.5%	0%		44%	29.8%	3.4%	0%		33.2%	-
PHF	0.81	0.76	0		0.76	0.86	0.9	0		0.96	0.89	0.75	0		0.87	-
Heavy	0	3	0		3	0	18	0		18	15	0	0		15	-
Heavy %	0%	0.8%	0%		0.7%	0%	3.4%	0%		2.2%	2.7%	0%	0%		2.4%	-
Lights	55	367	0		422	289	513	0		802	541	63	0		604	-
Lights %	100%	99.2%	0%		99.3%	100%	96.6%	0%		97.8%	97.3%	100%	0%		97.6%	-
Single-Unit Trucks	0	0	0		0	0	5	0		5	3	0	0		3	-
Single-Unit Trucks %	0%	0%	0%		0%	0%	0.9%	0%		0.6%	0.5%	0%	0%		0.5%	-
Buses	0	3	0		3	0	5	0		5	4	0	0		4	-
Buses %	0%	0.8%	0%		0.7%	0%	0.9%	0%		0.6%	0.7%	0%	0%		0.6%	-
Articulated Trucks	0	0	0		0	0	8	0		8	8	0	0		8	-
Articulated Trucks %	0%	0%	0%		0%	0%	1.5%	0%		1%	1.4%	0%	0%		1.3%	-
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	100%		-	-	-	0%		-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	1	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

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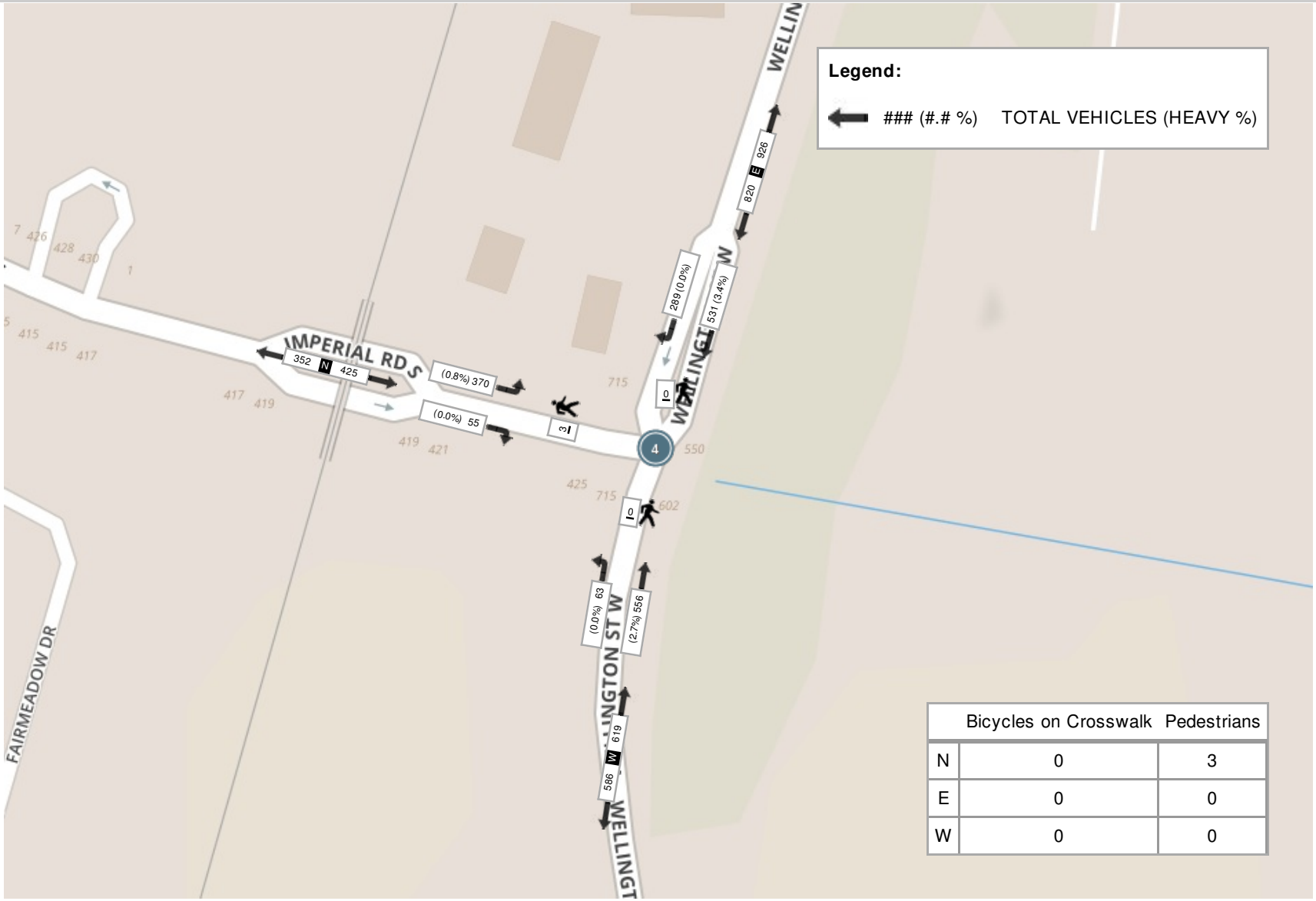
Peak Hour: 12:00 PM - 01:00 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	3
E	0	0
W	0	0

APPENDIX E:
TTS Data

Calculated Rates Based on TTS

Direction	Road	2018 Retail/OfficeDistribution				2018 Residential Distribution			
		PM		Subtotal		PM/Sat		Subtotal	
		In	Out	In	Out	In	Out	In	Out
North	Hwy 6	11%	20%			19%	25%		
	Silvercreek Parkway			39%	39%			31%	40%
	Edinburgh Road	28%	19%			12%	15%		
East	Paisley Road								
	Waterloo Avenue	9%	6%	14%	9%	15%	9%	22%	10%
	Wellington Street	5%	4%			7%	2%		
South	Highway 6	12%	11%	15%	15%	9%	10%	13%	20%
	Edinburgh Road	3%	4%			4%	10%		
West	Wellington Street	7%	9%	32%	36%	9%	9%	33%	29%
	Paisley Road	25%	27%			24%	20%		
Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Rounded, Final Selected Rates

Direction	Road	office		res		
North	Hwy 6	10		15		
	Silvercreek Parkway	10	35	10		40
	Edinburgh Road	15		15		
East	Paisley Road	10		10		
	Waterloo Avenue	5	20	5		20
	Wellington Street	5		5		
South	Highway 6	15		15		
	Edinburgh Road	5	20	5		20
West	Wellington Street	15		15		
	Paisley Road	10	25	5		20
Total		100	100	100	0	100

Retail Office Inbound

Fri Mar 16 2018 10:53:24 GMT-0400 (Eastern Daylight Time) - Run Time: 2296ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(8152-8166)
TblG:

Filters:
Primary travel mode of trip - mode_prime In D,P,M,T,S,U
and
Trip purpose of destination - purp_dest In M,W,

Trip 2016

Assignment	1		Paisley W / Hwy 31 W	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S
3199	19	0.0142					0.8		0.2		
4196	21	0.015695			0.3	0.7					
5061	14	0.010463			1						
7042	35	0.026158	0.95			0.05					
7099	9	0.006726	0.95			0.05					
7175	27	0.020179	0.95			0.05					
7254	23	0.01719	0.95			0.05					
7343	19	0.0142	0.95			0.05					
7404	14	0.010463	0.95			0.05					
7442	95	0.071001	0.95			0.05					
7466	17	0.012706	0.95			0.05					
7477	37	0.027653	0.95			0.05					
8019	28	0.020927					0.25		0.5	0.25	
8022	18	0.013453					0.25		0.5	0.25	
8024	15	0.011211					0.25		0.5	0.25	
8025	23	0.01719					0.25		0.5	0.25	
8026	18	0.013453					0.25		0.5	0.25	
8034	7	0.005232					0.25		0.5	0.25	
8035	18	0.013453					0.25		0.5	0.25	
8039	22	0.016442					0.25		0.5	0.25	
8044	59	0.044096					0.25		0.5	0.25	
8056	25	0.018685						0.25	0.5		0.25
8059	17	0.012706						0.25	0.5		0.25
8072	27	0.020179						0.25	0.5		0.25
8082	19	0.0142						0.25	0.5		0.25
8084	38	0.028401			0.5				0.5		
8085	37	0.027653			0.5				0.5		
8097	12	0.008969			1						
8098	22	0.016442			1						
8100	26	0.019432			1						
8111	12	0.008969			1						
8118	26	0.019432							0.5	0.5	
8125	5	0.003737							0.5	0.5	
8126	58	0.043348							0.5	0.5	
8128	51	0.038117							0.5	0.5	
8129	16	0.011958							1		
8135	26	0.019432							1		
8150	30	0.022422		1							
8153	19	0.0142		1							
8162	4	0.00299							0.5	0.5	
8163	11	0.008221			0.5				0.5		
8164	33	0.024664		0.5		0.5					
8166	45	0.033632		0.5		0.5					
8171	13	0.009716				1					
8172	14	0.010463	1								
8174	17	0.012706	1								
8177	21	0.015695	0.5	0.5							
8182	30	0.022422	1								
8303	15	0.011211				0.5			0.5		
8314	12	0.008969			1						
8348	37	0.027653		0.5					0.5		
8351	37	0.027653		0.5					0.5		
8357	20	0.014948		0.5					0.5		
8362	19	0.0142			0.5				0.5		
8411	6	0.004484		0.5					0.5		

Retail Office Inbound

Fri Mar 16 2018 10:53:24 GMT-0400 (Eastern Daylight Time) - Run Time: 2296ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(8152-8166)
TblG:

Overall Percentage	Paisley W / Hwy 31 W	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S
3199	0	0	0	0	0.01136	0	0.00284006	0	0
4196	0	0	0.004709	0.010987	0	0	0	0	0
5061	0	0	0.010463	0	0	0	0	0	0
7042	0.02485052	0	0	0.001308	0	0	0	0	0
7099	0.00639013	0	0	0.000336	0	0	0	0	0
7175	0.0191704	0	0	0.001009	0	0	0	0	0
7254	0.01633034	0	0	0.000859	0	0	0	0	0
7343	0.01349028	0	0	0.00071	0	0	0	0	0
7404	0.00994021	0	0	0.000523	0	0	0	0	0
7442	0.06745142	0	0	0.00355	0	0	0	0	0
7466	0.01207025	0	0	0.000635	0	0	0	0	0
7477	0.02627055	0	0	0.001383	0	0	0	0	0
8019	0	0	0	0	0.005232	0	0.010463378	0.00523169	0
8022	0	0	0	0	0.003363	0	0.006726457	0.00336323	0
8024	0	0	0	0	0.002803	0	0.005605381	0.00280269	0
8025	0	0	0	0	0.004297	0	0.008594918	0.00429746	0
8026	0	0	0	0	0.003363	0	0.006726457	0.00336323	0
8034	0	0	0	0	0.001308	0	0.002615845	0.00130792	0
8035	0	0	0	0	0.003363	0	0.006726457	0.00336323	0
8039	0	0	0	0	0.004111	0	0.008221226	0.00411061	0
8044	0	0	0	0	0.011024	0	0.022047833	0.01102392	0
8056	0	0	0	0	0	0.00467115	0.009342302	0	0.00467115
8059	0	0	0	0	0	0.00317638	0.006352765	0	0.00317638
8072	0	0	0	0	0	0.00504484	0.010089686	0	0.00504484
8082	0	0	0	0	0	0.00355007	0.007100149	0	0.00355007
8084	0	0	0.0142	0	0	0	0.014200299	0	0
8085	0	0	0.013827	0	0	0	0.013826607	0	0
8097	0	0	0.008969	0	0	0	0	0	0
8098	0	0	0.016442	0	0	0	0	0	0
8100	0	0	0.019432	0	0	0	0	0	0
8111	0	0	0.008969	0	0	0	0	0	0
8118	0	0	0	0	0	0	0.009715994	0.00971599	0
8125	0	0	0	0	0	0	0.00186846	0.00186846	0
8126	0	0	0	0	0	0	0.021674141	0.02167414	0
8128	0	0	0	0	0	0	0.019058296	0.0190583	0
8129	0	0	0	0	0	0	0.011958146	0	0
8135	0	0	0	0	0	0	0.019431988	0	0
8150	0	0.022422	0	0	0	0	0	0	0
8153	0	0.0142	0	0	0	0	0	0	0
8162	0	0	0	0	0	0	0.001494768	0.00149477	0
8163	0	0	0.004111	0	0	0	0.004110613	0	0
8164	0	0.012332	0	0.012332	0	0	0	0	0
8166	0	0.016816	0	0.016816	0	0	0	0	0
8171	0	0	0	0.009716	0	0	0	0	0
8172	0.01046338	0	0	0	0	0	0	0	0
8174	0.01270553	0	0	0	0	0	0	0	0
8177	0.00784753	0.007848	0	0	0	0	0	0	0
8182	0.02242152	0	0	0	0	0	0	0	0
8303	0	0	0	0.005605	0	0	0.005605381	0	0
8314	0	0	0.008969	0	0	0	0	0	0
8348	0	0.013827	0	0	0	0	0.013826607	0	0
8351	0	0.013827	0	0	0	0	0.013826607	0	0
8357	0	0.007474	0	0	0	0	0.007473842	0	0
8362	0	0	0.0071	0	0	0	0.007100149	0	0
8411	0	0.002242	0	0	0	0	0.002242152	0	0
	25%	**11%**	**12%**	**7%**	**5%**	**2%**	**28%**	**9%**	**2%**

Retail-Office Outbound

Fri Mar 16 2018 10:55:01 GMT-0400 (Eastern Daylight Time) - Run Time: 2163ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(8152-8166)
TblG:

Filters:
Primary travel mode of trip - mode_prime In D,P,M,T,S,U
and
Trip purpose of origin - purp_orig In M,W,

Trip 2016

Assignment	1		Paisley W / Hwy 31 W	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S
4159	22	0.014249			0.3	0.7					
4197	21	0.013601			0.3	0.7					
5061	14	0.009067			1						
5250	18	0.011658			1						
7081	14	0.009067	0.95			0.05					
7174	68	0.044041	0.95			0.05					
7175	27	0.017487	0.95			0.05					
7226	19	0.012306	0.95			0.05					
7254	23	0.014896	0.95			0.05					
7296	35	0.022668	0.95			0.05					
7353	27	0.017487	0.95			0.05					
7387	14	0.009067	0.95			0.05					
7442	95	0.061528	0.95			0.05					
7477	37	0.023964	0.95			0.05					
8004	11	0.007124					0.25		0.5	0.25	
8012	23	0.014896					0.25		0.5	0.25	
8019	28	0.018135					0.25		0.5	0.25	
8022	18	0.011658					0.25		0.5	0.25	
8024	30	0.01943					0.25		0.5	0.25	
8026	36	0.023316					0.25		0.5	0.25	
8043	38	0.024611					0.25		0.5	0.25	
8044	14	0.009067					0.25		0.5	0.25	
8047	30	0.01943					0.25		0.5	0.25	
8072	27	0.017487						0.7			0.3
8073	33	0.021373						0.7			0.3
8085	37	0.023964			0.5				0.5		
8094	19	0.012306			0.5				0.5		
8099	12	0.007772			1						
8100	26	0.016839			1						
8105	26	0.016839			1						
8113	23	0.014896			1						
8125	5	0.003238							0.5	0.5	
8126	17	0.01101							0.5	0.5	
8129	5	0.003238							1		
8135	19	0.012306							1		
8142	9	0.005829		0.5					0.5		
8148	4	0.002591		0.5					0.5		
8150	58	0.037565		1							
8151	17	0.01101		1							
8152	19	0.012306		1							
8153	45	0.029145		1							
8162	35	0.022668							0.5	0.5	
8163	11	0.007124			0.5						
8164	49	0.031736		0.5		0.5					
8166	64	0.041451		0.5		0.5					
8167	32	0.020725		0.5		0.5					
8171	13	0.00842				1					
8172	20	0.012953	1								
8173	26	0.016839	1								
8177	42	0.027202	0.5	0.5							
8178	12	0.007772	0.5	0.5							
8303	15	0.009715				0.5			0.5		
8348	37	0.023964		0.5					0.5		
8351	88	0.056995		0.5					0.5		
8354	12	0.007772		0.5					0.5		
8362	19	0.012306			0.5				0.5		
8411	6	0.003886		0.5					0.5		

Retail-Office Outbound

Fri Mar 16 2018 10:55:01 GMT-0400 (Eastern Daylight Time) - Run Time: 2163ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(8152-8166)
TblG:

Overall Percentage	Paisley W / Hwy 31 W	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S
4159	0	0	0.004275	0.009974	0	0	0	0	0
4197	0	0	0.00408	0.009521	0	0	0	0	0
5061	0	0	0.009067	0	0	0	0	0	0
5250	0	0	0.011658	0	0	0	0	0	0
7081	0.00861399	0	0	0.000453	0	0	0	0	0
7174	0.04183938	0	0	0.002202	0	0	0	0	0
7175	0.01661269	0	0	0.000874	0	0	0	0	0
7226	0.01169041	0	0	0.000615	0	0	0	0	0
7254	0.01415155	0	0	0.000745	0	0	0	0	0
7296	0.02153497	0	0	0.001133	0	0	0	0	0
7353	0.01661269	0	0	0.000874	0	0	0	0	0
7387	0.00861399	0	0	0.000453	0	0	0	0	0
7442	0.05845207	0	0	0.003076	0	0	0	0	0
7477	0.02276554	0	0	0.001198	0	0	0	0	0
8004	0	0	0	0	0.001781	0	0.003562176	0.00178109	0
8012	0	0	0	0	0.003724	0	0.007448187	0.00372409	0
8019	0	0	0	0	0.004534	0	0.009067358	0.00453368	0
8022	0	0	0	0	0.002915	0	0.005829016	0.00291451	0
8024	0	0	0	0	0.004858	0	0.009715026	0.00485751	0
8026	0	0	0	0	0.005829	0	0.011658031	0.00582902	0
8043	0	0	0	0	0.006153	0	0.012305699	0.00615285	0
8044	0	0	0	0	0.002267	0	0.004533679	0.00226684	0
8047	0	0	0	0	0.004858	0	0.009715026	0.00485751	0
8072	0	0	0	0	0	0.01224093	0	0	0.00524611
8073	0	0	0	0	0	0.01496114	0	0	0.00641192
8085	0	0	0.011982	0	0	0	0.011981865	0	0
8094	0	0	0.006153	0	0	0	0.00615285	0	0
8099	0	0	0.007772	0	0	0	0	0	0
8100	0	0	0.016839	0	0	0	0	0	0
8105	0	0	0.016839	0	0	0	0	0	0
8113	0	0	0.014896	0	0	0	0	0	0
8125	0	0	0	0	0	0	0.001619171	0.00161917	0
8126	0	0	0	0	0	0	0.005505181	0.00550518	0
8129	0	0	0	0	0	0	0.003238342	0	0
8135	0	0	0	0	0	0	0.012305699	0	0
8142	0	0.002915	0	0	0	0	0.002914508	0	0
8148	0	0.001295	0	0	0	0	0.001295337	0	0
8150	0	0.037565	0	0	0	0	0	0	0
8151	0	0.01101	0	0	0	0	0	0	0
8152	0	0.012306	0	0	0	0	0	0	0
8153	0	0.029145	0	0	0	0	0	0	0
8162	0	0	0	0	0	0	0.011334197	0.0113342	0
8163	0	0	0.003562	0	0	0	0	0	0
8164	0	0.015868	0	0.015868	0	0	0	0	0
8166	0	0.020725	0	0.020725	0	0	0	0	0
8167	0	0.010363	0	0.010363	0	0	0	0	0
8171	0	0	0	0.00842	0	0	0	0	0
8172	0.01295337	0	0	0	0	0	0	0	0
8173	0.01683938	0	0	0	0	0	0	0	0
8177	0.01360104	0.013601	0	0	0	0	0	0	0
8178	0.00388601	0.003886	0	0	0	0	0	0	0
8303	0	0	0	0.004858	0	0	0.004857513	0	0
8348	0	0.011982	0	0	0	0	0.011981865	0	0
8351	0	0.028497	0	0	0	0	0.028497409	0	0
8354	0	0.003886	0	0	0	0	0.00388601	0	0
8362	0	0	0.006153	0	0	0	0.00615285	0	0
8411	0	0.001943	0	0	0	0	0.001943005	0	0
	27%	**20%**	**11%**	**9%**	**4%**	**3%**	**19%**	**6%**	**1%**

Residential AM Outbound

Wed Mar 14 2018 08:57:57 GMT-0400 (Eastern Daylight Time) - Run Time: 2448ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(8152-8166)
TblG:

Filters:
Start time of trip - start_time In 600-859
and
Primary travel mode of trip - mode_prime In D, M, P, T, U
and
Trip purpose of origin - purp_orig In H,

Assignment			Paisley W / Hwy 31 W	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S
63	19	1%			1						
2385	38	1%			0.7		0.2			0.1	
3380	8	0%			0.7		0.2			0.1	
4027	21	1%			1						
4194	71	2%			1						
7008	9	0%	0.95			0.05					
7031	11	0%	0.95			0.05					
7034	17	1%	0.95			0.05					
7042	9	0%	0.95			0.05					
7055	49	2%	0.95			0.05					
7117	37	1%	0.95			0.05					
7135	30	1%	0.95			0.05					
7155	21	1%	0.95			0.05					
7197	53	2%	0.95			0.05					
7223	29	1%	0.95			0.05					
7237	31	1%	0.95			0.05					
7286	28	1%	0.95			0.05					
7313	41	1%	0.95			0.05					
7319	14	0%	0.95			0.05					
7344	27	1%	0.95			0.05					
7357	49	2%	0.95			0.05					
7375	38	1%	0.95			0.05					
7387	17	1%	0.95			0.05					
7421	9	0%	0.95			0.05					
8031	46	1%							0.25	0.5	0.25
8032	38	1%							0.25	0.5	0.25
8035	67	2%							0.25	0.5	0.25
8041	33	1%							0.25	0.5	0.25
8045	16	1%					0.5			0.5	
8049	20	1%					0.5			0.5	
8056	12	0%					0.5			0.5	
8,057	134	4%					0.5			0.5	
8058	32	1%					0.5			0.5	
8059	45	1%					0.5			0.5	
8062	9	0%			0.5					0.5	
8079	38	1%								1	
8087	36	1%			1						
8088	23	1%			1						
8095	30	1%			0.2			0.4			0.4
8111	41	1%					0.35	0.15		0.35	0.15
8113	68	2%					0.3			0.7	
8118	9	0%					0.3			0.7	
8121	52	2%					0.3			0.7	
8,123	118	4%					0.3			0.7	
8124	17	1%					0.3			0.7	
8133	52	2%							1		
8135	46	1%							1		
8139	58	2%							1		
8140	41	1%		0.2					0.8		
8143	9	0%		0.5					0.5		
8144	18	1%		0.5					0.5		
8146	7	0%		0.5					0.5		
8,147	143	5%		1							
8149	32	1%							1		
8151	96	3%		1							
8153	4	0%		1							
8154	27	1%		0.5					0.5		
8157	48	2%							1		
8165	33	1%			0.5	0.5					
8171	63	2%		0.5		0.5					
8174	24	1%	0.5	0.5							

Residential AM Outbound

Assignment	1		Paisley W / Hwy 31 W	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S
8175	50	2%	0.5	0.5							
8178	24	1%	0.5	0.5							
8,181	155	5%	0.5	0.5							
8,188	119	4%		1							
8,191	151	5%	0.5			0.5					
8192	64	2%	0.5			0.5					
8193	18	1%	0.5			0.5					
8199	37	1%	0.5			0.5					
8305	78	2%			0.5	0.5					
8310	9	0%			0.5	0.5					
8321	9	0%			0.5	0.5					
8323	30	1%			0.5	0.5					
8334	16	1%				1					
8358	26	1%		1							
8578	84	3%							0.5		0.5
8948	8	0%			0.5	0.5					
9053		0%									
9061		0%									

Residential AM Outbound

Overall Percentage	Paisley W / Hwy 31	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S	
63	0	0	0.006051	0	0	0	0	0	0	1
2385	0	0	0.008471	0	0.0024204	0	0	0.00121019	0	1
3380	0	0	0.001783	0	0.0005096	0	0	0.00025478	0	1
4027	0	0	0.006688	0	0	0	0	0	0	1
4194	0	0	0.022611	0	0	0	0	0	0	1
7008	0.002723	0	0	0.000143	0	0	0	0	0	1
7031	0.003328	0	0	0.000175	0	0	0	0	0	1
7034	0.005143	0	0	0.000271	0	0	0	0	0	1
7042	0.002723	0	0	0.000143	0	0	0	0	0	1
7055	0.014825	0	0	0.00078	0	0	0	0	0	1
7117	0.011194	0	0	0.000589	0	0	0	0	0	1
7135	0.009076	0	0	0.000478	0	0	0	0	0	1
7155	0.006354	0	0	0.000334	0	0	0	0	0	1
7197	0.016035	0	0	0.000844	0	0	0	0	0	1
7223	0.008774	0	0	0.000462	0	0	0	0	0	1
7237	0.009379	0	0	0.000494	0	0	0	0	0	1
7286	0.008471	0	0	0.000446	0	0	0	0	0	1
7313	0.012404	0	0	0.000653	0	0	0	0	0	1
7319	0.004236	0	0	0.000223	0	0	0	0	0	1
7344	0.008169	0	0	0.00043	0	0	0	0	0	1
7357	0.014825	0	0	0.00078	0	0	0	0	0	1
7375	0.011497	0	0	0.000605	0	0	0	0	0	1
7387	0.005143	0	0	0.000271	0	0	0	0	0	1
7421	0.002723	0	0	0.000143	0	0	0	0	0	1
8031	0	0	0	0	0	0	0.00366242	0.00732484	0.00366242	1
8032	0	0	0	0	0	0	0.003025478	0.00605096	0.00302548	1
8035	0	0	0	0	0	0	0.005334395	0.01066879	0.00533439	1
8041	0	0	0	0	0	0	0.002627389	0.00525478	0.00262739	1
8045	0	0	0	0	0.0025478	0	0	0.00254777	0	1
8049	0	0	0	0	0.0031847	0	0	0.00318471	0	1
8056	0	0	0	0	0.0019108	0	0	0.00191083	0	1
8,057	0	0	0	0	0.0213376	0	0	0.02133758	0	1
8058	0	0	0	0	0.0050955	0	0	0.00509554	0	1
8059	0	0	0	0	0.0071656	0	0	0.00716561	0	1
8062	0	0	0.001433	0	0	0	0	0.00143312	0	1
8079	0	0	0	0	0	0	0	0.01210191	0	1
8087	0	0	0.011465	0	0	0	0	0	0	1
8088	0	0	0.007325	0	0	0	0	0	0	1
8095	0	0	0.001911	0	0	0.003821656	0	0	0.00382166	1
8111	0	0	0	0	0.0045701	0.001958599	0	0.00457006	0.0019586	1
8113	0	0	0	0	0.0064968	0	0	0.01515924	0	1
8118	0	0	0	0	0.0008599	0	0	0.00200637	0	1
8121	0	0	0	0	0.0049682	0	0	0.01159236	0	1
8,123	0	0	0	0	0.0112739	0	0	0.02630573	0	1
8124	0	0	0	0	0.0016242	0	0	0.00378981	0	1
8133	0	0	0	0	0	0	0.01656051	0	0	1
8135	0	0	0	0	0	0	0.014649682	0	0	1
8139	0	0	0	0	0	0	0.018471338	0	0	1
8140	0	0.002611	0	0	0	0	0.01044586	0	0	1
8143	0	0.001433	0	0	0	0	0.001433121	0	0	1
8144	0	0.002866	0	0	0	0	0.002866242	0	0	1
8146	0	0.001115	0	0	0	0	0.00111465	0	0	1
8,147	0	0.045541	0	0	0	0	0	0	0	1
8149	0	0	0	0	0	0	0.010191083	0	0	1
8151	0	0.030573	0	0	0	0	0	0	0	1
8153	0	0.001274	0	0	0	0	0	0	0	1
8154	0	0.004299	0	0	0	0	0.004299363	0	0	1
8157	0	0	0	0	0	0	0.015286624	0	0	1
8165	0	0	0.005255	0.005255	0	0	0	0	0	1
8171	0	0.010032	0	0.010032	0	0	0	0	0	1
8174	0.003822	0.003822	0	0	0	0	0	0	0	1

Residential AM Outbound

Overall Percentage	Paisley W / Hwy 31	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S	
8175	0.007962	0.007962	0	0	0	0	0	0	0	1
8178	0.003822	0.003822	0	0	0	0	0	0	0	1
8,181	0.024682	0.024682	0	0	0	0	0	0	0	1
8,188	0	0.037898	0	0	0	0	0	0	0	1
8,191	0.024045	0	0	0.024045	0	0	0	0	0	1
8192	0.010191	0	0	0.010191	0	0	0	0	0	1
8193	0.002866	0	0	0.002866	0	0	0	0	0	1
8199	0.005892	0	0	0.005892	0	0	0	0	0	1
8305	0	0	0.01242	0.01242	0	0	0	0	0	1
8310	0	0	0.001433	0.001433	0	0	0	0	0	1
8321	0	0	0.001433	0.001433	0	0	0	0	0	1
8323	0	0	0.004777	0.004777	0	0	0	0	0	1
8334	0	0	0	0.005096	0	0	0	0	0	1
8358	0	0.00828	0	0	0	0	0	0	0	1
8578	0	0	0	0	0	0	0.013375796	0	0.0133758	1
8948	0	0	0.001274	0.001274	0	0	0	0	0	1
9053	0	0	0	0	0	0	0	0	0	0
9061	0	0	0	0	0	0	0	0	0	0
	24%	19%	9%	9%	7%	1%	12%	15%	3%	

Residential PM Inbound

Wed Mar 14 2018 12:17:05 GMT-0400 (Eastern Daylight Time) - Run Time: 2095ms

Cross Tabulation Query Form - Trip - 2016 v1.1
Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(8152-8166)
TblG:

Filters:
Start time of trip - start_time In 1530-1829
and Primary travel mode of trip - mode_prime In D, M, P, T, U
and Trip purpose of destination - purp_dest In H,

Assignment	1	%	Paisley W / Hwy 31 W	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S
7197	53	2%	0.95			0.05					
7203	16	1%	0.95			0.05					
7223	29	1%	0.95			0.05					
7237	31	1%	0.95			0.05					
7286	28	1%	0.95			0.05					
7313	41	2%	0.95			0.05					
7319	14	1%	0.95			0.05					
7344	27	1%	0.95			0.05					
7357	49	2%	0.95			0.05					
7387	17	1%	0.95			0.05					
8005	17	1%					0.25		0.25	0.25	0.25
8029	9	0%					0.25		0.25	0.25	0.25
8034	31	1%					0.25		0.25	0.25	0.25
8041	90	4%					0.25		0.25	0.25	0.25
8052	21	1%								1	
8056	28	1%						0.5			0.5
8057	58	2%						0.25		0.5	0.25
8058	32	1%						0.25		0.5	0.25
8059	45	2%						0.5			0.5
8062	9	0%								0.5	0.5
8084	16	1%						0.5			0.5
8086	26	1%						0.5			0.5
8087	12	0%						0.5			0.5
8088	23	1%			1					0.3	0.7
8090	21	1%			1						
8095	43	2%			1						
8105	9	0%			1						
8107	48	2%			1						
8113	60	2%						0.5		0.5	
8118	9	0%						0.5		0.5	
8121	24	1%							0.3	0.7	
8123	84	3%							0.5	0.5	
8124	17	1%					0.5			0.5	
8127	12	0%				0.5			0.5		
8133	18	1%							1		
8135	55	2%							1		
8136	12	0%							1		
8140	25	1%		0.2					0.8		
8143	9	0%		0.5					0.5		
8144	18	1%		0.5					0.5		
8146	7	0%		0.5					0.5		
8,147	100	4%		0.5					0.5		
8149	99	4%							1		
8,150	208	8%		1							
8,151	108	4%		1							
8154	11	0%		0.5					0.5		
8157	19	1%							1		
8167	29	1%			0.5	0.5					
8169	46	2%			0.5	0.5					
8171	17	1%		0.95		0.05					
8172	63	2%		1							
8174	24	1%	1								
8175	50	2%	1								
8181	28	1%	1								
8182	38	1%	1								
8,188	119	5%		1							
8,191	108	4%	0.5			0.5					
8193	18	1%	0.5			0.5					
8199	37	1%	0.5			0.5					
8305	78	3%			0.5	0.5					
8310	9	0%			0.5	0.5					
8323	30	1%			0.5	0.5					
8337	26	1%				1					
8351	36	1%		1							
8948	8	0%			0.5	0.5					
9068	34	1%									

Residential PM Inbound

Overall Percentage	Paisley W / Hwy 31 W	Hwy 6 N	Hwy 6 S	7 W	7 E	Paisley E - Edinburgh S	Edinburgh N	Waterloo E	Waterloo E - Edinburgh S
7197	0.0198541	0	0	0.001045	0	0	0	0	0
7203	0.00599369	0	0	0.0003155	0	0	0	0	0
7223	0.01086356	0	0	0.0005718	0	0	0	0	0
7237	0.01161278	0	0	0.0006112	0	0	0	0	0
7286	0.01048896	0	0	0.0005521	0	0	0	0	0
7313	0.01535883	0	0	0.0008084	0	0	0	0	0
7319	0.00524448	0	0	0.000276	0	0	0	0	0
7344	0.01011435	0	0	0.0005323	0	0	0	0	0
7357	0.01835568	0	0	0.0009661	0	0	0	0	0
7387	0.0063683	0	0	0.0003352	0	0	0	0	0
8005	0	0	0	0	0.0016759	0	0.001675868	0.00167587	0.00167587
8029	0	0	0	0	0.0008872	0	0.000887224	0.00088722	0.00088722
8034	0	0	0	0	0.003056	0	0.003055994	0.00305599	0.00305599
8041	0	0	0	0	0.0088722	0	0.00887224	0.00887224	0.00887224
8052	0	0	0	0	0	0	0	0.00828076	0
8056	0	0	0	0	0	0.005520505	0	0	0.0055205
8057	0	0	0	0	0	0.005717666	0	0.01143533	0.00571767
8058	0	0	0	0	0	0.003154574	0	0.00630915	0.00315457
8059	0	0	0	0	0	0.00887224	0	0	0.00887224
8062	0	0	0	0	0	0	0	0.00177445	0.00177445
8084	0	0	0	0	0	0.003154574	0	0	0.00315457
8086	0	0	0	0	0	0.005126183	0	0	0.00512618
8087	0	0	0	0	0	0.002365931	0	0	0.00236593
8088	0	0	0.009069	0	0	0	0	0.00272082	0.00634858
8090	0	0	0.008281	0	0	0	0	0	0
8095	0	0	0.016956	0	0	0	0	0	0
8105	0	0	0.003549	0	0	0	0	0	0
8107	0	0	0.018927	0	0	0	0	0	0
8113	0	0	0	0	0	0.011829653	0	0.01182965	0
8118	0	0	0	0	0	0.001774448	0	0.00177445	0
8121	0	0	0	0	0	0	0.002839117	0.00662461	0
8123	0	0	0	0	0	0	0.016561514	0.01656151	0
8124	0	0	0	0	0.0033517	0	0	0.00335174	0
8127	0	0	0	0.0023659	0	0	0.002365931	0	0
8133	0	0	0	0	0	0	0.007097792	0	0
8135	0	0	0	0	0	0	0.021687697	0	0
8136	0	0	0	0	0	0	0.004731861	0	0
8140	0	0.001972	0	0	0	0	0.007886435	0	0
8143	0	0.001774	0	0	0	0	0.001774448	0	0
8144	0	0.003549	0	0	0	0	0.003548896	0	0
8146	0	0.00138	0	0	0	0	0.001380126	0	0
8,147	0	0.019716	0	0	0	0	0.019716088	0	0
8149	0	0	0	0	0	0	0.039037855	0	0
8,150	0	0.082019	0	0	0	0	0	0	0
8,151	0	0.042587	0	0	0	0	0	0	0
8154	0	0.002169	0	0	0	0	0.00216877	0	0
8157	0	0	0	0	0	0	0.007492114	0	0
8167	0	0	0.005718	0.0057177	0	0	0	0	0
8169	0	0	0.009069	0.0090694	0	0	0	0	0
8171	0	0.006368	0	0.0003352	0	0	0	0	0
8172	0	0.024842	0	0	0	0	0	0	0
8174	0.00946372	0	0	0	0	0	0	0	0
8175	0.01971609	0	0	0	0	0	0	0	0
8181	0.01104101	0	0	0	0	0	0	0	0
8182	0.01498423	0	0	0	0	0	0	0	0
8,188	0	0.046924	0	0	0	0	0	0	0
8,191	0.02129338	0	0	0.0212934	0	0	0	0	0
8193	0.0035489	0	0	0.0035489	0	0	0	0	0
8199	0.00729495	0	0	0.007295	0	0	0	0	0
8305	0	0	0.015379	0.0153785	0	0	0	0	0
8310	0	0	0.001774	0.0017744	0	0	0	0	0
8323	0	0	0.005915	0.0059148	0	0	0	0	0
8337	0	0	0	0.0102524	0	0	0	0	0
8351	0	0.014196	0	0	0	0	0	0	0
8948	0	0	0.001577	0.0015773	0	0	0	0	0
9068	**20%**	**25%**	**10%**	**9%**	**2%**	**5%**	**15%**	**9%**	**6%**

APPENDIX F:
Signal Timing Plans

Guelph - Silvercreek Parkway
6087-13

Proposed Signal Timing Adjustments

Silvercreek & Paisley

		Existing		Future Background		Adjustments	
Phase	Movement	Turn Type	Sec	Turn Type	Sec	Turn Type	Sec
1	WBL	Perm					
2	EBT		47		60		13
3	SBL	Perm		PM+PT	11		11
4	NBT		28		19		-9
5	EBL	PM+PT	13	PM+PT	14.5		1.5
6	WBT		34		45.5		11.5
7	NBL			PM+PT	11		11
8	SBT		28		19		-9
Cycle Length			75		90		15
Offset			22		--		
Control Type		Act-Coord		Semi Act-Uncrd			

Silvercreek & Paisley

		Existing		Future Total		Adjustments	
Phase	Movement	Turn Type	Sec	Turn Type	Sec	Turn Type	Sec
1	WBL	Perm					
2	EBT		47		60		13
3	SBL	Perm		PM+PT	11		11
4	NBT		28		19		-9
5	EBL	PM+PT	13	PM+PT	14.5		1.5
6	WBT		34		45.5		11.5
7	NBL			PM+PT	11		11
8	SBT		28		19		-9
Cycle Length			75		90		15
Offset			22		--		
Control Type		Act-Coord		Act-Coord			

Hanlon & Paisley

		Existing		Future Total & Background		Adjustments	
Phase	Movement	Turn Type	Sec	Turn Type	Sec	Turn Type	Sec
1	SBL	Perm	13	Prot	16		3
2	NBT		90.4		95		4.6
3	WBL	PM+PT	31	PM+PT	24.4		-6.6
4	EBT		31		30		-1
5	NBL	Prot	20	Prot	26		6
6	SBT	Prot	83.4		85		1.6
7	EBL			PM+PT	24.4		24.4
8	WBT		62		30		-32
Cycle Length			165.4		165.4		0
Offset			--		--		
Control Type		Semi Act-Uncrd		Semi Act-Uncrd			

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date	From Field		Prepared Date:	January. 15, 2018
			Completed By:	Sh.H
			Checked By:	S.A

Location: Paisley Road at Alma street

Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.) WALK	Pedestrian Minimum (sec.) FDWALK	Amber (sec.)	All Red (sec.)	GREEN TIME PERIOD (sec.) Day MAX	Night MAX		
1					3.0					
2	EB	10.0	19.0	9.0	4.0	2.0	30.0	30.0		
3										
4	NB	7.0	12.0	11.0	4.0	2.0	21.0	28.0		
5										
6	WB	10.0	19.0	9.0	4.0	2.0	30.0	30.0		
7										
8	SB	7.0	12.0	11.0	4.0	2.0	21.0	28.0		

System Control	No
Local Control	Yes
Semi-Actuated Mode	Yes

TIME (M-F)	PEAK	CYCLE LENGTH (sec.)	OFFSET (sec.)
00:00 - 07:00		Free	
07:00 - 18:00		75	
18:00 - 00:00		Free	

Note: P+P = Protected Permissive Phase
Prot. = Fully Protected Phase

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date	From Field		Prepared Date:	January. 15, 2018
			Completed By:	Sh.H
			Checked By:	

Location: Paisley Road at Silvercreek

Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.) WALK	Pedestrian Minimum (sec.) FDWALK	Amber (sec.)	All Red (sec.)	GREEN TIME PERIOD (sec.) Day MAX	Night MAX		
1										
2	EB	10.0	11.0	14.0	4.0	2.0	25.0			
3										
4	NB	7.0	11.0	11.0	4.0	2.0	22.0			
5	EBLT	7.0			3.0		10.0			
6	WB	10.0	11.0	14.0	4.0	2.0	25.0			
7										
8	SB	7.0	11.0	11.0	4.0	2.0	22.0			

System Control	No
Local Control	Yes
Semi-Actuated Mode	Yes

TIME (M-F)	PEAK	CYCLE LENGTH (sec.)	OFFSET (sec.)
00:00 - 07:00		Free	
07:00 - 18:00		75	22
18:00 - 00:00		Free	

Note: P+P = Protected Permissive Phase
Prot. = Fully Protected Phase

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date	From Field		Prepared Date:	January. 15, 2018
			Completed By:	Sh.H
			Checked By:	S.A

Location: Waterloo Ave at Edinburgh Road

Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.) WALK	Pedestrian Minimum (sec.) FDWALK	Amber (sec.)	All Red (sec.)	GREEN TIME PERIOD (sec.) Day MAX	Night MAX		
1										
2	NB	10.0	16.0	14.0	4.0	2.0	30.0			
3										
4	WB	7.0	7.0	14.0	4.0	2.0	37.0			
5										
6	SB	10.0	16.0	14.0	4.0	2.0	30.0			
7										
8	EB	7.0	7.0	14.0	4.0	2.0	37.0			

System Control	No
Local Control	Yes
Semi-Actuated Mode	Yes

TIME (M-F)	PEAK	CYCLE LENGTH (sec.)	OFFSET (sec.)
00:00 - 07:00		Free	
07:00 - 9:00		90	69
09:00 - 15:00		90	26
15:00 - 21:01		Free	

Note: P+P = Protected Permissive Phase
Prot. = Fully Protected Phase

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date	From Field		Prepared Date:	March 9, 2017
			Completed By:	Sh.A
			Checked By:	

Location: Wellington Street West @ Edinburgh Road South

Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.) WALK	Pedestrian Minimum (sec.) FDWALK	Amber (sec.)	All Red (sec.)	GREEN TIME PERIOD (sec.) AM MAX	PM1 MAX	PM2 MAX	
1	SB LT	6.0			3.0		7.0			
2	NB Through	10.0	7.0	10.0	4.0	2.0	31.0			
3	EBLT	6.0			3.0		6.0			
4	WB Through	10.0	7.0	10.0	4.0	2.0	24.0			
5	NBLT	6.0			3.0		7.0			
6	SB Through	10.0	7.0	10.0	4.0	2.0	31.0			
7	WBLT	6.0			3.0		20.0			
8	EB Through	10.0	7.0	10.0	4.0	2.0	24.0			

System Control	No
Local Control	Yes
Full-Actuated Mode	Yes

TIME (M-F)	PEAK	CYCLE LENGTH (sec.)	OFFSET (sec.)
00:00 - 07:00		Free	
07:00 - 9:00		90	84
09:00 - 15:00		90	41
15:00 - 21:01		90	1

Note: P+P = Protected Permissive Phase
Prot. = Fully Protected Phase

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date	From Field		Prepared Date:	March 9, 2018
			Completed By:	Sh.H
			Checked By:	

Location: Wellington Street West and Imperial road South

Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.) WALK	Pedestrian Minimum (sec.) FDWALK	Amber (sec.)	All Red (sec.)	GREEN TIME PERIOD (sec.) Day MAX	Night MAX		
1										
2	EB Through	17.0	17.0	13.0	4.0	2.0	30.0			
3										
4	SB Through	7.0	7.0	11.0	4.0	2.0	18.0			
5										
6		5.0	17.0	13.0	4.0	2.0	30.0			
7										
8		5.0	7.0	11.0	4.0	2.0	18.0			

System Control	No
Local Control	Yes
Semi-Actuated Mode	Yes

TIME (M-F)	PEAK	CYCLE LENGTH (sec.)	OFFSET (sec.)
06:00 - 07:00		70	1
07:00 - 09:00		80	10
09:00 - 20:00		Free	
20:00 - 07:00		70	1

Note: P+P = Protected Permissive Phase
Prot. = Fully Protected Phase

Cover Sheet

NOTE: Phases 1 and 5 RESTRICTED, and LAG PHASE configuration modified to - Phases 2, 4, 5, 8

MASTER INTERSECTION (Highway 6 (Hanlon) North) - Paisley, Willow, Speedvale, & Woodlawn

Location: Hwy 6 (Hanlon) @ Paisley

Area/District:

Timing Based On T.M. Dated:

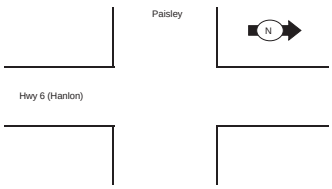
Traffic Signal # 115

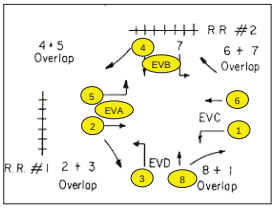
Timing Developed By: H Nichols

Approved By: K Plut

Installed By:

Installation Date: 18-Oct-11





Circle Movements and Operations

Note: Phase Sequence 1/6, 2/6, 2/5, 3/8, 4/8

Dial Out Telephone Number

		D
0	# OF DIGITS	
1	1st DIGIT	
2	2nd DIGIT	
3	3rd DIGIT	
4	4th DIGIT	
5	5th DIGIT	
6	6th DIGIT	
7	7th DIGIT	
8	8th DIGIT	
9	9th DIGIT	
A	10th DIGIT	
B	11th DIGIT	
C		
D		
E		
F		

< C + 0 + C = 5 >

Redial Time = 10
(C\5 + C + 0)

Default is Report All Alarms (no flags set)

Disable Alarm Reporting

		Column F 1	2	3	4	5	6	7	8
0	OMIT ALARMS					X			

< C + 0 + C = 5 >

1 = STOP TIME
2 = FLASH SENSE
3 = KEYBOARD ENTRY
4 = MANUAL PLAN SELECT
5 = ENABLE POLICE CNTRL (Not Used)
6 = EXTERNAL ALARM (Door Alarm)
7 = DETECTOR FAILURE

NOTE: If Local Controller is part of an Interconnect Ensure Phone Number Is Removed

Observe Redial Timer
(E/2 + D + 6)

COMMUNICATIONS ADDRESSING

COMM ADDRESS
(C/0 + 0 + 0) = 1

ZONE ADDRESS
(C/0 + 0 + 1) = 1

AREA NUMBER
(C/0 + 0 + 2) = 1

AREA ADDRESS
(C/0 + 0 + 3) = 115

Revisions to Timing Sheet - Oct 18, 2011
Add Faze 2/6 SEMI ACTUATED
Revise MANUAL PLAN to 0 from 14
Revise DETECTOR ASSIGNMENTS, PHASE(S) for C1 PIN # 58 as per Timing Sheet
Revise FIELD MASTER PAGE 1 & 2 as per Timing Sheet
Revise COORDINATION as per Timing Sheet

ACTUATED INTERVAL TIMING AND FAZE FUNCTIONS

		PHASE 1	2	3	4	5	6	7	8
0	WALK	-	42	-	20	-	42	-	20
1	DON'T WALK	-	10	-	15	-	10	-	15
2	MIN INITIAL	8		7	10	8			10
3	TYPE 3 LIMIT	-		-		-		-	
4	ADD PER VEH	-		-		-		-	
5	VEH EXT	4.0	3.0	3.0	3.0	4.0	3.0		3.0
6	MAX GAP	4.0	3.0	3.0	3.0	4.0	3.0		3.0
7	MIN GAP	4.0	3.0	3.0	3.0	4.0	3.0		3.0
8	MAX LIMIT	8	55	10	24	11	52		37
9	MAXIMUM 2	8	83	28	23	15	76	-	54
A	ADV /DLY WALK	-		-		-		-	
B	SEQUENCE TO	-		-		-		-	
C	COND SRV MIN	-		-		-		-	
D	REDUCE EVERY	-		-		-		-	
E	YELLOW	3.0	5.4	3.0	4.5	3.0	5.4		4.5
F	RED CLEAR	2.0	2.0		3.5	2.0	2.0		3.5

PHASE BANK # 1 < C + O + F = 1 >

		9	A	B	C	D		E
0							RR1 DLY	
1	PHASE 1	-					RR1 CLR	
2	PHASE 2	-					EVA DLY	
3	PHASE 3	-					EVA CLR	
4	PHASE 4	-					EVB DLY	
5	PHASE 5	-					EVB CLR	5
6	PHASE 6	-					EVC DLY	
7	PHASE 7	-					EVC CLR	
8	PHASE 8	-					EVD DLY	
		MAX INT	ALT WALK	ALT FLH D/W	ALT INT	ALT EXT	EVD CLR	
							RR2 DLY	
							RR2 CLR	
							EV CLR	
							EV DLY	
							RR CLR	
							RR DLY	

ALL RED START
(F/1 + C +O) = **5.0**
RED REVERT
(F/1 + O + F) = **5.0**

COLUMN F PHASES

		1	2	3	4	5	6	7	8
0	PERMIT	X	X	X	X	X	X		X
1	RED LOCK								
2	YELLOW LOCK								
3	VEH MIN CALL								
4	PED RECALL		X				X		
5	PEDESTRIANS	View Only							
6	YIELD AT FLSH D/W								
7	RED REST								
8	DOUBLE ENTRY				X				X
9	VEH MAX CALL		X				X		
A	SOFT RECALL								
B	MAXIMUM 2								
C	COND SERVICE								
D	MAN CONT CALL								
E	YELLOW START		X				X		
F	FIRST PHASES			X					X

< C + O + F = 1 >

BI Tran Systems, Inc.
510 Bercut Dr., Sacremento, Calif. 95814
916/441-0260
Traffic Signal Program **233** Ontario
Timing Sheet #2

Date: 18-Oct-11

LOCATION
Hwy: Hwy 6
At:
Paisley

		A	B	C
PREEMPT		RR1-2	SP	EMER
MINIMUMS		SPEV1	EV2	VEH
A	WLK (DFLT)	4.0	4.0	4.0
B	FD WALK			10
C	INITAL			5

< C + O + F = 1 >

Column E Phases / Bits

		1	2	3	4	5	6	7	8
0	EXCLUSIVE								
1	RR1 CLEAR								
2	RR2 CLEAR								
3	RR2 LTD SRV								
4	PROT/PERM			X					
5	FLH TO PREMT								
6	FLASH ENTRY								
7	DISABL MIN YEL								
8	DISABL OVP YEL								
9	OVP FLH YEL								
A	EM VEH A		X			X			
B	EM VEH B				X				X
C	EM VEH C								
D	EM VEH D								
E	EXTRA 1	X		X					
F	IC SELECT		X						

Column F Phases / Bits

		1	2	3	4	5	6	7	8
0									
1	EXT PERMIT 1								
2	EXT PERMIT 2								
3	EXCLU PED								
4									
5	PED 2P OUT		X						
6	PED 6P OUT						X		
7	PED 4P OUT				X				
8	PED 8P OUT								X
9	FLH YELLOW								
A									
B									
C									
D									
E	RESTRICTED	X				X			
F	EXTRA 2								

< C + O + E = 125 >

Column F Phases / Bits

		1	2	3	4	5	6	7	8
0	ADV GRN FLH								
1	PHASE FLASH								
2	FLASH WALK								
3	GUAR PASS								
4	SIMUL GAP				X				X
5	SEQ TIMING								
6	ADV WALK								
7	DELAY WALK								
8	EXT RECALL								
9									
A	MAX EXTEN								
B	INH PED RSRV								
C	SEMI ACTUATED		X				X		
D									
E	STRT VEH CALL	X		X		X			
F	STRT PED CALL		X		X		X		X

SPECIALS < C + O + F = 2 >

MANUAL PLAN	0
< C/0 + A + 1 >	
MANUAL OFFSET	0
< C/0 + A + 1 >	

MANUAL SELECTION

MANUAL PLAN
0 = Automatic (Master)
9 = Control Plan 1 - 9
14 (E) = Free (Isolated)
15 (F) = Software Flash

MANUAL OFFSET
0 = Automatic (Master)
1 = Offset A
2 = Offset B
3 = Offset C

FLASH TO PREEMPT
1 = EVA
2 = EVB
3 = EVC
4 = EVD
5 = RR1
6 = RR2
7 = SE1
8 = SE2

EXTRA 1
1 = TBC TYPE 1
2 = NEMA EXT. COORD.
3 = DAYLIGHT SAVINGS
4 =
5 = EXPANDED STATUS REPORTING
6 = INTERNATIONAL PED
7 = CLEAR OUTPUTS DURING FLASH
8 = SPLIT RING

EXTRA 2
1 = AWR ON DURING PHASE INITAL
2 = LMU INSTALLED

IC SELECT
2 = 2 WAY MODEM
3 = 7 WIRE SLAVE
4 = FLASH / FREE
5 = SIMPLES MASTER
7 = 7 WIRE MASTER
8 = OFFSET INTURP

Pretimed

PRETIMED ONTARIO 233 PROGRAM

PHASE

	1	2	3	4	5	6	7	8
WALK	-	42	-	20	-	42	-	20
DON'T WALK	-	10	-	15	-	10	-	15
MIN INTIAL	8		7	10	8			10
TYPE 3 LIMIT	-	-	-	-	-	-	-	-
ADD PER VEH	-	-	-	-	-	-	-	-
VEH EXT	4.0	3.0	3.0	3.0	4.0	3.0		3.0
MAX GAP	4.0	3.0	3.0	3.0	4.0	3.0		3.0
MIN GAP	4.0	3.0	3.0	3.0	4.0	3.0		3.0
MAX LIMIT	8	55	10	24	11	52		37
MAXIMUM 2	8	83	28	23	15	76	-	54
ADV / DLY WALK	-	-	-	-	-	-	-	-
SEQUENCE TO	-	-	-	-	-	-	-	-
COND SRV MIN	-	-	-	-	-	-	-	-
REDUCE EVERY	-	-	-	-	-	-	-	-
YELLOW	3.0	5.4	3.0	4.5	3.0	5.4		4.5
RED CLEAR	2.0	2.0		3.5	2.0	2.0		3.5

PHASE BANK # < C + O + F = 1 >

Column F
PHASES

		1	2	3	4	5	6	7	8
0	PERMIT	X	X	X	X	X	X		X
1	RED LOCK								
2	YELLOW LOCK								
3	VEH MIN CALL								
4	PED RECALL		X		X		X		X
5	PEDESTRIANS								
6	REST IN WALK								
7	RED REST								
8	DOUBLE ENTRY				X				X
9	VEH MAX CALL	X	X	X		X	X		
A	SOFT RECALL								
B	MAXIMUM 2								
C	CORD SERVICE								
D	MAN CONT CALL								
E	YELLOW START		X				X		
F	FIRST PHASES			X					X

< C + O + F = 1 >

T.O.D. FUNCTIONS

TIME HH MM	FUN	DAY OF WEEK S	M	T	W	T	F	S	Column 4 PHASES / BITS 1	2	3	4	5	6	7	8
0 07:00	B		X	X	X	X	X		X	X	X	X	X	X		X
1 09:00	B		X	X	X	X	X									
2 15:00	B		X	X	X	X	X		X	X	X	X	X	X		X
3 18:00	B		X	X	X	X	X									
4																
5																
6																
7																
8																
9																
A																
B																
C																
D																
E																
F																

< C + O + 7 = 1 > < C+ O + E = 27 >

T.O.D. FUNCTIONS

0 = PERMIT PHASES
1 = RED LOCK
2 = YELLOW LOCK
3 = VEH MIN RECALL
4 = PED RECALL
5 -
6 - REST IN WALK
7 = RED REST
8 = DOUBLE ENTRY
9 = VEH MAX RECALL
A = VEH SOFT RECALL
B = MAXIMUM 2
C = CONDITIONAL SERVICE
D = LAG PHASES
E = BIT 1 - LOCAL OVERIDE
BIT 4 - DISABLE DET OFF MONITOR
BIT 7 - DET COUNT MONITOR
BIT 8 - REAL TIME SPLIT MONITOR
F = OUTPUT BITS 1 THRU 4

LOCATION: **Hwy 6 (Hanlon) @ Paisley**

BI Tran Systems, Inc.
510 Bercut Dr., Sacremento, Calif. 95814
916/441-0260
Traffic Signal Program **233** Ontario
Timing Sheet #2
Revised (02/95)

Issued Date: **18-Jan-11**

Installed Date: **18-Jan-11**

DETECTOR ASSIGNMENTS

STANDARD 332 CABINET LOCATION	column	1	3
		delay	carry over
I-2 U	0		
J-2 U	1		
I-6 U	2		
J-6 U	3		
1-2 L	4		
J-2 L	5		
1-6 L	6		
J-6 L	7		
I-4	8		
J-4	9		
I-8	A		
J-8	B		
J-1	C		
I-1	D		
J-5	E		
I-5	F		
	< C + O + D = 0 >		

Column 0	Column 1								Column 2								Column 3							
	C1 Pin #	ATTRIBUTES							PHASE(S)								ASSIGNMENTS							
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
0	39																								
1	40																								
2	41				X	X		X					X					X	X	X					X
3	42				X	X		X									X	X	X	X					X
4	43																								
5	44																								
6	45				X	X		X					X					X	X	X					X
7	46				X	X		X									X	X	X	X					X
8	47																								
9	48																								
A	49																								
B	50																								
C	55				X	X		X						X				X	X	X					X
D	56				X	X		X		X								X	X	X					X
E	57																								
F	58				X	X		X				X					X	X	X	X					X
	DETECTOR ASSIGNMENTS < C + O + E = 126>																								

STANDARD 332 CABINET LOCATION	column	2	4
		delay	carry over
J-9 U	0		
I-9 U	1		
I-9 L	2		
J-9 L	3		
I-3 U	4		
J-3 U	5		
I-7 U	6		
J-7 U	7		
I-12 U	8		
I-13 U	9		
I-12 L	A		
I-13 L	B		
I-3 L	C		
J-3 L	D		
I-7 L	E		
J-7 L	F		
	< C + O + D = 0 >		

Column 4	Column 5								Column 6								Column 7							
	C1 Pin #	ATTRIBUTES							PHASE(S)								ASSIGNMENTS							
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
0	59				X	X		X						X				X	X	X					X
1	60																								
2	61																								
3	62																								
4	63																								
5	64																								
6	65				X	X		X					X					X	X	X					X
7	66																								
8	67																								
9	68																								
A	69		X										X					X	X	X					X
B	70		X														X	X	X	X					X
C	76																								
D	77																								
E																									
F																									
	DETECTOR ASSIGNMENTS < C + O + E = 126 >																								

DETECTOR ASSIGNMENT SHEET
ONTARIO 233 PROGRAM

LOCATION:
Hwy Hwy 6
at Paisley
Issued Date: 18-Oct-11
Installed Date: 18-Oct-11

DETECTOR ATTRIBUTES
1 = FULL TIME DELAY
2 = PEDESTRIAN CALL
3 =
4 = COUNT
5 = EXTENSION
6 = TYPE 3
7 = CALLING
8 = ALTERNATE

DETECTOR ASSIGNMENTS
1 = DET. SET # 1
2 = DET. SET # 2
3 = DET. SET # 3
4 =
5 =
6 = MIN RECALL ON FAILURE
7 = MAX RECALL ON FAILURE
8 - REPORT ON FAILURE

DETECTOR MONITOR
MAX OFF: D/0+0+1=120
MAX ON: D/0+0+2=60

ADVANCE WARNING BEACONS
SIGN #1 SIGN #2
PHASE NUMBER
(F/1+C+F)= (F/1+D+F)=
TIME BEFORE YELLOW
(F/1+C+E)= (F/1+D+E)=
OUTPUT PIN NUMBER
(E/127+E+8)= (E/127+E+9)=

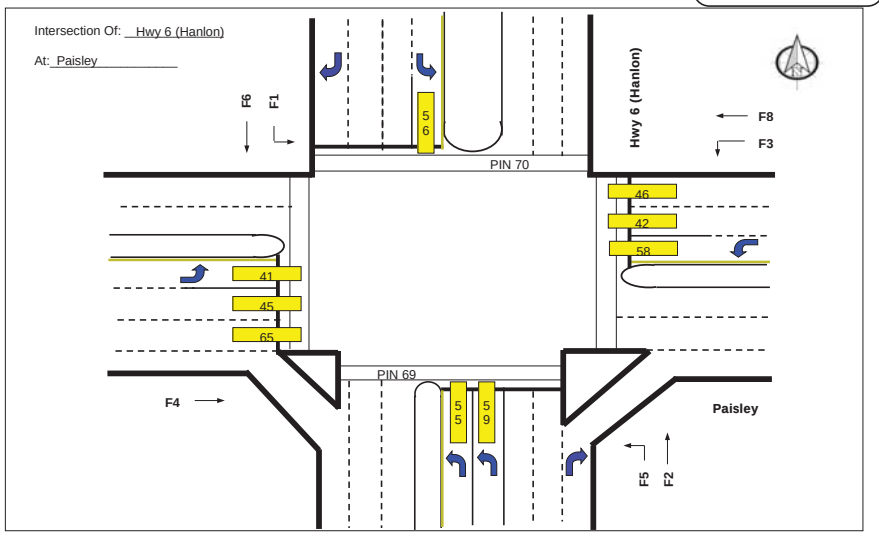
Input File Layout

Input File Slot No. →

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I" FILE	1 Ext, Cnt, Call <C1-56>	2 Ext, Cnt, Call <C1-39>	2 Ext, Cnt, Call <C1-63>	2 Type 3, Call <C1-47>	3 Ext, Cnt, Call <C1-58>	4 Ext, Cnt, Call <C1-41>	4 Ext, Cnt, Call <C1-65>	4 Type 3, Call <C1-49>	1 Ext, Cnt, Call <C1-60>	NOT WIRED	Not Assigned <C1-80>	2 Ped Call <C1-67>	6 Ped Call <C1-68>	Flash Sense <C1-81>
		2 Ext, Cnt, Call <C1-43>	2 Ext, Cnt, Call <C1-76>			4 Ext, Cnt, Call <C1-45>	4 Ext, Cnt, Call <C1-78>		3 Ext, Cnt, Call <C1-62>		Not Assigned <C1-53>	4 Ped Call <C1-69>	8 Ped Call <C1-70>	Stop Time <C1-82>
"J" FILE	5 Ext, Cnt, Call <C1-55>	6 Ext, Cnt, Call <C1-40>	6 Ext, Cnt, Call <C1-64>	6 Type 3, Call <C1-48>	7 Ext, Cnt, Call <C1-57>	8 Ext, Cnt, Call <C1-42>	8 Ext, Cnt, Call <C1-66>	8 Type 3, Call <C1-50>	5 Ext, Cnt, Call <C1-59>	NOT WIRED	Not Assigned <C1-54>	EV A Preempt <C1-71>	EV B Preempt <C1-72>	Railroad 1 <C1-51>
		6 Ext, Cnt, Call <C1-44>	6 Ext, Cnt, Call <C1-77>			8 Ext, Cnt, Call <C1-46>	8 Ext, Cnt, Call <C1-79>		7 Ext, Cnt, Call <C1-61>		Not Assigned <C1-75>	EV C Preempt <C1-73>	EV D Preempt <C1-74>	Railroad 2 <C1-52>

DETECTOR TYPES
Ext = Extension Detector
Detector is only active during the Phase's GREEN Intervals (ie, will NOT *Call* the Phase)
Cnt = Count Detector
Used in computing "Added Initial"
Call = Calling Detector
Detector is only active during the Phase's NON-GREEN Intervals (ie, will NOT *Extend* the Phase)
Type 3 = Type 3 Disconnect
Will allow a Calling Detector to Extend its Phase until the Call first drops or the "Type 3 Limit" is reached

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Traffic Signal Program 233
Initialized Detector Assignments
(Revised 8/92) 332 Cabinet



Hwy 6 (Hanlon) (North)
Field Master Subsystem Name

☐ Additional Special Timing Required
if box is checked, see additional timing sheets

FIELD MASTER ADDRESSES

COMMUNICATION ADDRESSES:
(C + 0 + 0) = **1**

AREA NUMBER:
(C + 0 + 2) = **7**

AREA ADDRESS:
(C + 0 + 3) = **9**

NUMBER OF LOCALS:
(D + 0 + 0) = 4
(NOTE: Largest Local Communication Address Number)

EXT COMM TIMEOUT

150 ms	1

< C+0+5 >

EXTRAS

Extra	3

< E+E+E >
3 = auto daylight sav.
5 = extended comm

COORD (9 key) TIME HHMM	PLAN	OFFSET	DAY OF WEEK S	M	T	W	T	F	S
			1	2	3	4	5	6	7
0									
1	0:01	E	X	X	X	X	X	X	X
2									
3									
4									
5									
6									
7									
8									
9									
A									
B									
C									
D									
E									
F									

< C + 0 + 9 = 0.1 >

PLAN SELECT
1 thru 9 = Coordination plan
D = Traffic Responsive
E = Free
F = Flash

COORD (9 key) TIME HHMM	PLAN	OFFSET	DAY OF WEEK S	M	T	W	T	F	S
			1	2	3	4	5	6	7
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
A									
B									
C									
D									
E									
F									

< C + 0 + 9 = 0.2 >

OFFSET SELECT
A = Offset A
B = Offset B
C = Offset C

Column F

		1	2	3	4	5	6	7	8
0	Alarm Flags	X	X	X	X			X	X

< C PAGE >

Turn On Date 18-Oct-11

Notes: _____

Manual
Plan Select:
(C + A + 1) = 0
AUTO = 0
PLAN = 1-9
FREE = 14
FLASH =15

Backup
Plan Select:
(C + A + 8) = 14
NONE = 0
PLAN = 1-9
FREE = 14
FLASH =15

Manual
Offset Select
(C + B + 1) = 0
AUTO = 0
OFFSET A = 1
OFFSET B = 2
OFFSET C = 3

Backup
Plan Select:
(C + B + 8) = 0
NONE = 0
OFFSET A = 1
OFFSET B = 2
OFFSET C = 3

ROW	LOCAL COMM. ADDRESS	AREA NUMMBER	AREA ADDRESS COLUMN 1	2
0	1	1	115	
1	2	1	116	
2	3	1	117	
3	4	1	118	
4	5			
5	6			
6	7			
7	8			
8	9			
9	10			
A	11			
B	12			
C	13			
D	14			
E	15			
F	16			

DIAL OUT PHONE NUMBER

Redial Timer (D+3+E)

ROW		D
0	# of Digits	11
1	1st Digit	1
2	2nd Digit	9
3	3rd Digit	0
4	4th Digit	5
5	5th Digit	7
6	6th Digit	0
7	7th Digit	4
8	8th Digit	3
9	9th Digit	0
A	10th Digit	0
B	11th Digit	6
C		
D		
E	Redial Time	10
F		

< C Page >

ADDRESSING FOR LOCAL PROGRAM 233
(NOT NEEDED WITH LOCAL PROGRAM 200)
SET C + 0 + E = 16
KEYSTROKES = E + COLUMN + ROW
(E PAGE ENABLE - SET F + 0 + E > 0)

A	b
4 0	5 A

LEVEL PLAN OFFSET

Example Shown:
Level: TRAFFIC RESPONSIVE CONTROL
Calling For: PLAN 5, OFFSET A

Field Master Control Level
1 = Manual Control Plan
2 = Central Master Control
3 = Time Of Day Control
4 = Traffic Responsive Control
5 = Backup Coordination Plan

Display Locations
Central Plan = C + A + 2
Current Plan = C + A + 3
Called Plan = C + A + 4
TOD Plan = C + A + 5
Traffic Responsive Plan = C + A + 6
Central Offset = C + B + 2
Current Offset = C + B + 3
Called Offset = C + B + 4
TOD Offset = C + B + 5
Traffic Responsive Offset = C + B + 6

Last Power Failure:
(HR-MIN-DOW) = 8+ 4
(DOM-YR-MONTH) = 8 + 5
Power Fail Counts:
(Long Failures) = F + 0 + C
(Short Failures) = F + 0 + D
Current Time:
(HR-MIN-DOW) = 8 + 0
(DOM-YR-MONTH) = 8 + 1
(MIN-SEC-1/10SEC) = 8 + F

Local Controller
Communication Responses
Locals: 1 thru 8 = C + F + 1
9 thru 16 = C + F +2
17 thru 24 = C + F + 3
25 thru 32 = C + F + 4
NOTE: Shown On Call/ACTIVE Lights 1 thru 8

ALARM REPORTING
1 = Stop Time
2 = Flash Sense
3 = Keyboard Entry
5 = Ext#1 (Pin 53)
6 = Ext#2 (Pin 54)
7 = Detector Failure
8 = Comm Failure

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Field Master Program ***210***
Fiield Master Timing
(Revised 12/93)

DETECTOR NUMBER	DET. FAILURE MAX ON 4	MAX OFF 5	DETECTOR ASSIGNMENTS COMM ADDR 9	SYS DET NO. A	"K" VALUE B	"C" VALUE C
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
A						
B						
C						
D						
E						
F						

INBOUND SYSTEM DETECTOR <F PAGE>

DETECTOR NUMBER	DET. FAILURE MAX ON 4	MAX OFF 5	DETECTOR ASSIGNMENTS COMM ADDR 9	SYS DET NO. A	"K" VALUE B	"C" VALUE C
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
A						
B						
C						
D						
E						
F						

OUTBOUND SYSTEM DETECTORS <D PAGE>

		1	2	3	4	5	6	7	8	9
0	CYCLE									
1	INCREASE PLAN									
2	DECREASE PLAN									
F	ZONE OFFSET									

PLAN SELECTION THRESHOLDS <C PAGE>

Display Movement
D
C ← → F
A

OFFSET SELECTION THRESHOLDS
OFFSET A = OUTBOUND
OFFSET B = AVERAGE
OFFSET C = INBOUND

SYSTEM DET.
SAMPLE TIME:
(D + 0 + 3) = _____

Detector Weighting Formula
(For Each System Detector)
Weighted Value = C [(Volume) + K(Occupancy)]

Power Cycle
Correction Factors
LONG FAILURE:
(F + 0 + 8) = _____
SHORT FAILURE: _____
(F + 0 + 7) =
NOTE: DO NOT Set To Zero.
Default Value = 0.5 ooo

Calculation Results
Average Inbound Volume = F + 1 + B
Average Inbound Volume = D + 1 + B
Average Inbound Volume = D + 1 + 7
Inbound/Outbound Ratio = D + 0 + F

	% OF INBOUND	A
A	OFFSET A to B	
B	OFFSET B to C	
C	OFFSET C to B	
D	OFFSET B to A	

<C PAGE>

System Detector Status
Failed INBOUND Detectors:
Detectors - 0 thru 7 = F + F + E
8 thru F = F + F + F
Failed OUTBOUND Detectors:
Detectors - 0 thru 7 = D + F + E
8 thru F = D + F + F
NOTE: Shown On CALL / ACTIVE Lights 1 thru 8

Row	Column Numbers ----> / Plan Name ---->	PLAN 1	2	3	4	5	6	7	8	9
0	Cycle Length	0	0	0	0	0	0	0	0	0
1	Phase 1 - ForceOff	0	0	0	0	0	0	0	0	0
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0
3	Phase 3 - ForceOff	0	0	0	0	0	0	0	0	0
4	Phase 4 - ForceOff	0	0	0	0	0	0	0	0	0
5	Phase 5 - ForceOff	0	0	0	0	0	0	0	0	0
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0
7	Phase 7 - ForceOff	0	0	0	0	0	0	0	0	0
8	Phase 8 - ForceOff	0	0	0	0	0	0	0	0	0
9	Ring Offset	0	0	0	0	0	0	0	0	0
A	Offset 1	0	0	0	0	0	0	0	0	0
B	Offset 2	0	0	0	0	0	0	0	0	0
C	Offset 3	0	0	0	0	0	0	0	0	0
D	Perm 1 - End	0	0	0	0	0	0	0	0	0
E	Hold Release	0	0	0	0	0	0	0	0	0
F	Zone Offset	0	0	0	0	0	0	0	0	0

Coordination - Bank 1 <C+0+C=1>

(Coord Extra Bit 1 = Programmed WALK Time for Sync Phases)

	E
Plan 1 - Sync	2__6__
Plan 2 - Sync	2__6__
Plan 3 - Sync	2__6__
Plan 4 - Sync	2__6__
Plan 5 - Sync	2__6__
Plan 6 - Sync	2__6__
Plan 7 - Sync	2__6__
Plan 8 - Sync	2__6__
Plan 9 - Sync	2__6__
NEMA Sync	
NEMA Hold	
Coord Extra	#NAME?

Sync Phases < C+0+C = 1>

Row	Time	Plan	Offset	Day of Week
0	0:01	E	0	1,2,3,4,5,6,7
1	0:00	0	0	
2	0:00	0	0	
3	0:00	0	0	
4	0:00	0	0	
5	0:00	0	0	
6	0:00	0	0	
7	0:00	0	0	
8	0:00	0	0	
9	0:00	0	0	
A	0:00	0	0	
B	0:00	0	0	
C	0:00	0	0	
D	0:00	0	0	
E	0:00	0	0	
F	0:00	0	0	

TOD Coodination < C+0+9 = 0.1 >
(Bank 1)

Row		1	2	3	4	5	6	7	8	9
0	Ped Adjustment	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	0	0	0	0	0	0	0	0	0
2	Perm 2 - End	0	0	0	0	0	0	0	0	0
3	Perm 3 - Start	0	0	0	0	0	0	0	0	0
4	Perm 3 - End	0	0	0	0	0	0	0	0	0
5	Reservice Time	0	0	0	0	0	0	0	0	0
6	Reservice Phases									
7										
8	Pretimed Phases									
9	Max Recall									
A	Perm 1 Veh Phase	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567
B	Perm 1 Ped Phase	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567
C	Perm 2 Veh Phase									
D	Perm 2 Ped Phase									
E	Perm 3 Veh Phase									
F	Perm 3 Ped Phase									

Coordination - Bank 2 <C+0+C=2>

	F
Free Lag	2_45__8
Plan 1 - Lag	2_4_6_8
Plan 2 - Lag	2_4_6_8
Plan 3 - Lag	2_4_6_8
Plan 4 - Lag	2_4_6_8
Plan 5 - Lag	2_4_6_8
Plan 6 - Lag	2_4_6_8
Plan 7 - Lag	2_4_6_8
Plan 8 - Lag	2_4_6_8
Plan 9 - Lag	2_4_6_8
External Lag	

Lag Phases <C+0+C=1>

Row	Time	Plan	Offset	Day of Week
0	0:00	0	0	
1	0:00	0	0	
2	0:00	0	0	
3	0:00	0	0	
4	0:00	0	0	
5	0:00	0	0	
6	0:00	0	0	
7	0:00	0	0	
8	0:00	0	0	
9	0:00	0	0	
A	0:00	0	0	
B	0:00	0	0	
C	0:00	0	0	
D	0:00	0	0	
E	0:00	0	0	
F	0:00	0	0	

TOD Coodination < C+0+9 = 0.2 >
(Bank 2)

Row		2
0		
1	Phase 1	5
2	Phase 2	5
3	Phase 3	5
4	Phase 4	5
5	Phase 5	5
6	Phase 6	5
7	Phase 7	5
8	Phase 8	5

Coordination Transition Minimums < C+0+C = 5 >

Transition Type	0.3	< C/5+1+9 >
TBC TRANSITION		
Lag Hold Phases		< C/5+1+A >
Coordinated Lag Hold Phases		
Sync Output Time		< C/5+1+C >
7 - Wire Master		

Transition Type
0.X = Shortway
1.X = Lengthen
X.1 thru X.4 = # of cycles when lengthening

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Traffic Signal Program **233** Ontario
Timing Sheet #2
Revised (02/96)

DATE: 18-Oct-11

LOCATION: Hwy 6 (Hanlon) @ Paisley

DEFAULT DETECTOR ASSIGNMENTS

Standard 332 Cabinet Location	Column 0 C1 PIN NUMBER	Column 1 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 2 PHASE(S) 1	2	3	4	5	6	7	8	Column 3 ASSIGNMENTS 1	2	3	4	5	6	7	8
I-2 U -->	0 *39*				X	X		X			X								X	X	X				X
J-2 U -->	1 *40*				X	X		X							X				X	X	X				X
I-6 U -->	2 *41*				X	X		X						X					X	X	X				X
J-6 U -->	3 *42*				X	X		X										X	X	X	X				X
I-2 L -->	4 *43*				X	X		X			X								X	X	X				X
J-2 L -->	5 *44*				X	X		X							X				X	X	X				X
I-6 L -->	6 *45*				X	X		X						X					X	X	X				X
J-6 L -->	7 *46*				X	X		X										X	X	X	X				X
I-4 -->	8 *47*						X	X			X								X	X	X				X
J-4 -->	9 *48*						X	X							X				X	X	X				X
I-8 -->	A *49*						X	X						X					X	X	X				X
J-8 -->	B *50*						X	X										X	X	X	X				X
J-1 -->	C *55*				X	X		X							X				X	X	X				X
I-1 -->	D *56*				X	X		X		X									X	X	X				X
J-5 -->	E *57*				X	X		X									X		X	X	X				X
I-5 -->	F *58*				X	X		X				X							X	X	X				X

"INITIALIZED" DETECTOR ASSIGNMENTS
< C + 0 + E = 126 >

Standard 332 Cabinet Location	Column 4 C1 PIN NUMBER	Column 5 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 6 PHASE(S) 1	2	3	4	5	6	7	8	Column 7 ASSIGNMENTS 1	2	3	4	5	6	7	8
J-9 U -->	0 *59*				X	X		X							X				X	X	X				X
I-9 U -->	1 *60*				X	X		X		X									X	X	X				X
J-9 L -->	2 *61*				X	X		X								X			X	X	X				X
I-9 L -->	3 *62*				X	X		X				X							X	X	X				X
I-3 U -->	4 *63*				X	X		X			X								X	X	X				X
J-3 U -->	5 *64*				X	X		X								X			X	X	X				X
I-7 U -->	6 *65*				X	X		X						x					X	X	X				X
J-7 U -->	7 *66*				X	X		X										X	X	X	X				X
I-12 U -->	8 *67*		X								X								X	X	X				X
I-13 U -->	9 *68*		X													X			X	X	X				X
I-12 L -->	A *69*		X											X					X	X	X				X
I-13 L -->	B *70*		X															X	X	X	X				X
I-3 L -->	C *76*				X	X		X			X								X	X	X				X
J-3 L -->	D *77*				X	X		X								X			X	X	X				X
I-7 L -->	E *78*				X	X		X						X					X	X	X				X
J-7 L -->	F *79*				X	X		X										X		X	X				X

"INITIALIZED" DETECTOR ASSIGNMENTS
< C + 0 + E = 126 >

DETECTOR ATTRIBUTES

1= Full time Delay
2 = Pedestrian call
3 =
4 = Count
5 = Extention
6 = Type 3
7 = Calling
8 = Alternate

DETECTOR ASSIGNMENTS

1 = Det. Set #1
2 = Det. Set #2
3 = Det. Set #3
4 =
5 =
6 = MIN Recall On Failure
7 = MAX Recall On Failure
8 = Report On Failure

Input File --> 1 2 3 4 5 6 7 8 9 10 11 12 13 14

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I" FILE	1 Ext, Cnt, Call <C1-56>	2 Ext, Cnt, Call <C1-39>	2 Ext, Cnt, Call <C1-63>	2 Type 3, Call <C1-47>	3 Ext, Cnt, Call <C1-58>	4 Ext, Cnt, Call <C1-41>	4 Ext, Cnt, Call <C1-65>	4 Type 3, Call <C1-49>	1 Ext, Cnt, Call <C1-60>	NOT WIRED	Not Assigned <C1-80>	2 Ped Call <C1-67>	6 Ped Call <C1-68>	Flash Sense <C1-81>
		2 Ext, Cnt, Call <C1-43>	2 Ext, Cnt, Call <C1-76>			4 Ext, Cnt, Call <C1-45>	4 Ext, Cnt, Call <C1-78>		3 Ext, Cnt,		Not Assigned <C1-53>	4 Ped Call <C1-69>	8 Ped Call	Stop Time <C1-82>
"J" FILE	5 Ext, Cnt, Call <C1-55>	6 Ext, Cnt, Call <C1-40>	6 Ext, Cnt, Call <C1-64>	6 Type 3, Call <C1-48>	7 Ext, Cnt, Call <C1-57>	8 Ext, Cnt, Call <C1-42>	8 Ext, Cnt, Call <C1-66>	8 Type 3, Call <C1-50>	5 Ext, Cnt, Call <C1-59>	NOT WIRED	Not Assigned <C1-54>	EV A Preempt <C1-71>	EV B Preempt <C1-72>	Railroad 1 <C1-51>
		6 Ext, Cnt, Call <C1-44>	6 Ext, Cnt, Call <C1-77>			8 Ext, Cnt, Call <C1-46>	8 Ext, Cnt, Call <C1-79>		7 Ext, Cnt, Call <C1-61>		Not Assigned <C1-75>	EV C Ped Call <C1-73>	EV D Preempt <C1-74>	Railroad 2 <C1-52>

DETECTOR TYPES

Ext = Extension Detector
Detector is only active during the Phase's GREEN Intervals (ie, will NOT *Call* the Phase)
Cnt = Count Detector
Used in computing "Added Initial"
Call = Calling Detector
Detector is only active during the Phase's NON-GREEN Intervals (ie, will NOT *Extend* the Phase)
Type 3 = Type 3 Disconnect
Will allow a Calling Detector to Extend its Phase until the Call first drops or the "Type 3 Limit" is reached

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Traffic Signal Program 233
Initialized Detector Assignments
(Revised 8/92) 332 Cabinet

REFERENCE SHEET

Controller Intervals

0 = Walk	8 = Red Rest
1 = FDW	9 = Preemption
2 = Min. Green	A = Stop Time
3 =	B = Red Revert
4= Var. Initial	C = Yellow-Gap Termination
5 = Extension	D = Yellow-Max. Termination
6 =	E = Yellow-Forceoff Termination
7 = Reduce Gap	F = Red Clearance

Continuous Memory Error Monitoring

The controller's RAM and EPROM memories are continuously checked for errors. If an erro is found, the intersection will go into FLASH (via Watch Dog Timer), and one of the following will be shown on the controller's display:

bAd A = An error was detected in the CPU's RAM, or a new program has been installed on the memory module. Often caused by a bad controller "gel-cell" battery.
bAd b = An error was detected in the memory module's RAM. Often caused by a bad "lithium" battery on the memory module.
bAd E = An error was detected in the 233 Program EPROM.
bAd F = An error was detected in the Z-RAM (Dallas chip) on the memory module.

412/C Memory Module Lithium Battery Condition

To check the condition of the 3.6 volt Lithium Battery on the 412/C Memory Module:

If E/112 + 0 + A = 84 - the battery is BAD
If E/112 + 0 + A = 85 - the battery is O.K.

Monitor "Activate" Flags

(Also Requires T.O.D. Function "E" Flag)
Detector Count Recording:
E/2 + 0 + 9 = Not Zero
Real Time Split Monitor:
E/2 + 0 + E = Not Zero

E Page Enable: F/1 + 9 + E = Not Zero

Display Movement Codes

D
C ← → F
A

A = Advance ROW
D = Decrement ROW
C = COLUMN Back
F = Forward COLUMN

Special Event Schedules

Special Event #1: C + 0 + E = 27
Special Event #2: C + 0 + E = 28

Current Interval = E + 5 + 0
Current Interval Timer = E + 5 + B
Current Interval Clearance Phases = E + 5 + C

Time of Day Function (7 Key)

Current T.O.D. "E Function" Control Bits = C/0 + E + E
Current T.O.D. "F Function" Output Bits = C/0 + E + F

Logic DELAY Gate Delay Timer Display

DELAY A Timer = C/0 + 9 +A
DELAY B Timer = C/0 + 9 + B
thru thru
DELAY F Timer = C/0 + 9 + F

Interval Timer Display

Ring A = F/0 + A + Interval Row
Ring B = F/0 + B + (Interval Row From PHASE BANK data)

Display Locations

	Plan Select	Offset Select
Manual	= C/0 + A + 1	C/0 + B + 1
Master	= C/0 + A + 2	C/0 + B + 2
Current	= C/0 + A + 3	C/0 + B + 3
Next	= C/0 + A + 4	C/0 + B + 4
TOD	= C/0 + A +5	C/0 + B + 5

Master Cycle = C/0 + A + 0
Ring A Cycle = C/0 + B + 0
Ring B Cycle = C/0 + D + 0

MIN Cycle = C/0 + A + E
MAX Cycle = C/0 + B + E

Phase Hold = C/0 + F + D
Phase Next = C/0 + F + E
Force Off = C/0 + F + F
(with Ring A Cycle Timer)

Current Calculated Cycle Length = C/0 + B + F
Current Permitted Phases = E/0 + 7 +8
Current Phase Bank = F/0 + C + E

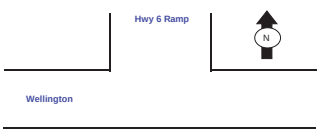
Last Power Failure:
(HR-MIN-DOW) = 8 + 4
(DOW-YR-MONTH) = 8 + 5
Last Cabinet Flash
(HR-MIN-DOW) = 8 + 6
(DOW-YR-MONTH) = 8 + 7
Power Fail Counts:
(Long Failures) = F/1 + 0 + C
(Short Failures) = F/1 + 0 + D
Current Time:
(HR-MIN-DOW) = 8 + 0
(DOW-YR-MONTH) = 8 + 1
(MIN-SEC-1/10SEC) = 8 + F

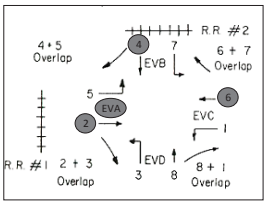
BI Tran Systems, Inc
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260

Traffic Signal Program 233
"View" Locations
(Revised 03/94

Cover Sheet

Location: Hwy 6 (Hanlon) WRT @ Wellington
Area/District:
Timing Based On T.M. Dated:
Traffic Signal # 108
Timing Developed By: H Nichols
Approved By: K Plut
Installed By:
Installation Date: 04-Dec-17





Circle Movements and Operations

COMMUNICATIONS ADDRESSING

COMM ADDRESS (C/0 + 0 + 0) = 1
ZONE ADDRESS (C/0 + 0 + 1) = 1
AREA NUMBER (C/0 + 0 + 2) = 1
AREA ADDRESS 108 (C/0 + 0 + 3) =

CELL # :
UDP PORT:
IP ADDRESS:
AMPIFIER:
PROGRAM: 233ON1.C

DISABLE ALARM REPORTING

Column F

		1	2	3	4	5	6	7	8
0	OMIT ALARMS					X			

< C + 0 + C = 5 >

1 = STOP TIME
2 = FLASH SENSE
3 = KEYBOARD ENTRY
4 = MANUAL PLAN SELECT
5 = ENABLE POLICE CNTRL (Not Used)
6 = EXTERNAL ALARM (Door Alarm)
7 = DETECTOR FAILURE

ACTUATED INTERVAL TIMING AND FAZE FUNCTIONS

		PHASE 1	2	3	4	5	6	7	8
0	WALK	-		-		-	7	-	
1	DON'T WALK	-		-		-	16	-	
2	MIN INITIAL		20		10		20		
3	TYPE 3 LIMIT	-		-		-		-	
4	ADD PER VEH	-		-		-		-	
5	VEH EXT		3.0		3.0		3.0		
6	MAX GAP		3.0		3.0		3.0		
7	MIN GAP		3.0		3.0		3.0		
8	MAX LIMIT		50		35		50		
9	MAXIMUM 2	-		-		-		-	
A	ADV /DLY WALK	-		-		-		-	
B	SEQUENCE TO	-		-		-		-	
C	COND SRV MIN	-		-		-		-	
D	REDUCE EVERY	-		-		-		-	
E	YELLOW		5.0		4.5		5.0		
F	RED CLEAR		1.9		2.2		1.9		

PHASE BANK # 1 < C + O + F = 1 >

		9	A	B	C	D		E
0							RR1 DLY	
1	PHASE 1	-					RR1 CLR	
2	PHASE 2	-					EVA DLY	
3	PHASE 3	-					EVA CLR	5
4	PHASE 4	-					EVB DLY	
5	PHASE 5	-					EVB CLR	
6	PHASE 6	-					EVC DLY	
7	PHASE 7	-					EVC CLR	
8	PHASE 8	-					EVD DLY	
		MAX INT	ALT WALK	ALT FLH	ALT INT	ALT EXT	EVD CLR	
				D/W			RR2 DLY	
							RR2 CLR	
							EV CLR	
							EV DLY	
							RR CLR	
							RR DLY	

ALL RED START
(F/1 + C +O) = **5.0**
RED REVERT
(F/1 + O + F) = **5.0**

COLUMN F PHASES

		1	2	3	4	5	6	7	8
0	PERMIT		X		X		X		
1	RED LOCK								
2	YELLOW LOCK								
3	VEH MIN CALL								
4	PED RECALL						X		
5	PEDESTRIANS			View Only					
6	YIELD AT FLSH D/W						X		
7	RED REST								
8	DOUBLE ENTRY		X				X		
9	VEH MAX CALL		X				X		
A	SOFT RECALL								
B	MAXIMUM 2								
C	COND SERVICE								
D	MAN CONT CALL								
E	YELLOW START		X				X		
F	FIRST PHASES				X				

< C + O + F = 1 >

BI Tran Systems, Inc.
510 Bercut Dr., Sacremento, Calif. 95814
916/441-0260
Traffic Signal Program **233** Ontario
Timing Sheet #2

Date: 04-Dec-17

LOCATION
Hwy: Hwy 6 WRT
At:
Wellington

PREEMPT MINIMUMS		A RR1-2 SPEV1	B SP EV2	C EMER VEH
A	WLK (DFLT)	4	4	4
B	FD WALK			8
C	INITAL			5

< C + O + F = 1 >

Column E Phases / Bits

		1	2	3	4	5	6	7	8
0	EXCLUSIVE								
1	RR1 CLEAR								
2	RR2 CLEAR								
3	RR2 LTD SRV								
4	PROT/PERM								
5	FLH TO PREMT								
6	FLASH ENTRY								
7	DISABL MIN YEL								
8	DISABL OVP YEL								
9	OVP FLH YEL								
A	EM VEH A		X				X		
B	EM VEH B								
C	EM VEH C								
D	EM VEH D								
E	EXTRA 1	X		X		X			
F	IC SELECT		X						

< C + O + E = 125 >

Column F Phases / Bits

		1	2	3	4	5	6	7	8
0									
1	EXT PERMIT 1								
2	EXT PERMIT 2								
3	EXCLU PED								
4									
5	PED 2P OUT								
6	PED 6P OUT						X		
7	PED 4P OUT								
8	PED 8P OUT								
9	FLH YELLOW								
A									
B									
C									
D									
E	RESTRICTED								
F	EXTRA 2								

Column F Phases / Bits

		1	2	3	4	5	6	7	8
0	ADV GRN FLH								
1	PHASE FLASH								
2	FLASH WALK								
3	GUAR PASS								
4	SIMUL GAP								
5	SEQ TIMING								
6	ADV WALK								
7	DELAY WALK								
8	EXT RECALL								
9									
A	MAX EXTEN								
B	INH PED RSRV								
C	SEMI ACTUATED		X				X		
D									
E	STRT VEH CALL		X		X				
F	STRT PED CALL						X		

SPECIALS < C + O + F = 2 >

MANUAL PLAN **< C/0 + A + 1 >**	0
MANUAL OFFSET **< C/0 + B + 1 >**	0

MANUAL SELECTION

MANUAL PLAN
0 = Automatic (Master)
9 = Control Plan 1 - 9
14 (E) = Free (Isolated)
15 (F) = Software Flash

MANUAL OFFSET
0 = Automatic (Master)
1 = Offset A
2 = Offset B
3 = Offset C

FLASH TO PREEMPT
1 = EVA
2 = EVB
3 = EVC
4 = EVD
5 = RR1
6 = RR2
7 = SE1
8 = SE2

EXTRA 1
1 = TBC TYPE 1
2 = NEMA EXT. COORD.
3 = DAYLIGHT SAVINGS
4 =
5 = EXPANDED STATUS REPORTING
6 = INTERNATIONAL PED
7 = CLEAR OUTPUTS DURING FLASH
8 = SPLIT RING

EXTRA 2
1 = AWR ON DURING PHASE INITAL
2 = LMU INSTALLED

IC SELECT
2 = 2 WAY MODEM
3 = 7 WIRE SLAVE
4 = FLASH / FREE
5 = SIMPLEX MASTER
7 = 7 WIRE MASTER
8 = OFFSET INTURP

Pretimed

PHASE

	1	2	3	4	5	6	7	8
WALK	-		-		-	7	-	
DON'T WALK	-		-		-	16	-	
MIN INTIAL		20		10		20		
TYPE 3 LIMIT	-		-		-		-	
ADD PER VEH	-		-		-		-	
VEH EXT		3.0		3.0		3.0		
MAX GAP		3.0		3.0		3.0		
MIN GAP		3.0		3.0		3.0		
MAX LIMIT		50		35		50		
MAXIMUM 2	-		-		-		-	
ADV / DLY WALK	-		-		-		-	
SEQUENCE TO	-		-		-		-	
COND SRV MIN	-		-		-		-	
REDUCE EVERY	-		-		-		-	
YELLOW		5.0		4.5		5.0		
RED CLEAR		1.9		2.2		1.9		

PHASE BANK # < C + O + F = 1 >

Column F
PHASES

		1	2	3	4	5	6	7	8
0	PERMIT		X		X		X		
1	RED LOCK								
2	YELLOW LOCK								
3	VEH MIN CALL								
4	PED RECALL						X		
5	PEDESTRIANS								
6	REST IN WALK						X		
7	RED REST								
8	DOUBLE ENTRY		X				X		
9	VEH MAX CALL		X		X		X		
A	SOFT RECALL								
B	MAXIMUM 2								
C	CORD SERVICE								
D	MAN CONT CALL								
E	YELLOW START		X				X		
F	FIRST PHASES				X				

< C + O + F = 1 >

LOCATION: **Hwy 6 (Hanlon) WRT @ Wellington**

Issued Date: 04-Dec-17

Installed Date: 04-Dec-17

BI Tran Systems, Inc.
510 Bercut Dr., Sacremento, Calif. 95814
916/441-0260
Traffic Signal Program **233** Ontario
Timing Sheet #2
Revised (02/95)

Time of Day

Actuated

T.O.D FUNCTIONS

	TIME HH MM	FUN	DAY OF WEEK S 1	M 2	T 3	W 4	T 5	F 6	S 7	Column 4 PHASE / BITS 1	2	3	4	5	6	7	8
0																	
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
A																	
B																	
C																	
D																	
E																	
F																	

< C + O + 7 = 1 > < C + O + E = 27 >

T.O.D FUNCTIONS

A = VEH SOFT RECALL
B = MAXIMUM 2
C = CONDITIONAL SERVICE
D = LAG PHASES
E= BIT 1- LOCAL OVERIDE
BIT 4- DISABLE DET OFF MONITOR
BIT 7- DET COUNT MONITOR
BIT 8- REAL TIME SPLIT MONITOR
F = OUTPUT BITS 1 THRU 4

0 = PERMIT PHASES
1 = RED LOCK
2 = YELLOW LOCK
3 = VEH MIN RECALL
4 = PED RECALL
5 -
6 - REST IN WALK
7 = RED REST
8 = DOUBLE ENTRY
9 = VEH MAX RECALL

LOCATION: **Hwy 6 @ Wellington**

Issued Date: 04-Dec-17

Installed Date: 04-Dec-17

Pretimed

T.O.D FUNCTIONS

	TIME HH MM	FUN	DAY OF WEEK S 1	M 2	T 3	W 4	T 5	F 6	S 7	Column 4 PHASE / BITS 1	2	3	4	5	6	7	8
0																	
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
A																	
B																	
C																	
D																	
E																	
F																	

< C + O + 7 = 1 > < C + O + E = 27 >

T.O.D FUNCTIONS

A = VEH SOFT RECALL
B = MAXIMUM 2
C = CONDITIONAL SERVICE
D = LAG PHASES
E = BIT 1- LOCAL OVERIDE
BIT 4- DISABLE DET OFF MONITOR
BIT 7- DET COUNT MONITOR
BIT 8- REAL TIME SPLIT MONITOR
F = OUTPUT BITS 1 THRU 4

0 = PERMIT PHASES
1 = RED LOCK
2 = YELLOW LOCK
3 = VEH MIN RECALL
4 = PED RECALL
5 -
6 - REST IN WALK
7 = RED REST
8 = DOUBLE ENTRY
9 = VEH MAX RECALL

LOCATION: **Hwy 6 @ Wellington**

Issued Date: 04-Dec-17

Installed Date: 04-Dec-17

BI Tran Systems, Inc.
510 Bercut Dr., Sacremento, Calif. 95814
916/441-0260
Traffic Signal Program ***233*** *Ontario*
Timing Sheet #2
Revised (02/95)

Page 2B (Optional)

DETECTOR ASSIGNMENTS

STANDARD 332 CABINET LOCATION	column	1 delay	3 carry over	Column 0 C1 Pin #	Column 1 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 2 PHASE(S) 1	2	3	4	5	6	7	8	Column 3 ASSIGNMENTS 1	2	3	4	5	6	7	8
I-2 U	0			0	39																							
J-2 U	1			1	40																							
I-6 U	2			2	41			X	X		X				X					X	X	X						X
J-6 U	3			3	42																							
1-2 L	4			4	43																							
J-2 L	5			5	44																							
1-6 L	6			6	45			X	X		X				X					X	X	X						X
J-6 L	7			7	46																							
I-4	8			8	47																							
J-4	9			9	48																							
I-8	A			A	49																							
J-8	B			B	50																							
J-1	C			C	55																							
I-1	D			D	56																							
J-5	E			E	57																							
I-5	F			F	58																							
	< C + O + D = 0 >				DETECTOR ASSIGNMENTS < C + O + E = 126>																							

STANDARD 332 CABINET LOCATION	column	2 delay	4 carry over	Column 4 C1 Pin #	Column 5 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 6 PHASE(S) 1	2	3	4	5	6	7	8	Column 7 ASSIGNMENTS 1	2	3	4	5	6	7	8
J-9 U	0			0	59																							
I-9 U	1			1	60																							
I-9 L	2			2	61																							
J-9 L	3			3	62																							
I-3 U	4			4	63																							
J-3 U	5			5	64																							
I-7 U	6	5		6	65			X	X		X				X					X	X	X						X
J-7 U	7			7	66																							
I-12 U	8			8	67																							
I-13 U	9			9	68																							
I-12 L	A			A	69																							
I-13 L	B			B	70																							
I-3 L	C			C	76																							
J-3 L	D			D	77																							
I-7 L	E			E	78																							
J-7 L	F			F	79																							
	< C + O + D = 0 >				DETECTOR ASSIGNMENTS < C + O + E = 126 >																							

DETECTOR ASSIGNMENT SHEET
ONTARIO 233 PROGRAM

LOCATION:
Hwy Hwy 6 WRT
at Wellington

Issued Date: 4-Dec-17
Installed Date: 4-Dec-17

DETECTOR ATTRIBUTES
1 = FULL TIME DELAY
2 = PEDESTRIAN CALL
3 =
4 = COUNT
5 = EXTENSION
6 = TYPE 3
7 = CALLING
8 = ALTERNATE

DETECTOR ASSIGNMENTS
1 = DET. SET # 1
2 = DET. SET # 2
3 = DET. SET # 3
4 =
5 =
6 = MIN RECALL ON FAILURE
7 = MAX RECALL ON FAILURE
8 - REPORT ON FAILURE

DETECTOR MONITOR
MAX OFF: D/0+0+1=120
MAX ON: D/0+0+2=60

ADVANCE WARNING BEACONS
SIGN #1 SIGN #2
PHASE NUMBER
(F/1+C+F)= (F/1+D+F)=
TIME BEFORE YELLOW
(F/1+C+E)= (F/1+D+E)=
OUTPUT PIN NUMBER
(E/127+E+8)= (E/127+E+9)=

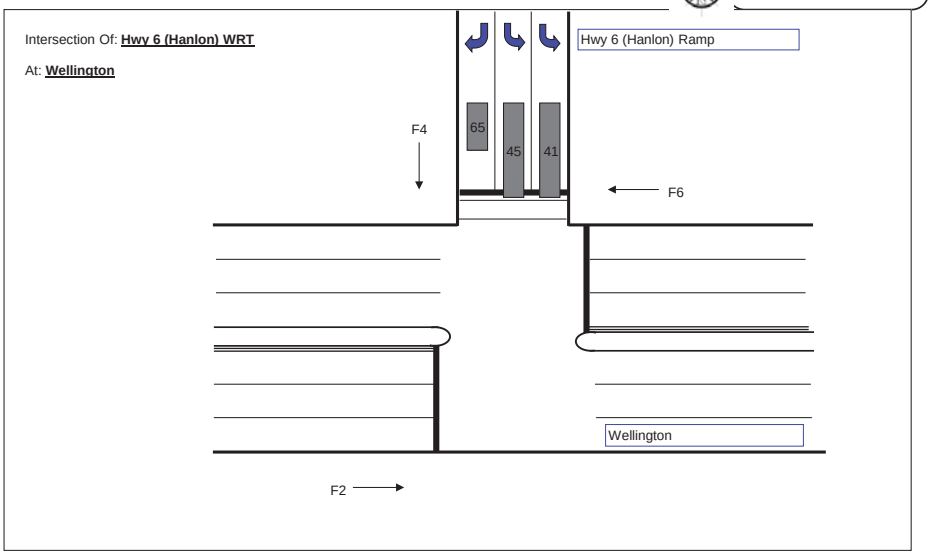
Input File Layout

Input File Slot No. →	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I" FILE	1 Ext, Cnt, Call <C1-56>	2 Ext, Cnt, Call <C1-39>	2 Ext, Cnt, Call <C1-63>	2 Type 3, Call <C1-47>	3 Ext, Cnt, Call <C1-58>	4 Ext, Cnt, Call <C1-41>	4 Ext, Cnt, Call <C1-65>	4 Type 3, Call <C1-49>	1 Ext, Cnt, Call <C1-60>	NOT WIRED	Not Assigned <C1-80>	2 Ped Call <C1-67>	6 Ped Call <C1-68>	Flash Sense <C1-81>
		2 Ext, Cnt, Call <C1-43>	2 Ext, Cnt, Call <C1-76>			4 Ext, Cnt, Call <C1-45>	4 Ext, Cnt, Call <C1-78>		3 Ext, Cnt, Call <C1-62>		Not Assigned <C1-53>	4 Ped Call <C1-69>	8 Ped Call <C1-70>	Stop Time <C1-82>
"J" FILE	5 Ext, Cnt, Call <C1-55>	6 Ext, Cnt, Call <C1-40>	6 Ext, Cnt, Call <C1-64>	6 Type 3, Call <C1-48>	7 Ext, Cnt, Call <C1-57>	8 Ext, Cnt, Call <C1-42>	8 Ext, Cnt, Call <C1-66>	8 Type 3, Call <C1-50>	5 Ext, Cnt, Call <C1-59>	NOT WIRED	Not Assigned <C1-54>	EV A Preempt <C1-71>	EV B Preempt <C1-72>	Railroad 1 <C1-51>
		6 Ext, Cnt, Call <C1-44>	6 Ext, Cnt, Call <C1-77>			8 Ext, Cnt, Call <C1-46>	8 Ext, Cnt, Call <C1-79>		7 Ext, Cnt, Call <C1-61>		Not Assigned <C1-75>	EV C Preempt <C1-73>	EV D Preempt <C1-74>	Railroad

DETECTOR TYPES
Ext = Extension Detector
Detector is only active during the Phase's GREEN Intervals (ie, will NOT *Call* the Phase)
Cnt = Count Detector
Used in computing "Added Initial"
Call = Calling Detector
Detector is only active during the Phase's NON-GREEN Intervals (ie, will NOT *Extend* the Phase)
Type 3 = Type 3 Disconnect
Will allow a Calling Detector to Extend its Phase until the Call first drops or the "Type 3 Limit" is reached

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260

Traffic Signal Program 233
Initialized Detector Assignments
(Revised 8/92) *332 Cabinet*



COORDINATION

Row	Column Numbers ----> / Plan Name ---->	PLAN 1	2	3	4	5	6	7	8	9
0	Cycle Length	95	95	95	0	0	0	0	0	0
1	Phase 1 - ForceOff	0	0	0	0	0	0	0	0	0
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0
3	Phase 3 - ForceOff	0	0	0	0	0	0	0	0	0
4	Phase 4 - ForceOff	50	50	49	0	0	0	0	0	0
5	Phase 5 - ForceOff	0	0	0	0	0	0	0	0	0
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0
7	Phase 7 - ForceOff	0	0	0	0	0	0	0	0	0
8	Phase 8 - ForceOff	0	0	0	0	0	0	0	0	0
9	Ring Offset	0	0	0	0	0	0	0	0	0
A	Offset 1	21	12	28	0	0	0	0	0	0
B	Offset 2	0	0	0	0	0	0	0	0	0
C	Offset 3	0	0	0	0	0	0	0	0	0
D	Perm 1 - End	33	33	32	0	0	0	0	0	0
E	Hold Release	255	255	255	255	255	255	255	255	255
F	Zone Offset	0	0	0	0	0	0	0	0	0

Coordination - Bank 1 <C+0+C=1>

Row										
0	Ped Adjustment	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	0	0	0	0	0	0	0	0	0
2	Perm 2 - End	0	0	0	0	0	0	0	0	0
3	Perm 3 - Start	0	0	0	0	0	0	0	0	0
4	Perm 3 - End	0	0	0	0	0	0	0	0	0
5	Reservice Time	0	0	0	0	0	0	0	0	0
6	Reservice Phases									
7										
8	Pretimed Phases									
9	Max Recall									
A	Perm 1 Veh Phase	4	4	4	1_345_78	1_345_78	1_345_78	1_345_78	1_345_78	1_345_78
B	Perm 1 Ped Phase				1_345_78	1_345_78	1_345_78	1_345_78	1_345_78	1_345_78
C	Perm 2 Veh Phase									
D	Perm 2 Ped Phase									
E	Perm 3 Veh Phase									
F	Perm 3 Ped Phase									

Coordination - Bank 2 <C+0+C=2>

(Coord Extra Bit 1 = Programmed WALK Time for Sync Phases)

	E
Plan 1 - Sync	_2__6_
Plan 2 - Sync	_2__6_
Plan 3 - Sync	_2__6_
Plan 4 - Sync	_2__6_
Plan 5 - Sync	_2__6_
Plan 6 - Sync	_2__6_
Plan 7 - Sync	_2__6_
Plan 8 - Sync	_2__6_
Plan 9 - Sync	_2__6_
NEMA Sync	
NEMA Hold	
Coord Extra	#NAME?

Sync Phases < C+0+C = 1>

Row	Time	Plan	Offset	Day of Week
0	0:01	E	0	1234567
1	6:30	1	A	1234567
2	9:00	2	A	1234567
3	15:00	3	A	1234567
4	18:30	2	A	1234567
5	23:00	E	0	1234567
6	0:00	0	0	
7	0:00	0	0	
8	0:00	0	0	
9	0:00	0	0	
A	0:00	0	0	
B	0:00	0	0	
C	0:00	0	0	
D	0:00	0	0	
E	0:00	0	0	
F	0:00	0	0	

TOD Coodination < C+0+9 = 0.1 >
(Bank 1)

	F
Free Lag	_2_4_6_8
Plan 1 - Lag	_2_4_6_8
Plan 2 - Lag	_2_4_6_8
Plan 3 - Lag	_2_4_6_8
Plan 4 - Lag	_2_4_6_8
Plan 5 - Lag	_2_4_6_8
Plan 6 - Lag	_2_4_6_8
Plan 7 - Lag	_2_4_6_8
Plan 8 - Lag	_2_4_6_8
Plan 9 - Lag	_2_4_6_8
External Lag	

Lag Phases <C+0+C=1>

Row	Time	Plan	Offset	Day of Week
0	0:00	0	0	
1	0:00	0	0	
2	0:00	0	0	
3	0:00	0	0	
4	0:00	0	0	
5	0:00	0	0	
6	0:00	0	0	
7	0:00	0	0	
8	0:00	0	0	
9	0:00	0	0	
A	0:00	0	0	
B	0:00	0	0	
C	0:00	0	0	
D	0:00	0	0	
E	0:00	0	0	
F	0:00	0	0	

TOD Coodination < C+0+9 = 0.2 >
(Bank 2)

Row		2
1	Phase 1	0
2	Phase 2	27
3	Phase 3	0
4	Phase 4	17
5	Phase 5	0
6	Phase 6	30
7	Phase 7	0
8	Phase 8	0

Coordination Transition Minimums < C+0+C = 5 >

Transition Type	0.3	< C/5+1+9 >
TBC TRANSITION		
Lag Hold Phases		< C/5+1+A >
Coordinated Lag Hold Phases		
Sync Output Time		< C/5+1+C >
7 - Wire Master		

Transition Type
0.X = Shortway
1.X = Lengthen
X.1 thru X.4 = # of cycles when lengthening

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260

*Traffic Signal Program **233** Ontario*
Timing Sheet-02
Revised: (02/06)

DATE: 04-Dec-17 **LOCATION:** Hwy 6 (Hanlon) WRT @ Wellington

DEFAULT DETECTOR ASSIGNMENTS

Standard 332 Cabinet Location	Column 0 (C1 PIN NUMBER)	Column 1 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 2 PHASE(S) 1	2	3	4	5	6	7	8	Column 3 ASSIGNMENTS 1	2	3	4	5	6	7	8
I-2 U -->	0 39				X	X		X			X								X	X	X				X
J-2 U -->	1 40				X	X		X							X				X	X	X				X
I-6 U -->	2 41				X	X		X					X						X	X	X				X
J-6 U -->	3 42				X	X		X										X	X	X	X				X
I-2 L -->	4 43				X	X		X			X								X	X	X				X
J-2 L -->	5 44				X	X		X							X				X	X	X				X
I-6 L -->	6 45				X	X		X					X						X	X	X				X
J-6 L -->	7 46				X	X		X										X	X	X	X				X
I-4 -->	8 47						X	X			X								X	X	X				X
J-4 -->	9 48						X	X							X				X	X	X				X
I-8 -->	A 49						X	X					X						X	X	X				X
J-8 -->	B 50						X	X										X	X	X	X				X
J-1 -->	C 55				X	X		X							X				X	X	X				X
I-1 -->	D 56				X	X		X		X									X	X	X				X
J-5 -->	E 57				X	X		X									X		X	X	X				X
I-5 -->	F 58				X	X		X				X							X	X	X				X

"INITIALIZED" DETECTOR ASSIGNMENTS
< C + 0 + E = 126 >

Standard 332 Cabinet Location	Column 4 (C1 PIN NUMBER)	Column 5 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 6 PHASE(S) 1	2	3	4	5	6	7	8	Column 7 ASSIGNMENTS 1	2	3	4	5	6	7	8
J-9 U -->	0 59				X	X		X							X				X	X	X				X
I-9 U -->	1 60				X	X		X		X									X	X	X				X
J-9 L -->	2 61				X	X		X								X			X	X	X				X
I-9 L -->	3 62				X	X		X				X							X	X	X				X
I-3 U -->	4 63				X	X		X		X									X	X	X				X
J-3 U -->	5 64				X	X		X								X			X	X	X				X
I-7 U -->	6 65				X	X		X						X					X	X	X				X
J-7 U -->	7 66				X	X		X										X	X	X	X				X
I-12 U -->	8 67	X								X									X	X	X				X
I-13 U -->	9 68	X														X			X	X	X				X
I-12 L -->	A 69	X												X					X	X	X				X
I-13 L -->	B 70	X																X	X	X	X				X
I-3 L -->	C 76				X	X		X		X									X	X	X				X
J-3 L -->	D 77				X	X		X								X			X	X	X				X
I-7 L -->	E 78				X	X		X						X					X	X	X				X
J-7 L -->	F 79				X	X		X									X		X	X	X				X

"INITIALIZED" DETECTOR ASSIGNMENTS
< C + 0 + E = 126 >

DETECTOR ATTRIBUTES

1= Full time Delay
2 = Pedestrian call
3 =
4 = Count
5 = Extention
6 = Type 3
7 = Calling
8 = Alternate

DETECTOR ASSIGNMENTS

1 = Det. Set #1
2 = Det. Set #2
3 = Det. Set #3
4 =
5 =
6 = MIN Recall On Failure
7 = MAX Recall On Failure
8 = Report On Failure

Input File --> 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I" FILE	1 Ext, Cnt, Call <C1-56>	2 Ext, Cnt, Call <C1-39>	2 Ext, Cnt, Call <C1-63>	2 Type 3, Call <C1-47>	3 Ext, Cnt, Call <C1-58>	4 Ext, Cnt, Call <C1-41>	4 Ext, Cnt, Call <C1-65>	4 Type 3, Call <C1-49>	1 Ext, Cnt, Call <C1-60>	NOT WIRED	Not Assigned <C1-80>	2 Ped Call <C1-67>	6 Ped Call <C1-68>	Flash Sense <C1-81>
		2 Ext, Cnt, Call <C1-43>	2 Ext, Cnt, Call <C1-76>			4 Ext, Cnt, Call <C1-45>	4 Ext, Cnt, Call <C1-78>		3 Ext, Cnt,		Not Assigned <C1-53>	4 Ped Call <C1-69>	8 Ped Call	Stop Time <C1-82>
"J" FILE	5 Ext, Cnt, Call <C1-55>	6 Ext, Cnt, Call <C1-40>	6 Ext, Cnt, Call <C1-64>	6 Type 3, Call <C1-48>	7 Ext, Cnt, Call <C1-57>	8 Ext, Cnt, Call <C1-42>	8 Ext, Cnt, Call <C1-66>	8 Type 3, Call <C1-50>	5 Ext, Cnt, Call <C1-59>	NOT WIRED	Not Assigned <C1-54>	EV A Preempt <C1-71>	EV B Preempt <C1-72>	Railroad 1 <C1-51>
		6 Ext, Cnt, Call <C1-44>	6 Ext, Cnt, Call <C1-77>			8 Ext, Cnt, Call <C1-46>	8 Ext, Cnt, Call <C1-79>		7 Ext, Cnt, Call <C1-61>		Not Assigned <C1-75>	EV C Ped Call <C1-73>	EV D Preempt <C1-74>	Railroad 2 <C1-52>

DETECTOR TYPES

Ext = Extension Detector
Detector is only active during the Phase's GREEN Intervals (ie, will NOT *Call* the Phase)
Cnt = Count Detector
Used in computing "Added Initial"
Call = Calling Detector
Detector is only active during the Phase's NON-GREEN Intervals (ie, will NOT *Extend* the Phase)
Type 3 = Type 3 Disconnect
Will allow a Calling Detector to Extend its Phase until the Call first drops or the "Type 3 Limit" is reached

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Traffic Signal Program 233
Initialized Detector Assignments
(Revised 8/92) 332 Cabinet

REFERENCE SHEET

Controller Intervals

0 = Walk	8 = Red Rest
1 = FDW	9 = Preemption
2 = Min. Green	A = Stop Time
3 =	B = Red Revert
4= Var. Initial	C = Yellow-Gap Termination
5 = Extension	D = Yellow-Max. Termination
6 =	E = Yellow-Forceoff Termination
7 = Reduce Gap	F = Red Clearance

Continuous Memory Error Monitoring

The controller's RAM and EPROM memories are continuously checked for errors. If an erro is found, the intersection will go into FLASH (via Watch Dog Timer), and one of the following will be shown on the controller's display:

bAd A = An error was detected in the CPU's RAM, or a new program has been installed on the memory module. Often caused by a bad controller "gel-cell" battery.
bAd b = An error was detected in the memory module's RAM. Often caused by a bad "lithium" battery on the memory module.
bAd E = An error was detected in the 233 Program EPROM.
bAd F = An error was detected in the Z-RAM (Dallas chip) on the memory module.

412/C Memory Module Lithium Battery Condition

To check the condition of the 3.6 volt Lithium Battery on the 412/C Memory Module:

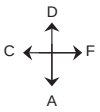
If E/112 + 0 + A = 84 - the battery is BAD
If E/112 + 0 + A = 85 - the battery is O.K.

Monitor "Activate" Flags

(Also Requires T.O.D. Function "E" Flag)
Detector Count Recording:
E/2 + 0 + 9 = Not Zero
Real Time Split Monitor:
E/2 + 0 + E = Not Zero

E Page Enable: F/1 + 9 + E = Not Zero

Display Movement Codes



A = Advance ROW
D = Decrement ROW
C = COLUMN Back
F = Forward COLUMN

Special Event Schedules

Special Event #1: C + 0 + E = 27
Special Event #2: C + 0 + E = 28

Current Interval = E + 5 + 0
Current Interval Timer = E + 5 + B
Current Interval Clearance Phases = E + 5 + C

Time of Day Function (7 Key)

Current T.O.D. "E Function" Control Bits = C/0 + E + E
Current T.O.D. "F Function" Output Bits = C/0 + E + F

Logic DELAY Gate Delay Timer Display

DELAY A Timer = C/0 + 9 +A
DELAY B Timer = C/0 + 9 + B
thru thru
DELAY F Timer = C/0 + 9 + F

Interval Timer Display

Ring A = F/0 + A + Interval Row
Ring B = F/0 + B + (Interval Row From PHASE BANK data)

Display Locations

	Plan Select	Offset Select
Manual	= C/0 + A + 1	C/0 + B + 1
Master	= C/0 + A + 2	C/0 + B + 2
Current	= C/0 + A + 3	C/0 + B + 3
Next	= C/0 + A + 4	C/0 + B + 4
TOD	= C/0 + A +5	C/0 + B + 5

Master Cycle = C/0 + A + 0
Ring A Cycle = C/0 + B + 0
Ring B Cycle = C/0 + D + 0

MIN Cycle = C/0 + A + E
MAX Cycle = C/0 + B + E

Phase Hold = C/0 + F + D
Phase Next = C/0 + F + E
Force Off = C/0 + F + F
(with Ring A Cycle Timer)

Current Calculated Cycle Length = C/0 + B + F
Current Permitted Phases = E/0 + 7 +8
Current Phase Bank = F/0 + C + E

Last Power Failure:
(HR-MIN-DOW) = 8 + 4
(DOW-YR-MONTH) = 8 + 5
Last Cabinet Flash
(HR-MIN-DOW) = 8 + 6
(DOW-YR-MONTH) = 8 + 7
Power Fail Counts:
(Long Failures) = F/1 + 0 + C
(Short Failures) = F/1 + 0 + D
Current Time:
(HR-MIN-DOW) = 8 + 0
(DOW-YR-MONTH) = 8 + 1
(MIN-SEC-1/10SEC) = 8 + F

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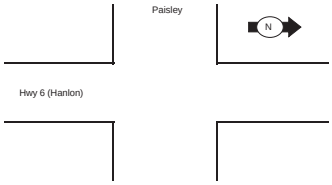
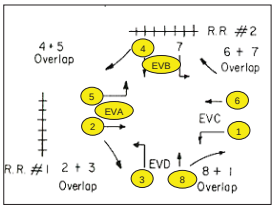
916/441-0260
Traffic Signal Program 233
"View" Locations
(Revised 03/94

NOTE: Phases 1 and 5 RESTRICTED, and LAG PHASE configuration modified to - Phases 2, 4, 5, 8

MASTER INTERSECTION (Highway 6 (Hanlon) North) - Paisley, Willow, Speedvale, & Woodlawn

Location:	Hwy 6 (Hanlon) @ Paisley	**Area/District:**	
Timing Based On T.M. Dated:		**Traffic Signal #**	115
Timing Developed By:	H Nichols	**Approved By:**	K Plut
Installed By:		**Installation Date:**	18-Oct-11





Circle Movements and Operations

Note: Phase Sequence 1/6, 2/6, 2/5, 3/8, 4/8

Dial Out Telephone Number

		D
0	# OF DIGITS	
1	1st DIGIT	
2	2nd DIGIT	
3	3rd DIGIT	
4	4th DIGIT	
5	5th DIGIT	
6	6th DIGIT	
7	7th DIGIT	
8	8th DIGIT	
9	9th DIGIT	
A	10th DIGIT	
B	11th DIGIT	
C		
D		
E		
F		

< C + 0 + C = 5 >

Redial Time = 10
(C\5 + C + 0)
Default is Report All Alarms (no flags set)

Disable Alarm Reporting

		Column F 1	2	3	4	5	6	7	8
0	OMIT ALARMS					X			

< C + 0 + C = 5 >

1 = STOP TIME
2 = FLASH SENSE
3 = KEYBOARD ENTRY
4 = MANUAL PLAN SELECT
5 = ENABLE POLICE CNTRL (Not Used)
6 = EXTERNAL ALARM (Door Alarm)
7 = DETECTOR FAILURE

NOTE: If Local Controller is part of an Interconnect Ensure Phone Number Is Removed

Observe Redial Timer
(E/2 + D + 6)

COMMUNICATIONS ADDRESSING

COMM ADDRESS
(C/0 + 0 + 0) = 1

ZONE ADDRESS
(C/0 + 0 + 1) = 1

AREA NUMBER
(C/0 + 0 + 2) = 1

AREA ADDRESS
(C/0 + 0 + 3) = 115

Revisions to Timing Sheet - Oct 18, 2011
Add Faze 2/6 SEMI ACTUATED
Revise MANUAL PLAN to 0 from 14
Revise DETECTOR ASSIGNMENTS, PHASE(S) for C1 PIN # 58 as per Timing Sheet
Revise FIELD MASTER PAGE 1 & 2 as per Timing Sheet
Revise COORDINATION as per Timing Sheet

ACTUATED INTERVAL TIMING AND FAZE FUNCTIONS

		PHASE 1	2	3	4	5	6	7	8
0	WALK	-	42	-	20	-	42	-	20
1	DON'T WALK	-	10	-	15	-	10	-	15
2	MIN INITIAL	8		7	10	8			10
3	TYPE 3 LIMIT	-		-		-		-	
4	ADD PER VEH	-		-		-		-	
5	VEH EXT	4.0	3.0	3.0	3.0	4.0	3.0		3.0
6	MAX GAP	4.0	3.0	3.0	3.0	4.0	3.0		3.0
7	MIN GAP	4.0	3.0	3.0	3.0	4.0	3.0		3.0
8	MAX LIMIT	8	55	10	24	11	52		37
9	MAXIMUM 2	8	83	28	23	15	76	-	54
A	ADV /DLY WALK	-		-		-		-	
B	SEQUENCE TO	-		-		-		-	
C	COND SRV MIN	-		-		-		-	
D	REDUCE EVERY	-		-		-		-	
E	YELLOW	3.0	5.4	3.0	4.5	3.0	5.4		4.5
F	RED CLEAR	2.0	2.0		3.5	2.0	2.0		3.5

PHASE BANK # 1 < C + O + F = 1 >

		9	A	B	C	D		E
0							RR1 DLY	
1	PHASE 1	-					RR1 CLR	
2	PHASE 2	-					EVA DLY	
3	PHASE 3	-					EVA CLR	
4	PHASE 4	-					EVB DLY	
5	PHASE 5	-					EVB CLR	5
6	PHASE 6	-					EVC DLY	
7	PHASE 7	-					EVC CLR	
8	PHASE 8	-					EVD DLY	
		MAX INT	ALT WALK	ALT FLH	ALT INT	ALT EXT	EVD CLR	
				D/W			RR2 DLY	
							RR2 CLR	
							EV CLR	
							EV DLY	
							RR CLR	
							RR DLY	

ALL RED START
(F/1 + C +O) = **5.0**
RED REVERT
(F/1 + O + F) = **5.0**

COLUMN F PHASES

		1	2	3	4	5	6	7	8
0	PERMIT	X	X	X	X	X	X		X
1	RED LOCK								
2	YELLOW LOCK								
3	VEH MIN CALL								
4	PED RECALL		X				X		
5	PEDESTRIANS			View Only					
6	YIELD AT FLSH D/W								
7	RED REST								
8	DOUBLE ENTRY				X				X
9	VEH MAX CALL		X				X		
A	SOFT RECALL								
B	MAXIMUM 2								
C	COND SERVICE								
D	MAN CONT CALL								
E	YELLOW START		X				X		
F	FIRST PHASES			X					X

< C + O + F = 1 >

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814 916/441-0260
Traffic Signal Program ***233*** *Ontario Timing Sheet #2*

Date: 18-Oct-11

LOCATION
Hwy: Hwy 6
At: Paisley

		A	B	C
PREEMPT		RR1-2	SP	EMER
MINIMUMS		SPEV1	EV2	VEH
A	WLK (DFLT)	4.0	4.0	4.0
B	FD WALK			10
C	INITAL			5

< C + O + F = 1 >

Column E Phases / Bits

		1	2	3	4	5	6	7	8
0	EXCLUSIVE								
1	RR1 CLEAR								
2	RR2 CLEAR								
3	RR2 LTD SRV								
4	PROT/PERM			X					
5	FLH TO PREMT								
6	FLASH ENTRY								
7	DISABL MIN YEL								
8	DISABL OVP YEL								
9	OVP FLH YEL								
A	EM VEH A		X			X			
B	EM VEH B				X				X
C	EM VEH C								
D	EM VEH D								
E	EXTRA 1	X		X					
F	IC SELECT		X						

< C + O + E = 125 >

Column F Phases / Bits

		1	2	3	4	5	6	7	8
0									
1	EXT PERMIT 1								
2	EXT PERMIT 2								
3	EXCLU PED								
4									
5	PED 2P OUT		X						
6	PED 6P OUT						X		
7	PED 4P OUT				X				
8	PED 8P OUT								X
9	FLH YELLOW								
A									
B									
C									
D									
E	RESTRICTED	X				X			
F	EXTRA 2								

Column F Phases / Bits

		1	2	3	4	5	6	7	8
0	ADV GRN FLH								
1	PHASE FLASH								
2	FLASH WALK								
3	GUAR PASS								
4	SIMUL GAP				X				X
5	SEQ TIMING								
6	ADV WALK								
7	DELAY WALK								
8	EXT RECALL								
9									
A	MAX EXTEN								
B	INH PED RSRV								
C	SEMI ACTUATED		X				X		
D									
E	STRT VEH CALL	X		X		X			
F	STRT PED CALL		X		X		X		X

SPECIALS < C + O + F = 2 >

MANUAL PLAN	0
< C/0 + A + 1 >	
MANUAL OFFSET	0
< C/0 + A + 1 >	

MANUAL SELECTION

MANUAL PLAN
0 = Automatic (Master)
9 = Control Plan 1 - 9
14 (E) = Free (Isolated)
15 (F) = Software Flash

MANUAL OFFSET
0 = Automatic (Master)
1 = Offset A
2 = Offset B
3 = Offset C

FLASH TO PREEMPT
1 = EVA
2 = EVB
3 = EVC
4 = EVD
5 = RR1
6 = RR2
7 = SE1
8 = SE2

EXTRA 1
1 = TBC TYPE 1
2 = NEMA EXT. COORD.
3 = DAYLIGHT SAVINGS
4 =
5 = EXPANDED STATUS REPORTING
6 = INTERNATIONAL PED
7 = CLEAR OUTPUTS DURING FLASH
8 = SPLIT RING

EXTRA 2
1 = AWR ON DURING PHASE INITAL
2 = LMU INSTALLED

IC SELECT
2 = 2 WAY MODEM
3 = 7 WIRE SLAVE
4 = FLASH / FREE
5 = SIMPLES MASTER
7 = 7 WIRE MASTER
8 = OFFSET INTURP

PRETIMED ONTARIO 233 PROGRAM

PHASE

	1	2	3	4	5	6	7	8
WALK	-	42	-	20	-	42	-	20
DON'T WALK	-	10	-	15	-	10	-	15
MIN INTIAL	8		7	10	8			10
TYPE 3 LIMIT	-	-	-	-	-	-	-	-
ADD PER VEH	-	-	-	-	-	-	-	-
VEH EXT	4.0	3.0	3.0	3.0	4.0	3.0		3.0
MAX GAP	4.0	3.0	3.0	3.0	4.0	3.0		3.0
MIN GAP	4.0	3.0	3.0	3.0	4.0	3.0		3.0
MAX LIMIT	8	55	10	24	11	52		37
MAXIMUM 2	8	83	28	23	15	76	-	54
ADV / DLY WALK	-	-	-	-	-	-	-	-
SEQUENCE TO	-	-	-	-	-	-	-	-
COND SRV MIN	-	-	-	-	-	-	-	-
REDUCE EVERY	-	-	-	-	-	-	-	-
YELLOW	3.0	5.4	3.0	4.5	3.0	5.4		4.5
RED CLEAR	2.0	2.0		3.5	2.0	2.0		3.5

PHASE BANK # < C + O + F = 1 >

Column F

PHASES

		1	2	3	4	5	6	7	8
0	PERMIT	X	X	X	X	X	X		X
1	RED LOCK								
2	YELLOW LOCK								
3	VEH MIN CALL								
4	PED RECALL		X		X		X		X
5	PEDESTRIANS								
6	REST IN WALK								
7	RED REST								
8	DOUBLE ENTRY				X				X
9	VEH MAX CALL	X	X	X		X	X		
A	SOFT RECALL								
B	MAXIMUM 2								
C	CORD SERVICE								
D	MAN CONT CALL								
E	YELLOW START		X				X		
F	FIRST PHASES			X					X

< C + O + F = 1 >

T.O.D. FUNCTIONS

	TIME HH MM	FUN	DAY OF WEEK S	M	T	W	T	F	S	Column 4 PHASES / BITS 1	2	3	4	5	6	7	8
0	07:00	B		X	X	X	X	X		X	X	X	X	X	X		X
1	09:00	B		X	X	X	X	X									
2	15:00	B		X	X	X	X	X		X	X	X	X	X	X		X
3	18:00	B		X	X	X	X	X									
4																	
5																	
6																	
7																	
8																	
9																	
A																	
B																	
C																	
D																	
E																	
F																	

< C + O + 7 = 1 > < C+ O + E = 27 >

T.O.D. FUNCTIONS

0 = PERMIT PHASES
1 = RED LOCK
2 = YELLOW LOCK
3 = VEH MIN RECALL
4 = PED RECALL
5 -
6 - REST IN WALK
7 = RED REST
8 = DOUBLE ENTRY
9 = VEH MAX RECALL
A = VEH SOFT RECALL
B = MAXIMUM 2
C = CONDITIONAL SERVICE
D = LAG PHASES
E = BIT 1 - LOCAL OVERIDE
BIT 4 - DISABLE DET OFF MONITOR
BIT 7 - DET COUNT MONITOR
BIT 8 - REAL TIME SPLIT MONITOR
F = OUTPUT BITS 1 THRU 4

LOCATION: **Hwy 6 (Hanlon) @ Paisley**

BI Tran Systems, Inc.
510 Bercut Dr., Sacremento, Calif. 95814
916/441-0260
Traffic Signal Program **233** Ontario
Timing Sheet #2
Revised (02/95)

Issued Date: **18-Jan-11**

Installed Date: **18-Jan-11**

DETECTOR ASSIGNMENTS

STANDARD 332 CABINET LOCATION	column	1 delay	3 carry over
I-2 U	0		
J-2 U	1		
I-6 U	2		
J-6 U	3		
1-2 L	4		
J-2 L	5		
1-6 L	6		
J-6 L	7		
I-4	8		
J-4	9		
I-8	A		
J-8	B		
J-1	C		
I-1	D		
J-5	E		
I-5	F		
	< C + O + D = 0 >		

Column 0	C1 Pin #	Column 1 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 2 PHASE(S) 1	2	3	4	5	6	7	8	Column 3 ASSIGNMENTS 1	2	3	4	5	6	7	8
0	39																								
1	40																								
2	41				X	X		X					X					X	X	X					X
3	42				X	X		X									X	X	X	X					X
4	43																								
5	44																								
6	45				X	X		X					X					X	X	X					X
7	46				X	X		X									X	X	X	X					X
8	47																								
9	48																								
A	49																								
B	50																								
C	55				X	X		X						X				X	X	X					X
D	56				X	X		X		X								X	X	X					X
E	57																								
F	58				X	X		X				X					X	X	X	X					X

DETECTOR ASSIGNMENTS < C + O + E = 126>

STANDARD 332 CABINET LOCATION	column	2 delay	4 carry over
J-9 U	0		
I-9 U	1		
I-9 L	2		
J-9 L	3		
I-3 U	4		
J-3 U	5		
I-7 U	6		
J-7 U	7		
I-12 U	8		
I-13 U	9		
I-12 L	A		
I-13 L	B		
I-3 L	C		
J-3 L	D		
I-7 L	E		
J-7 L	F		
	< C + O + D = 0 >		

Column 4	C1 Pin #	Column 5 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 6 PHASE(S) 1	2	3	4	5	6	7	8	Column 7 ASSIGNMENTS 1	2	3	4	5	6	7	8
0	59				X	X		X						X				X	X	X					X
1	60																								
2	61																								
3	62																								
4	63																								
5	64																								
6	65				X	X		X					X					X	X	X					X
7	66																								
8	67																								
9	68																								
A	69		X										X					X	X	X					X
B	70		X														X	X	X	X					X
C	76																								
D	77																								
E																									
F																									

DETECTOR ASSIGNMENTS < C + O + E = 126 >

DETECTOR ASSIGNMENT SHEET
ONTARIO 233 PROGRAM

LOCATION:
Hwy Hwy 6
at Paisley
Issued Date: 18-Oct-11
Installed Date: 18-Oct-11

DETECTOR ATTRIBUTES
1 = FULL TIME DELAY
2 = PEDESTRIAN CALL
3 =
4 = COUNT
5 = EXTENSION
6 = TYPE 3
7 = CALLING
8 = ALTERNATE

DETECTOR ASSIGNMENTS
1 = DET. SET # 1
2 = DET. SET # 2
3 = DET. SET # 3
4 =
5 =
6 = MIN RECALL ON FAILURE
7 = MAX RECALL ON FAILURE
8 - REPORT ON FAILURE

DETECTOR MONITOR
MAX OFF: D/0+0+1=120
MAX ON: D/0+0+2=60

ADVANCE WARNING BEACONS
SIGN #1 SIGN #2
PHASE NUMBER
(F/1+C+F)= (F/1+D+F)=
TIME BEFORE YELLOW
(F/1+C+E)= (F/1+D+E)=
OUTPUT PIN NUMBER
(E/127+E+8)= (E/127+E+9)=

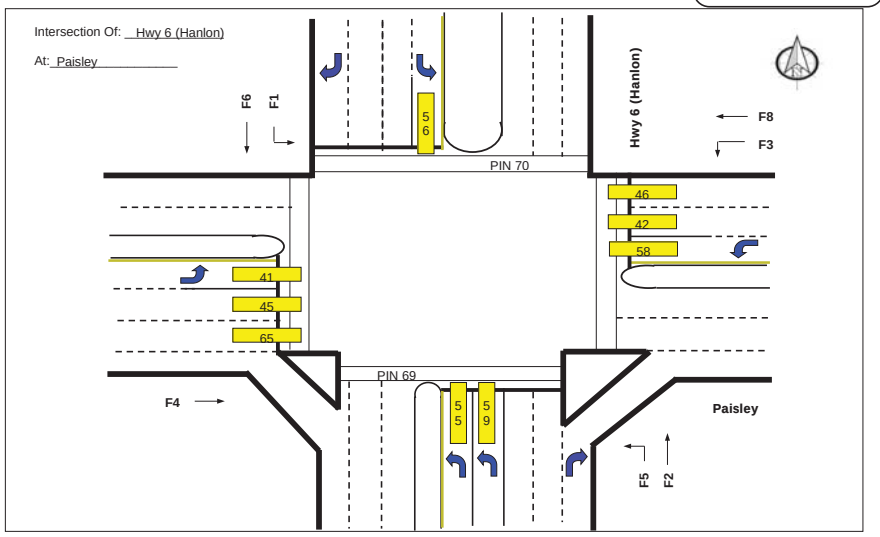
Input File Layout

Input File Slot No. →	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I" FILE	1 Ext, Cnt, Call <C1-56>	2 Ext, Cnt, Call <C1-39>	2 Ext, Cnt, Call <C1-63>	2 Type 3, Call <C1-47>	3 Ext, Cnt, Call <C1-58>	4 Ext, Cnt, Call <C1-41>	4 Ext, Cnt, Call <C1-65>	4 Type 3, Call <C1-49>	1 Ext, Cnt, Call <C1-60>	NOT WIRED	Not Assigned <C1-80>	2 Ped Call <C1-67>	6 Ped Call <C1-68>	Flash Sense <C1-81>
		2 Ext, Cnt, Call <C1-43>	2 Ext, Cnt, Call <C1-76>			4 Ext, Cnt, Call <C1-45>	4 Ext, Cnt, Call <C1-78>		3 Ext, Cnt, Call <C1-62>		Not Assigned <C1-53>	4 Ped Call <C1-69>	8 Ped Call <C1-70>	Stop Time <C1-82>
"J" FILE	5 Ext, Cnt, Call <C1-55>	6 Ext, Cnt, Call <C1-40>	6 Ext, Cnt, Call <C1-64>	6 Type 3, Call <C1-48>	7 Ext, Cnt, Call <C1-57>	8 Ext, Cnt, Call <C1-42>	8 Ext, Cnt, Call <C1-66>	8 Type 3, Call <C1-50>	5 Ext, Cnt, Call <C1-59>	NOT WIRED	Not Assigned <C1-54>	EV A Preempt <C1-71>	EV B Preempt <C1-72>	Railroad 1 <C1-51>
		6 Ext, Cnt, Call <C1-44>	6 Ext, Cnt, Call <C1-77>			8 Ext, Cnt, Call <C1-46>	8 Ext, Cnt, Call <C1-79>		7 Ext, Cnt, Call <C1-61>		Not Assigned <C1-75>	EV C Preempt <C1-73>	EV D Preempt <C1-74>	Railroad 2 <C1-52>

DETECTOR TYPES

Ext = Extension Detector
Detector is only active during the Phase's GREEN Intervals (ie, will NOT *Call* the Phase)
Cnt = Count Detector
Used in computing "Added Initial"
Call = Calling Detector
Detector is only active during the Phase's NON-GREEN Intervals (ie, will NOT *Extend* the Phase)
Type 3 = Type 3 Disconnect
Will allow a Calling Detector to Extend its Phase until the Call first drops or the "Type 3 Limit" is reached

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Traffic Signal Program 233
Initialized Detector Assignments
(Revised 8/92) 332 Cabinet



Hwy 6 (Hanlon) (North)
Field Master Subsystem Name

☐ Additional Special Timing Required
if box is checked, see additional timing sheets

FIELD MASTER ADDRESSES

COMMUNICATION ADDRESSES: (C + 0 + 0) = 1
AREA NUMBER: (C + 0 + 2) = 7
AREA ADDRESS: (C + 0 + 3) = 9

NUMBER OF LOCALS: (D + 0 + 0) = 4
(NOTE: Largest Local Communication Address Number)

EXT COMM TIMEOUT
150 ms | 1
< C+0+5 >

EXTRAS
Extra | 3
< E+E+E >
3 = auto daylight sav.
5 = extended comm

Turn On Date 18-Oct-11

Notes: _____

Manual
Plan Select:
(C + A + 1) = 0
AUTO = 0
PLAN = 1-9
FREE = 14
FLASH =15

Backup
Plan Select:
(C + A + 8) = 14
NONE = 0
PLAN = 1-9
FREE = 14
FLASH =15

Manual
Offset Select
(C + B + 1) = 0
AUTO = 0
OFFSET A = 1
OFFSET B = 2
OFFSET C = 3

Backup
Plan Select:
(C + B + 8) = 0
NONE = 0
OFFSET A = 1
OFFSET B = 2
OFFSET C = 3

A		b	
4	0	5	A

LEVEL PLAN OFFSET

Example Shown:
Level: TRAFFIC RESPONSIVE CONTROL
Calling For: PLAN 5, OFFSET A

Field Master Control Level
1 = Manual Control Plan
2 = Central Master Control
3 = Time Of Day Control
4 = Traffic Responsive Control
5 = Backup Coordination Plan

Display Locations
Central Plan = C + A + 2
Current Plan = C + A + 3
Called Plan = C + A + 4
TOD Plan = C + A + 5
Traffic Responsive Plan = C + A + 6
Central Offset = C + B + 2
Current Offset = C + B + 3
Called Offset = C + B + 4
TOD Offset = C + B + 5
Traffic Responsive Offset = C + B + 6

COORD (9 key) TIME HHMM	PLAN	OFFSET	DAY OF WEEK S	M	T	W	T	F	S
			1	2	3	4	5	6	7
0									
1	0:01	E	X	X	X	X	X	X	X
2									
3									
4									
5									
6									
7									
8									
9									
A									
B									
C									
D									
E									
F									

< C + 0 + 9 = 0.1 >

PLAN SELECT
1 thru 9 = Coordination plan
D = Traffic Responsive
E = Free
F = Flash

COORD (9 key) TIME HHMM	PLAN	OFFSET	DAY OF WEEK S	M	T	W	T	F	S
			1	2	3	4	5	6	7
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
A									
B									
C									
D									
E									
F									

< C + 0 + 9 = 0.2 >

OFFSET SELECT
A = Offset A
B = Offset B
C = Offset C

		Column F 1	2	3	4	5	6	7	8
0	Alarm Flags	X	X	X	X			X	X

< C PAGE >

ROW	LOCAL COMM. ADDRESS	AREA NUMMBER	AREA ADDRESS
	COLUMN 1	2	
0	1	1	115
1	2	1	116
2	3	1	117
3	4	1	118
4	5		
5	6		
6	7		
7	8		
8	9		
9	10		
A	11		
B	12		
C	13		
D	14		
E	15		
F	16		

DIAL OUT PHONE NUMBER
Redial Timer (D+3+E)

ROW		D
0	# of Digits	11
1	1st Digit	1
2	2nd Digit	9
3	3rd Digit	0
4	4th Digit	5
5	5th Digit	7
6	6th Digit	0
7	7th Digit	4
8	8th Digit	3
9	9th Digit	0
A	10th Digit	0
B	11th Digit	6
C		
D		
E	Redial Time	10
F		

< C Page >

Last Power Failure:
(HR-MIN-DOW) = 8+ 4
(DOM-YR-MONTH) = 8 + 5
Power Fail Counts:
(Long Failures) = F + 0 + C
(Short Failures) = F + 0 + D
Current Time:
(HR-MIN-DOW) = 8 + 0
(DOM-YR-MONTH) = 8 + 1
(MIN-SEC-1/10SEC) = 8 + F

Local Controller Communication Responses
Locals: 1 thru 8 = C + F + 1
9 thru 16 = C + F +2
17 thru 24 = C + F + 3
25 thru 32 = C + F + 4
NOTE: Shown On Call/ACTIVE Lights 1 thru 8

ALARM REPORTING
1 = Stop Time
2 = Flash Sense
3 = Keyboard Entry
5 = Ext#1 (Pin 53)
6 = Ext#2 (Pin 54)
7 = Detector Failure
8 = Comm Failure

ADDRESSING FOR LOCAL PROGRAM 233
(NOT NEEDED WITH LOCAL PROGRAM 200)
SET C + 0 + E = 16
KEYSTROKES = E + COLUMN + ROW
(E PAGE ENABLE - SET F + 0 + E > 0)

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Field Master Program ***210***
Fiield Master Timing
(Revised 12/93)

DETECTOR NUMBER	DET. FAILURE MAX ON (4)	DET. FAILURE MAX OFF (5)	DETECTOR ASSIGNMENTS COMM ADDR (9)	SYS DET NO. (A)	"K" VALUE (B)	"C" VALUE (C)
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
A						
B						
C						
D						
E						
F						

INBOUND SYSTEM DETECTOR <F PAGE>

DETECTOR NUMBER	DET. FAILURE MAX ON (4)	DET. FAILURE MAX OFF (5)	DETECTOR ASSIGNMENTS COMM ADDR (9)	SYS DET NO. (A)	"K" VALUE (B)	"C" VALUE (C)
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
A						
B						
C						
D						
E						
F						

OUTBOUND SYSTEM DETECTORS <D PAGE>

		1	2	3	4	5	6	7	8	9
0	CYCLE									
1	INCREASE PLAN									
2	DECREASE PLAN									
F	ZONE OFFSET									

PLAN SELECTION THRESHOLDS <C PAGE>

Display Movement

D
C F
A

OFFSET SELECTION THRESHOLDS

OFFSET A = OUTBOUND
OFFSET B = AVERAGE
OFFSET C = INBOUND

SYSTEM DET.
SAMPLE TIME:
(D + 0 + 3) = _____

Detector Weighting Formula

(For Each System Detector)
Weighted Value = C [(Volume) + K(Occupancy)]

	% OF INBOUND	A
A	OFFSET A to B	
B	OFFSET B to C	
C	OFFSET C to B	
D	OFFSET B to A	

<C PAGE>

System Detector Status

Failed INBOUND Detectors:
Detectors - 0 thru 7 = F + F + E
8 thru F = F + F + F
Failed OUTBOUND Detectors:
Detectors - 0 thru 7 = D + F + E
8 thru F = D + F + F
NOTE: Shown On CALL / ACTIVE Lights 1 thru 8

Power Cycle
Correction Factors

LONG FAILURE:
(F + 0 + 8) = _____

SHORT FAILURE: _____
(F + 0 + 7) =
NOTE: DO NOT Set To Zero.
Default Value = 0.5 ooo

Calculation Results

Average Inbound Volume = F + 1 + B
Average Inbound Volume = D + 1 + B
Average Inbound Volume = D + 1 + 7
Inbound/Outbound Ratio = D + 0 + F

COORDINATION

Row	Column Numbers ----> / Plan Name ---->	PLAN 1	2	3	4	5	6	7	8	9
0	Cycle Length	0	0	0	0	0	0	0	0	0
1	Phase 1 - ForceOff	0	0	0	0	0	0	0	0	0
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0
3	Phase 3 - ForceOff	0	0	0	0	0	0	0	0	0
4	Phase 4 - ForceOff	0	0	0	0	0	0	0	0	0
5	Phase 5 - ForceOff	0	0	0	0	0	0	0	0	0
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0
7	Phase 7 - ForceOff	0	0	0	0	0	0	0	0	0
8	Phase 8 - ForceOff	0	0	0	0	0	0	0	0	0
9	Ring Offset	0	0	0	0	0	0	0	0	0
A	Offset 1	0	0	0	0	0	0	0	0	0
B	Offset 2	0	0	0	0	0	0	0	0	0
C	Offset 3	0	0	0	0	0	0	0	0	0
D	Perm 1 - End	0	0	0	0	0	0	0	0	0
E	Hold Release	0	0	0	0	0	0	0	0	0
F	Zone Offset	0	0	0	0	0	0	0	0	0

Coordination - Bank 1 <C+0+C=1>

(Coord Extra Bit 1 = Programmed WALK Time for Sync Phases)

	E
Plan 1 - Sync	_2__6__
Plan 2 - Sync	_2__6__
Plan 3 - Sync	_2__6__
Plan 4 - Sync	_2__6__
Plan 5 - Sync	_2__6__
Plan 6 - Sync	_2__6__
Plan 7 - Sync	_2__6__
Plan 8 - Sync	_2__6__
Plan 9 - Sync	_2__6__
NEMA Sync	
NEMA Hold	
Coord Extra	#NAME?

Sync Phases < C+0+C = 1>

Row	Time	Plan	Offset	Day of Week
0	0:01	E	0	1,2,3,4,5,6,7
1	0:00	0	0	
2	0:00	0	0	
3	0:00	0	0	
4	0:00	0	0	
5	0:00	0	0	
6	0:00	0	0	
7	0:00	0	0	
8	0:00	0	0	
9	0:00	0	0	
A	0:00	0	0	
B	0:00	0	0	
C	0:00	0	0	
D	0:00	0	0	
E	0:00	0	0	
F	0:00	0	0	

TOD Coodination < C+0+9 = 0.1 >
(Bank 1)

Row		1	2	3	4	5	6	7	8	9
0	Ped Adjustment	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	0	0	0	0	0	0	0	0	0
2	Perm 2 - End	0	0	0	0	0	0	0	0	0
3	Perm 3 - Start	0	0	0	0	0	0	0	0	0
4	Perm 3 - End	0	0	0	0	0	0	0	0	0
5	Reservice Time	0	0	0	0	0	0	0	0	0
6	Reservice Phases									
7										
8	Pretimed Phases									
9	Max Recall									
A	Perm 1 Veh Phase	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567
B	Perm 1 Ped Phase	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567
C	Perm 2 Veh Phase									
D	Perm 2 Ped Phase									
E	Perm 3 Veh Phase									
F	Perm 3 Ped Phase									

Coordination - Bank 2 <C+0+C=2>

	F
Free Lag	_2_45__8
Plan 1 - Lag	_2_4_6_8
Plan 2 - Lag	_2_4_6_8
Plan 3 - Lag	_2_4_6_8
Plan 4 - Lag	_2_4_6_8
Plan 5 - Lag	_2_4_6_8
Plan 6 - Lag	_2_4_6_8
Plan 7 - Lag	_2_4_6_8
Plan 8 - Lag	_2_4_6_8
Plan 9 - Lag	_2_4_6_8
External Lag	

Lag Phases <C+0+C=1>

Row	Time	Plan	Offset	Day of Week
0	0:00	0	0	
1	0:00	0	0	
2	0:00	0	0	
3	0:00	0	0	
4	0:00	0	0	
5	0:00	0	0	
6	0:00	0	0	
7	0:00	0	0	
8	0:00	0	0	
9	0:00	0	0	
A	0:00	0	0	
B	0:00	0	0	
C	0:00	0	0	
D	0:00	0	0	
E	0:00	0	0	
F	0:00	0	0	

TOD Coodination < C+0+9 = 0.2 >
(Bank 2)

Row		2
0		
1	Phase 1	5
2	Phase 2	5
3	Phase 3	5
4	Phase 4	5
5	Phase 5	5
6	Phase 6	5
7	Phase 7	5
8	Phase 8	5

Coordination Transition Minimums < C+0+C = 5 >

Transition Type	0.3	< C/5+1+9 >
TBC TRANSITION		
Lag Hold Phases		< C/5+1+A >
Coordinated Lag Hold Phases		
Sync Output Time		< C/5+1+C >
7 - Wire Master		

Transition Type
0.X = Shortway
1.X = Lengthen
X.1 thru X.4 = # of cycles when lengthening

BI Tran Systems, Inc.
623 Bercut Dr., Sacramento, Calif. 95814
916/442-0200
Traffic Signal Program **233** Ontario
Timing Sheet-02
Revised: (02/06)

DATE: 18-Oct-11

LOCATION: Hwy 6 (Hanlon) @ Paisley

DEFAULT DETECTOR ASSIGNMENTS

Standard 332 Cabinet Location	Column 0	C1 PIN NUMBER	Column 1 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 2 PHASE(S) 1	2	3	4	5	6	7	8	Column 3 ASSIGNMENTS 1	2	3	4	5	6	7	8
I-2 U -->	0	39				X	X		X			X								X	X	X				X
J-2 U -->	1	40				X	X		X							X				X	X	X				X
I-6 U -->	2	41				X	X		X					X						X	X	X				X
J-6 U -->	3	42				X	X		X										X	X	X	X				X
I-2 L -->	4	43				X	X		X			X								X	X	X				X
J-2 L -->	5	44				X	X		X							X				X	X	X				X
I-6 L -->	6	45				X	X		X					X						X	X	X				X
J-6 L -->	7	46				X	X		X										X	X	X	X				X
I-4 -->	8	47						X	X			X								X	X	X				X
J-4 -->	9	48						X	X							X				X	X	X				X
I-8 -->	A	49						X	X					X						X	X	X				X
J-8 -->	B	50						X	X										X	X	X	X				X
J-1 -->	C	55				X	X		X						X					X	X	X				X
I-1 -->	D	56				X	X		X		X									X	X	X				X
J-5 -->	E	57				X	X		X								X			X	X	X				X
I-5 -->	F	58				X	X		X				X							X	X	X				X

"INITIALIZED" DETECTOR ASSIGNMENTS
< C + 0 + E = 126 >

Standard 332 Cabinet Location	Column 4	C1 PIN NUMBER	Column 5 ATTRIBUTES 1	2	3	4	5	6	7	8	Column 6 PHASE(S) 1	2	3	4	5	6	7	8	Column 7 ASSIGNMENTS 1	2	3	4	5	6	7	8
J-9 U -->	0	59				X	X		X							X				X	X	X				X
I-9 U -->	1	60				X	X		X		X									X	X	X				X
J-9 L -->	2	61				X	X		X								X			X	X	X				X
I-9 L -->	3	62				X	X		X					X						X	X	X				X
I-3 U -->	4	63				X	X		X		X									X	X	X				X
J-3 U -->	5	64				X	X		X								X			X	X	X				X
I-7 U -->	6	65				X	X		X						X					X	X	X				X
J-7 U -->	7	66				X	X		X										X	X	X	X				X
I-12 U -->	8	67		X							X									X	X	X				X
I-13 U -->	9	68		X													X			X	X	X				X
I-12 L -->	A	69		X											X					X	X	X				X
I-13 L -->	B	70		X															X	X	X	X				X
I-3 L -->	C	76				X	X		X		X									X	X	X				X
J-3 L -->	D	77				X	X		X								X			X	X	X				X
I-7 L -->	E	78				X	X		X						X					X	X	X				X
J-7 L -->	F	79				X	X		X									X		X	X	X				X

"INITIALIZED" DETECTOR ASSIGNMENTS
< C + 0 + E = 126 >

DETECTOR ATTRIBUTES

1= Full time Delay
2 = Pedestrian call
3 =
4 = Count
5 = Extention
6 = Type 3
7 = Calling
8 = Alternate

DETECTOR ASSIGNMENTS

1 = Det. Set #1
2 = Det. Set #2
3 = Det. Set #3
4 =
5 =
6 = MIN Recall On Failure
7 = MAX Recall On Failure
8 = Report On Failure

Input File --> 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
"I" FILE	1 Ext, Cnt, Call <C1-56>	2 Ext, Cnt, Call <C1-39>	2 Ext, Cnt, Call <C1-63>	2 Type 3, Call <C1-47>	3 Ext, Cnt, Call <C1-58>	4 Ext, Cnt, Call <C1-41>	4 Ext, Cnt, Call <C1-65>	4 Type 3, Call <C1-49>	1 Ext, Cnt, Call <C1-60>	NOT WIRED	Not Assigned <C1-80>	2 Ped Call <C1-67>	6 Ped Call <C1-68>	Flash Sense <C1-81>
		2 Ext, Cnt, Call <C1-43>	2 Ext, Cnt, Call <C1-76>			4 Ext, Cnt, Call <C1-45>	4 Ext, Cnt, Call <C1-78>		3 Ext, Cnt,		Not Assigned <C1-53>	4 Ped Call <C1-69>	8 Ped Call	Stop Time <C1-82>
"J" FILE	5 Ext, Cnt, Call <C1-55>	6 Ext, Cnt, Call <C1-40>	6 Ext, Cnt, Call <C1-64>	6 Type 3, Call <C1-48>	7 Ext, Cnt, Call <C1-57>	8 Ext, Cnt, Call <C1-42>	8 Ext, Cnt, Call <C1-66>	8 Type 3, Call <C1-50>	5 Ext, Cnt, Call <C1-59>	NOT WIRED	Not Assigned <C1-54>	EV A Preempt <C1-71>	EV B Preempt <C1-72>	Railroad 1 <C1-51>
		6 Ext, Cnt, Call <C1-44>	6 Ext, Cnt, Call <C1-77>			8 Ext, Cnt, Call <C1-46>	8 Ext, Cnt, Call <C1-79>		7 Ext, Cnt, Call <C1-61>		Not Assigned <C1-75>	EV C Ped Call <C1-73>	EV D Preempt <C1-74>	Railroad 2 <C1-52>

DETECTOR TYPES

Ext = Extension Detector
Detector is only active during the Phase's GREEN Intervals (ie, will NOT *Call* the Phase)
Cnt = Count Detector
Used in computing "Added Initial"
Call = Calling Detector
Detector is only active during the Phase's NON-GREEN Intervals (ie, will NOT *Extend* the Phase)
Type 3 = Type 3 Disconnect
Will allow a Calling Detector to Extend its Phase until the Call first drops or the "Type 3 Limit" is reached

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Traffic Signal Program 233
Initialized Detector Assignments
(Revised 8/92) 332 Cabinet

REFERENCE SHEET

Controller Intervals

0 = Walk	8 = Red Rest
1 = FDW	9 = Preemption
2 = Min. Green	A = Stop Time
3 =	B = Red Revert
4= Var. Initial	C = Yellow-Gap Termination
5 = Extension	D = Yellow-Max. Termination
6 =	E = Yellow-Forceoff Termination
7 = Reduce Gap	F = Red Clearance

Continuous Memory Error Monitoring

The controller's RAM and EPROM memories are continuously checked for errors. If an erro is found, the intersection will go into FLASH (via Watch Dog Timer), and one of the following will be shown on the controller's display:

bAd A = An error was detected in the CPU's RAM, or a new program has been installed on the memory module. Often caused by a bad controller "gel-cell" battery.
bAd b = An error was detected in the memory module's RAM. Often caused by a bad "lithium" battery on the memory module.
bAd E = An error was detected in the 233 Program EPROM.
bAd F = An error was detected in the Z-RAM (Dallas chip) on the memory module.

412/C Memory Module Lithium Battery Condition

To check the condition of the 3.6 volt Lithium Battery on the 412/C Memory Module:

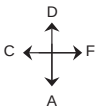
If E/112 + 0 + A = 84 - the battery is BAD
If E/112 + 0 + A = 85 - the battery is O.K.

Monitor "Activate" Flags

(Also Requires T.O.D. Function "E" Flag)
Detector Count Recording:
E/2 + 0 + 9 = Not Zero
Real Time Split Monitor:
E/2 + 0 + E = Not Zero

E Page Enable: F/1 + 9 + E = Not Zero

Display Movement Codes



A = Advance ROW
D = Decrement ROW
C = COLUMN Back
F = Forward COLUMN

Special Event Schedules

Special Event #1: C + 0 + E = 27
Special Event #2: C + 0 + E = 28

Current Interval = E + 5 + 0
Current Interval Timer = E + 5 + B
Current Interval Clearance Phases = E + 5 + C

Time of Day Function (7 Key)

Current T.O.D. "E Function" Control Bits = C/0 + E + E
Current T.O.D. "F Function" Output Bits = C/0 + E + F

Logic DELAY Gate Delay Timer Display

DELAY A Timer = C/0 + 9 +A
DELAY B Timer = C/0 + 9 + B
thru thru
DELAY F Timer = C/0 + 9 + F

Interval Timer Display

Ring A = F/0 + A + Interval Row
Ring B = F/0 + B + (Interval Row From PHASE BANK data)

Display Locations

	Plan Select	Offset Select
Manual	= C/0 + A + 1	C/0 + B + 1
Master	= C/0 + A + 2	C/0 + B + 2
Current	= C/0 + A + 3	C/0 + B + 3
Next	= C/0 + A + 4	C/0 + B + 4
TOD	= C/0 + A +5	C/0 + B + 5

Master Cycle = C/0 + A + 0
Ring A Cycle = C/0 + B + 0
Ring B Cycle = C/0 + D + 0

MIN Cycle = C/0 + A + E
MAX Cycle = C/0 + B + E

Phase Hold = C/0 + F + D
Phase Next = C/0 + F + E
Force Off = C/0 + F + F
(with Ring A Cycle Timer)

Current Calculated Cycle Length = C/0 + B + F
Current Permitted Phases = E/0 + 7 +8
Current Phase Bank = F/0 + C + E

Last Power Failure:
(HR-MIN-DOW) = 8 + 4
(DOW-YR-MONTH) = 8 + 5
Last Cabinet Flash
(HR-MIN-DOW) = 8 + 6
(DOW-YR-MONTH) = 8 + 7
Power Fail Counts:
(Long Failures) = F/1 + 0 + C
(Short Failures) = F/1 + 0 + D
Current Time:
(HR-MIN-DOW) = 8 + 0
(DOW-YR-MONTH) = 8 + 1
(MIN-SEC-1/10SEC) = 8 + F

BI Tran Systems, Inc
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Traffic Signal Program 233
"View" Locations
(Revised 03/94

APPENDIX G:
Synchro Analysis Worksheets

Synchro Results for Signalized Intersections

	Existing		Future Background 2021		Future Total 2021		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
1	**Edinburgh Rd & Wellington St W**													
EBL	0.37 (0.50) [0.30]	B (C) [C]	0.37 (0.50) [0.30]	B (C) [C]	0.37 (0.51) [0.30]	B (C) [C]	0.38 (0.53) [0.30]	B (C) [C]	0.38 (0.53) [0.30]	B (C) [C]	0.38 (0.53) [0.32]	B (C) [C]	0.38 (0.54) [0.33]	B (C) [C]
EBT	0.77 (0.64) [0.68]	C (C) [C]	0.78 (0.64) [0.68]	C (C) [C]	0.78 (0.64) [0.69]	C (C) [C]	0.78 (0.65) [0.69]	C (C) [C]	0.78 (0.65) [0.70]	C (C) [C]	0.78 (0.65) [0.70]	C (C) [C]	0.78 (0.65) [0.70]	C (C) [C]
WBL	0.56 (0.87) [0.65]	C (D) [C]	0.58 (0.87) [0.66]	C (D) [C]	0.58 (0.88) [0.66]	C (D) [C]	0.58 (0.91) [0.68]	C (E) [C]	0.58 (0.90) [0.69]	C (D) [C]	0.61 (0.92) [0.71]	C (E) [C]	0.61 (0.92) [0.71]	C (E) [C]
WBT	0.51 (0.70) [0.60]	C (C) [C]	0.51 (0.71) [0.60]	C (C) [C]	0.52 (0.71) [0.61]	C (C) [C]	0.51 (0.71) [0.61]	C (C) [C]	0.52 (0.72) [0.61]	C (C) [C]	0.52 (0.72) [0.61]	C (C) [C]	0.52 (0.72) [0.62]	C (C) [C]
NBL	0.51 (0.46) [0.22]	B (B) [B]	0.53 (0.48) [0.23]	B (B) [B]	0.55 (0.49) [0.24]	B (B) [B]	0.57 (0.50) [0.24]	B (B) [B]	0.59 (0.51) [0.24]	C (B) [B]	0.60 (0.53) [0.25]	C (B) [B]	0.62 (0.54) [0.26]	C (B) [B]
NBT	0.51 (0.47) [0.27]	C (C) [B]	0.53 (0.48) [0.27]	C (C) [B]	0.54 (0.50) [0.29]	C (C) [B]	0.55 (0.50) [0.29]	C (C) [B]	0.57 (0.52) [0.30]	C (C) [B]	0.58 (0.53) [0.30]	C (C) [B]	0.60 (0.55) [0.31]	C (C) [B]
SBL	0.20 (0.16) [0.11]	B (B) [B]	0.22 (0.17) [0.12]	B (B) [B]	0.23 (0.17) [0.13]	B (B) [B]	0.23 (0.19) [0.13]	B (B) [B]	0.24 (0.19) [0.13]	B (B) [B]	0.24 (0.19) [0.13]	B (B) [B]	0.25 (0.20) [0.13]	B (B) [B]
SBT	0.56 (0.54) [0.30]	C (C) [B]	0.57 (0.56) [0.31]	C (C) [B]	0.60 (0.59) [0.32]	C (C) [B]	0.61 (0.59) [0.32]	C (C) [B]	0.64 (0.62) [0.34]	C (C) [B]	0.64 (0.63) [0.34]	C (C) [B]	0.67 (0.66) [0.35]	C (C) [B]
Overall	**0.64 (0.69) [0.43]**	**C (C) [C]**	**0.66 (0.70) [0.44]**	**C (C) [C]**	**0.67 (0.72) [0.45]**	**C (C) [C]**	**0.68 (0.73) [0.46]**	**C (C) [C]**	**0.69 (0.75) [0.47]**	**C (C) [C]**	**0.70 (0.76) [0.48]**	**C (C) [C]**	**0.71 (0.78) [0.49]**	**C (C) [C]**
2	**Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W**													
EBL	0.36 (0.36) [0.17]	B (B) [B]	0.36 (0.38) [0.18]	B (B) [B]	0.41 (0.53) [0.30]	B (C) [B]	0.38 (0.40) [0.18]	B (B) [B]	0.43 (0.55) [0.30]	B (C) [B]	0.40 (0.40) [0.20]	B (B) [B]	0.45 (0.56) [0.32]	B (C) [B]
EBT	0.33 (0.26) [0.19]	B (B) [B]	0.33 (0.27) [0.19]	B (B) [B]	0.33 (0.26) [0.18]	B (B) [B]	0.34 (0.28) [0.20]	B (B) [B]	0.34 (0.27) [0.19]	B (B) [B]	0.35 (0.28) [0.20]	B (B) [B]	0.35 (0.27) [0.19]	B (B) [B]
WBTR	0.41 (0.50) [0.36]	C (C) [C]	0.42 (0.51) [0.36]	C (C) [C]	0.42 (0.52) [0.38]	C (C) [C]	0.43 (0.52) [0.37]	C (C) [C]	0.43 (0.54) [0.38]	C (C) [C]	0.44 (0.54) [0.38]	C (C) [C]	0.44 (0.55) [0.39]	C (C) [C]
NBL	0.28 (0.48) [0.31]	C (D) [C]	0.29 (0.50) [0.32]	C (D) [C]	0.30 (0.53) [0.35]	C (D) [D]	0.29 (0.50) [0.32]	C (D) [D]	0.31 (0.53) [0.35]	C (D) [D]	0.30 (0.52) [0.33]	C (D) [D]	0.31 (0.55) [0.36]	C (D) [D]
NBLT	0.27 (0.47) [0.31]	C (D) [C]	0.28 (0.49) [0.31]	C (D) [C]	0.29 (0.52) [0.34]	C (D) [D]	0.29 (0.50) [0.32]	C (D) [D]	0.30 (0.53) [0.35]	C (D) [D]	0.29 (0.52) [0.33]	C (D) [D]	0.31 (0.55) [0.36]	C (D) [D]
NBR	0.15 (0.09) [0.10]	B (B) [B]	0.32 (0.09) [0.10]	D (B) [B]	0.15 (0.09) [0.10]	B (B) [C]	0.34 (0.09) [0.10]	D (B) [C]	0.16 (0.09) [0.10]	B (B) [C]	0.16 (0.10) [0.10]	B (B) [B]	0.16 (0.10) [0.10]	B (B) [B]
SBL	0.00 (0.02) [0.01]	C (C) [C]	0.00 (0.02) [0.01]	C (C) [C]	0.05 (0.15) [0.13]	C (C) [C]	0.00 (0.02) [0.01]	C (C) [C]	0.05 (0.16) [0.14]	C (C) [C]	0.00 (0.02) [0.01]	C (C) [C]	0.04 (0.16) [0.14]	C (C) [C]
SBR	0.16 (0.17) [0.10]	C (C) [C]	0.17 (0.17) [0.10]	C (C) [C]	0.22 (0.22) [0.16]	C (C) [C]	0.18 (0.17) [0.11]	C (C) [C]	0.22 (0.22) [0.16]	C (C) [C]	0.18 (0.18) [0.11]	C (C) [C]	0.22 (0.23) [0.16]	C (C) [C]
Overall	**0.36 (0.47) [0.31]**	**C (C) [C]**	**0.37 (0.48) [0.32]**	**C (C) [C]**	**0.38 (0.54) [0.35]**	**C (C) [C]**	**0.39 (0.49) [0.32]**	**C (C) [C]**	**0.40 (0.56) [0.36]**	**C (C) [C]**	**0.38 (0.50) [0.33]**	**C (C) [C]**	**0.41 (0.57) [0.37]**	**C (C) [C]**
3	**Hanlon Expressway & Wellington St W**													
EBTR	0.55 (0.50) [0.29]	B (B) [A]	0.56 (0.51) [0.29]	B (B) [A]	0.57 (0.54) [0.31]	B (B) [A]	0.57 (0.53) [0.30]	B (B) [A]	0.59 (0.55) [0.32]	B (B) [A]	0.59 (0.54) [0.31]	B (B) [A]	0.60 (0.57) [0.33]	B (B) [A]
WBT	0.34 (0.49) [0.27]	B (B) [A]	0.34 (0.50) [0.28]	B (B) [A]	0.35 (0.51) [0.29]	B (B) [A]	0.35 (0.51) [0.28]	B (B) [A]	0.36 (0.53) [0.30]	B (B) [A]	0.36 (0.53) [0.29]	B (B) [A]	0.37 (0.54) [0.30]	B (B) [A]
SBL	0.14 (0.14) [0.20]	C (C) [C]	0.15 (0.15) [0.21]	C (C) [C]	0.15 (0.15) [0.21]	C (C) [C]	0.16 (0.16) [0.23]	C (C) [C]	0.16 (0.16) [0.23]	C (C) [C]	0.17 (0.18) [0.24]	C (C) [C]	0.17 (0.18) [0.24]	C (C) [C]
SBR	0.06 (0.05) [0.08]	B (B) [A]	0.06 (0.05) [0.09]	B (B) [A]	0.07 (0.06) [0.10]	B (B) [A]	0.07 (0.06) [0.09]	B (B) [A]	0.08 (0.07) [0.11]	B (B) [A]	0.07 (0.06) [0.10]	B (B) [A]	0.08 (0.07) [0.11]	B (B) [A]
Overall	**0.38 (0.35) [0.26]**	**B (B) [A]**	**0.39 (0.36) [0.27]**	**B (B) [A]**	**0.40 (0.38) [0.29]**	**B (B) [A]**	**0.41 (0.38) [0.28]**	**B (B) [A]**	**0.41 (0.39) [0.30]**	**B (B) [A]**	**0.42 (0.39) [0.29]**	**B (B) [A]**	**0.43 (0.41) [0.31]**	**B (B) [A]**
4	**Wellington St W & Imperial Rd**													
EBLT	0.64 (0.63) [0.40]	B (B) [B]	0.65 (0.66) [0.41]	B (B) [B]	0.68 (0.71) [0.45]	B (B) [B]	0.67 (0.69) [0.42]	B (B) [B]	0.70 (0.74) [0.46]	B (B) [B]	0.71 (0.72) [0.44]	B (B) [B]	0.74 (0.77) [0.48]	B (B) [B]
WBTR	0.44 (0.59) [0.40]	B (B) [B]	0.45 (0.61) [0.41]	B (B) [B]	0.48 (0.63) [0.45]	B (B) [B]	0.47 (0.63) [0.43]	B (B) [B]	0.50 (0.65) [0.46]	B (B) [B]	0.49 (0.65) [0.44]	B (B) [B]	0.51 (0.67) [0.48]	B (B) [B]
SBL	0.81 (0.76) [0.77]	D (C) [C]	0.82 (0.76) [0.77]	D (C) [C]	0.82 (0.76) [0.77]	D (C) [C]	0.83 (0.76) [0.78]	D (C) [C]	0.83 (0.76) [0.78]	D (C) [C]	0.84 (0.77) [0.79]	D (C) [C]	0.84 (0.77) [0.79]	D (C) [C]
SBR	0.05 (0.04) [0.04]	B (C) [C]	0.05 (0.04) [0.04]	B (C) [C]	0.05 (0.04) [0.04]	B (C) [C]	0.05 (0.04) [0.04]	B (C) [C]	0.05 (0.04) [0.04]	B (C) [C]	0.05 (0.04) [0.04]	B (C) [C]	0.05 (0.04) [0.04]	B (C) [C]
Overall	**0.70 (0.67) [0.52]**	**B (B) [B]**	**0.71 (0.69) [0.53]**	**B (B) [B]**	**0.73 (0.73) [0.56]**	**B (B) [B]**	**0.73 (0.71) [0.55]**	**B (B) [B]**	**0.74 (0.75) [0.57]**	**B (B) [B]**	**0.76 (0.74) [0.56]**	**B (B) [B]**	**0.78 (0.77) [0.58]**	**B (B) [B]**

Synchro Results for Signalized Intersections

	Existing		Future Background 2021		Future Total 2021		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
5						**Hanlon Expressway & Paisley Rd**								
EBL	0.70 (0.92) [0.87]	E (F) [F]	0.37 (0.55) [0.50]	D (E) [E]	0.38 (0.58) [0.54]	D (E) [E]	0.37 (0.57) [0.52]	D (E) [E]	0.38 (0.60) [0.56]	D (E) [E]	0.38 (0.56) [0.52]	D (E) [E]	0.39 (0.60) [0.56]	D (E) [E]
EBT	0.74 (0.72) [0.59]	E (E) [E]	0.77 (0.82) [0.74]	E (F) [E]	0.80 (0.86) [0.77]	E (F) [E]	0.79 (0.84) [0.74]	E (F) [E]	0.81 (0.87) [0.78]	E (F) [E]	0.79 (0.85) [0.76]	E (F) [E]	0.82 (0.88) [0.79]	E (F) [E]
WBL	0.58 (0.71) [0.57]	D (D) [D]	0.62 (0.82) [0.66]	D (E) [E]	0.70 (0.93) [0.77]	E (F) [E]	0.63 (0.84) [0.67]	D (E) [E]	0.70 (0.95) [0.79]	E (F) [E]	0.65 (0.87) [0.70]	D (E) [E]	0.72 (0.98) [0.81]	E (F) [E]
WBTR	0.24 (0.45) [0.33]	D (D) [D]	0.42 (0.81) [0.68]	E (E) [E]	0.49 (0.87) [0.76]	E (E) [E]	0.42 (0.84) [0.70]	E (E) [E]	0.49 (0.89) [0.78]	E (F) [E]	0.43 (0.83) [0.70]	E (E) [E]	0.51 (0.89) [0.78]	E (F) [E]
NBL	0.20 (0.89) [0.46]	B (E) [C]	0.44 (0.89) [0.79]	E (F) [E]	0.41 (0.93) [0.82]	E (F) [E]	0.45 (0.91) [0.81]	E (F) [E]	0.43 (0.96) [0.84]	E (F) [F]	0.46 (0.92) [0.82]	E (F) [E]	0.25 (0.97) [0.52]	C (F) [D]
NBT	0.63 (0.57) [0.55]	C (C) [C]	0.65 (0.57) [0.55]	C (C) [C]	0.67 (0.60) [0.58]	C (C) [C]	0.70 (0.62) [0.59]	C (C) [C]	0.73 (0.65) [0.62]	C (C) [C]	0.76 (0.66) [0.64]	C (C) [C]	0.79 (0.69) [0.67]	C (C) [C]
SBL	0.50 (0.59) [0.50]	E (F) [E]	0.48 (0.53) [0.44]	E (F) [E]	0.59 (0.83) [0.75]	F (F) [F]	0.48 (0.59) [0.48]	F (F) [E]	0.59 (0.87) [0.79]	F (F) [F]	0.48 (0.59) [0.49]	F (F) [E]	0.58 (0.86) [0.79]	F (F) [F]
SBT	0.54 (0.82) [0.54]	C (D) [C]	0.57 (0.87) [0.57]	C (D) [C]	0.59 (0.88) [0.58]	C (D) [C]	0.62 (0.95) [0.62]	C (D) [C]	0.63 (0.95) [0.63]	C (D) [C]	0.67 (0.99) [0.67]	C (E) [C]	0.68 (0.99) [0.68]	C (E) [C]
SBR	0.03 (0.08) [0.08]	B (C) [C]	0.03 (0.08) [0.08]	B (C) [C]	0.03 (0.08) [0.08]	C (C) [C]	0.03 (0.09) [0.08]	B (C) [C]	0.03 (0.09) [0.08]	C (C) [C]	0.03 (0.09) [0.09]	B (C) [C]	0.03 (0.09) [0.09]	C (C) [C]
Overall	**0.65 (0.88) [0.62]**	**C (D) [D]**	**0.67 (0.88) [0.65]**	**D (D) [D]**	**0.70 (0.92) [0.70]**	**D (E) [D]**	**0.71 (0.92) [0.68]**	**D (E) [D]**	**0.74 (0.97) [0.73]**	**D (E) [D]**	**0.76 (0.97) [0.72]**	**D (E) [D]**	**0.79 (1.01) [0.74]**	**D (E) [D]**
6						**Waterloo Ave & Edinburgh Rd**								
EBL	0.21 (0.33) [0.30]	C (C) [D]	0.23 (0.32) [0.33]	C (C) [D]	0.33 (0.53) [0.57]	C (C) [D]	0.23 (0.32) [0.33]	C (C) [D]	0.33 (0.54) [0.57]	C (C) [D]	0.22 (0.32) [0.32]	C (C) [D]	0.33 (0.53) [0.55]	C (C) [D]
EBTR	0.70 (0.46) [0.47]	D (C) [D]	0.70 (0.45) [0.47]	D (C) [D]	0.72 (0.47) [0.54]	D (C) [D]	0.71 (0.46) [0.47]	D (C) [D]	0.72 (0.48) [0.54]	D (C) [D]	0.71 (0.47) [0.49]	D (C) [D]	0.72 (0.49) [0.55]	D (C) [D]
WBL	0.56 (0.43) [0.41]	D (C) [D]	0.55 (0.42) [0.39]	D (C) [D]	0.55 (0.42) [0.39]	C (C) [D]	0.55 (0.42) [0.39]	D (C) [D]	0.55 (0.42) [0.39]	C (C) [D]	0.55 (0.41) [0.39]	C (C) [D]	0.55 (0.42) [0.39]	C (C) [D]
WBTR	0.36 (0.69) [0.45]	C (D) [D]	0.36 (0.70) [0.46]	C (D) [D]	0.36 (0.70) [0.52]	C (D) [D]	0.37 (0.70) [0.46]	C (D) [D]	0.37 (0.71) [0.52]	C (D) [D]	0.36 (0.70) [0.45]	C (D) [D]	0.37 (0.71) [0.50]	C (D) [D]
NBL	0.04 (0.09) [0.05]	B (A) [A]	0.05 (0.10) [0.05]	B (A) [A]	0.06 (0.14) [0.07]	B (A) [A]	0.05 (0.10) [0.06]	B (A) [A]	0.06 (0.15) [0.08]	B (A) [A]	0.05 (0.11) [0.06]	B (A) [A]	0.07 (0.16) [0.08]	B (A) [A]
NBTR	0.58 (0.57) [0.39]	C (B) [A]	0.59 (0.59) [0.39]	C (B) [A]	0.61 (0.60) [0.41]	C (B) [A]	0.61 (0.61) [0.41]	C (B) [A]	0.63 (0.62) [0.42]	C (B) [A]	0.63 (0.62) [0.42]	C (B) [A]	0.65 (0.64) [0.43]	C (B) [A]
SBL	0.12 (0.13) [0.05]	A (A) [A]	0.12 (0.15) [0.05]	A (A) [A]	0.13 (0.15) [0.05]	A (A) [A]	0.14 (0.15) [0.05]	A (A) [A]	0.15 (0.16) [0.06]	A (A) [A]	0.15 (0.16) [0.06]	A (A) [A]	0.16 (0.17) [0.07]	A (A) [A]
SBTR	0.45 (0.52) [0.35]	A (A) [A]	0.46 (0.53) [0.36]	A (B) [A]	0.49 (0.58) [0.40]	B (B) [A]	0.47 (0.55) [0.37]	A (B) [A]	0.50 (0.60) [0.41]	B (B) [A]	0.49 (0.57) [0.37]	B (B) [A]	0.52 (0.62) [0.42]	B (B) [A]
Overall	**0.61 (0.60) [0.40]**	**C (B) [B]**	**0.62 (0.61) [0.40]**	**C (B) [B]**	**0.64 (0.63) [0.43]**	**C (C) [B]**	**0.63 (0.63) [0.42]**	**C (B) [B]**	**0.66 (0.65) [0.44]**	**C (C) [B]**	**0.65 (0.64) [0.43]**	**C (B) [B]**	**0.67 (0.66) [0.45]**	**C (C) [B]**
8						**Edinburgh Rd & Paisley Rd**								
EBL	0.29 (0.37) [0.27]	B (C) [C]	0.31 (0.41) [0.29]	B (C) [C]	0.40 (0.58) [0.42]	C (C) [C]	0.32 (0.42) [0.30]	B (C) [C]	0.41 (0.60) [0.43]	C (C) [C]	0.35 (0.44) [0.32]	C (C) [C]	0.44 (0.63) [0.46]	C (D) [C]
EBTR	0.68 (0.69) [0.58]	C (C) [C]	0.69 (0.70) [0.59]	C (C) [C]	0.75 (0.76) [0.66]	C (C) [C]	0.72 (0.72) [0.61]	C (C) [C]	0.78 (0.78) [0.68]	C (C) [C]	0.73 (0.74) [0.63]	C (C) [C]	0.79 (0.80) [0.70]	C (C) [C]
WBL	0.23 (0.30) [0.14]	C (C) [B]	0.23 (0.31) [0.16]	C (C) [B]	0.27 (0.36) [0.18]	C (C) [B]	0.27 (0.32) [0.16]	C (C) [B]	0.32 (0.38) [0.19]	C (C) [B]	0.28 (0.37) [0.17]	C (C) [B]	0.33 (0.44) [0.20]	C (C) [C]
WBTR	0.52 (0.67) [0.48]	C (C) [C]	0.53 (0.69) [0.50]	C (C) [C]	0.57 (0.75) [0.57]	C (C) [C]	0.54 (0.70) [0.51]	C (C) [C]	0.58 (0.76) [0.58]	C (C) [C]	0.56 (0.72) [0.51]	C (C) [C]	0.60 (0.78) [0.59]	C (C) [C]
NBL	0.20 (0.40) [0.27]	B (B) [B]	0.21 (0.46) [0.31]	B (B) [B]	0.25 (0.58) [0.37]	B (C) [B]	0.24 (0.48) [0.31]	B (B) [B]	0.27 (0.62) [0.38]	B (C) [B]	0.25 (0.52) [0.34]	B (C) [B]	0.28 (0.68) [0.41]	B (C) [B]
NBTR	0.61 (0.67) [0.53]	B (B) [B]	0.57 (0.62) [0.49]	B (B) [B]	0.61 (0.65) [0.53]	B (B) [B]	0.59 (0.64) [0.51]	B (B) [B]	0.63 (0.68) [0.55]	B (B) [B]	0.61 (0.66) [0.52]	B (B) [B]	0.64 (0.69) [0.56]	B (B) [B]
SBL	0.35 (0.41) [0.16]	B (B) [B]	0.32 (0.37) [0.16]	B (B) [B]	0.35 (0.40) [0.17]	B (B) [B]	0.35 (0.41) [0.17]	B (B) [B]	0.38 (0.45) [0.18]	B (B) [B]	0.37 (0.43) [0.17]	B (B) [B]	0.40 (0.47) [0.19]	B (B) [B]
SBTR	0.53 (0.66) [0.50]	B (B) [B]	0.53 (0.68) [0.51]	B (B) [B]	0.56 (0.74) [0.58]	B (C) [B]	0.54 (0.70) [0.53]	B (B) [B]	0.58 (0.76) [0.59]	B (C) [B]	0.56 (0.71) [0.54]	B (B) [B]	0.59 (0.77) [0.60]	B (C) [B]
Overall	**0.63 (0.67) [0.55]**	**B (C) [B]**	**0.62 (0.69) [0.54]**	**B (C) [B]**	**0.67 (0.75) [0.61]**	**C (C) [B]**	**0.64 (0.71) [0.56]**	**B (C) [B]**	**0.69 (0.77) [0.63]**	**C (C) [B]**	**0.66 (0.72) [0.57]**	**B (C) [B]**	**0.70 (0.78) [0.64]**	**C (C) [B]**

Synchro Results for Signalized Intersections

	Existing		Future Background 2021		Future Total 2021		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031		Westwood Interchange - Future Background 2031		Westwood Interchange - Future Total 2031	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
10								**Silvercreek Pkwy & Paisley Rd**										
EBL	0.43 (0.78) [0.49]	A (C) [A]	0.38 (0.54) [0.35]	A (A) [A]	0.39 (0.68) [0.42]	A (B) [A]	0.43 (0.63) [0.36]	A (B) [A]	0.41 (0.71) [0.44]	A (B) [A]	0.45 (0.61) [0.41]	A (A) [A]	0.42 (0.73) [0.46]	A (B) [A]	0.47 (0.65) [0.42]	A (B) [A]	0.51 (0.91) [0.45]	B (D) [A]
EBT	0.34 (0.40) [0.32]	A (A) [A]	0.31 (0.34) [0.28]	A (A) [A]	0.31 (0.34) [0.29]	A (A) [A]	0.34 (0.38) [0.28]	A (A) [A]	0.32 (0.35) [0.30]	A (A) [A]	0.34 (0.33) [0.31]	A (A) [A]	0.33 (0.36) [0.30]	A (A) [A]	0.34 (0.38) [0.30]	A (A) [A]	0.36 (0.38) [0.31]	A (A) [A]
EBR	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	0.04 (0.08) [0.09]	A (A) [A]	-- (--) [--]	-- (--) [--]	0.04 (0.08) [0.09]	A (A) [A]	0.00 (0.01) [0.00]	-- (--) [--]	0.04 (0.08) [0.09]	A (A) [A]	-- (--) [--]	-- (--) [--]	0.02 (0.03) [0.04]	A (A) [A]
WBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	0.07 (0.14) [0.15]	B (B) [B]	-- (--) [--]	-- (--) [--]	0.07 (0.15) [0.15]	B (B) [B]	0.00 (0.01) [0.00]	-- (--) [--]	0.07 (0.15) [0.15]	B (B) [B]	-- (--) [--]	-- (--) [--]	0.08 (0.15) [0.15]	B (B) [B]
WBTR	0.57 (0.97) [0.61]	B (E) [C]	0.50 (0.67) [0.50]	B (B) [B]	0.51 (0.70) [0.55]	B (C) [B]	0.56 (0.77) [0.50]	B (C) [B]	0.53 (0.72) [0.55]	B (C) [B]	0.58 (0.68) [0.57]	B (B) [B]	0.55 (0.74) [0.57]	B (C) [B]	0.61 (0.81) [0.60]	B (C) [B]	0.65 (0.87) [0.55]	C (D) [B]
NBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	0.47 (0.50) [0.55]	D (D) [D]	-- (--) [--]	-- (--) [--]	0.47 (0.50) [0.55]	D (D) [D]	0.00 (0.08) [0.00]	A (D) [A]	0.47 (0.50) [0.55]	D (D) [D]	-- (--) [--]	-- (--) [--]	0.13 (0.28) [0.25]	C (C) [C]
NBTR	0.00 (0.03) [0.02]	C (C) [C]	0.25 (0.07) [0.31]	D (D) [D]	0.32 (0.25) [0.32]	D (D) [D]	0.09 (0.01) [0.31]	D (D) [D]	0.32 (0.25) [0.32]	D (D) [D]	0.25 (0.00) [0.31]	D (A) [D]	0.33 (0.25) [0.32]	D (D) [D]	0.15 (0.07) [0.25]	D (D) [D]	0.48 (0.41) [0.56]	C (D) [C]
SBL	-- (--) [--]	-- (--) [--]	0.67 (0.78) [0.70]	D (D) [D]	0.73 (0.84) [0.65]	D (D) [D]	0.52 (0.57) [0.70]	C (C) [D]	0.73 (0.84) [0.65]	D (D) [D]	0.52 (0.78) [0.53]	C (D) [C]	0.73 (0.84) [0.65]	D (D) [D]	0.50 (0.60) [0.53]	C (D) [C]	0.63 (0.72) [0.69]	C (D) [D]
SBT	0.58 (0.67) [0.62]	C (C) [C]	0.10 (0.21) [0.16]	C (C) [C]	0.24 (0.44) [0.44]	D (D) [D]	0.10 (0.21) [0.16]	C (C) [C]	0.24 (0.44) [0.44]	D (D) [D]	0.10 (0.02) [0.15]	C (C) [C]	0.23 (0.44) [0.44]	D (D) [D]	0.10 (0.14) [0.15]	C (C) [C]	0.21 (0.75) [0.69]	C (D) [D]
Overall	**0.55** **(0.85)** **[0.60]**	**B (C)** **[B]**	**0.55** **(0.71)** **[0.55]**	**B (B)** **[B]**	**0.56** **(0.76)** **[0.58]**	**C (C)** **[C]**	**0.56** **(0.72)** **[0.55]**	**B (C)** **[B]**	**0.57** **(0.78)** **[0.58]**	**C (C)** **[C]**	**0.57** **(0.76)** **[0.56]**	**B (B)** **[B]**	**0.59** **(0.80)** **[0.60]**	**C (C)** **[C]**	**0.59** **(0.76)** **[0.58]**	**B (C)** **[B]**	**0.65** **(0.92)** **[0.60]**	**B (C)** **[C]**

Synchro Results for Unsignalized Intersections

	Existing		Future Background 2021		Future Total 2021		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
7	**Waterloo Ave & Silvercreek Pkwy (Current Configuration)**													
WBL	7.7 (7.8) [7.6]	A (A) [A]	7.7 (7.7) [7.5]	A (A) [A]	8.2 (8.3) [8.1]	A (A) [A]	7.7 (7.8) [7.6]	A (A) [A]	8.2 (8.3) [8.1]	A (A) [A]	7.8 (7.8) [7.6]	A (A) [A]	8.2 (8.3) [8.1]	A (A) [A]
NBL	9.7 (10.1) [9.2]	A (B) [A]	9.7 (9.9) [9.1]	A (A) [A]	11.3 (16.4) [12.9]	B (C) [B]	9.7 (10.0) [9.1]	A (A) [A]	11.3 (16.7) [13.1]	B (C) [B]	9.8 (10.0) [9.2]	A (B) [A]	11.4 (17.0) [13.2]	B (C) [B]
7	**Waterloo Ave & Silvercreek Pkwy (Alternate Configuration)**													
WBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	17.2 (23.7) [16.4]	C (C) [C]	-- (--) [--]	-- (--) [--]	17.6 (24.4) [16.7]	C (C) [C]	-- (--) [--]	-- (--) [--]	18.0 (22.1) [16.9]	C (C) [C]
WBR	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	9.4 (10.2) [9.6]	A (B) [A]	-- (--) [--]	-- (--) [--]	9.4 (10.2) [9.6]	A (B) [A]	-- (--) [--]	-- (--) [--]	9.4 (10.2) [9.6]	A (B) [A]
SBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	8.1 (8.4) [8.1]	A (A) [A]	-- (--) [--]	-- (--) [--]	8.1 (8.4) [8.1]	A (A) [A]	-- (--) [--]	-- (--) [--]	8.1 (8.5) [8.1]	A (A) [A]
11	**Silvercreek Pkwy & North Access**													
EBLTR	-- (--) [--]	-- (--) [--]	0.0 (0.0) [0.0]	A (A) [A]	10.9 (12.7) [13.8]	B (B) [B]	0.0 (0.0) [0.0]	A (A) [A]	10.9 (12.7) [13.8]	B (B) [B]	0.0 (0.0) [0.0]	A (A) [A]	10.9 (12.7) [13.8]	B (B) [B]
WBLTR	-- (--) [--]	-- (--) [--]	0.0 (0.0) [0.0]	A (A) [A]	10.2 (11.0) [11.9]	B (B) [B]	0.0 (0.0) [0.0]	A (A) [A]	10.2 (11.0) [11.9]	B (B) [B]	0.0 (0.0) [0.0]	A (A) [A]	10.2 (11.0) [11.9]	B (B) [B]
NBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	7.5 (7.7) [7.8]	A (A) [A]	-- (--) [--]	-- (--) [--]	7.5 (7.7) [7.8]	A (A) [A]	-- (--) [--]	-- (--) [--]	7.5 (7.7) [7.8]	A (A) [A]
SBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	7.4 (7.5) [7.5]	A (A) [A]	-- (--) [--]	-- (--) [--]	7.4 (7.5) [7.5]	A (A) [A]	-- (--) [--]	-- (--) [--]	7.4 (7.5) [7.5]	A (A) [A]
12	**Silvercreek Pkwy & South Access**													
EBLTR	-- (--) [--]	-- (--) [--]	0.0 (0.0) [0.0]	A (A) [A]	10.4 (12.8) [13.9]	B (B) [B]	0.0 (0.0) [0.0]	A (A) [A]	10.4 (12.8) [13.9]	B (B) [B]	0.0 (0.0) [0.0]	A (A) [A]	10.4 (12.8) [13.9]	B (B) [B]
WBLTR	-- (--) [--]	-- (--) [--]	0.0 (0.0) [0.0]	A (A) [A]	9.9 (12.8) [12.7]	A (B) [B]	0.0 (0.0) [0.0]	A (A) [A]	9.9 (12.8) [12.7]	A (B) [B]	0.0 (0.0) [0.0]	A (A) [A]	9.9 (12.8) [12.7]	A (B) [B]
NBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	7.5 (7.7) [7.8]	A (A) [A]	-- (--) [--]	-- (--) [--]	7.5 (7.7) [7.8]	A (A) [A]	-- (--) [--]	-- (--) [--]	7.5 (7.7) [7.8]	A (A) [A]
SBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	7.3 (7.5) [7.5]	A (A) [A]	-- (--) [--]	-- (--) [--]	7.3 (7.5) [7.5]	A (A) [A]	-- (--) [--]	-- (--) [--]	7.3 (7.5) [7.5]	A (A) [A]

Synchro Queue Results for Signalized Intersections

	Existing		Future Background 2021		Future Total 2021		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031	
	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile
1	**Edinburgh Rd & Wellington St W**													
EBL	12.6 (12.3) [9.2]	19.7 (20.2) [17.0]	12.5 (12.2) [9.3]	19.5 (20.0) [17.0]	12.4 (12.1) [9.2]	19.2 (19.7) [16.8]	12.9 (12.7) [9.2]	19.5 (20.5) [16.8]	12.7 (12.6) [9.1]	19.3 (20.3) [16.6]	12.7 (12.6) [9.8]	19.2 (20.3) [17.5]	12.4 (12.4) [9.7]	19.1 (20.0) [17.3]
EBT	73.6 (52.4) [47.5]	84.5 (63.5) [59.8]	74.9 (52.8) [48.2]	85.8 (63.9) [60.6]	76.4 (53.9) [50.0]	87.3 (65.0) [62.3]	76.8 (54.5) [49.5]	86.9 (65.6) [61.8]	78.2 (55.5) [51.3]	88.3 (66.6) [63.6]	78.6 (55.5) [50.8]	88.6 (66.6) [63.3]	78.9 (56.7) [52.6]	90.1 (67.6) [65.1]
WBL	12.3 (27.5) [20.9]	19.3 (#47.7) [32.5]	12.5 (27.8) [20.8]	19.6 (#48.9) [32.3]	12.4 (27.5) [20.6]	19.4 (#48.8) [31.9]	12.4 (28.2) [21.3]	19.1 (#51.7) [32.9]	12.3 (27.9) [21.1]	18.9 (#51.3) [32.5]	12.7 (28.6) [21.9]	19.4 (#53.5) [33.5]	12.4 (28.3) [21.7]	19.2 (#53.2) [33.1]
WBT	43.3 (63.0) [44.0]	52.1 (75.2) [55.8]	44.0 (64.1) [44.5]	52.7 (76.3) [56.4]	44.7 (65.8) [46.3]	53.4 (78.0) [58.3]	44.5 (65.3) [45.7]	52.7 (77.5) [57.6]	45.3 (67.0) [47.5]	53.4 (79.2) [59.4]	45.7 (67.0) [47.1]	53.7 (79.2) [59.0]	45.7 (68.7) [48.8]	54.3 (80.8) [60.8]
NBL	20.1 (17.7) [9.0]	38.6 (35.0) [19.6]	20.7 (18.3) [9.3]	39.4 (36.0) [20.2]	20.9 (18.6) [9.4]	#41.3 (36.4) [20.5]	21.5 (19.0) [9.4]	#47.2 (37.2) [20.5]	21.7 (19.3) [9.6]	#43.4 (37.6) [20.8]	22.5 (19.8) [10.0]	#46.5 (38.6) [21.6]	23.1 (20.1) [10.2]	#50.9 (39.1) [21.9]
NBT	47.3 (46.9) [25.2]	73.1 (73.4) [42.1]	48.9 (48.2) [25.8]	74.5 (75.4) [42.7]	50.3 (50.1) [27.1]	75.9 (78.1) [44.8]	51.0 (50.1) [27.0]	76.6 (78.4) [44.6]	52.5 (52.0) [28.4]	78.3 (80.9) [46.7]	53.2 (52.5) [28.0]	78.8 (81.6) [46.1]	55.5 (54.5) [29.3]	#81.7 (84.5) [48.1]
SBL	3.8 (3.9) [2.9]	7.7 (m7.6) [7.8]	4.2 (3.8) [3.2]	8.1 (m7.6) [8.1]	4.2 (3.9) [3.1]	8.5 (m8.6) [7.1]	4.4 (4.1) [3.3]	8.5 (m8.5) [8.4]	4.1 (4.2) [3.1]	m8.3 (m9.3) [7.2]	4.3 (4.1) [3.4]	8.4 (m8.7) [8.3]	4.3 (4.2) [3.1]	m8.0 (m9.5) [7.4]
SBT	50.2 (51.5) [30.8]	69.9 (66.0) [49.4]	51.6 (52.3) [31.4]	71.0 (67.7) [50.3]	54.0 (50.9) [33.2]	67.3 (72.0) [52.7]	54.2 (56.0) [32.4]	73.2 (70.2) [51.7]	56.5 (54.4) [34.1]	67.5 (#77.2) [54.2]	56.1 (60.1) [34.0]	71.4 (#78.0) [53.9]	58.3 (57.2) [35.6]	66.7 (#89.5) [56.4]
2	**Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W**													
EBL	18.7 (16.5) [9.2]	29.7 (26.8) [16.5]	18.7 (17.4) [9.7]	29.7 (28.0) [17.3]	21.4 (25.1) [16.1]	33.3 (38.1) [26.1]	19.3 (18.0) [9.7]	30.7 (28.6) [17.3]	22.1 (25.7) [16.1]	34.3 (39.5) [26.1]	20.0 (18.0) [10.3]	31.5 (28.6) [18.1]	22.7 (25.7) [16.8]	35.0 (41.5) [27.2]
EBT	45.2 (36.1) [24.6]	54.4 (44.1) [31.2]	46.1 (36.8) [25.0]	55.3 (44.9) [31.6]	46.1 (35.4) [23.9]	55.3 (43.3) [30.4]	47.5 (38.0) [25.7]	56.8 (46.2) [32.5]	47.5 (36.5) [24.7]	56.8 (44.7) [31.3]	49.1 (38.9) [26.5]	58.7 (47.1) [33.3]	49.1 (37.4) [25.4]	58.7 (45.6) [32.2]
WBTR	56.0 (73.2) [48.5]	68.3 (87.3) [59.8]	56.9 (74.5) [49.5]	69.3 (88.7) [61.0]	57.7 (76.3) [50.7]	70.3 (90.6) [62.3]	58.4 (76.9) [50.8]	70.9 (91.3) [62.4]	59.1 (78.6) [51.9]	71.8 (93.1) [63.6]	60.2 (79.4) [52.4]	73.0 (94.0) [64.2]	61.0 (81.0) [53.6]	74.0 (95.8) [65.7]
NBL	29.8 (57.5) [34.4]	49.0 (86.0) [55.4]	30.6 (59.8) [35.5]	50.3 (89.0) [56.8]	32.5 (64.3) [39.6]	52.6 (94.7) [62.4]	31.0 (60.8) [36.3]	50.8 (90.4) [57.7]	33.1 (65.0) [40.4]	53.4 (96.0) [63.2]	32.0 (62.4) [36.7]	52.1 (92.5) [58.3]	33.3 (67.0) [41.0]	54.0 (98.6) [64.3]
NBLT	30.9 (58.1) [35.0]	50.4 (86.6) [56.0]	31.3 (59.8) [35.5]	50.9 (88.9) [56.5]	33.3 (65.2) [40.0]	53.6 (96.0) [62.3]	32.3 (62.0) [37.1]	52.2 (91.8) [58.9]	34.1 (67.4) [41.6]	54.7 (98.8) [64.7]	32.5 (64.5) [37.8]	52.7 (94.8) [60.0]	35.0 (69.6) [42.2]	56.0 (101.7) [65.2]
NBR	0.0 (0.0) [0.0]	11.3 (9.0) [9.4]	24.7 (0.0) [0.0]	49.5 (9.1) [9.6]	0.0 (0.0) [0.0]	11.4 (9.1) [16.1]	27.5 (0.0) [0.0]	52.9 (9.2) [16.1]	0.0 (0.0) [0.0]	11.5 (9.2) [16.1]	0.0 (0.0) [0.0]	11.5 (9.5) [9.6]	0.0 (0.0) [0.0]	11.5 (9.5) [9.6]
SBL	0.2 (0.9) [0.6]	1.7 (4.2) [3.0]	0.2 (0.9) [0.6]	1.7 (4.2) [3.0]	3.3 (7.7) [8.7]	9.5 (17.4) [18.8]	0.2 (0.9) [0.6]	1.7 (4.2) [3.0]	3.3 (7.8) [8.7]	9.5 (17.5) [18.9]	0.2 (0.9) [0.6]	1.7 (4.2) [3.0]	3.0 (7.8) [8.7]	8.7 (17.6) [18.9]
SBR	0.0 (0.0) [0.0]	17.2 (17.2) [14.1]	0.0 (0.0) [0.0]	17.5 (17.4) [14.1]	0.0 (0.0) [0.0]	19.0 (19.4) [17.0]	0.0 (0.0) [0.0]	17.5 (17.3) [14.5]	0.0 (0.0) [0.0]	19.2 (19.4) [17.0]	0.0 (0.0) [0.0]	17.9 (17.7) [14.6]	0.0 (0.0) [0.0]	19.2 (19.6) [17.4]
3	**Hanlon Expressway & Wellington St W**													
EBTR	58.8 (51.6) [14.6]	72.6 (64.6) [20.6]	60.2 (53.5) [15.1]	74.5 (66.6) [21.2]	62.7 (57.9) [17.6]	77.3 (71.6) [24.1]	62.8 (55.7) [15.7]	77.5 (69.3) [22.0]	65.3 (60.3) [18.2]	80.4 (74.4) [25.1]	65.1 (57.9) [16.5]	80.0 (71.6) [22.8]	67.7 (62.6) [19.0]	83.0 (77.0) [26.1]
WBT	35.4 (59.2) [21.4]	44.6 (71.7) [27.8]	36.2 (60.3) [21.9]	45.6 (72.9) [28.3]	37.8 (62.4) [23.1]	47.4 (75.3) [29.7]	37.5 (62.7) [22.6]	47.1 (75.6) [29.2]	39.2 (64.7) [23.7]	48.9 (77.8) [30.5]	38.6 (64.7) [23.2]	48.4 (77.8) [29.9]	40.2 (66.8) [24.3]	50.2 (80.1) [31.3]
SBL	11.5 (12.3) [10.5]	19.0 (19.9) [18.4]	12.1 (12.8) [10.9]	19.8 (20.6) [19.0]	12.1 (12.8) [10.9]	19.8 (20.6) [19.0]	13.2 (13.9) [12.1]	21.2 (22.2) [20.6]	13.2 (13.9) [12.1]	21.2 (22.2) [20.6]	14.0 (15.2) [12.8]	22.3 (23.7) [21.5]	14.0 (15.2) [12.8]	22.3 (23.7) [21.5]
SBR	0.0 (0.0) [0.0]	7.4 (6.9) [5.9]	0.0 (0.0) [0.0]	7.6 (6.9) [6.1]	0.0 (0.0) [0.0]	8.1 (7.6) [6.5]	0.0 (0.0) [0.0]	7.8 (7.4) [6.3]	0.0 (0.0) [0.0]	8.3 (7.9) [6.7]	0.0 (0.0) [0.0]	8.1 (7.6) [6.5]	0.0 (0.0) [0.0]	8.6 (8.1) [6.9]
4	**Wellington St W & Imperial Rd**													
EBLT	55.6 (48.8) [27.4]	86.8 (85.2) [48.0]	57.3 (52.1) [28.5]	89.0 (90.7) [49.1]	60.3 (57.6) [31.8]	93.6 (#102.1) [54.5]	60.1 (54.8) [29.8]	91.9 (96.1) [50.6]	63.1 (60.6) [33.3]	96.7 (#118.7) [56.2]	65.0 (58.5) [31.1]	97.5 (#113.8) [52.1]	68.8 (64.7) [34.6]	103.8 (#125.6) [57.8]
WBTR	36.6 (52.7) [28.1]	57.5 (89.5) [50.3]	38.3 (54.9) [29.2]	59.4 (92.9) [51.7]	41.5 (59.3) [34.2]	64.1 (99.7) [58.8]	40.1 (57.8) [31.1]	61.3 (97.7) [53.7]	43.5 (62.5) [36.0]	66.2 (104.7) [60.9]	42.3 (61.2) [33.0]	63.1 (102.5) [56.0]	45.8 (66.0) [38.0]	68.2 (110.1) [63.3]
SBL	62.5 (52.5) [55.6]	89.7 (73.0) [76.7]	63.4 (53.4) [56.4]	91.3 (74.2) [78.3]	63.4 (53.4) [56.4]	91.3 (74.2) [78.3]	64.9 (54.0) [57.8]	94.0 (75.0) [80.5]	64.9 (54.0) [57.8]	94.0 (75.0) [80.5]	67.0 (55.6) [59.1]	98.4 (76.7) [83.1]	67.0 (55.6) [59.1]	98.4 (76.7) [83.1]
SBR	0.0 (0.0) [0.0]	7.9 (7.6) [7.2]	0.0 (0.0) [0.0]	7.9 (7.6) [7.2]	0.0 (0.0) [0.0]	7.9 (7.6) [7.2]	0.0 (0.0) [0.0]	7.9 (7.6) [7.2]	0.0 (0.0) [0.0]	7.9 (7.6) [7.2]	0.0 (0.0) [0.0]	8.3 (7.5) [7.5]	0.0 (0.0) [0.0]	8.3 (7.5) [7.5]

Synchro Queue Results for Signalized Intersections

	Existing		Future Background 2021		Future Total 2021		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031	
	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile	50th Percentile	95th Percentile
5						**Hanlon Expressway & Paisley Rd**								
EBL	28.7 (39.2) [40.6]	52.0 (#84.6) [#83.5]	24.0 (30.6) [33.4]	41.3 (49.0) [52.2]	24.5 (30.6) [33.4]	41.3 (49.0) [52.2]	24.0 (32.0) [34.8]	41.3 (50.4) [54.4]	24.5 (32.0) [34.8]	41.3 (50.4) [54.4]	25.3 (31.4) [34.8]	43.0 (49.8) [54.4]	25.8 (31.4) [34.8]	43.0 (49.8) [54.4]
EBT	50.6 (60.9) [47.8]	71.1 (83.3) [67.5]	53.9 (65.5) [52.4]	75.2 (85.2) [71.1]	58.8 (70.7) [58.4]	79.0 (#95.3) [76.8]	56.0 (67.5) [53.5]	78.0 (87.5) [72.3]	60.7 (72.7) [59.4]	81.3 (#99.0) [78.1]	57.1 (68.9) [55.7]	79.0 (#90.1) [74.6]	61.9 (74.0) [61.4]	82.3 (#101.7) [80.4]
WBL	40.7 (60.3) [47.1]	61.9 (86.1) [69.6]	44.7 (65.5) [51.3]	68.8 (93.3) [75.2]	53.3 (77.2) [63.9]	78.4 (#117.7) [91.3]	44.7 (67.1) [52.8]	68.8 (#99.2) [77.2]	53.3 (78.9) [65.5]	78.4 (#125.1) [93.4]	46.4 (69.7) [54.3]	71.0 (#98.0) [79.2]	54.8 (81.6) [67.1]	80.7 (#133.1) [95.2]
WBTR	26.7 (65.8) [44.2]	38.4 (83.1) [58.7]	33.7 (82.1) [56.5]	50.6 (#115.4) [77.6]	42.4 (94.1) [69.9]	61.2 (#140.0) [#94.3]	34.6 (85.5) [58.8]	51.5 (#124.3) [80.3]	43.5 (97.7) [72.3]	62.4 (#148.5) [#102.1]	35.7 (86.5) [59.7]	53.2 (#125.4) [81.4]	44.6 (98.6) [73.3]	63.7 (#149.5) [#104.4]
NBL	11.0 (45.3) [29.1]	19.5 (#81.3) [42.0]	25.9 (74.1) [61.2]	40.1 (#107.6) [#87.2]	26.6 (74.1) [63.0]	40.1 (#107.6) [#87.2]	26.9 (76.3) [63.5]	41.0 (#112.0) [#91.3]	27.6 (76.3) [65.1]	41.0 (#112.0) [#91.3]	27.9 (77.6) [65.8]	42.3 (#114.2) [#95.4]	14.0 (77.6) [33.5]	21.1 (#114.2) [44.1]
NBT	134.5 (121.4) [113.1]	184.1 (156.1) [146.3]	149.6 (130.3) [116.3]	199.7 (155.6) [153.6]	163.0 (132.8) [128.0]	199.7 (155.6) [153.6]	170.5 (147.6) [132.1]	224.8 (174.1) [170.6]	185.3 (149.5) [143.3]	224.8 (174.1) [170.6]	196.7 (162.5) [150.4]	255.3 (191.1) [190.4]	214.0 (164.8) [161.8]	255.3 (191.1) [190.4]
SBL	7.4 (13.8) [11.2]	18.8 (29.3) [25.0]	8.4 (15.7) [11.9]	20.2 (30.5) [25.5]	15.3 (34.2) [30.2]	30.8 (#69.6) [#60.3]	8.4 (17.8) [13.6]	20.2 (33.5) [28.0]	15.4 (36.0) [32.0]	30.8 (#73.9) [#64.6]	8.4 (17.4) [13.7]	20.2 (33.1) [28.0]	15.5 (35.7) [32.1]	30.8 (#73.2) [#64.6]
SBT	99.4 (206.1) [109.5]	136.8 (257.4) [140.9]	114.0 (236.3) [120.5]	152.2 (271.9) [152.6]	122.7 (236.3) [126.8]	152.2 (271.9) [152.6]	127.5 (270.3) [135.6]	168.2 (#324.6) [169.2]	137.1 (270.3) [141.7]	168.2 (#324.6) [169.2]	144.3 (296.4) [153.1]	187.3 (#354.1) [187.7]	155.1 (296.4) [159.2]	187.3 (#354.1) [187.7]
SBR	0.0 (0.0) [0.0]	0.0 (13.0) [12.4]	0.0 (0.0) [0.0]	0.0 (12.7) [12.7]	0.0 (0.0) [0.0]	0.0 (12.7) [12.7]	0.0 (0.0) [0.0]	0.0 (12.7) [12.7]	0.0 (0.0) [0.0]	0.0 (12.7) [12.7]	0.0 (0.0) [0.0]	0.0 (12.8) [12.7]	0.0 (0.0) [0.0]	0.0 (12.8) [12.7]
6						**Waterloo Ave & Edinburgh Rd**								
EBL	8.1 (7.3) [7.2]	16.3 (16.1) [16.4]	9.0 (7.1) [7.8]	17.7 (15.8) [17.6]	13.9 (12.4) [14.3]	24.5 (24.5) [27.4]	9.0 (7.1) [7.8]	17.7 (15.7) [17.6]	13.8 (12.4) [14.3]	24.4 (24.5) [27.4]	8.9 (7.1) [7.8]	17.5 (15.6) [17.6]	13.8 (12.3) [14.2]	24.2 (24.4) [27.2]
EBTR	45.6 (27.6) [15.9]	65.1 (43.5) [31.1]	46.9 (27.5) [16.5]	66.3 (43.1) [31.7]	50.7 (30.1) [21.1]	70.0 (45.9) [37.7]	47.7 (28.5) [16.5]	67.3 (44.2) [31.7]	51.6 (31.0) [21.1]	71.3 (46.8) [37.7]	48.6 (29.4) [17.5]	68.2 (45.0) [33.2]	52.4 (31.9) [22.2]	72.2 (47.9) [39.5]
WBL	13.5 (15.0) [10.2]	26.3 (27.2) [21.4]	13.3 (14.7) [9.8]	25.8 (26.4) [20.7]	13.1 (14.5) [9.7]	25.6 (26.1) [20.3]	13.3 (14.6) [9.8]	25.8 (26.4) [20.7]	13.1 (14.5) [9.7]	25.4 (26.1) [20.3]	13.2 (14.6) [9.8]	25.7 (26.3) [20.7]	13.0 (14.4) [9.6]	25.4 (26.0) [20.3]
WBTR	21.1 (44.6) [14.5]	34.4 (64.3) [30.3]	21.4 (46.1) [15.4]	34.6 (65.9) [31.4]	23.1 (49.6) [20.0]	36.1 (69.3) [36.6]	22.5 (46.9) [15.4]	35.9 (66.5) [31.4]	23.9 (50.4) [20.0]	37.1 (70.0) [36.6]	22.4 (47.9) [15.3]	35.7 (67.5) [31.2]	23.8 (51.3) [19.8]	36.8 (71.2) [36.4]
NBL	1.1 (1.4) [1.0]	m7.1 (m4.8) [2.9]	1.4 (1.5) [1.0]	m7.3 (m5.6) [2.9]	1.9 (1.9) [1.4]	m8.6 (m7.5) [4.1]	1.6 (1.5) [1.2]	m6.9 (m6.0) [3.2]	2.2 (1.9) [1.6]	m8.5 (m8.1) [4.7]	1.8 (1.5) [1.2]	m6.8 (m6.4) [3.1]	2.6 (1.9) [1.6]	m8.1 (m8.5) [5.6]
NBTR	78.5 (47.9) [24.5]	149.3 (105.0) [70.8]	82.2 (49.7) [25.1]	151.0 (108.9) [73.3]	85.1 (50.3) [25.8]	152.2 (111.8) [78.8]	89.5 (52.9) [26.9]	155.5 (116.2) [80.3]	92.2 (53.4) [27.2]	156.6 (119.4) [84.9]	95.2 (55.8) [27.9]	159.1 (122.0) [84.5]	100.9 (56.9) [28.5]	160.3 (125.2) [89.3]
SBL	2.8 (2.9) [1.2]	9.4 (9.6) [4.2]	2.7 (3.2) [1.2]	9.2 (10.6) [4.1]	2.9 (3.4) [1.3]	9.8 (11.1) [4.6]	3.2 (3.3) [1.2]	10.6 (10.8) [4.1]	3.4 (3.5) [1.3]	11.3 (11.4) [4.6]	3.2 (3.4) [1.4]	10.8 (11.1) [4.7]	3.4 (3.5) [1.5]	11.6 (11.7) [5.2]
SBTR	42.6 (53.8) [23.9]	83.1 (103.2) [45.9]	44.1 (56.3) [24.7]	86.4 (108.5) [47.7]	49.6 (65.0) [29.7]	96.3 (124.6) [58.7]	46.2 (59.1) [25.9]	89.7 (113.4) [49.3]	51.5 (67.7) [30.9]	100.2 (130.0) [60.8]	48.8 (62.5) [27.0]	94.7 (120.4) [51.6]	54.4 (72.0) [32.5]	105.4 (138.5) [62.9]
8						**Edinburgh Rd & Paisley Rd**								
EBL	9.6 (10.2) [10.2]	21.6 (22.9) [22.8]	10.1 (10.5) [10.6]	23.3 (25.4) [23.6]	12.4 (13.3) [13.8]	28.1 (#34.5) [30.1]	10.1 (10.5) [10.6]	23.3 (25.5) [23.7]	12.5 (13.4) [13.9]	m28.1 (#35.6) [30.3]	10.9 (10.6) [11.3]	24.9 (25.9) [25.0]	13.3 (13.5) [14.6]	m29.5 (#36.9) [32.1]
EBTR	52.4 (56.3) [45.3]	85.5 (92.6) [70.7]	57.1 (59.1) [47.6]	91.7 (95.2) [78.2]	64.1 (66.2) [55.2]	#106.9 (#110.8) [89.1]	60.0 (61.3) [49.4]	#98.6 (#100.4) [81.0]	67.6 (68.6) [57.4]	#113.7 (#115.1) [92.3]	61.3 (63.3) [51.2]	#100.7 (#104.4) [83.7]	68.6 (70.6) [59.3]	#115.3 (#118.5) [95.2]
WBL	5.3 (6.4) [3.6]	14.1 (16.6) [10.3]	5.2 (6.4) [3.9]	13.9 (16.8) [10.9]	5.3 (6.6) [4.0]	14.5 (17.7) [11.2]	5.8 (6.5) [3.9]	15.3 (17.0) [11.0]	5.9 (6.6) [4.0]	16.1 (18.0) [11.3]	5.8 (7.3) [4.0]	15.4 (18.8) [11.1]	6.0 (7.5) [4.0]	16.3 (20.3) [11.4]
WBTR	35.1 (51.6) [32.9]	59.6 (82.6) [55.7]	36.0 (53.5) [34.3]	61.0 (85.5) [57.9]	39.4 (60.0) [41.0]	66.0 (#104.0) [67.4]	36.8 (54.4) [35.3]	62.1 (86.9) [59.1]	40.3 (61.0) [41.8]	67.1 (#106.3) [68.7]	38.2 (56.2) [36.0]	64.2 (89.4) [60.2]	41.7 (62.7) [42.6]	69.3 (#109.8) [69.8]
NBL	5.5 (8.8) [8.2]	13.7 (22.5) [18.8]	5.9 (10.1) [9.2]	14.1 (25.6) [20.5]	6.5 (11.5) [10.0]	15.4 (#36.7) [22.8]	6.4 (10.3) [9.3]	15.2 (26.8) [20.7]	6.9 (11.8) [10.1]	16.5 (#38.7) [23.2]	6.5 (11.0) [9.8]	15.4 (29.3) [21.9]	7.0 (13.0) [10.8]	16.7 (#42.4) [24.9]
NBTR	54.9 (64.3) [46.9]	88.0 (102.1) [74.6]	51.1 (58.6) [42.9]	80.6 (91.4) [67.7]	55.9 (63.4) [47.8]	87.9 (99.2) [74.9]	53.3 (61.8) [44.8]	84.0 (96.5) [70.5]	58.2 (66.8) [49.8]	91.5 (104.1) [78.0]	55.5 (63.5) [46.2]	87.5 (99.1) [72.7]	60.6 (68.5) [51.1]	95.0 (106.8) [79.9]
SBL	8.2 (9.0) [4.2]	19.8 (22.5) [10.8]	8.1 (8.7) [4.4]	19.2 (20.9) [11.1]	8.2 (8.8) [4.5]	20.0 (22.0) [11.3]	8.7 (9.4) [4.5]	20.6 (23.1) [11.2]	8.8 (9.7) [4.5]	21.7 (24.7) [11.5]	8.7 (9.5) [4.5]	21.1 (23.6) [11.3]	8.9 (9.8) [4.5]	22.2 (25.3) [11.5]
SBTR	44.2 (63.8) [42.4]	70.6 (100.2) [67.5]	44.9 (66.2) [44.1]	71.5 (103.9) [69.9]	48.6 (75.9) [51.6]	77.4 (119.5) [81.7]	46.5 (69.0) [45.4]	73.9 (108.4) [72.1]	50.0 (79.0) [53.1]	79.5 (124.5) [83.6]	48.7 (70.7) [47.0]	77.3 (110.9) [74.2]	52.1 (81.0) [54.4]	82.8 (127.8) [86.0]

Synchro Queue Results for Signalized Intersections

	Existing		Future Background 2021		Future Total 2021		Future Background 2026		Future Total 2026		Future Background 2031		Future Total 2031		Westwood Interchange Future Background 2031		Westwood Interchange Future Total 2031	
	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile	50th %ile	95th %ile
10	**Silvercreek Pkwy & Paisley Rd**																	
EBL	9.2 (28.6) [10.6]	19.0 (#68.8) [21.2]	4.7 (7.0) [4.9]	20.5 (27.8) [20.2]	11.8 (18.3) [13.0]	24.7 (34.6) [25.1]	9.7 (14.2) [5.0]	21.8 (32.4) [20.6]	12.2 (18.8) [13.4]	25.4 (#41.0) [25.8]	9.3 (7.3) [9.5]	21.5 (24.9) [21.1]	12.5 (19.1) [13.8]	26.0 (#41.2) [26.5]	9.3 (13.6) [9.5]	19.9 (28.2) [20.6]	14.7 (31.8) [16.2]	26.6 (#81.8) [26.5]
EBT	21.2 (29.5) [21.4]	38.4 (51.5) [37.9]	12.0 (14.3) [11.3]	40.7 (45.9) [36.4]	25.5 (30.5) [24.2]	47.9 (54.4) [43.1]	21.6 (25.5) [11.7]	43.2 (53.0) [37.7]	26.3 (31.5) [25.2]	49.5 (55.9) [44.6]	21.2 (14.8) [19.3]	43.5 (41.6) [38.4]	27.2 (32.6) [25.7]	51.3 (57.7) [45.5]	21.2 (24.9) [19.0]	40.7 (48.0) [37.2]	31.6 (37.4) [29.6]	52.6 (57.7) [45.5]
EBR	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	0.0 (0.0) [0.0]	4.4 (6.7) [6.7]	-- (--) [--]	-- (--) [--]	0.0 (0.0) [0.0]	4.4 (6.7) [6.7]	-- (--) [--]	-- (--) [--]	0.0 (0.0) [0.0]	4.2 (6.7) [6.7]	-- (--) [--]	-- (--) [--]	0.0 (0.0) [0.0]	0.2 (3.0) [3.7]
WBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	3.2 (6.9) [7.0]	10.0 (16.5) [17.5]	-- (--) [--]	-- (--) [--]	3.3 (7.0) [7.0]	10.0 (16.6) [17.3]	0.0 (0.3) [0.0]	0.0 (2.2) [0.0]	3.3 (7.3) [7.1]	10.0 (16.6) [17.4]	-- (--) [--]	-- (--) [--]	3.7 (6.8) [7.4]	10.3 (15.4) [16.4]
WBTR	54.6 (~126.3) [68.5]	79.8 (#142.1) [80.1]	29.5 (48.5) [31.2]	84.3 (126.8) [85.6]	49.7 (84.7) [54.1]	93.8 (#146.6) [97.2]	45.0 (73.5) [31.9]	90.9 (#158.1) [86.9]	52.6 (89.7) [55.1]	98.2 (#161.7) [97.7]	45.4 (57.5) [46.2]	92.1 (124.8) [91.7]	55.2 (95.7) [58.0]	102.6 (#166.3) [102.0]	48.7 (80.3) [49.4]	95.3 (#167.5) [96.9]	67.3 (108.6) [59.8]	114.2 (#184.4) [93.9]
NBL	-- (--) [--]	-- (--) [--]	-- (--) [--]	-- (--) [--]	15.2 (14.9) [19.0]	26.6 (26.6) [32.5]	-- (--) [--]	-- (--) [--]	15.2 (14.9) [19.0]	26.6 (26.6) [32.5]	0.0 (0.3) [0.0]	0.0 (2.3) [0.0]	15.2 (14.9) [19.0]	26.6 (26.6) [32.5]	-- (--) [--]	-- (--) [--]	4.0 (6.4) [6.2]	9.5 (14.9) [13.2]
NBTR	0.1 (0.4) [0.8]	1.2 (2.0) [3.0]	2.0 (0.3) [1.2]	9.1 (2.4) [6.6]	6.4 (5.7) [7.4]	20.2 (18.9) [22.6]	1.9 (0.3) [1.2]	7.7 (2.0) [6.6]	6.4 (5.7) [7.4]	20.2 (18.9) [22.6]	2.3 (0.0) [1.4]	9.1 (0.0) [6.6]	6.6 (5.7) [7.4]	20.6 (18.9) [22.6]	0.6 (0.3) [1.1]	3.7 (2.4) [5.1]	12.2 (14.8) [14.4]	34.9 (32.1) [26.1]
SBL	-- (--) [--]	-- (--) [--]	26.2 (~38.1) [29.7]	45.4 (56.7) [50.5]	28.7 (36.8) [31.8]	44.7 (#56.6) [49.6]	26.2 (34.1) [29.7]	45.2 (56.3) [50.5]	28.7 (36.8) [31.8]	44.7 (#56.6) [49.6]	26.2 (~38.1) [29.7]	45.4 (57.6) [50.5]	28.7 (36.8) [31.8]	44.7 (#56.6) [49.6]	26.2 (34.1) [29.7]	45.6 (56.9) [50.5]	28.0 (34.2) [29.7]	45.6 (#59.7) [49.6]
SBT	15.3 (20.0) [17.6]	22.7 (23.6) [22.3]	0.1 (0.4) [0.7]	14.6 (21.2) [18.6]	4.0 (7.4) [10.2]	21.7 (36.1) [35.2]	0.2 (0.5) [0.7]	16.5 (24.5) [18.6]	4.0 (7.4) [10.2]	21.7 (36.1) [35.2]	0.1 (0.4) [0.5]	14.6 (3.1) [18.4]	3.8 (7.4) [10.2]	21.5 (36.1) [35.2]	0.1 (0.4) [0.7]	14.7 (17.9) [18.7]	7.3 (35.6) [30.2]	23.7 (#85.4) [#68.3]

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	765	0	108	500	0	173	546	0	55	506	0
Future Volume (vph)	110	765	0	108	500	0	173	546	0	55	506	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3471	1810	1703	3438	0	1752	3539	0	1703	3505	0
Flt Permitted	0.349			0.163			0.293			0.375		
Satd. Flow (perm)	654	3471	1810	292	3438	0	538	3539	0	664	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Adj. Flow (vph)	124	860	0	121	562	0	194	613	0	62	569	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	860	0	121	562	0	194	613	0	62	569	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

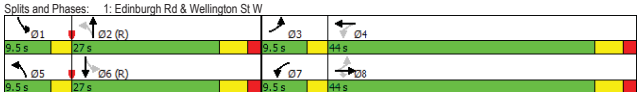
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4			2			6		
Detector Phase	3	8	8	7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0	44.0	9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%	48.9%	10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0	38.0	6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	38.3	28.8		38.3	28.8		42.1	31.0		36.6	26.2	
Actuated g/C Ratio	0.43	0.32		0.43	0.32		0.47	0.34		0.41	0.29	
v/c Ratio	0.34	0.77		0.54	0.51		0.49	0.50		0.18	0.56	
Control Delay	15.8	32.4		22.1	25.9		20.5	27.4		11.7	27.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.8	32.4		22.1	25.9		20.5	27.4		11.7	27.1	
LOS	B	C		C	C		C	C		B	C	
Approach Delay		30.3			25.3			25.7			25.6	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 27.1		Intersection LOS: C	
Intersection Capacity Utilization 67.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	124	860	121	562	194	613	62	569
v/c Ratio	0.34	0.77	0.54	0.51	0.49	0.50	0.18	0.56
Control Delay	15.8	32.4	22.1	25.9	20.5	27.4	11.7	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	32.4	22.1	25.9	20.5	27.4	11.7	27.1
Queue Length 50th (m)	12.6	73.6	12.3	43.3	20.1	47.3	3.8	50.2
Queue Length 95th (m)	19.7	84.5	19.3	52.1	38.6	73.1	7.7	69.9
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	360	1465	226	1451	392	1219	358	1021
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.59	0.54	0.39	0.49	0.50	0.17	0.56

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	765	0	108	500	0	173	546	0	55	506	0
Future Volume (vph)	110	765	0	108	500	0	173	546	0	55	506	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1785	3471		1703	3438		1751	3539		1694	3505	
Flt Permitted	0.35	1.00		0.16	1.00		0.29	1.00		0.38	1.00	
Satd. Flow (perm)	655	3471		292	3438		540	3539		669	3505	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	124	860	0	121	562	0	194	613	0	62	569	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	124	860	0	121	562	0	194	613	0	62	569	0
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4			2			6		
Actuated Green, G (s)	35.3	28.8		35.3	28.8		39.7	30.5		32.5	26.3	
Effective Green, g (s)	35.3	28.8		35.3	28.8		39.7	30.5		32.5	26.3	
Actuated g/C Ratio	0.39	0.32		0.39	0.32		0.44	0.34		0.36	0.29	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	338	1110		216	1100		378	1199		312	1024	
v/s Ratio Prot	0.03	c0.25		c0.04	0.16		c0.06	0.17		0.01	0.16	
v/s Ratio Perm	0.12			0.18			c0.17			0.06		
v/c Ratio	0.37	0.77		0.56	0.51		0.51	0.51		0.20	0.56	
Uniform Delay, d1	18.1	27.7		19.4	24.9		16.5	23.8		19.1	26.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.70	0.87	
Incremental Delay, d2	0.7	3.4		3.3	0.4		1.2	1.6		0.3	2.0	
Delay (s)	18.8	31.1		22.7	25.3		17.7	25.3		13.7	25.5	
Level of Service	B	C		C	C		B	C		B	C	
Approach Delay (s)		29.6			24.8			23.5			24.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	847	0	0	727	7	183	82	220	1	0	237
Future Volume (vph)	155	847	0	0	727	7	183	82	220	1	0	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.999				0.850			0.850
Flt Protected	0.950						0.950	0.981		0.950		
Satd. Flow (prot)	1736	4988	0	0	4983	0	1633	1726	1599	1805	0	1583
Flt Permitted	0.265						0.950	0.981		0.645		
Satd. Flow (perm)	484	4988	0	0	4983	0	1633	1726	1599	1226	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				242			260
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Adj. Flow (vph)	170	931	0	0	799	8	201	90	242	1	0	260
Shared Lane Traffic (%)							29%					
Lane Group Flow (vph)	170	931	0	0	807	0	143	148	242	1	0	260
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

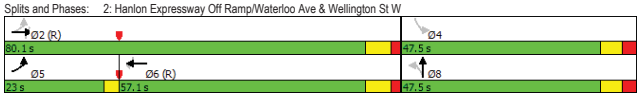
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.31		0.39
v/c Ratio	0.35	0.33			0.41		0.28	0.27	0.24	0.00		0.33
Control Delay	13.2	14.8			28.9		34.8	34.6	2.1	30.0		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	13.2	14.8			28.9		34.8	34.6	2.1	30.0		4.2
LOS	B	B			C		C	C	A	C		A
Approach Delay		14.5			28.9			19.9			4.3	
Approach LOS		B			C			B			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 18.9 — Intersection LOS: B
Intersection Capacity Utilization 62.5% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	170	931	807	143	148	242	1	260
v/c Ratio	0.35	0.33	0.41	0.28	0.27	0.24	0.00	0.33
Control Delay	13.2	14.8	28.9	34.8	34.6	2.1	30.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	14.8	28.9	34.8	34.6	2.1	30.0	4.2
Queue Length 50th (m)	18.7	45.2	56.0	29.8	30.9	0.0	0.2	0.0
Queue Length 95th (m)	29.7	54.4	68.3	49.0	50.4	11.3	1.7	17.2
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	488	2853	1953	511	541	1018	384	778
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.33	0.41	0.28	0.27	0.24	0.00	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	847	0	0	727	7	183	82	220	1	0	237
Future Volume (vph)	155	847	0	0	727	7	183	82	220	1	0	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1735	4988			4981		1633	1726	1599	1805		1583
Flt Permitted	0.26	1.00			1.00		0.95	0.98	1.00	0.64		1.00
Satd. Flow (perm)	483	4988			4981		1633	1726	1599	1225		1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	170	931	0	0	799	8	201	90	242	1	0	260
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	104	0	0	158
Lane Group Flow (vph)	170	931	0	0	806	0	143	148	138	1	0	102
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Grp Cap (vph)	472	2853			1951		511	541	914	384		620
v/s Ratio Prot	c0.06	0.19			c0.16							
v/s Ratio Perm	0.15						c0.09	0.09	0.09	0.00		0.06
v/c Ratio	0.36	0.33			0.41		0.28	0.27	0.15	0.00		0.16
Uniform Delay, d1	13.6	14.4			28.2		33.0	32.9	12.8	30.1		25.2
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.1	0.3			0.6		1.4	1.2	0.4	0.0		0.6
Delay (s)	15.8	14.7			28.8		34.3	34.1	13.1	30.1		25.8
Level of Service	B	B			C		C	C	B	C		C
Approach Delay (s)		14.8			28.8			24.7			25.8	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	892	436	0	806	0	0	0	0	158	0	80
Future Volume (vph)	0	892	436	0	806	0	0	0	0	158	0	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.951										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4698	0	0	4988	0	0	0	0	3242	0	1455
Flt Permitted										0.950		
Satd. Flow (perm)	0	4698	0	0	4988	0	0	0	0	3242	0	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		182										84
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	1					1						
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
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Adj. Flow (vph)	0	939	459	0	848	0	0	0	0	166	0	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1398	0	0	848	0	0	0	0	166	0	84
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			29.9					24.7		29.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		0.0			7.0					0.0		7.0
Flash Dont Walk (s)		0.0			16.0					0.0		16.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.57			0.34					0.14		0.11

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

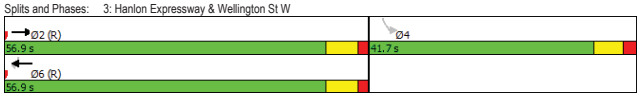
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		15.4			14.9					22.1		3.2
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		15.4			14.9					22.1		3.2
LOS		B			B					C		A
Approach Delay		15.4			14.9						15.8	
Approach LOS		B			B						B	

Intersection Summary

Area Type: Other
Cycle Length: 98.6
Actuated Cycle Length: 98.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 15.3 — Intersection LOS: B
Intersection Capacity Utilization 40.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1398	848	166	84
v/c Ratio	0.57	0.34	0.14	0.11
Control Delay	15.4	14.9	22.1	3.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.4	14.9	22.1	3.2
Queue Length 50th (m)	58.8	35.4	11.5	0.0
Queue Length 95th (m)	72.6	44.6	19.0	7.4
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2472	2529	1150	779
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.34	0.14	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	892	436	0	806	0	0	0	0	158	0	80
Future Volume (vph)	0	892	436	0	806	0	0	0	0	158	0	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4697			4988					3242		1455
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4697			4988					3242		1455
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)	0	939	459	0	848	0	0	0	0	166	0	84
RTOR Reduction (vph)	0	90	0	0	0	0	0	0	0	0	0	41
Lane Group Flow (vph)	0	1308	0	0	848	0	0	0	0	166	0	43
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2381			2529					1150		737
v/s Ratio Prot		c0.28			0.17							
v/s Ratio Perm										c0.05		0.03
v/c Ratio		0.55			0.34					0.14		0.06
Uniform Delay, d1		16.6			14.4					21.6		12.3
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.9			0.4					0.3		0.1
Delay (s)		17.5			14.8					21.9		12.5
Level of Service		B			B					C		B
Approach Delay (s)		17.5			14.8			0.0			18.7	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	900	634	163	415	69
Future Volume (vph)	60	900	634	163	415	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	1.00			
Frt			0.969			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3397	3310	0	1770	1599
Flt Permitted		0.835			0.950	
Satd. Flow (perm)	0	2845	3310	0	1770	1599
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			56			72
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Adj. Flow (vph)	63	938	660	170	432	72
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1001	830	0	432	72
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

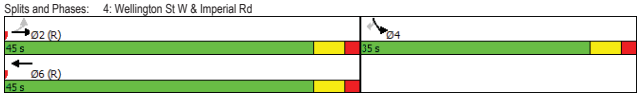
06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	-1.0
Total Lost Time (s)		6.0	6.0		6.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		44.0	44.0		24.0	25.0
Actuated g/C Ratio		0.55	0.55		0.30	0.31
v/c Ratio		0.64	0.45		0.82	0.13
Control Delay		15.9	11.7		38.5	5.2
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		15.9	11.7		38.5	5.2
LOS		B	B		D	A
Approach Delay		15.9	11.7		33.7	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 18.2		Intersection LOS: B	
Intersection Capacity Utilization 87.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1001	830	432	72
v/c Ratio	0.64	0.45	0.82	0.13
Control Delay	15.9	11.7	38.5	5.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.9	11.7	38.5	5.2
Queue Length 50th (m)	55.6	36.6	62.5	0.0
Queue Length 95th (m)	86.8	57.5	89.7	7.9
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1565	1846	641	644
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.64	0.45	0.67	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	900	634	163	415	69
Future Volume (vph)	60	900	634	163	415	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.97		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3397	3311		1770	1599
Flt Permitted		0.84	1.00		0.95	1.00
Satd. Flow (perm)		2846	3311		1770	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	938	660	170	432	72
RTOR Reduction (vph)	0	0	25	0	0	50
Lane Group Flow (vph)	0	1001	805	0	432	23
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		44.0	44.0		24.0	24.0
Effective Green, g (s)		44.0	44.0		24.0	25.0
Actuated g/C Ratio		0.55	0.55		0.30	0.31
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1565	1821		531	499
v/s Ratio Prot			0.24		c0.24	
v/s Ratio Perm		c0.35				0.01
v/c Ratio		0.64	0.44		0.81	0.05
Uniform Delay, d1		12.5	10.7		25.9	19.2
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.0	0.8		9.3	0.0
Delay (s)		14.5	11.5		35.2	19.2
Level of Service		B	B		D	B
Approach Delay (s)		14.5	11.5		32.9	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	310	0	163	186	24	156	1190	0	24	894	43
Future Volume (vph)	93	310	0	163	186	24	156	1190	0	24	894	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Frt					0.983							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	3438	0	1787	3471	0	3303	3343	0	1597	3282	1482
Flt Permitted	0.618			0.347			0.275			0.950		
Satd. Flow (perm)	1097	3438	0	653	3471	0	956	3343	0	1597	3282	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					9							102
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Adj. Flow (vph)	95	316	0	166	190	24	159	1214	0	24	912	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	316	0	166	214	0	159	1214	0	24	912	44
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	

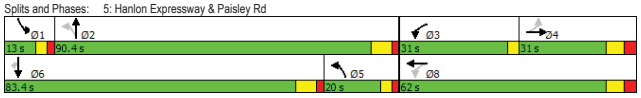
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2					6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	31.0	31.0		9.5	33.0		10.0	59.4		10.0	59.4	59.4
Total Split (s)	31.0	31.0		31.0	62.0		20.0	90.4		13.0	83.4	83.4
Total Split (%)	18.7%	18.7%		18.7%	37.5%		12.1%	54.7%		7.9%	50.4%	50.4%
Maximum Green (s)	23.0	23.0		28.0	54.0		15.0	83.0		8.0	76.0	76.0
Yellow Time (s)	4.5	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	3.5	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	Min	Min		None	Min		None	Max		None	Max	Max
Walk Time (s)	5.0	5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)	15.0	15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0			0			0	0
Act Effct Green (s)	18.4	18.4		42.4	37.4		87.6	85.1		7.1	76.5	76.5
Actuated g/C Ratio	0.13	0.13		0.29	0.26		0.60	0.59		0.05	0.53	0.53
v/c Ratio	0.69	0.73		0.53	0.24		0.21	0.62		0.31	0.53	0.05
Control Delay	87.5	72.2		46.6	41.3		17.6	23.5		81.2	25.6	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	87.5	72.2		46.6	41.3		17.6	23.5		81.2	25.6	0.1
LOS	F	E		D	D		B	C		F	C	A
Approach Delay		75.7			43.6			22.8			25.8	
Approach LOS		E			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 145.3			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 33.2		Intersection LOS: C	
Intersection Capacity Utilization 75.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	95	316	166	214	159	1214	24	912	44
v/c Ratio	0.69	0.73	0.53	0.24	0.21	0.62	0.31	0.53	0.05
Control Delay	87.5	72.2	46.6	41.3	17.6	23.5	81.2	25.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.5	72.2	46.6	41.3	17.6	23.5	81.2	25.6	0.1
Queue Length 50th (m)	28.7	50.6	40.7	26.7	11.0	134.5	7.4	99.4	0.0
Queue Length 95th (m)	52.0	71.1	61.9	38.4	19.5	184.1	18.8	136.8	0.0
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	174	548	410	1304	848	1958	88	1728	829
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.58	0.40	0.16	0.19	0.62	0.27	0.53	0.05

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	310	0	163	186	24	156	1190	0	24	894	43
Future Volume (vph)	93	310	0	163	186	24	156	1190	0	24	894	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1687	3438		1787	3472		3303	3343		1597	3282	1482
Flt Permitted	0.62	1.00		0.35	1.00		0.28	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1097	3438		653	3472		958	3343		1597	3282	1482
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	95	316	0	166	190	24	159	1214	0	24	912	44
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	0	0	0	21
Lane Group Flow (vph)	95	316	0	166	207	0	159	1214	0	24	912	23
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2					6
Actuated Green, G (s)	18.4	18.4		37.4	37.4		87.5	85.1		4.5	76.5	76.5
Effective Green, g (s)	18.4	18.4		37.4	37.4		87.5	85.1		4.5	76.5	76.5
Actuated g/C Ratio	0.12	0.12		0.25	0.25		0.59	0.58		0.03	0.52	0.52
Clearance Time (s)	8.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	136	429		288	880		777	1930		48	1703	769
v/s Ratio Prot		c0.09		c0.06	0.06		0.02	c0.36		0.02	c0.28	
v/s Ratio Perm	0.09			0.08			0.10					0.02
v/c Ratio	0.70	0.74		0.58	0.24		0.20	0.63		0.50	0.54	0.03
Uniform Delay, d1	61.8	62.2		45.5	43.7		18.8	20.7		70.3	23.6	17.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.5	6.5		2.8	0.1		0.1	1.6		8.0	1.2	0.1
Delay (s)	76.4	68.6		48.3	43.8		18.9	22.2		78.3	24.8	17.4
Level of Service	E	E		D	D		B	C		E	C	B
Approach Delay (s)		70.4			45.8			21.9			25.8	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	147.4	Sum of lost time (s)	23.4
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	220	42	76	118	23	19	537	90	41	458	33
Future Volume (vph)	50	220	42	76	118	23	19	537	90	41	458	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt		0.976			0.975			0.978			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1781	0	1752	1786	0	1805	1818	0	1770	1842	0
Flt Permitted	0.642			0.372			0.406			0.312		
Satd. Flow (perm)	1186	1781	0	679	1786	0	767	1818	0	579	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			17			10			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	54	239	46	83	128	25	21	584	98	45	498	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	285	0	83	153	0	21	682	0	45	534	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

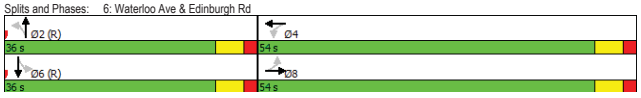
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	19.8	19.8		19.8	19.8		58.2	58.2		58.2	58.2	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65	
v/c Ratio	0.21	0.71		0.56	0.38		0.04	0.58		0.12	0.45	
Control Delay	28.3	39.6		44.2	27.7		17.7	27.3		8.9	10.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.3	39.6		44.2	27.7		17.7	27.3		8.9	10.4	
LOS	C	D		D	C		B	C		A	B	
Approach Delay		37.8			33.5			27.0			10.3	
Approach LOS		D			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 24.6		Intersection LOS: C	
Intersection Capacity Utilization 68.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	54	285	83	153	21	682	45	534
v/c Ratio	0.21	0.71	0.56	0.38	0.04	0.58	0.12	0.45
Control Delay	28.3	39.6	44.2	27.7	17.7	27.3	8.9	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	39.6	44.2	27.7	17.7	27.3	8.9	10.4
Queue Length 50th (m)	8.1	45.6	13.5	21.1	1.1	78.5	2.8	42.6
Queue Length 95th (m)	16.3	65.1	26.3	34.4	m7.1	149.3	9.4	83.1
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	632	957	362	960	496	1179	374	1193
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.30	0.23	0.16	0.04	0.58	0.12	0.45

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	220	42	76	118	23	19	537	90	41	458	33
Future Volume (vph)	50	220	42	76	118	23	19	537	90	41	458	33
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		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)	1755	1781		1737	1787		1793	1819		1762	1842	
Flt Permitted	0.64	1.00		0.37	1.00		0.41	1.00		0.31	1.00	
Satd. Flow (perm)	1187	1781		680	1787		766	1819		579	1842	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	239	46	83	128	25	21	584	98	45	498	36
RTOR Reduction (vph)	0	12	0	0	13	0	0	4	0	0	1	0
Lane Group Flow (vph)	54	273	0	83	140	0	21	678	0	45	533	0
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	19.8	19.8		19.8	19.8		58.2	58.2		58.2	58.2	
Effective Green, g (s)	19.8	19.8		19.8	19.8		58.2	58.2		58.2	58.2	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65	
Clearance Time (s)	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	
Lane Grp Cap (vph)	261	391		149	393		495	1176		374	1191	
v/s Ratio Prot		c0.15			0.08			c0.37			0.29	
v/s Ratio Perm	0.05			0.12			0.03			0.08		
v/c Ratio	0.21	0.70		0.56	0.36		0.04	0.58		0.12	0.45	
Uniform Delay, d1	28.7	32.3		31.2	29.7		5.8	9.0		6.1	7.9	
Progression Factor	1.00	1.00		1.00	1.00		2.25	2.43		1.00	1.00	
Incremental Delay, d2	0.4	5.3		4.5	0.6		0.1	1.8		0.7	1.2	
Delay (s)	29.1	37.7		35.7	30.3		13.1	23.7		6.7	9.1	
Level of Service	C	D		D	C		B	C		A	A	
Approach Delay (s)		36.3			32.2			23.4			8.9	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	4	230	6	5	242
Future Volume (vph)	10	4	230	6	5	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1568
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1568
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		7	7			1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	2%	0%	0%	3%
Adj. Flow (vph)	11	4	258	7	6	272
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	4	258	7	6	272
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.7%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	4	230	6	5	242
Future Volume (Veh/h)	10	4	230	6	5	242
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	11	4	258	7	6	272
Pedestrians				1	7	
Lane Width (m)				3.6	3.6	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			22		541	19
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			22		541	19
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			84		99	74
cM capacity (veh/h)			1584		421	1049

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	11	4	258	7	278
Volume Left	0	0	258	0	6
Volume Right	0	4	0	0	272
cSH	1700	1700	1584	1700	1072
Volume to Capacity	0.01	0.00	0.16	0.00	0.26
Queue Length 95th (m)	0.0	0.0	4.7	0.0	8.3
Control Delay (s)	0.0	0.0	7.7	0.0	9.7
Lane LOS			A		A
Approach Delay (s)	0.0		7.5		9.7
Approach LOS					A

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	308	65	46	222	73	71	430	56	90	381	68
Future Volume (vph)	72	308	65	46	222	73	71	430	56	90	381	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.99		0.99	0.98		0.99	1.00		1.00	0.99	
Frt		0.974			0.963			0.983			0.977	
Flt Protected	0.950			0.950			0.950	0.999		0.950		
Satd. Flow (prot)	1703	1758	0	1805	1749	0	1681	1733	0	1656	1802	0
Flt Permitted	0.458			0.344			0.386	0.993		0.323		
Satd. Flow (perm)	800	1758	0	649	1749	0	675	1723	0	561	1802	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			24			12			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Adj. Flow (vph)	78	335	71	50	241	79	77	467	61	98	414	74
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	78	406	0	50	320	0	69	536	0	98	488	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

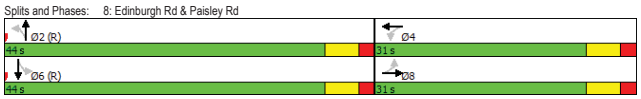
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.29	0.68		0.23	0.53		0.20	0.61		0.35	0.53	
Control Delay	20.6	26.9		21.6	22.6		12.2	16.6		15.5	14.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.6	26.9		21.6	22.6		12.2	16.6		15.5	14.6	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		25.9			22.5			16.1			14.8	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 19.2		Intersection LOS: B	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	78	406	50	320	69	536	98	488
v/c Ratio	0.29	0.68	0.23	0.53	0.20	0.61	0.35	0.53
Control Delay	20.6	26.9	21.6	22.6	12.2	16.6	15.5	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	26.9	21.6	22.6	12.2	16.6	15.5	14.6
Queue Length 50th (m)	9.6	52.4	5.3	35.1	5.5	54.9	8.2	44.2
Queue Length 95th (m)	21.6	85.5	14.1	59.6	13.7	88.0	19.8	70.6
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	266	596	216	599	342	878	284	921
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.68	0.23	0.53	0.20	0.61	0.35	0.53

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	308	65	46	222	73	71	430	56	90	381	68
Future Volume (vph)	72	308	65	46	222	73	71	430	56	90	381	68
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		0.95	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.97	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		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)	1660	1758		1794	1749		1661	1733		1650	1802	
Flt Permitted	0.46	1.00		0.34	1.00		0.39	0.99		0.32	1.00	
Satd. Flow (perm)	799	1758		650	1749		676	1722		561	1802	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	335	71	50	241	79	77	467	61	98	414	74
RTOR Reduction (vph)	0	10	0	0	16	0	0	6	0	0	8	0
Lane Group Flow (vph)	78	396	0	50	304	0	69	530	0	98	480	0
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	266	586		216	583		342	872		284	913	
v/s Ratio Prot		c0.23			0.17						0.27	
v/s Ratio Perm	0.10			0.08			0.10	c0.31		0.17		
v/c Ratio	0.29	0.68		0.23	0.52		0.20	0.61		0.35	0.53	
Uniform Delay, d1	18.5	21.5		18.1	20.2		10.2	13.2		11.1	12.4	
Progression Factor	0.93	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	5.6		2.5	3.3		1.3	3.1		3.3	2.2	
Delay (s)	19.7	26.9		20.6	23.5		11.5	16.3		14.4	14.6	
Level of Service	B	C		C	C		B	B		B	B	
Approach Delay (s)		25.8			23.1			15.8			14.6	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	337	1	0	293	143	0	1	0	171	1	131
Future Volume (vph)	197	337	1	0	293	143	0	1	0	171	1	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	0.99	1.00			0.98						0.98	
Frt					0.956						0.935	
Flt Protected	0.950										0.973	
Satd. Flow (prot)	1752	1793	0	0	1726	0	0	1900	0	0	3168	0
Flt Permitted	0.333										0.810	
Satd. Flow (perm)	609	1793	0	0	1726	0	0	1900	0	0	2592	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					37						160	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Adj. Flow (vph)	240	411	1	0	357	174	0	1	0	209	1	160
Shared Lane Traffic (%)												
Lane Group Flow (vph)	240	412	0	0	531	0	0	1	0	0	370	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

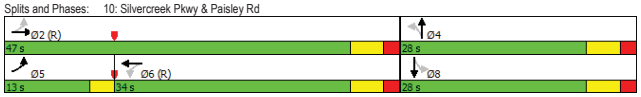
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA			NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		28.0	28.0		28.0	28.0	
Total Split (s)	13.0	47.0		34.0	34.0		28.0	28.0		28.0	28.0	
Total Split (%)	17.3%	62.7%		45.3%	45.3%		37.3%	37.3%		37.3%	37.3%	
Maximum Green (s)	10.0	41.0		28.0	28.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0			6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)		14.0		14.0	14.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	54.2	51.2			39.1			11.8			11.8	
Actuated g/C Ratio	0.72	0.68			0.52			0.16			0.16	
v/c Ratio	0.42	0.34			0.58			0.00			0.68	
Control Delay	6.3	6.5			21.5			24.0			22.7	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	6.3	6.5			21.5			24.0			22.7	
LOS	A	A			C			C			C	
Approach Delay		6.4			21.5			24.0			22.7	
Approach LOS		A			C			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 22 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 15.5		Intersection LOS: B	
Intersection Capacity Utilization 77.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	240	412	531	1	370
v/c Ratio	0.42	0.34	0.58	0.00	0.68
Control Delay	6.3	6.5	21.5	24.0	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	6.5	21.5	24.0	22.7
Queue Length 50th (m)	9.2	21.2	54.6	0.1	15.3
Queue Length 95th (m)	19.0	38.4	79.8	1.2	22.7
Internal Link Dist (m)		178.0	665.0	185.5	362.4
Turn Bay Length (m)	80.0				
Base Capacity (vph)	600	1223	916	557	873
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.40	0.34	0.58	0.00	0.42

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	337	1	0	293	143	0	1	0	171	1	131
Future Volume (vph)	197	337	1	0	293	143	0	1	0	171	1	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			0.95	
Frpb, ped/bikes	1.00	1.00			0.98			1.00			0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			0.98	
Frt	1.00	1.00			0.96			1.00			0.94	
Flt Protected	0.95	1.00			1.00			1.00			0.97	
Satd. Flow (prot)	1747	1792			1726			1900			3112	
Flt Permitted	0.33	1.00			1.00			1.00			0.81	
Satd. Flow (perm)	613	1792			1726			1900			2592	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	240	411	1	0	357	174	0	1	0	209	1	160
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	0	0	135	0
Lane Group Flow (vph)	240	412	0	0	513	0	0	1	0	0	235	0
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA			NA			NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	51.2	51.2			39.1			11.8			11.8	
Effective Green, g (s)	51.2	51.2			39.1			11.8			11.8	
Actuated g/C Ratio	0.68	0.68			0.52			0.16			0.16	
Clearance Time (s)	3.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	556	1223			899			298			407	
v/s Ratio Prot	c0.05	0.23			c0.30			0.00				
v/s Ratio Perm	0.24										c0.09	
v/c Ratio	0.43	0.34			0.57			0.00			0.58	
Uniform Delay, d1	5.7	4.9			12.2			26.6			29.3	
Progression Factor	1.00	1.00			1.38			1.00			1.00	
Incremental Delay, d2	0.5	0.7			2.6			0.0			2.0	
Delay (s)	6.3	5.6			19.4			26.6			31.3	
Level of Service	A	A			B			C			C	
Approach Delay (s)		5.9			19.4			26.6			31.3	
Approach LOS		A			B			C			C	

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	613	0	226	711	0	186	639	0	56	626	0
Future Volume (vph)	110	613	0	226	711	0	186	639	0	56	626	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.226			0.258			0.271			0.380		
Satd. Flow (perm)	428	3539	0	480	3539	0	513	3610	0	705	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	112	626	0	231	726	0	190	652	0	57	639	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	626	0	231	726	0	190	652	0	57	639	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

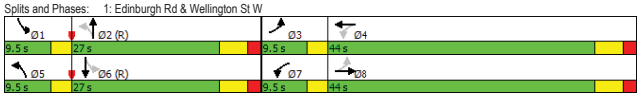
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	33.8	24.3		34.4	26.2		47.2	35.8		40.0	29.9	
Actuated g/C Ratio	0.38	0.27		0.38	0.29		0.52	0.40		0.44	0.33	
v/c Ratio	0.43	0.65		0.84	0.70		0.44	0.45		0.14	0.53	
Control Delay	20.7	31.9		45.6	32.3		16.2	23.4		11.1	22.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.7	31.9		45.6	32.3		16.2	23.4		11.1	22.6	
LOS	C	C		D	C		B	C		B	C	
Approach Delay		30.2			35.5			21.8			21.6	
Approach LOS		C			D			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 71 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 27.7		Intersection LOS: C	
Intersection Capacity Utilization 73.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	112	626	231	726	190	652	57	639
v/c Ratio	0.43	0.65	0.84	0.70	0.44	0.45	0.14	0.53
Control Delay	20.7	31.9	45.6	32.3	16.2	23.4	11.1	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	31.9	45.6	32.3	16.2	23.4	11.1	22.6
Queue Length 50th (m)	12.3	52.4	27.5	63.0	17.7	46.9	3.9	51.5
Queue Length 95th (m)	20.2	63.5	#47.7	75.2	35.0	73.4	m7.6	66.0
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	260	1494	276	1494	430	1435	401	1199
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.42	0.84	0.49	0.44	0.45	0.14	0.53

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	613	0	226	711	0	186	639	0	56	626	0
Future Volume (vph)	110	613	0	226	711	0	186	639	0	56	626	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3539		1769	3539		1804	3610		1766	3610	
Flt Permitted	0.23	1.00		0.26	1.00		0.27	1.00		0.38	1.00	
Satd. Flow (perm)	430	3539		481	3539		514	3610		706	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	626	0	231	726	0	190	652	0	57	639	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	112	626	0	231	726	0	190	652	0	57	639	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	30.1	24.9		32.7	26.2		43.6	34.6		35.3	29.3	
Effective Green, g (s)	30.1	24.9		32.7	26.2		43.6	34.6		35.3	29.3	
Actuated g/C Ratio	0.33	0.28		0.36	0.29		0.48	0.38		0.39	0.33	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	223	979		267	1030		410	1387		347	1175	
v/s Ratio Prot	0.03	0.18		c0.06	0.21		c0.06	0.18		0.01	c0.18	
v/s Ratio Perm	0.14			c0.25			0.17			0.05		
v/c Ratio	0.50	0.64		0.87	0.70		0.46	0.47		0.16	0.54	
Uniform Delay, d1	21.9	28.6		24.3	28.5		14.3	20.8		17.2	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.80	0.79	
Incremental Delay, d2	1.8	1.4		24.0	2.2		0.8	1.1		0.2	1.6	
Delay (s)	23.7	30.0		48.3	30.7		15.1	22.0		13.9	21.4	
Level of Service	C	C		D	C		B	C		B	C	
Approach Delay (s)		29.0			34.9			20.4			20.8	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	752	0	0	972	9	388	112	139	5	0	257
Future Volume (vph)	148	752	0	0	972	9	388	112	139	5	0	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.999				0.850			0.850
Flt Protected	0.950						0.950	0.973		0.950		
Satd. Flow (prot)	1787	5136	0	0	5130	0	1698	1747	1599	1805	0	1599
Flt Permitted	0.189						0.950	0.973		0.474		
Satd. Flow (perm)	355	5136	0	0	5130	0	1698	1747	1599	901	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				143			265
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	153	775	0	0	1002	9	400	115	143	5	0	265
Shared Lane Traffic (%)							36%					
Lane Group Flow (vph)	153	775	0	0	1011	0	256	259	143	5	0	265
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	24.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	3.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

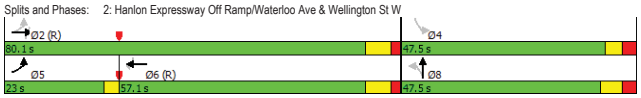
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.32		0.39
v/c Ratio	0.35	0.26			0.50		0.48	0.47	0.15	0.02		0.34
Control Delay	13.3	14.0			30.4		39.1	38.8	2.3	30.0		4.1
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	13.3	14.0			30.4		39.1	38.8	2.3	30.0		4.1
LOS	B	B			C		D	D	A	C		A
Approach Delay		13.9			30.4			31.0			4.6	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type:	Other		
Cycle Length: 127.6			
Actuated Cycle Length: 127.6			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 22.8		Intersection LOS: C	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	153	775	1011	256	259	143	5	265
v/c Ratio	0.35	0.26	0.50	0.48	0.47	0.15	0.02	0.34
Control Delay	13.3	14.0	30.4	39.1	38.8	2.3	30.0	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	14.0	30.4	39.1	38.8	2.3	30.0	4.1
Queue Length 50th (m)	16.5	36.1	73.2	57.5	58.1	0.0	0.9	0.0
Queue Length 95th (m)	26.8	44.1	87.3	86.0	86.6	9.0	4.2	17.2
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	438	2938	2010	532	547	975	289	787
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.26	0.50	0.48	0.47	0.15	0.02	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	752	0	0	972	9	388	112	139	5	0	257
Future Volume (vph)	148	752	0	0	972	9	388	112	139	5	0	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5128		1698	1746	1599	1805		1599
Flt Permitted	0.19	1.00			1.00		0.95	0.97	1.00	0.47		1.00
Satd. Flow (perm)	356	5136			5128		1698	1746	1599	901		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	153	775	0	0	1002	9	400	115	143	5	0	265
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	61	0	0	161
Lane Group Flow (vph)	153	775	0	0	1010	0	256	259	82	5	0	104
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.32		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Grp Cap (vph)	427	2938			2009		532	547	914	289		626
v/s Ratio Prot	c0.06	0.15			c0.20							
v/s Ratio Perm	0.15						c0.15	0.15	0.05	0.01		0.06
v/c Ratio	0.36	0.26			0.50		0.48	0.47	0.09	0.02		0.17
Uniform Delay, d1	14.2	13.8			29.4		35.4	35.3	12.3	29.6		25.2
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.3	0.2			0.9		3.1	2.9	0.2	0.1		0.6
Delay (s)	16.5	14.0			30.3		38.5	38.2	12.5	29.7		25.8
Level of Service	B	B			C		D	D	B	C		C
Approach Delay (s)		14.4			30.3			32.7			25.9	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	787	484	0	1219	0	0	0	0	168	0	69
Future Volume (vph)	0	787	484	0	1219	0	0	0	0	168	0	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.943										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4813	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4813	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		229										73
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	828	509	0	1283	0	0	0	0	177	0	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1337	0	0	1283	0	0	0	0	177	0	73
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.52			0.49					0.14		0.09

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

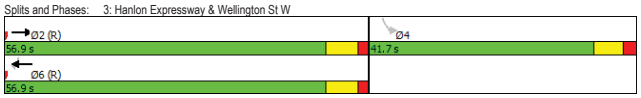
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		14.0			16.8					22.0		3.4
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		14.0			16.8					22.0		3.4
LOS		B			B					C		A
Approach Delay		14.0			16.8						16.6	
Approach LOS		B			B						B	

Intersection Summary

Area Type:	Other		
Cycle Length: 98.6			
Actuated Cycle Length: 98.6			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 15.5		Intersection LOS: B	
Intersection Capacity Utilization 39.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1337	1283	177	73
v/c Ratio	0.52	0.49	0.14	0.09
Control Delay	14.0	16.8	22.0	3.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.0	16.8	22.0	3.4
Queue Length 50th (m)	51.6	59.2	12.3	0.0
Queue Length 95th (m)	64.6	71.7	19.9	6.9
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2553	2604	1230	808
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.52	0.49	0.14	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	787	484	0	1219	0	0	0	0	168	0	69
Future Volume (vph)	0	787	484	0	1219	0	0	0	0	168	0	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4813			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4813			5136					3467		1524
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)	0	828	509	0	1283	0	0	0	0	177	0	73
RTOR Reduction (vph)	0	113	0	0	0	0	0	0	0	0	0	36
Lane Group Flow (vph)	0	1224	0	0	1283	0	0	0	0	177	0	37
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2440			2604					1230		772
v/s Ratio Prot		c0.25			0.25							
v/s Ratio Perm										c0.05		0.02
v/c Ratio		0.50			0.49					0.14		0.05
Uniform Delay, d1		16.1			16.0					21.6		12.3
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.7			0.7					0.2		0.1
Delay (s)		16.8			16.6					21.9		12.4
Level of Service		B			B					C		B
Approach Delay (s)		16.8			16.6			0.0			19.1	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	67	866	796	385	348	57
Future Volume (vph)	67	866	796	385	348	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.951			0.850
Flt Protected		0.996				
Satd. Flow (prot)	0	3562	3342	0	1787	1615
Flt Permitted		0.730			0.950	
Satd. Flow (perm)	0	2611	3342	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			143			59
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Adj. Flow (vph)	69	893	821	397	359	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	962	1218	0	359	59
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

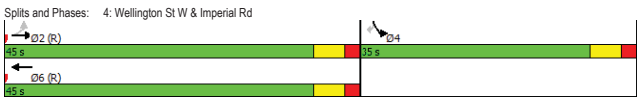
06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		46.7	46.7		21.3	21.3
Actuated g/C Ratio		0.58	0.58		0.27	0.27
v/c Ratio		0.63	0.61		0.76	0.12
Control Delay		14.5	11.8		37.0	6.1
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		14.5	11.8		37.0	6.1
LOS		B	B		D	A
Approach Delay		14.5	11.8		32.6	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 94.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	962	1218	359	59
v/c Ratio	0.63	0.61	0.76	0.12
Control Delay	14.5	11.8	37.0	6.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.5	11.8	37.0	6.1
Queue Length 50th (m)	48.8	52.7	52.5	0.0
Queue Length 95th (m)	85.2	89.5	73.0	7.6
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1524	2011	647	623
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.63	0.61	0.55	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	67	866	796	385	348	57
Future Volume (vph)	67	866	796	385	348	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3564	3342		1787	1615
Flt Permitted		0.73	1.00		0.95	1.00
Satd. Flow (perm)		2611	3342		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	69	893	821	397	359	59
RTOR Reduction (vph)	0	0	60	0	0	43
Lane Group Flow (vph)	0	962	1158	0	359	16
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		46.7	46.7		21.3	21.3
Effective Green, g (s)		46.7	46.7		21.3	21.3
Actuated g/C Ratio		0.58	0.58		0.27	0.27
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1524	1950		475	429
v/s Ratio Prot			0.35		c0.20	
v/s Ratio Perm		c0.37				0.01
v/c Ratio		0.63	0.59		0.76	0.04
Uniform Delay, d1		11.0	10.6		27.0	21.7
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.0	1.3		6.7	0.0
Delay (s)		13.0	12.0		33.7	21.8
Level of Service		B	B		C	C
Approach Delay (s)		13.0	12.0		32.0	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	350	0	228	421	35	394	1001	0	41	1340	130
Future Volume (vph)	114	350	0	228	421	35	394	1001	0	41	1340	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.989							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3566	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.483			0.302			0.069			0.950		
Satd. Flow (perm)	907	3574	0	573	3566	0	252	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					6							134
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	118	361	0	235	434	36	406	1032	0	42	1381	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	361	0	235	470	0	406	1032	0	42	1381	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

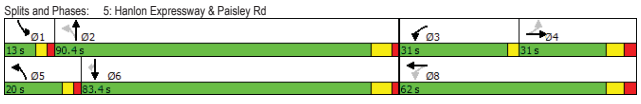
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2					6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	30.0	30.0		9.5	30.0		10.0	60.4		10.0	60.4	60.4
Total Split (s)	31.0	31.0		31.0	62.0		20.0	90.4		13.0	83.4	83.4
Total Split (%)	18.7%	18.7%		18.7%	37.5%		12.1%	54.7%		7.9%	50.4%	50.4%
Maximum Green (s)	23.0	23.0		28.0	54.0		15.0	83.0		8.0	76.0	76.0
Yellow Time (s)	4.5	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	3.5	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)	5.0	5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)	15.0	15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0			0			0	0
Act Effct Green (s)	22.4	22.4		51.7	46.7		98.5	85.9		7.5	76.1	76.1
Actuated g/C Ratio	0.14	0.14		0.33	0.30		0.62	0.54		0.05	0.48	0.48
v/c Ratio	0.92	0.71		0.67	0.45		0.88	0.56		0.49	0.83	0.16
Control Delay	127.0	74.0		50.9	45.8		55.6	26.7		95.0	41.4	4.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	127.0	74.0		50.9	45.8		55.6	26.7		95.0	41.4	4.0
LOS	F	E		D	D		E	C		F	D	A
Approach Delay		87.0			47.5			34.9			39.7	
Approach LOS		F			D			C			D	

Intersection Summary

Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 158.2			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 44.8		Intersection LOS: D	
Intersection Capacity Utilization 91.2%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	118	361	235	470	406	1032	42	1381	134
v/c Ratio	0.92	0.71	0.67	0.45	0.88	0.56	0.49	0.83	0.16
Control Delay	127.0	74.0	50.9	45.8	55.6	26.7	95.0	41.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	127.0	74.0	50.9	45.8	55.6	26.7	95.0	41.4	4.0
Queue Length 50th (m)	39.2	60.9	60.3	65.8	45.3	121.4	13.8	206.1	0.0
Queue Length 95th (m)	#84.6	83.3	86.1	83.1	#81.3	156.1	29.3	257.4	13.0
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	131	520	405	1222	462	1832	91	1669	846
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.69	0.58	0.38	0.88	0.56	0.46	0.83	0.16

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	350	0	228	421	35	394	1001	0	41	1340	130
Future Volume (vph)	114	350	0	228	421	35	394	1001	0	41	1340	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1785	3574		1805	3565		3467	3374		1805	3471	1615
Flt Permitted	0.48	1.00		0.30	1.00		0.07	1.00		0.95	1.00	1.00
Satd. Flow (perm)	907	3574		573	3565		252	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	118	361	0	235	434	36	406	1032	0	42	1381	134
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	0	0	0	69
Lane Group Flow (vph)	118	361	0	235	466	0	406	1032	0	42	1381	65
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2					6
Actuated Green, G (s)	22.5	22.5		46.7	46.7		97.2	85.9		6.3	77.2	77.2
Effective Green, g (s)	22.5	22.5		46.7	46.7		97.2	85.9		6.3	77.2	77.2
Actuated g/C Ratio	0.14	0.14		0.29	0.29		0.61	0.54		0.04	0.48	0.48
Clearance Time (s)	8.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	128	504		331	1045		456	1819		71	1682	782
v/s Ratio Prot		0.10		c0.09	0.13		c0.08	0.31		0.02	0.40	
v/s Ratio Perm	c0.13			0.11			c0.46					0.04
v/c Ratio	0.92	0.72		0.71	0.45		0.89	0.57		0.59	0.82	0.08
Uniform Delay, d1	67.5	65.4		46.3	45.8		44.5	24.4		75.2	35.1	22.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	55.9	4.8		6.8	0.3		19.1	1.3		12.5	4.6	0.2
Delay (s)	123.4	70.2		53.1	46.1		63.5	25.7		87.7	39.8	22.3
Level of Service	F	E		D	D		E	C		F	D	C
Approach Delay (s)		83.3			48.4			36.3			39.6	
Approach LOS		F			D			D			D	

Intersection Summary

HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	159.3	Sum of lost time (s)	23.4
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	148	42	91	228	43	37	600	80	47	592	32
Future Volume (vph)	46	148	42	91	228	43	37	600	80	47	592	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.967			0.976			0.982			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1807	0	1805	1832	0	1805	1856	0	1770	1882	0
Flt Permitted	0.371			0.545			0.341			0.306		
Satd. Flow (perm)	685	1807	0	1028	1832	0	647	1856	0	569	1882	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			16			8			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	47	153	43	94	235	44	38	619	82	48	610	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	196	0	94	279	0	38	701	0	48	643	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

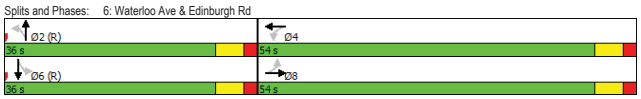
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	19.0	19.0		19.0	19.0		59.0	59.0		59.0	59.0	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.66	0.66		0.66	0.66	
v/c Ratio	0.33	0.49		0.44	0.70		0.09	0.58		0.13	0.52	
Control Delay	34.2	30.3		35.6	39.8		6.4	17.2		8.6	11.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.2	30.3		35.6	39.8		6.4	17.2		8.6	11.0	
LOS	C	C		D	D		A	B		A	B	
Approach Delay		31.1			38.7			16.6			10.9	
Approach LOS		C			D			B			B	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 20.4		Intersection LOS: C	
Intersection Capacity Utilization 73.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	47	196	94	279	38	701	48	643
v/c Ratio	0.33	0.49	0.44	0.70	0.09	0.58	0.13	0.52
Control Delay	34.2	30.3	35.6	39.8	6.4	17.2	8.6	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	30.3	35.6	39.8	6.4	17.2	8.6	11.0
Queue Length 50th (m)	7.3	27.6	15.0	44.6	1.4	47.9	2.9	53.8
Queue Length 95th (m)	16.1	43.5	27.2	64.3	m4.8	105.0	9.6	103.2
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	365	974	548	984	423	1219	372	1234
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.20	0.17	0.28	0.09	0.58	0.13	0.52

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	148	42	91	228	43	37	600	80	47	592	32
Future Volume (vph)	46	148	42	91	228	43	37	600	80	47	592	32
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1757	1807		1793	1832		1801	1857		1763	1883	
Flt Permitted	0.37	1.00		0.55	1.00		0.34	1.00		0.31	1.00	
Satd. Flow (perm)	686	1807		1029	1832		646	1857		567	1883	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	47	153	43	94	235	44	38	619	82	48	610	33
RTOR Reduction (vph)	0	19	0	0	13	0	0	3	0	0	1	0
Lane Group Flow (vph)	47	177	0	94	266	0	38	698	0	48	642	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	19.0	19.0		19.0	19.0		59.0	59.0		59.0	59.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0		59.0	59.0		59.0	59.0	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.66	0.66		0.66	0.66	
Clearance Time (s)	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	
Lane Grp Cap (vph)	144	381		217	386		423	1217		371	1234	
v/s Ratio Prot		0.10			c0.15			c0.38			0.34	
v/s Ratio Perm	0.07			0.09			0.06			0.08		
v/c Ratio	0.33	0.46		0.43	0.69		0.09	0.57		0.13	0.52	
Uniform Delay, d1	30.1	31.1		30.8	32.8		5.7	8.6		5.8	8.1	
Progression Factor	1.00	1.00		1.00	1.00		0.80	1.54		1.00	1.00	
Incremental Delay, d2	1.3	0.9		1.4	5.2		0.4	1.8		0.7	1.6	
Delay (s)	31.4	32.0		32.2	38.0		4.9	14.9		6.6	9.7	
Level of Service	C	C		C	D		A	B		A	A	
Approach Delay (s)		31.8			36.6			14.4			9.5	
Approach LOS		C			D			B			A	

Intersection Summary

HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	9	12	250	9	18	251
Future Volume (vph)	9	12	250	9	18	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	11	15	305	11	22	306
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	15	305	11	22	306
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.5%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	9	12	250	9	18	251
Future Volume (Veh/h)	9	12	250	9	18	251
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	15	305	11	22	306
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			27		633	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			27		633	12
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			81		94	71
cM capacity (veh/h)			1586		361	1071

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	11	15	305	11	328
Volume Left	0	0	305	0	22
Volume Right	0	15	0	0	306
cSH	1700	1700	1586	1700	1148
Volume to Capacity	0.01	0.01	0.19	0.01	0.29
Queue Length 95th (m)	0.0	0.0	5.7	0.0	9.5
Control Delay (s)	0.0	0.0	7.8	0.0	10.1
Lane LOS			A		B
Approach Delay (s)	0.0		7.5		10.1
Approach LOS					B

Intersection Summary

Average Delay	8.5		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	287	111	55	345	44	101	493	51	96	500	85
Future Volume (vph)	72	287	111	55	345	44	101	493	51	96	500	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.958			0.983			0.986			0.978	
Flt Protected	0.950			0.950			0.950	0.999		0.950		
Satd. Flow (prot)	1805	1790	0	1805	1843	0	1715	1770	0	1736	1847	0
Flt Permitted	0.329			0.316			0.271	0.987		0.272		
Satd. Flow (perm)	620	1790	0	597	1843	0	488	1749	0	496	1847	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			9			10			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	77	309	119	59	371	47	109	530	55	103	538	91
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	77	428	0	59	418	0	98	596	0	103	629	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

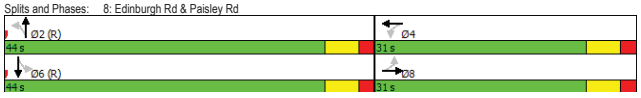
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.37	0.70		0.30	0.67		0.40	0.67		0.41	0.67	
Control Delay	26.2	28.8		23.6	27.5		17.5	18.2		17.8	17.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.2	28.8		23.6	27.5		17.5	18.2		17.8	17.7	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		28.4			27.0			18.1			17.7	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 104.2%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	428	59	418	98	596	103	629
v/c Ratio	0.37	0.70	0.30	0.67	0.40	0.67	0.41	0.67
Control Delay	26.2	28.8	23.6	27.5	17.5	18.2	17.8	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.2	28.8	23.6	27.5	17.5	18.2	17.8	17.7
Queue Length 50th (m)	10.2	56.3	6.4	51.6	8.8	64.3	9.0	63.8
Queue Length 95th (m)	22.9	92.6	16.6	82.6	22.5	102.1	22.5	100.2
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	206	615	199	620	247	891	251	943
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.70	0.30	0.67	0.40	0.67	0.41	0.67

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	287	111	55	345	44	101	493	51	96	500	85
Future Volume (vph)	72	287	111	55	345	44	101	493	51	96	500	85
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		0.95	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.99		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)	1789	1791		1794	1843		1709	1771		1732	1848	
Flt Permitted	0.33	1.00		0.32	1.00		0.27	0.99		0.27	1.00	
Satd. Flow (perm)	619	1791		597	1843		487	1749		496	1848	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	77	309	119	59	371	47	109	530	55	103	538	91
RTOR Reduction (vph)	0	19	0	0	6	0	0	5	0	0	8	0
Lane Group Flow (vph)	77	409	0	59	412	0	98	591	0	103	621	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	206	597		199	614		246	886		251	936	
v/s Ratio Prot		c0.23			0.22						0.34	
v/s Ratio Perm	0.12			0.10			0.20	c0.34		0.21		
v/c Ratio	0.37	0.69		0.30	0.67		0.40	0.67		0.41	0.66	
Uniform Delay, d1	19.0	21.6		18.5	21.5		11.4	13.8		11.5	13.7	
Progression Factor	1.05	1.09		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	5.9		3.8	5.8		4.8	4.0		4.9	3.7	
Delay (s)	24.7	29.4		22.3	27.2		16.2	17.8		16.4	17.5	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		28.7			26.6			17.5			17.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	15		

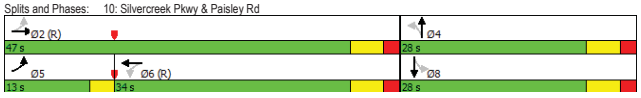
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	274	379	1	0	392	185	2	0	0	217	0	295
Future Volume (vph)	274	379	1	0	392	185	2	0	0	217	0	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor		1.00			0.99			1.00			0.99	
Frt					0.957						0.914	
Flt Protected	0.950							0.950			0.979	
Satd. Flow (prot)	1805	1881	0	0	1793	0	0	1770	0	0	3193	0
Flt Permitted	0.118							0.276			0.834	
Satd. Flow (perm)	224	1881	0	0	1793	0	0	514	0	0	2716	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					36						378	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	351	486	1	0	503	237	3	0	0	278	0	378
Shared Lane Traffic (%)												
Lane Group Flow (vph)	351	487	0	0	740	0	0	3	0	0	656	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		28.0	28.0		28.0	28.0	
Total Split (s)	13.0	47.0		34.0	34.0		28.0	28.0		28.0	28.0	
Total Split (%)	17.3%	62.7%		45.3%	45.3%		37.3%	37.3%		37.3%	37.3%	
Maximum Green (s)	10.0	41.0		28.0	28.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0			6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)		14.0		14.0	14.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	51.5	48.5			31.0			14.5			14.5	
Actuated g/C Ratio	0.69	0.65			0.41			0.19			0.19	
v/c Ratio	0.76	0.40			0.97			0.03			0.79	
Control Delay	28.8	8.7			57.4			21.5			18.7	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	28.8	8.7			57.4			21.5			18.7	
LOS	C	A			E			C			B	
Approach Delay		17.1			57.4			21.5			18.7	
Approach LOS		B			E			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 22 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 30.9		Intersection LOS: C	
Intersection Capacity Utilization 83.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	351	487	740	3	656
v/c Ratio	0.76	0.40	0.97	0.03	0.79
Control Delay	28.8	8.7	57.4	21.5	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	8.7	57.4	21.5	18.7
Queue Length 50th (m)	28.6	29.5	~126.3	0.4	20.0
Queue Length 95th (m)	#68.8	51.5	#142.1	2.0	23.6
Internal Link Dist (m)		178.0	665.0	185.5	362.4
Turn Bay Length (m)	80.0				
Base Capacity (vph)	460	1216	761	150	1063
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.76	0.40	0.97	0.02	0.62

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	274	379	1	0	392	185	2	0	0	217	0	295
Future Volume (vph)	274	379	1	0	392	185	2	0	0	217	0	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			0.95	
Frpb, ped/bikes	1.00	1.00			0.99			1.00			0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	1.00			0.96			1.00			0.91	
Flt Protected	0.95	1.00			1.00			0.95			0.98	
Satd. Flow (prot)	1805	1881			1792			1769			3187	
Flt Permitted	0.12	1.00			1.00			0.28			0.83	
Satd. Flow (perm)	224	1881			1792			514			2715	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	351	486	1	0	503	237	3	0	0	278	0	378
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	0	0	305	0
Lane Group Flow (vph)	351	487	0	0	719	0	0	3	0	0	351	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA			NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	48.5	48.5			30.9			14.5			14.5	
Effective Green, g (s)	48.5	48.5			30.9			14.5			14.5	
Actuated g/C Ratio	0.65	0.65			0.41			0.19			0.19	
Clearance Time (s)	3.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	452	1216			738			99			524	
v/s Ratio Prot	c0.15	0.26			c0.40							
v/s Ratio Perm	0.35							0.01			c0.13	
v/c Ratio	0.78	0.40			0.97			0.03			0.67	
Uniform Delay, d1	18.2	6.3			21.7			24.5			28.0	
Progression Factor	1.00	1.00			1.38			1.00			1.00	
Incremental Delay, d2	8.2	1.0			26.8			0.1			3.2	
Delay (s)	26.4	7.3			56.7			24.7			31.3	
Level of Service	C	A			E			C			C	
Approach Delay (s)		15.3			56.7			24.7			31.3	
Approach LOS		B			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	522	0	160	489	0	117	420	0	56	443	0
Future Volume (vph)	74	522	0	160	489	0	117	420	0	56	443	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.364			0.277			0.435			0.502		
Satd. Flow (perm)	689	3539	0	516	3539	0	823	3610	0	928	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	76	533	0	163	499	0	119	429	0	57	452	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	533	0	163	499	0	119	429	0	57	452	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

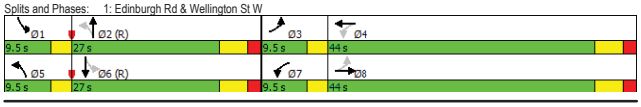
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	28.6	19.3		29.4	21.2		51.1	41.0		47.7	37.9	
Actuated g/C Ratio	0.32	0.21		0.33	0.24		0.57	0.46		0.53	0.42	
v/c Ratio	0.26	0.70		0.63	0.60		0.21	0.26		0.10	0.30	
Control Delay	20.6	37.6		32.1	33.9		10.5	17.3		8.0	18.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.6	37.6		32.1	33.9		10.5	17.3		8.0	18.0	
LOS	C	D		C	C		B	B		A	B	
Approach Delay		35.4			33.5			15.8			16.9	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80.5 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 26.2		Intersection LOS: C	
Intersection Capacity Utilization 60.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	76	533	163	499	119	429	57	452
v/c Ratio	0.26	0.70	0.63	0.60	0.21	0.26	0.10	0.30
Control Delay	20.6	37.6	32.1	33.9	10.5	17.3	8.0	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	37.6	32.1	33.9	10.5	17.3	8.0	18.0
Queue Length 50th (m)	9.2	47.5	20.9	44.0	9.0	25.2	2.9	30.8
Queue Length 95th (m)	17.0	59.8	32.5	55.8	19.6	42.1	7.8	49.4
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	301	1494	259	1494	559	1645	561	1518
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.36	0.63	0.33	0.21	0.26	0.10	0.30

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	522	0	160	489	0	117	420	0	56	443	0
Future Volume (vph)	74	522	0	160	489	0	117	420	0	56	443	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3539		1769	3539		1802	3610		1762	3610	
Flt Permitted	0.36	1.00		0.28	1.00		0.44	1.00		0.50	1.00	
Satd. Flow (perm)	691	3539		517	3539		825	3610		931	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	76	533	0	163	499	0	119	429	0	57	452	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	76	533	0	163	499	0	119	429	0	57	452	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.1	19.9		27.7	21.2		48.1	39.8		43.1	37.3	
Effective Green, g (s)	25.1	19.9		27.7	21.2		48.1	39.8		43.1	37.3	
Actuated g/C Ratio	0.28	0.22		0.31	0.24		0.53	0.44		0.48	0.41	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	256	782		249	833		531	1596		499	1496	
v/s Ratio Prot	0.02	0.15		c0.05	0.14		c0.02	0.12		0.01	c0.13	
v/s Ratio Perm	0.07			c0.15			0.10			0.05		
v/c Ratio	0.30	0.68		0.65	0.60		0.22	0.27		0.11	0.30	
Uniform Delay, d1	24.6	32.1		24.2	30.6		10.6	15.9		12.6	17.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.78	0.94	
Incremental Delay, d2	0.7	2.5		6.1	1.2		0.2	0.4		0.1	0.5	
Delay (s)	25.2	34.6		30.3	31.8		10.8	16.3		10.0	17.0	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		33.4			31.4			15.1			16.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	537	0	0	688	8	273	47	152	3	0	155
Future Volume (vph)	85	537	0	0	688	8	273	47	152	3	0	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.998				0.850			0.850
Flt Protected	0.950						0.950	0.966		0.950		
Satd. Flow (prot)	1787	5136	0	0	5125	0	1698	1731	1599	1805	0	1599
Flt Permitted	0.304						0.950	0.966		0.616		
Satd. Flow (perm)	571	5136	0	0	5125	0	1698	1731	1599	1170	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				157			160
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	88	554	0	0	709	8	281	48	157	3	0	160
Shared Lane Traffic (%)							42%					
Lane Group Flow (vph)	88	554	0	0	717	0	163	166	157	3	0	160
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

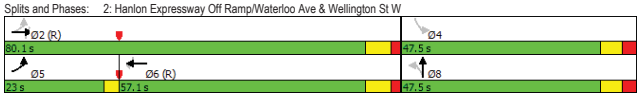
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.31		0.39
v/c Ratio	0.16	0.19			0.36		0.31	0.31	0.16	0.01		0.22
Control Delay	11.3	13.3			28.0		35.3	35.2	2.2	30.3		4.5
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	11.3	13.3			28.0		35.3	35.2	2.2	30.3		4.5
LOS	B	B			C		D	D	A	C		A
Approach Delay		13.0			28.0			24.6			4.9	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.36
Intersection Signal Delay: 20.5 — Intersection LOS: C
Intersection Capacity Utilization 59.0% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	88	554	717	163	166	157	3	160
v/c Ratio	0.16	0.19	0.36	0.31	0.31	0.16	0.01	0.22
Control Delay	11.3	13.3	28.0	35.3	35.2	2.2	30.3	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	13.3	28.0	35.3	35.2	2.2	30.3	4.5
Queue Length 50th (m)	9.2	24.6	48.5	34.4	35.0	0.0	0.6	0.0
Queue Length 95th (m)	16.5	31.2	59.8	55.4	56.0	9.4	3.0	14.1
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	535	2938	2008	532	542	981	366	723
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.19	0.36	0.31	0.31	0.16	0.01	0.22

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	537	0	0	688	8	273	47	152	3	0	155
Future Volume (vph)	85	537	0	0	688	8	273	47	152	3	0	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5126		1698	1731	1599	1805		1599
Flt Permitted	0.30	1.00			1.00		0.95	0.97	1.00	0.62		1.00
Satd. Flow (perm)	572	5136			5126		1698	1731	1599	1170		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	88	554	0	0	709	8	281	48	157	3	0	160
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	67	0	0	97
Lane Group Flow (vph)	88	554	0	0	716	0	163	166	90	3	0	63
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Grp Cap (vph)	517	2938			2008		532	542	914	366		626
v/s Ratio Prot	0.03	c0.11			c0.14							
v/s Ratio Perm	0.07						c0.10	0.10	0.06	0.00		0.04
v/c Ratio	0.17	0.19			0.36		0.31	0.31	0.10	0.01		0.10
Uniform Delay, d1	12.7	13.1			27.4		33.3	33.3	12.4	30.1		24.6
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.7	0.1			0.5		1.5	1.5	0.2	0.0		0.3
Delay (s)	13.4	13.2			27.9		34.8	34.7	12.6	30.2		24.9
Level of Service	B	B			C		C	C	B	C		C
Approach Delay (s)		13.3			27.9			27.6			25.0	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	565	370	0	815	0	0	0	0	145	0	118
Future Volume (vph)	0	565	370	0	815	0	0	0	0	145	0	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.941										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4804	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4804	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		372										124
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	595	389	0	858	0	0	0	0	153	0	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	984	0	0	858	0	0	0	0	153	0	124
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					24.7		56.9
Total Split (%)		69.7%			69.7%					30.3%		69.7%
Maximum Green (s)		50.0			50.0					18.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
v/c Ratio		0.32			0.27					0.20		0.13

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

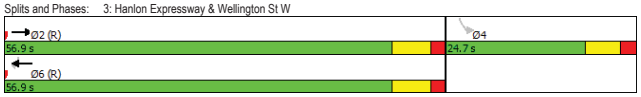
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		4.8			7.6					26.8		1.7
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		4.8			7.6					26.8		1.7
LOS		A			A					C		A
Approach Delay		4.8			7.6						15.5	
Approach LOS		A			A						B	

Intersection Summary

Area Type: Other
Cycle Length: 81.6
Actuated Cycle Length: 81.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.32
Intersection Signal Delay: 7.3 — Intersection LOS: A
Intersection Capacity Utilization 34.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	984	858	153	124
v/c Ratio	0.32	0.27	0.20	0.13
Control Delay	4.8	7.6	26.8	1.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.8	7.6	26.8	1.7
Queue Length 50th (m)	14.6	21.4	10.5	0.0
Queue Length 95th (m)	20.6	27.8	18.4	5.9
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	3087	3147	764	981
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.32	0.27	0.20	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	565	370	0	815	0	0	0	0	145	0	118
Future Volume (vph)	0	565	370	0	815	0	0	0	0	145	0	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4802			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4802			5136					3467		1524
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)	0	595	389	0	858	0	0	0	0	153	0	124
RTOR Reduction (vph)	0	144	0	0	0	0	0	0	0	0	0	48
Lane Group Flow (vph)	0	840	0	0	858	0	0	0	0	153	0	76
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					18.0		50.0
Effective Green, g (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2942			3147					764		933
v/s Ratio Prot		c0.17			0.17							
v/s Ratio Perm										c0.04		0.05
v/c Ratio		0.29			0.27					0.20		0.08
Uniform Delay, d1		7.4			7.3					25.9		6.4
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.2			0.2					0.6		0.2
Delay (s)		7.7			7.6					26.5		6.6
Level of Service		A			A					C		A
Approach Delay (s)		7.7			7.6			0.0			17.6	
Approach LOS		A			A			A			B	

Intersection Summary

HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	63	556	531	289	370	55
Future Volume (vph)	63	556	531	289	370	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.947			0.850
Flt Protected		0.995			0.950	
Satd. Flow (prot)	0	3529	3328	0	1787	1615
Flt Permitted		0.787			0.950	
Satd. Flow (perm)	0	2791	3328	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			178			57
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Adj. Flow (vph)	65	573	547	298	381	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	638	845	0	381	57
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

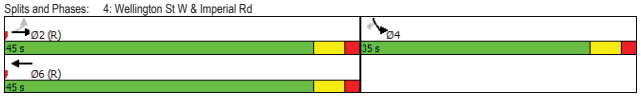
Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		45.8	45.8		22.2	22.2
Actuated g/C Ratio		0.57	0.57		0.28	0.28
v/c Ratio		0.40	0.43		0.77	0.12
Control Delay		11.4	9.0		36.9	6.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.4	9.0		36.9	6.0
LOS		B	A		D	A
Approach Delay		11.4	9.0		32.8	
Approach LOS		B	A		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 15.2		Intersection LOS: B	
Intersection Capacity Utilization 76.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	638	845	381	57
v/c Ratio	0.40	0.43	0.77	0.12
Control Delay	11.4	9.0	36.9	6.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.4	9.0	36.9	6.0
Queue Length 50th (m)	27.4	28.1	55.6	0.0
Queue Length 95th (m)	48.0	50.3	76.7	7.2
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1598	1982	647	621
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.40	0.43	0.59	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	63	556	531	289	370	55
Future Volume (vph)	63	556	531	289	370	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		0.99	1.00		0.95	1.00
Satd. Flow (prot)		3528	3329		1787	1615
Flt Permitted		0.79	1.00		0.95	1.00
Satd. Flow (perm)		2792	3329		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	65	573	547	298	381	57
RTOR Reduction (vph)	0	0	76	0	0	41
Lane Group Flow (vph)	0	638	769	0	381	16
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		45.8	45.8		22.2	22.2
Effective Green, g (s)		45.8	45.8		22.2	22.2
Actuated g/C Ratio		0.57	0.57		0.28	0.28
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1598	1905		495	448
v/s Ratio Prot			c0.23		c0.21	
v/s Ratio Perm		0.23				0.01
v/c Ratio		0.40	0.40		0.77	0.04
Uniform Delay, d1		9.5	9.5		26.6	21.1
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.7	0.6		7.1	0.0
Delay (s)		10.2	10.1		33.6	21.1
Level of Service		B	B		C	C
Approach Delay (s)		10.2	10.1		32.0	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	288	0	183	300	21	346	988	0	34	906	127
Future Volume (vph)	123	288	0	183	300	21	346	988	0	34	906	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.990							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3570	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.552			0.397			0.263			0.950		
Satd. Flow (perm)	1037	3574	0	753	3570	0	960	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					5							131
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	127	297	0	189	309	22	357	1019	0	35	934	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	297	0	189	331	0	357	1019	0	35	934	131
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

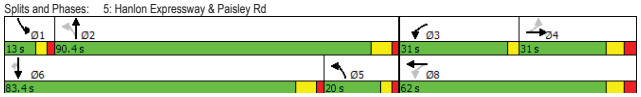
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2					6
Detector Phase	4	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	31.0	31.0		9.5	33.0		10.0	59.4		10.0	60.4	60.4
Total Split (s)	31.0	31.0		31.0	62.0		20.0	90.4		13.0	83.4	83.4
Total Split (%)	18.7%	18.7%		18.7%	37.5%		12.1%	54.7%		7.9%	50.4%	50.4%
Maximum Green (s)	23.0	23.0		28.0	54.0		15.0	83.0		8.0	76.0	76.0
Yellow Time (s)	4.5	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	3.5	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)	5.0	5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)	15.0	15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0			0			0	0
Act Effct Green (s)	21.6	21.6		47.4	42.3		86.6	84.2		7.3	76.3	76.3
Actuated g/C Ratio	0.14	0.14		0.31	0.28		0.57	0.55		0.05	0.50	0.50
v/c Ratio	0.86	0.58		0.53	0.33		0.47	0.55		0.41	0.54	0.15
Control Delay	109.2	66.9		46.0	43.7		28.1	24.5		87.1	28.4	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	109.2	66.9		46.0	43.7		28.1	24.5		87.1	28.4	3.9
LOS	F	E		D	D		C	C		F	C	A
Approach Delay		79.6			44.5			25.4			27.3	
Approach LOS		E			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 151.9			
Natural Cycle: 115			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 35.7		Intersection LOS: D	
Intersection Capacity Utilization 74.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	127	297	189	331	357	1019	35	934	131
v/c Ratio	0.86	0.58	0.53	0.33	0.47	0.55	0.41	0.54	0.15
Control Delay	109.2	66.9	46.0	43.7	28.1	24.5	87.1	28.4	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	109.2	66.9	46.0	43.7	28.1	24.5	87.1	28.4	3.9
Queue Length 50th (m)	40.6	47.8	47.1	44.2	29.1	113.1	11.2	109.5	0.0
Queue Length 95th (m)	#83.5	67.5	69.6	58.7	42.0	146.3	25.0	140.9	12.4
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	157	543	429	1277	810	1869	95	1744	876
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.55	0.44	0.26	0.44	0.55	0.37	0.54	0.15

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	288	0	183	300	21	346	988	0	34	906	127
Future Volume (vph)	123	288	0	183	300	21	346	988	0	34	906	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1785	3574		1804	3571		3467	3374		1805	3471	1615
Flt Permitted	0.55	1.00		0.40	1.00		0.26	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1037	3574		754	3571		958	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	127	297	0	189	309	22	357	1019	0	35	934	131
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	0	0	0	66
Lane Group Flow (vph)	127	297	0	189	327	0	357	1019	0	35	934	65
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2					6
Actuated Green, G (s)	21.6	21.6		42.3	42.3		86.6	84.2		6.0	76.4	76.4
Effective Green, g (s)	21.6	21.6		42.3	42.3		86.6	84.2		6.0	76.4	76.4
Actuated g/C Ratio	0.14	0.14		0.28	0.28		0.57	0.55		0.04	0.50	0.50
Clearance Time (s)	8.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	146	504		330	987		769	1858		70	1734	806
v/s Ratio Prot		0.08		c0.07	0.09		0.04	c0.30		0.02	c0.27	
v/s Ratio Perm	c0.12			0.09			0.22					0.04
v/c Ratio	0.87	0.59		0.57	0.33		0.46	0.55		0.50	0.54	0.08
Uniform Delay, d1	64.3	61.5		44.9	44.0		28.2	22.1		72.0	26.2	19.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.6	1.8		2.4	0.2		0.4	1.2		5.5	1.2	0.2
Delay (s)	102.8	63.3		47.3	44.2		28.7	23.3		77.5	27.4	20.1
Level of Service	F	E		D	D		C	C		E	C	C
Approach Delay (s)		75.1			45.4			24.7			28.1	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	152.9	Sum of lost time (s)	23.4
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	88	23	57	81	40	30	469	61	31	464	19
Future Volume (vph)	41	88	23	57	81	40	30	469	61	31	464	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.969			0.951			0.983			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1780	0	1805	1858	0	1770	1887	0
Flt Permitted	0.677			0.683			0.464			0.435		
Satd. Flow (perm)	1247	1811	0	1288	1780	0	880	1858	0	807	1887	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			41			8			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	42	91	24	59	84	41	31	484	63	32	478	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	115	0	59	125	0	31	547	0	32	498	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

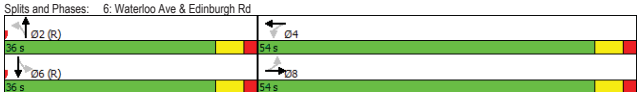
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.1	10.1		10.1	10.1		67.9	67.9		67.9	67.9	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.75	0.75		0.75	0.75	
v/c Ratio	0.30	0.52		0.41	0.53		0.05	0.39		0.05	0.35	
Control Delay	41.0	37.4		44.5	33.1		3.1	8.2		3.8	4.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.0	37.4		44.5	33.1		3.1	8.2		3.8	4.9	
LOS	D	D		D	C		A	A		A	A	
Approach Delay		38.4			36.8			7.9			4.8	
Approach LOS		D			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 13.7		Intersection LOS: B	
Intersection Capacity Utilization 57.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	42	115	59	125	31	547	32	498
v/c Ratio	0.30	0.52	0.41	0.53	0.05	0.39	0.05	0.35
Control Delay	41.0	37.4	44.5	33.1	3.1	8.2	3.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	37.4	44.5	33.1	3.1	8.2	3.8	4.9
Queue Length 50th (m)	7.2	15.9	10.2	14.5	1.0	24.5	1.2	23.9
Queue Length 95th (m)	16.4	31.1	21.4	30.3	2.9	70.8	4.2	45.9
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	665	976	686	968	663	1404	608	1424
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.12	0.09	0.13	0.05	0.39	0.05	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	88	23	57	81	40	30	469	61	31	464	19
Future Volume (vph)	41	88	23	57	81	40	30	469	61	31	464	19
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.98		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)	1750	1811		1791	1780		1800	1858		1759	1887	
Flt Permitted	0.68	1.00		0.68	1.00		0.46	1.00		0.44	1.00	
Satd. Flow (perm)	1247	1811		1288	1780		878	1858		806	1887	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	42	91	24	59	84	41	31	484	63	32	478	20
RTOR Reduction (vph)	0	20	0	0	36	0	0	2	0	0	1	0
Lane Group Flow (vph)	42	95	0	59	89	0	31	545	0	32	497	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	10.1	10.1		10.1	10.1		67.9	67.9		67.9	67.9	
Effective Green, g (s)	10.1	10.1		10.1	10.1		67.9	67.9		67.9	67.9	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.75	0.75		0.75	0.75	
Clearance Time (s)	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	
Lane Grp Cap (vph)	139	203		144	199		662	1401		608	1423	
v/s Ratio Prot		c0.05			0.05			c0.29			0.26	
v/s Ratio Perm	0.03			0.05			0.04			0.04		
v/c Ratio	0.30	0.47		0.41	0.45		0.05	0.39		0.05	0.35	
Uniform Delay, d1	36.7	37.4		37.2	37.3		2.8	3.8		2.8	3.7	
Progression Factor	1.00	1.00		1.00	1.00		0.82	1.70		1.00	1.00	
Incremental Delay, d2	1.2	1.7		1.9	1.6		0.1	0.8		0.2	0.7	
Delay (s)	37.9	39.1		39.1	38.9		2.4	7.3		3.0	4.4	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		38.8			39.0			7.1			4.3	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	4	13	159	5	11	150
Future Volume (vph)	4	13	159	5	11	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	5	16	194	6	13	183
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	16	194	6	13	183
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 25.5% ICU Level of Service A
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	4	13	159	5	11	150
Future Volume (Veh/h)	4	13	159	5	11	150
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	5	16	194	6	13	183
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			22		400	6
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			22		400	6
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		98	83
cM capacity (veh/h)			1592		535	1079

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	5	16	194	6	196
Volume Left	0	0	194	0	13
Volume Right	0	16	0	0	183
cSH	1700	1700	1592	1700	1155
Volume to Capacity	0.00	0.01	0.12	0.00	0.17
Queue Length 95th (m)	0.0	0.0	3.3	0.0	4.9
Control Delay (s)	0.0	0.0	7.6	0.0	9.2
Lane LOS			A		A
Approach Delay (s)	0.0		7.3		9.2
Approach LOS					A

Intersection Summary

Average Delay 7.9
Intersection Capacity Utilization 25.5% ICU Level of Service A
Analysis Period (min) 15

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	251	87	33	223	57	101	407	27	52	381	61
Future Volume (vph)	77	251	87	33	223	57	101	407	27	52	381	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.961			0.970			0.991			0.979	
Flt Protected	0.950			0.950			0.950	0.999		0.950		
Satd. Flow (prot)	1805	1797	0	1805	1814	0	1715	1782	0	1736	1850	0
Flt Permitted	0.483			0.399			0.397	0.988		0.373		
Satd. Flow (perm)	907	1797	0	753	1814	0	713	1762	0	679	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			18			6			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	83	270	94	35	240	61	109	438	29	56	410	66
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	83	364	0	35	301	0	98	478	0	56	476	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

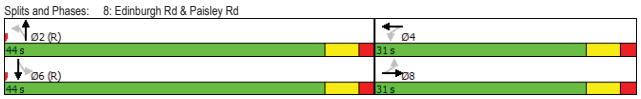
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.27	0.59		0.14	0.49		0.27	0.53		0.16	0.50	
Control Delay	22.5	25.4		19.4	21.9		13.2	15.1		11.5	14.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.5	25.4		19.4	21.9		13.2	15.1		11.5	14.1	
LOS	C	C		B	C		B	B		B	B	
Approach Delay		24.9			21.7			14.8			13.9	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 18.1 Intersection LOS: B
Intersection Capacity Utilization 92.3% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	83	364	35	301	98	478	56	476
v/c Ratio	0.27	0.59	0.14	0.49	0.27	0.53	0.16	0.50
Control Delay	22.5	25.4	19.4	21.9	13.2	15.1	11.5	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	25.4	19.4	21.9	13.2	15.1	11.5	14.1
Queue Length 50th (m)	10.2	45.3	3.6	32.9	8.2	46.9	4.2	42.4
Queue Length 95th (m)	22.8	70.7	10.3	55.7	18.8	74.6	10.8	67.5
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	302	615	251	616	361	895	344	945
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.59	0.14	0.49	0.27	0.53	0.16	0.50

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	251	87	33	223	57	101	407	27	52	381	61
Future Volume (vph)	77	251	87	33	223	57	101	407	27	52	381	61
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		0.95	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		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)	1784	1797		1792	1813		1707	1781		1730	1850	
Flt Permitted	0.48	1.00		0.40	1.00		0.40	0.99		0.37	1.00	
Satd. Flow (perm)	908	1797		753	1813		712	1761		680	1850	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	83	270	94	35	240	61	109	438	29	56	410	66
RTOR Reduction (vph)	0	17	0	0	12	0	0	3	0	0	8	0
Lane Group Flow (vph)	83	347	0	35	289	0	98	475	0	56	468	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	302	599		251	604		360	892		344	937	
v/s Ratio Prot		c0.19			0.16						0.25	
v/s Ratio Perm	0.09			0.05			0.14	c0.27		0.08		
v/c Ratio	0.27	0.58		0.14	0.48		0.27	0.53		0.16	0.50	
Uniform Delay, d1	18.3	20.7		17.5	19.8		10.6	12.5		9.9	12.2	
Progression Factor	1.06	1.08		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	3.9		1.2	2.7		1.9	2.3		1.0	1.9	
Delay (s)	21.6	26.2		18.6	22.5		12.4	14.8		11.0	14.1	
Level of Service	C	C		B	C		B	B		B	B	
Approach Delay (s)		25.3			22.1			14.4			13.8	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	310	4	0	303	141	2	2	0	188	3	206
Future Volume (vph)	200	310	4	0	303	141	2	2	0	188	3	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00			0.99			1.00			0.99	
Frt		0.998			0.957						0.922	
Flt Protected	0.950							0.976			0.977	
Satd. Flow (prot)	1805	1877	0	0	1793	0	0	1836	0	0	3215	0
Flt Permitted	0.293							0.754			0.824	
Satd. Flow (perm)	556	1877	0	0	1793	0	0	1418	0	0	2707	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			36						264	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	256	397	5	0	388	181	3	3	0	241	4	264
Shared Lane Traffic (%)												
Lane Group Flow (vph)	256	402	0	0	569	0	0	6	0	0	509	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

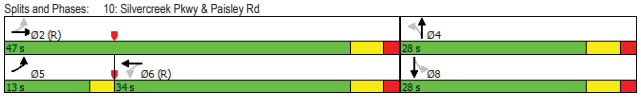
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		28.0	28.0		28.0	28.0	
Total Split (s)	13.0	47.0		34.0	34.0		28.0	28.0		28.0	28.0	
Total Split (%)	17.3%	62.7%		45.3%	45.3%		37.3%	37.3%		37.3%	37.3%	
Maximum Green (s)	10.0	41.0		28.0	28.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0			6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)		14.0		14.0	14.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0		0	0		0	0	
Act Effct Green (s)	53.0	50.0			37.6			13.0			13.0	
Actuated g/C Ratio	0.71	0.67			0.50			0.17			0.17	
v/c Ratio	0.47	0.32			0.62			0.02			0.74	
Control Delay	7.5	7.0			24.4			22.6			20.1	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	7.5	7.0			24.4			22.6			20.1	
LOS	A	A			C			C			C	
Approach Delay		7.2			24.4			22.6			20.1	
Approach LOS		A			C			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 22 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 77.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	256	402	569	6	509
v/c Ratio	0.47	0.32	0.62	0.02	0.74
Control Delay	7.5	7.0	24.4	22.6	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	7.0	24.4	22.6	20.1
Queue Length 50th (m)	10.6	21.4	68.5	0.8	17.6
Queue Length 95th (m)	21.2	37.9	80.1	3.0	22.3
Internal Link Dist (m)		178.0	665.0	185.5	362.4
Turn Bay Length (m)	80.0				
Base Capacity (vph)	569	1251	917	415	980
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.32	0.62	0.01	0.52

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	310	4	0	303	141	2	2	0	188	3	206
Future Volume (vph)	200	310	4	0	303	141	2	2	0	188	3	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			0.95	
Frpb, ped/bikes	1.00	1.00			0.99			1.00			0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	1.00			0.96			1.00			0.92	
Flt Protected	0.95	1.00			1.00			0.98			0.98	
Satd. Flow (prot)	1804	1878			1793			1835			3210	
Flt Permitted	0.29	1.00			1.00			0.75			0.82	
Satd. Flow (perm)	556	1878			1793			1419			2707	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	256	397	5	0	388	181	3	3	0	241	4	264
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	0	0	218	0
Lane Group Flow (vph)	256	402	0	0	551	0	0	6	0	0	291	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA			NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	50.0	50.0			37.7			13.0			13.0	
Effective Green, g (s)	50.0	50.0			37.7			13.0			13.0	
Actuated g/C Ratio	0.67	0.67			0.50			0.17			0.17	
Clearance Time (s)	3.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	525	1252			901			245			469	
v/s Ratio Prot	c0.06	0.21			c0.31							
v/s Ratio Perm	0.26							0.00			c0.11	
v/c Ratio	0.49	0.32			0.61			0.02			0.62	
Uniform Delay, d1	6.8	5.3			13.4			25.7			28.7	
Progression Factor	1.00	1.00			1.39			1.00			1.00	
Incremental Delay, d2	0.7	0.7			3.1			0.0			2.4	
Delay (s)	7.5	6.0			21.7			25.8			31.2	
Level of Service	A	A			C			C			C	
Approach Delay (s)		6.6			21.7			25.8			31.2	
Approach LOS		A			C			C			C	

Intersection Summary

HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	780	0	110	510	0	175	555	0	60	515	0
Future Volume (vph)	110	780	0	110	510	0	175	555	0	60	515	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3471	0	1703	3438	0	1752	3539	0	1703	3505	0
Flt Permitted	0.343			0.158			0.283			0.363		
Satd. Flow (perm)	643	3471	0	283	3438	0	520	3539	0	643	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Adj. Flow (vph)	124	876	0	124	573	0	197	624	0	67	579	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	876	0	124	573	0	197	624	0	67	579	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

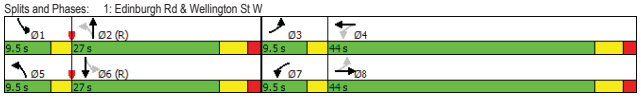
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	38.7	29.2		38.7	29.2		41.7	30.6		36.2	25.8	
Actuated g/C Ratio	0.43	0.32		0.43	0.32		0.46	0.34		0.40	0.29	
v/c Ratio	0.35	0.78		0.55	0.51		0.51	0.52		0.19	0.58	
Control Delay	15.6	32.3		22.6	25.7		21.5	27.9		12.0	27.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.6	32.3		22.6	25.7		21.5	27.9		12.0	27.4	
LOS	B	C		C	C		C	C		B	C	
Approach Delay		30.2			25.2			26.4			25.8	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 27.2		Intersection LOS: C	
Intersection Capacity Utilization 68.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	124	876	124	573	197	624	67	579
v/c Ratio	0.35	0.78	0.55	0.51	0.51	0.52	0.19	0.58
Control Delay	15.6	32.3	22.6	25.7	21.5	27.9	12.0	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	32.3	22.6	25.7	21.5	27.9	12.0	27.4
Queue Length 50th (m)	12.5	74.9	12.5	44.0	20.7	48.9	4.2	51.6
Queue Length 95th (m)	19.5	85.8	19.6	52.7	39.4	74.5	8.1	71.0
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	359	1465	224	1451	383	1204	349	1006
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.60	0.55	0.39	0.51	0.52	0.19	0.58

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	780	0	110	510	0	175	555	0	60	515	0
Future Volume (vph)	110	780	0	110	510	0	175	555	0	60	515	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1786	3471		1703	3438		1751	3539		1695	3505	
Flt Permitted	0.34	1.00		0.16	1.00		0.28	1.00		0.36	1.00	
Satd. Flow (perm)	645	3471		284	3438		521	3539		647	3505	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	124	876	0	124	573	0	197	624	0	67	579	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	124	876	0	124	573	0	197	624	0	67	579	0
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	35.7	29.2		35.7	29.2		39.3	30.0		32.2	25.9	
Effective Green, g (s)	35.7	29.2		35.7	29.2		39.3	30.0		32.2	25.9	
Actuated g/C Ratio	0.40	0.32		0.40	0.32		0.44	0.33		0.36	0.29	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	338	1126		215	1115		369	1179		304	1008	
v/s Ratio Prot	0.03	c0.25		c0.04	0.17		c0.06	0.18		0.02	0.17	
v/s Ratio Perm	0.12			0.19			c0.17			0.06		
v/c Ratio	0.37	0.78		0.58	0.51		0.53	0.53		0.22	0.57	
Uniform Delay, d1	17.9	27.5		19.2	24.6		16.8	24.3		19.4	27.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.70	0.87	
Incremental Delay, d2	0.7	3.5		3.7	0.4		1.5	1.7		0.3	2.2	
Delay (s)	18.5	30.9		23.0	25.0		18.3	26.0		13.9	25.9	
Level of Service	B	C		C	C		B	C		B	C	
Approach Delay (s)		29.4			24.7			24.1			24.7	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	860	0	0	740	5	185	85	225	1	0	250
Future Volume (vph)	155	860	0	0	740	5	185	85	225	1	0	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.999				0.850			0.850
Flt Protected	0.950						0.950	0.981		0.950		
Satd. Flow (prot)	1736	4988	0	0	4983	0	1633	1727	1599	1805	0	1583
Flt Permitted	0.260						0.950	0.981		0.642		
Satd. Flow (perm)	475	4988	0	0	4983	0	1633	1727	1599	1220	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				123			275
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Adj. Flow (vph)	170	945	0	0	813	5	203	93	247	1	0	275
Shared Lane Traffic (%)							28%					
Lane Group Flow (vph)	170	945	0	0	818	0	146	150	247	1	0	275
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	47.5	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	47.5	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	37.2%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	4.5	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	3.0	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	33.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

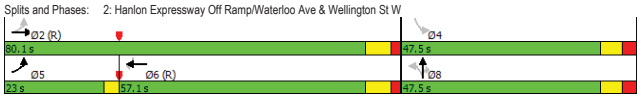
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.31	0.31		0.39
v/c Ratio	0.35	0.33			0.42		0.29	0.28	0.42	0.00		0.35
Control Delay	13.2	14.8			29.0		34.9	34.7	19.3	30.0		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	13.2	14.8			29.0		34.9	34.7	19.3	30.0		4.2
LOS	B	B			C		C	C	B	C		A
Approach Delay		14.6			29.0			27.7			4.3	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type:	Other		
Cycle Length: 127.6			
Actuated Cycle Length: 127.6			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 20.4		Intersection LOS: C	
Intersection Capacity Utilization 63.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	170	945	818	146	150	247	1	275
v/c Ratio	0.35	0.33	0.42	0.29	0.28	0.42	0.00	0.35
Control Delay	13.2	14.8	29.0	34.9	34.7	19.3	30.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	14.8	29.0	34.9	34.7	19.3	30.0	4.2
Queue Length 50th (m)	18.7	46.1	56.9	30.6	31.3	24.7	0.2	0.0
Queue Length 95th (m)	29.7	55.3	69.3	50.3	50.9	49.5	1.7	17.5
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	484	2853	1953	511	541	585	382	787
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.33	0.42	0.29	0.28	0.42	0.00	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	860	0	0	740	5	185	85	225	1	0	250
Future Volume (vph)	155	860	0	0	740	5	185	85	225	1	0	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1735	4988			4983		1633	1728	1599	1805		1583
Flt Permitted	0.26	1.00			1.00		0.95	0.98	1.00	0.64		1.00
Satd. Flow (perm)	475	4988			4983		1633	1728	1599	1219		1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	170	945	0	0	813	5	203	93	247	1	0	275
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	84	0	0	167
Lane Group Flow (vph)	170	945	0	0	817	0	146	150	163	1	0	108
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.31	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Grp Cap (vph)	469	2853			1952		511	541	501	382		620
v/s Ratio Prot	c0.06	0.19			c0.16							
v/s Ratio Perm	0.15						0.09	0.09	c0.10	0.00		0.07
v/c Ratio	0.36	0.33			0.42		0.29	0.28	0.32	0.00		0.17
Uniform Delay, d1	13.7	14.4			28.2		33.0	32.9	33.5	30.1		25.3
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.2	0.3			0.7		1.4	1.3	1.7	0.0		0.6
Delay (s)	15.8	14.7			28.9		34.4	34.2	35.2	30.1		25.9
Level of Service	B	B			C		C	C	D	C		C
Approach Delay (s)		14.9			28.9			34.7			25.9	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	905	445	0	820	0	0	0	0	165	0	85
Future Volume (vph)	0	905	445	0	820	0	0	0	0	165	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.951										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4698	0	0	4988	0	0	0	0	3242	0	1455
Flt Permitted										0.950		
Satd. Flow (perm)	0	4698	0	0	4988	0	0	0	0	3242	0	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		182										89
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	1					1						
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
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Adj. Flow (vph)	0	953	468	0	863	0	0	0	0	174	0	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1421	0	0	863	0	0	0	0	174	0	89
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			29.9					24.7		29.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		0.0			7.0					0.0		7.0
Flash Dont Walk (s)		0.0			16.0					0.0		16.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.57			0.34					0.15		0.11

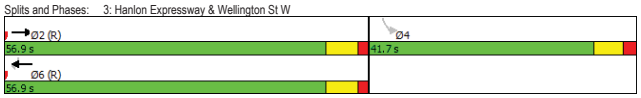
Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		15.6			15.0					22.2		3.2
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		15.6			15.0					22.2		3.2
LOS		B			B					C		A
Approach Delay		15.6			15.0						15.7	
Approach LOS		B			B						B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 98.6			
Actuated Cycle Length: 98.6			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 15.4		Intersection LOS: B	
Intersection Capacity Utilization 41.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1421	863	174	89
v/c Ratio	0.57	0.34	0.15	0.11
Control Delay	15.6	15.0	22.2	3.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.6	15.0	22.2	3.2
Queue Length 50th (m)	60.2	36.2	12.1	0.0
Queue Length 95th (m)	74.5	45.6	19.8	7.6
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2472	2529	1150	781
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.34	0.15	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	905	445	0	820	0	0	0	0	165	0	85
Future Volume (vph)	0	905	445	0	820	0	0	0	0	165	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4696			4988					3242		1455
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4696			4988					3242		1455
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)	0	953	468	0	863	0	0	0	0	174	0	89
RTOR Reduction (vph)	0	90	0	0	0	0	0	0	0	0	0	44
Lane Group Flow (vph)	0	1331	0	0	863	0	0	0	0	174	0	45
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2381			2529					1150		737
v/s Ratio Prot		c0.28			0.17							
v/s Ratio Perm										c0.05		0.03
v/c Ratio		0.56			0.34					0.15		0.06
Uniform Delay, d1		16.7			14.5					21.7		12.4
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		1.0			0.4					0.3		0.2
Delay (s)		17.7			14.9					22.0		12.5
Level of Service		B			B					C		B
Approach Delay (s)		17.7			14.9			0.0			18.8	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	915	650	165	420	70
Future Volume (vph)	60	915	650	165	420	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	1.00			
Frt			0.970			0.850
Flt Protected		0.997				
Satd. Flow (prot)	0	3397	3314	0	1770	1599
Flt Permitted		0.834			0.950	
Satd. Flow (perm)	0	2842	3314	0	1770	1599
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			55			73
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Adj. Flow (vph)	63	953	677	172	438	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1016	849	0	438	73
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

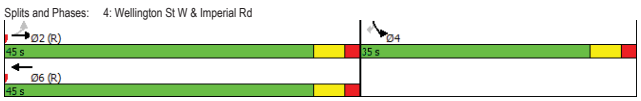
06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	-1.0
Total Lost Time (s)		6.0	6.0		6.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		43.8	43.8		24.2	25.2
Actuated g/C Ratio		0.55	0.55		0.30	0.32
v/c Ratio		0.65	0.46		0.82	0.13
Control Delay		16.3	11.9		38.7	5.1
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.3	11.9		38.7	5.1
LOS		B	B		D	A
Approach Delay		16.3	11.9		33.9	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 18.5		Intersection LOS: B	
Intersection Capacity Utilization 88.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1016	849	438	73
v/c Ratio	0.65	0.46	0.82	0.13
Control Delay	16.3	11.9	38.7	5.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.3	11.9	38.7	5.1
Queue Length 50th (m)	57.3	38.3	63.4	0.0
Queue Length 95th (m)	89.0	59.4	91.3	7.9
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1557	1840	641	645
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.65	0.46	0.68	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	915	650	165	420	70
Future Volume (vph)	60	915	650	165	420	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.97		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3397	3313		1770	1599
Flt Permitted		0.83	1.00		0.95	1.00
Satd. Flow (perm)		2841	3313		1770	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	953	677	172	438	73
RTOR Reduction (vph)	0	0	25	0	0	50
Lane Group Flow (vph)	0	1016	824	0	438	23
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		43.8	43.8		24.2	24.2
Effective Green, g (s)		43.8	43.8		24.2	25.2
Actuated g/C Ratio		0.55	0.55		0.30	0.31
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1555	1813		535	503
v/s Ratio Prot			0.25		c0.25	
v/s Ratio Perm		c0.36				0.01
v/c Ratio		0.65	0.45		0.82	0.05
Uniform Delay, d1		12.8	10.9		25.9	19.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.2	0.8		9.5	0.0
Delay (s)		14.9	11.7		35.3	19.1
Level of Service		B	B		D	B
Approach Delay (s)		14.9	11.7		33.0	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	315	0	170	190	30	160	1245	0	25	935	45
Future Volume (vph)	95	315	0	170	190	30	160	1245	0	25	935	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Frt					0.979							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	3438	0	1787	3456	0	3303	3343	0	1597	3282	1482
Flt Permitted	0.611			0.325			0.950			0.950		
Satd. Flow (perm)	1085	3438	0	611	3456	0	3303	3343	0	1597	3282	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					9							102
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Adj. Flow (vph)	97	321	0	173	194	31	163	1270	0	26	954	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	321	0	173	225	0	163	1270	0	26	954	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

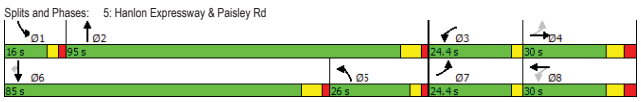
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	59.4	59.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	35.9	18.7		43.4	23.2		15.4	90.3		8.0	78.0	78.0
Actuated g/C Ratio	0.24	0.12		0.28	0.15		0.10	0.59		0.05	0.51	0.51
v/c Ratio	0.32	0.76		0.57	0.42		0.49	0.64		0.31	0.57	0.06
Control Delay	44.8	77.9		51.2	59.4		70.5	24.5		82.5	28.8	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	44.8	77.9		51.2	59.4		70.5	24.5		82.5	28.8	0.1
LOS	D	E		D	E		E	C		F	C	A
Approach Delay		70.2			55.9			29.7			28.8	
Approach LOS		E			E			C			C	

Intersection Summary

Area Type:	Other	
Cycle Length: 165.4		
Actuated Cycle Length: 152.3		
Natural Cycle: 110		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.76		
Intersection Signal Delay: 37.8		Intersection LOS: D
Intersection Capacity Utilization 77.0%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	97	321	173	225	163	1270	26	954	46
v/c Ratio	0.32	0.76	0.57	0.42	0.49	0.64	0.31	0.57	0.06
Control Delay	44.8	77.9	51.2	59.4	70.5	24.5	82.5	28.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	77.9	51.2	59.4	70.5	24.5	82.5	28.8	0.1
Queue Length 50th (m)	24.0	53.9	44.7	33.7	25.9	149.6	8.4	114.0	0.0
Queue Length 95th (m)	41.3	75.2	68.8	50.6	40.1	199.7	20.2	152.2	0.0
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	388	499	340	564	458	1982	116	1681	809
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.64	0.51	0.40	0.36	0.64	0.22	0.57	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	315	0	170	190	30	160	1245	0	25	935	45
Future Volume (vph)	95	315	0	170	190	30	160	1245	0	25	935	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1687	3438		1787	3457		3303	3343		1597	3282	1482
Flt Permitted	0.61	1.00		0.33	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1086	3438		611	3457		3303	3343		1597	3282	1482
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	321	0	173	194	31	163	1270	0	26	954	46
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	0	0	0	23
Lane Group Flow (vph)	97	321	0	173	217	0	163	1270	0	26	954	23
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	30.8	18.7		38.3	23.2		17.5	90.3		5.3	78.1	78.1
Effective Green, g (s)	30.8	18.7		38.3	23.2		17.5	90.3		5.3	78.1	78.1
Actuated g/C Ratio	0.20	0.12		0.25	0.15		0.11	0.59		0.03	0.51	0.51
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	263	416		278	519		374	1956		54	1661	750
v/s Ratio Prot	0.03	c0.09		c0.07	0.06		0.05	c0.38		0.02	c0.29	
v/s Ratio Perm	0.04			0.09								0.02
v/c Ratio	0.37	0.77		0.62	0.42		0.44	0.65		0.48	0.57	0.03
Uniform Delay, d1	52.4	65.7		48.6	59.4		63.8	21.4		73.2	26.5	19.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	8.6		4.3	0.5		0.8	1.7		6.6	1.5	0.1
Delay (s)	53.3	74.3		52.9	60.0		64.6	23.1		79.8	28.0	19.2
Level of Service	D	E		D	E		E	C		E	C	B
Approach Delay (s)		69.5			56.9			27.8			28.9	
Approach LOS		E			E			C			C	

Intersection Summary

HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	154.3	Sum of lost time (s)	23.4
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	225	45	75	120	25	20	545	90	40	465	35
Future Volume (vph)	55	225	45	75	120	25	20	545	90	40	465	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt		0.975			0.974			0.979			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1779	0	1752	1784	0	1805	1820	0	1770	1842	0
Flt Permitted	0.636			0.361			0.398			0.305		
Satd. Flow (perm)	1175	1779	0	659	1784	0	752	1820	0	567	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			18			10			5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	60	245	49	82	130	27	22	592	98	43	505	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	294	0	82	157	0	22	690	0	43	543	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

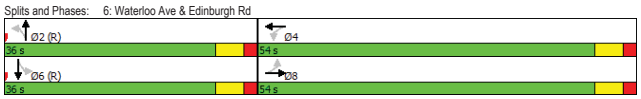
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.2	20.2		20.2	20.2		57.8	57.8		57.8	57.8	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.64	0.64		0.64	0.64	
v/c Ratio	0.23	0.71		0.55	0.38		0.05	0.59		0.12	0.46	
Control Delay	28.3	39.4		43.9	27.2		18.6	28.3		9.2	10.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.3	39.4		43.9	27.2		18.6	28.3		9.2	10.8	
LOS	C	D		D	C		B	C		A	B	
Approach Delay		37.5			32.9			28.0			10.7	
Approach LOS		D			C			C			B	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 25.0		Intersection LOS: C	
Intersection Capacity Utilization 69.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	60	294	82	157	22	690	43	543
v/c Ratio	0.23	0.71	0.55	0.38	0.05	0.59	0.12	0.46
Control Delay	28.3	39.4	43.9	27.2	18.6	28.3	9.2	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	39.4	43.9	27.2	18.6	28.3	9.2	10.8
Queue Length 50th (m)	9.0	46.9	13.3	21.4	1.4	82.2	2.7	44.1
Queue Length 95th (m)	17.7	66.3	25.8	34.6	m7.3	151.0	9.2	86.4
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	626	956	351	959	482	1172	363	1184
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.31	0.23	0.16	0.05	0.59	0.12	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	225	45	75	120	25	20	545	90	40	465	35
Future Volume (vph)	55	225	45	75	120	25	20	545	90	40	465	35
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		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)	1755	1779		1738	1785		1793	1819		1762	1841	
Flt Permitted	0.64	1.00		0.36	1.00		0.40	1.00		0.31	1.00	
Satd. Flow (perm)	1174	1779		661	1785		752	1819		566	1841	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	245	49	82	130	27	22	592	98	43	505	38
RTOR Reduction (vph)	0	13	0	0	14	0	0	4	0	0	2	0
Lane Group Flow (vph)	60	281	0	82	143	0	22	686	0	43	541	0
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.2	20.2		20.2	20.2		57.8	57.8		57.8	57.8	
Effective Green, g (s)	20.2	20.2		20.2	20.2		57.8	57.8		57.8	57.8	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.64	0.64		0.64	0.64	
Clearance Time (s)	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	
Lane Grp Cap (vph)	263	399		148	400		482	1168		363	1182	
v/s Ratio Prot		c0.16			0.08			c0.38			0.29	
v/s Ratio Perm	0.05			0.12			0.03			0.08		
v/c Ratio	0.23	0.70		0.55	0.36		0.05	0.59		0.12	0.46	
Uniform Delay, d1	28.5	32.1		30.9	29.4		5.9	9.3		6.2	8.2	
Progression Factor	1.00	1.00		1.00	1.00		2.28	2.43		1.00	1.00	
Incremental Delay, d2	0.4	5.6		4.4	0.6		0.2	1.9		0.7	1.3	
Delay (s)	29.0	37.7		35.3	30.0		13.7	24.4		6.9	9.4	
Level of Service	C	D		D	C		B	C		A	A	
Approach Delay (s)		36.2			31.8			24.1			9.3	
Approach LOS		D			C			C			A	

Intersection Summary

HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	4	245	5	5	245
Future Volume (vph)	10	4	245	5	5	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1568
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1568
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		7	7			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	3%
Adj. Flow (vph)	11	4	266	5	5	266
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	4	266	5	5	266
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.6%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	4	245	5	5	245
Future Volume (Veh/h)	10	4	245	5	5	245
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	4	266	5	5	266
Pedestrians				1	7	
Lane Width (m)				3.6	3.6	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			22		555	19
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			22		555	19
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			83		99	75
cM capacity (veh/h)			1584		410	1049

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	11	4	266	5	271
Volume Left	0	0	266	0	5
Volume Right	0	4	0	0	266
cSH	1700	1700	1584	1700	1069
Volume to Capacity	0.01	0.00	0.17	0.00	0.25
Queue Length 95th (m)	0.0	0.0	4.8	0.0	8.1
Control Delay (s)	0.0	0.0	7.7	0.0	9.7
Lane LOS			A		A
Approach Delay (s)	0.0		7.6		9.7
Approach LOS					A

Intersection Summary

Average Delay	8.4		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	315	65	45	225	75	70	440	55	90	385	70
Future Volume (vph)	75	315	65	45	225	75	70	440	55	90	385	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.98		0.99	1.00		1.00	0.99	
Frt		0.974			0.962			0.983			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1758	0	1805	1747	0	1770	1827	0	1656	1802	0
Flt Permitted	0.448			0.335			0.381			0.344		
Satd. Flow (perm)	783	1758	0	633	1747	0	702	1827	0	597	1802	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			24			12			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Adj. Flow (vph)	82	342	71	49	245	82	76	478	60	98	418	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	413	0	49	327	0	76	538	0	98	494	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

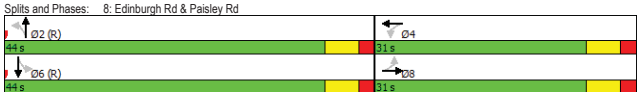
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.31	0.69		0.23	0.55		0.21	0.58		0.32	0.54	
Control Delay	20.8	26.9		21.7	22.9		12.3	15.7		14.7	14.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.8	26.9		21.7	22.9		12.3	15.7		14.7	14.7	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		25.9			22.8			15.3			14.7	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 76.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	413	49	327	76	538	98	494
v/c Ratio	0.31	0.69	0.23	0.55	0.21	0.58	0.32	0.54
Control Delay	20.8	26.9	21.7	22.9	12.3	15.7	14.7	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	26.9	21.7	22.9	12.3	15.7	14.7	14.7
Queue Length 50th (m)	10.1	57.1	5.2	36.0	5.9	51.1	8.1	44.9
Queue Length 95th (m)	23.3	91.7	13.9	61.0	14.1	80.6	19.2	71.5
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	261	596	211	598	355	931	302	921
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.69	0.23	0.55	0.21	0.58	0.32	0.54

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	315	65	45	225	75	70	440	55	90	385	70
Future Volume (vph)	75	315	65	45	225	75	70	440	55	90	385	70
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	
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	0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		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)	1661	1759		1794	1747		1749	1828		1650	1801	
Flt Permitted	0.45	1.00		0.34	1.00		0.38	1.00		0.34	1.00	
Satd. Flow (perm)	783	1759		633	1747		702	1828		598	1801	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	342	71	49	245	82	76	478	60	98	418	76
RTOR Reduction (vph)	0	10	0	0	16	0	0	6	0	0	9	0
Lane Group Flow (vph)	82	403	0	49	311	0	76	532	0	98	485	0
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	261	586		211	582		355	926		302	912	
v/s Ratio Prot		c0.23			0.18			c0.29			0.27	
v/s Ratio Perm	0.10			0.08			0.11			0.16		
v/c Ratio	0.31	0.69		0.23	0.53		0.21	0.57		0.32	0.53	
Uniform Delay, d1	18.6	21.6		18.1	20.3		10.2	12.9		10.9	12.5	
Progression Factor	0.91	0.97		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.8	5.9		2.6	3.5		1.4	2.6		2.8	2.2	
Delay (s)	19.8	26.9		20.6	23.8		11.6	15.5		13.8	14.7	
Level of Service	B	C		C	C		B	B		B	B	
Approach Delay (s)		25.7			23.4			15.0			14.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	340	1	0	295	145	10	4	5	170	1	130
Future Volume (vph)	200	340	1	0	295	145	10	4	5	170	1	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.98			0.97		0.94	0.98	
Frt					0.955			0.966			0.851	
Flt Protected	0.950							0.973		0.950		
Satd. Flow (prot)	1752	1793	0	0	1721	0	0	1750	0	1770	1518	0
Flt Permitted	0.377									0.767		
Satd. Flow (perm)	687	1793	0	0	1721	0	0	1788	0	1342	1518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					35			5			141	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Adj. Flow (vph)	217	370	1	0	321	158	11	4	5	185	1	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	217	371	0	0	479	0	0	20	0	185	142	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

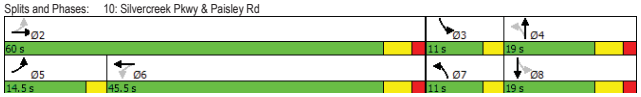
Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0		45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%		50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0		39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.4	54.4			43.0			6.4		13.3	10.2	
Actuated g/C Ratio	0.75	0.71			0.56			0.08		0.17	0.13	
v/c Ratio	0.34	0.29			0.49			0.13		0.67	0.44	
Control Delay	5.3	5.8			13.4			31.3		40.7	9.9	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	5.3	5.8			13.4			31.3		40.7	9.9	
LOS	A	A			B			C		D	A	
Approach Delay		5.6			13.4			31.3			27.3	
Approach LOS		A			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 76.7			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 13.6		Intersection LOS: B	
Intersection Capacity Utilization 76.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	217	371	479	20	185	142
v/c Ratio	0.34	0.29	0.49	0.13	0.67	0.44
Control Delay	5.3	5.8	13.4	31.3	40.7	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.3	5.8	13.4	31.3	40.7	9.9
Queue Length 50th (m)	4.7	12.0	29.5	2.0	26.2	0.1
Queue Length 95th (m)	20.5	40.7	84.3	9.1	45.4	14.6
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	674	1271	979	309	278	411
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.29	0.49	0.06	0.67	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	340	1	0	295	145	10	4	5	170	1	130
Future Volume (vph)	200	340	1	0	295	145	10	4	5	170	1	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.98			0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00			0.99		0.96	1.00	
Frt	1.00	1.00			0.96			0.97		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1745	1792			1724			1745		1706	1520	
Flt Permitted	0.38	1.00			1.00			1.00		0.77	1.00	
Satd. Flow (perm)	692	1792			1724			1793		1377	1520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	370	1	0	321	158	11	4	5	185	1	141
RTOR Reduction (vph)	0	0	0	0	16	0	0	5	0	0	116	0
Lane Group Flow (vph)	217	371	0	0	463	0	0	15	0	185	26	0
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.4	54.4			43.0			2.7		14.1	14.1	
Effective Green, g (s)	54.4	54.4			43.0			2.7		14.1	14.1	
Actuated g/C Ratio	0.68	0.68			0.53			0.03		0.18	0.18	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	577	1210			920			60		275	266	
v/s Ratio Prot	c0.04	0.21			c0.27					c0.07	0.02	
v/s Ratio Perm	0.21							0.01		c0.05		
v/c Ratio	0.38	0.31			0.50			0.25		0.67	0.10	
Uniform Delay, d1	5.8	5.3			11.9			37.9		30.7	27.9	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.7			2.0			2.2		6.3	0.2	
Delay (s)	6.2	6.0			13.9			40.1		37.1	28.0	
Level of Service	A	A			B			D		D	C	
Approach Delay (s)		6.1			13.9			40.1			33.1	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	620	0	230	725	0	190	650	0	55	635	0
Future Volume (vph)	110	620	0	230	725	0	190	650	0	55	635	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.221			0.257			0.261			0.373		
Satd. Flow (perm)	419	3539	0	478	3539	0	495	3610	0	692	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	112	633	0	235	740	0	194	663	0	56	648	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	633	0	235	740	0	194	663	0	56	648	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

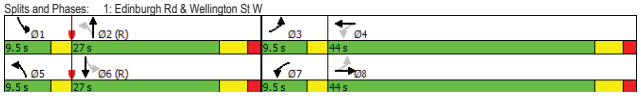
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	34.2	24.7		34.8	26.6		46.8	35.5		39.4	29.3	
Actuated g/C Ratio	0.38	0.27		0.39	0.30		0.52	0.39		0.44	0.33	
v/c Ratio	0.43	0.65		0.85	0.71		0.46	0.47		0.14	0.55	
Control Delay	20.5	31.6		46.9	32.2		16.7	23.8		11.5	23.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.5	31.6		46.9	32.2		16.7	23.8		11.5	23.4	
LOS	C	C		D	C		B	C		B	C	
Approach Delay		29.9			35.7			22.2			22.5	
Approach LOS		C			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 71 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 28.0		Intersection LOS: C	
Intersection Capacity Utilization 74.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	112	633	235	740	194	663	56	648
v/c Ratio	0.43	0.65	0.85	0.71	0.46	0.47	0.14	0.55
Control Delay	20.5	31.6	46.9	32.2	16.7	23.8	11.5	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	31.6	46.9	32.2	16.7	23.8	11.5	23.4
Queue Length 50th (m)	12.2	52.8	27.8	64.1	18.3	48.2	3.8	52.3
Queue Length 95th (m)	20.0	63.9	#48.9	76.3	36.0	75.4	m7.6	67.7
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	259	1494	277	1494	424	1422	392	1176
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.42	0.85	0.50	0.46	0.47	0.14	0.55

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	620	0	230	725	0	190	650	0	55	635	0
Future Volume (vph)	110	620	0	230	725	0	190	650	0	55	635	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3539		1769	3539		1804	3610		1766	3610	
Flt Permitted	0.22	1.00		0.26	1.00		0.26	1.00		0.37	1.00	
Satd. Flow (perm)	420	3539		479	3539		495	3610		693	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	633	0	235	740	0	194	663	0	56	648	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	112	633	0	235	740	0	194	663	0	56	648	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	30.5	25.3		33.1	26.6		43.2	34.2		34.7	28.7	
Effective Green, g (s)	30.5	25.3		33.1	26.6		43.2	34.2		34.7	28.7	
Actuated g/C Ratio	0.34	0.28		0.37	0.30		0.48	0.38		0.39	0.32	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	222	994		269	1045		404	1371		338	1151	
v/s Ratio Prot	0.03	0.18		c0.06	0.21		c0.06	0.18		0.01	c0.18	
v/s Ratio Perm	0.14			c0.26			0.17			0.05		
v/c Ratio	0.50	0.64		0.87	0.71		0.48	0.48		0.17	0.56	
Uniform Delay, d1	21.7	28.3		24.2	28.2		14.6	21.2		17.6	25.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.81	0.80	
Incremental Delay, d2	1.8	1.3		25.3	2.2		0.9	1.2		0.2	1.8	
Delay (s)	23.5	29.7		49.5	30.5		15.5	22.4		14.5	22.2	
Level of Service	C	C		D	C		B	C		B	C	
Approach Delay (s)		28.7			35.1			20.8			21.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	765	0	0	985	10	395	120	140	5	0	260
Future Volume (vph)	155	765	0	0	985	10	395	120	140	5	0	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.999				0.850			0.850
Flt Protected	0.950						0.950	0.974		0.950		
Satd. Flow (prot)	1787	5136	0	0	5130	0	1698	1749	1599	1805	0	1599
Flt Permitted	0.185						0.950	0.974		0.464		
Satd. Flow (perm)	348	5136	0	0	5130	0	1698	1749	1599	882	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				144			268
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	160	789	0	0	1015	10	407	124	144	5	0	268
Shared Lane Traffic (%)							35%					
Lane Group Flow (vph)	160	789	0	0	1025	0	265	266	144	5	0	268
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	24.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	3.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

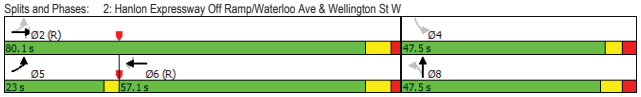
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.32		0.39
v/c Ratio	0.37	0.27			0.51		0.50	0.49	0.15	0.02		0.34
Control Delay	13.5	14.1			30.6		39.6	39.1	2.3	30.0		4.1
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	13.5	14.1			30.6		39.6	39.1	2.3	30.0		4.1
LOS	B	B			C		D	D	A	C		A
Approach Delay		14.0			30.6			31.4			4.6	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 23.0 — Intersection LOS: C
Intersection Capacity Utilization 70.8% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	160	789	1025	265	266	144	5	268
v/c Ratio	0.37	0.27	0.51	0.50	0.49	0.15	0.02	0.34
Control Delay	13.5	14.1	30.6	39.6	39.1	2.3	30.0	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	14.1	30.6	39.6	39.1	2.3	30.0	4.1
Queue Length 50th (m)	17.4	36.8	74.5	59.8	59.8	0.0	0.9	0.0
Queue Length 95th (m)	28.0	44.9	88.7	89.0	88.9	9.1	4.2	17.4
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	435	2938	2010	532	548	976	283	789
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.27	0.51	0.50	0.49	0.15	0.02	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	765	0	0	985	10	395	120	140	5	0	260
Future Volume (vph)	155	765	0	0	985	10	395	120	140	5	0	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5128		1698	1749	1599	1805		1599
Flt Permitted	0.18	1.00			1.00		0.95	0.97	1.00	0.46		1.00
Satd. Flow (perm)	348	5136			5128		1698	1749	1599	881		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	160	789	0	0	1015	10	407	124	144	5	0	268
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	62	0	0	163
Lane Group Flow (vph)	160	789	0	0	1024	0	265	266	82	5	0	105
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.32		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Grp Cap (vph)	424	2938			2009		532	548	914	283		626
v/s Ratio Prot	c0.06	0.15			c0.20							
v/s Ratio Perm	0.16						c0.16	0.15	0.05	0.01		0.07
v/c Ratio	0.38	0.27			0.51		0.50	0.49	0.09	0.02		0.17
Uniform Delay, d1	14.4	13.8			29.5		35.6	35.5	12.3	29.6		25.3
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.5	0.2			0.9		3.3	3.1	0.2	0.1		0.6
Delay (s)	16.9	14.0			30.4		38.9	38.5	12.5	29.7		25.8
Level of Service	B	B			C		D	D	B	C		C
Approach Delay (s)		14.5			30.4			33.1			25.9	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	805	490	0	1235	0	0	0	0	175	0	70
Future Volume (vph)	0	805	490	0	1235	0	0	0	0	175	0	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.943										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4813	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4813	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		226										74
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	847	516	0	1300	0	0	0	0	184	0	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1363	0	0	1300	0	0	0	0	184	0	74
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.53			0.50					0.15		0.09

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

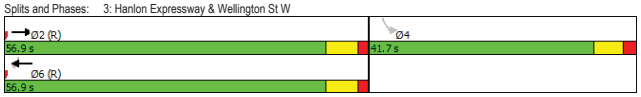
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		14.2			16.9					22.1		3.4
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		14.2			16.9					22.1		3.4
LOS		B			B					C		A
Approach Delay		14.2			16.9						16.7	
Approach LOS		B			B						B	

Intersection Summary

Area Type: Other
Cycle Length: 98.6
Actuated Cycle Length: 98.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 15.6 — Intersection LOS: B
Intersection Capacity Utilization 40.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1363	1300	184	74
v/c Ratio	0.53	0.50	0.15	0.09
Control Delay	14.2	16.9	22.1	3.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.2	16.9	22.1	3.4
Queue Length 50th (m)	53.5	60.3	12.8	0.0
Queue Length 95th (m)	66.6	72.9	20.6	6.9
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2552	2604	1230	809
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.53	0.50	0.15	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	805	490	0	1235	0	0	0	0	175	0	70
Future Volume (vph)	0	805	490	0	1235	0	0	0	0	175	0	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4814			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4814			5136					3467		1524
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)	0	847	516	0	1300	0	0	0	0	184	0	74
RTOR Reduction (vph)	0	111	0	0	0	0	0	0	0	0	0	36
Lane Group Flow (vph)	0	1252	0	0	1300	0	0	0	0	184	0	38
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2441			2604					1230		772
v/s Ratio Prot		c0.26			0.25							
v/s Ratio Perm										c0.05		0.02
v/c Ratio		0.51			0.50					0.15		0.05
Uniform Delay, d1		16.2			16.0					21.7		12.3
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.8			0.7					0.3		0.1
Delay (s)		17.0			16.7					21.9		12.4
Level of Service		B			B					C		B
Approach Delay (s)		17.0			16.7			0.0			19.2	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	885	810	390	355	60
Future Volume (vph)	70	885	810	390	355	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.951			0.850
Flt Protected		0.996			0.950	
Satd. Flow (prot)	0	3563	3342	0	1787	1615
Flt Permitted		0.714			0.950	
Satd. Flow (perm)	0	2554	3342	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			142			62
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Adj. Flow (vph)	72	912	835	402	366	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	984	1237	0	366	62
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

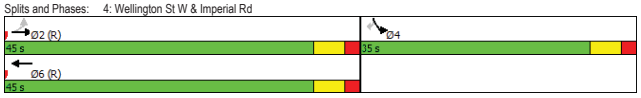
06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		46.4	46.4		21.6	21.6
Actuated g/C Ratio		0.58	0.58		0.27	0.27
v/c Ratio		0.66	0.62		0.76	0.13
Control Delay		15.5	12.2		36.8	6.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		15.5	12.2		36.8	6.0
LOS		B	B		D	A
Approach Delay		15.5	12.2		32.4	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 96.1%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	984	1237	366	62
v/c Ratio	0.66	0.62	0.76	0.13
Control Delay	15.5	12.2	36.8	6.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.5	12.2	36.8	6.0
Queue Length 50th (m)	52.1	54.9	53.4	0.0
Queue Length 95th (m)	90.7	92.9	74.2	7.6
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1481	1998	647	624
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.66	0.62	0.57	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	885	810	390	355	60
Future Volume (vph)	70	885	810	390	355	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3564	3342		1787	1615
Flt Permitted		0.71	1.00		0.95	1.00
Satd. Flow (perm)		2552	3342		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	912	835	402	366	62
RTOR Reduction (vph)	0	0	60	0	0	45
Lane Group Flow (vph)	0	984	1177	0	366	17
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		46.4	46.4		21.6	21.6
Effective Green, g (s)		46.4	46.4		21.6	21.6
Actuated g/C Ratio		0.58	0.58		0.27	0.27
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1480	1938		482	436
v/s Ratio Prot			0.35		c0.20	
v/s Ratio Perm		c0.39				0.01
v/c Ratio		0.66	0.61		0.76	0.04
Uniform Delay, d1		11.5	10.9		26.8	21.5
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.4	1.4		6.8	0.0
Delay (s)		13.9	12.3		33.6	21.6
Level of Service		B	B		C	C
Approach Delay (s)		13.9	12.3		31.8	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	355	0	230	425	35	400	1045	0	45	1400	130
Future Volume (vph)	115	355	0	230	425	35	400	1045	0	45	1400	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.989							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3566	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.296			0.256			0.950			0.950		
Satd. Flow (perm)	556	3574	0	486	3566	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4							134
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	119	366	0	237	438	36	412	1077	0	46	1443	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	366	0	237	474	0	412	1077	0	46	1443	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

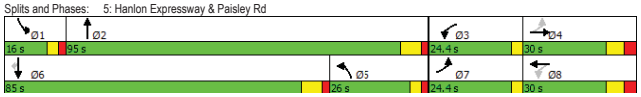
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	13.0	30.0		9.5	30.0		10.0	60.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	38.9	20.3		48.0	26.5		20.8	91.8		9.1	77.7	77.7
Actuated g/C Ratio	0.24	0.13		0.30	0.16		0.13	0.57		0.06	0.48	0.48
v/c Ratio	0.50	0.82		0.78	0.81		0.93	0.56		0.46	0.87	0.16
Control Delay	50.7	84.7		64.3	76.3		96.8	25.2		89.3	44.9	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	50.7	84.7		64.3	76.3		96.8	25.2		89.3	44.9	3.9
LOS	D	F		E	E		F	C		F	D	A
Approach Delay		76.4			72.3			45.0			42.8	
Approach LOS		E			E			D			D	

Intersection Summary

Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 162			
Natural Cycle: 115			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 52.2		Intersection LOS: D	
Intersection Capacity Utilization 93.2%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	119	366	237	474	412	1077	46	1443	134
v/c Ratio	0.50	0.82	0.78	0.81	0.93	0.56	0.46	0.87	0.16
Control Delay	50.7	84.7	64.3	76.3	96.8	25.2	89.3	44.9	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	84.7	64.3	76.3	96.8	25.2	89.3	44.9	3.9
Queue Length 50th (m)	30.6	65.5	65.5	82.1	74.1	130.3	15.7	236.3	0.0
Queue Length 95th (m)	49.0	85.2	93.3	#115.4	#107.6	155.6	30.5	271.9	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	320	485	318	585	450	1911	123	1664	843
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.75	0.75	0.81	0.92	0.56	0.37	0.87	0.16

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	355	0	230	425	35	400	1045	0	45	1400	130
Future Volume (vph)	115	355	0	230	425	35	400	1045	0	45	1400	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574		1805	3565		3467	3374		1805	3471	1615
Flt Permitted	0.30	1.00		0.26	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	558	3574		487	3565		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	366	0	237	438	36	412	1077	0	46	1443	134
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	70
Lane Group Flow (vph)	119	366	0	237	471	0	412	1077	0	46	1443	64
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	33.9	20.3		43.1	26.5		21.9	91.8		7.8	77.7	77.7
Effective Green, g (s)	33.9	20.3		43.1	26.5		21.9	91.8		7.8	77.7	77.7
Actuated g/C Ratio	0.21	0.12		0.26	0.16		0.13	0.56		0.05	0.48	0.48
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	218	444		288	579		465	1899		86	1653	769
v/s Ratio Prot	0.05	0.10		c0.10	0.13		c0.12	0.32		0.03	c0.42	
v/s Ratio Perm	0.07			c0.12								0.04
v/c Ratio	0.55	0.82		0.82	0.81		0.89	0.57		0.53	0.87	0.08
Uniform Delay, d1	55.0	69.7		51.4	65.9		69.4	22.9		75.9	38.3	23.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.8	11.8		17.0	8.5		18.0	1.2		6.3	6.7	0.2
Delay (s)	57.8	81.4		68.4	74.4		87.4	24.1		82.1	45.0	23.5
Level of Service	E	F		E	E		F	C		F	D	C
Approach Delay (s)		75.6			72.4			41.6			44.3	
Approach LOS		E			E			D			D	

Intersection Summary

HCM 2000 Control Delay	51.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	163.1	Sum of lost time (s)	23.4
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	150	40	90	235	45	40	610	80	50	600	35
Future Volume (vph)	45	150	40	90	235	45	40	610	80	50	600	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.969			0.976			0.983			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1832	0	1805	1858	0	1770	1882	0
Flt Permitted	0.361			0.549			0.331			0.297		
Satd. Flow (perm)	667	1811	0	1036	1832	0	628	1858	0	552	1882	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			16			8			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	46	155	41	93	242	46	41	629	82	52	619	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	196	0	93	288	0	41	711	0	52	655	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

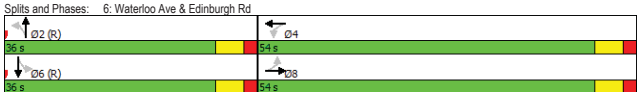
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	19.5	19.5		19.5	19.5		58.5	58.5		58.5	58.5	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65	
v/c Ratio	0.32	0.48		0.42	0.70		0.10	0.59		0.15	0.54	
Control Delay	33.6	29.8		34.4	39.5		7.0	18.1		9.1	11.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.6	29.8		34.4	39.5		7.0	18.1		9.1	11.6	
LOS	C	C		C	D		A	B		A	B	
Approach Delay		30.5			38.3			17.5			11.4	
Approach LOS		C			D			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 20.7		Intersection LOS: C	
Intersection Capacity Utilization 76.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	196	93	288	41	711	52	655
v/c Ratio	0.32	0.48	0.42	0.70	0.10	0.59	0.15	0.54
Control Delay	33.6	29.8	34.4	39.5	7.0	18.1	9.1	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	29.8	34.4	39.5	7.0	18.1	9.1	11.6
Queue Length 50th (m)	7.1	27.5	14.7	46.1	1.5	49.7	3.2	56.3
Queue Length 95th (m)	15.8	43.1	26.4	65.9	m5.6	108.9	10.6	108.5
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	355	976	552	984	408	1210	358	1224
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.20	0.17	0.29	0.10	0.59	0.15	0.54

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	150	40	90	235	45	40	610	80	50	600	35
Future Volume (vph)	45	150	40	90	235	45	40	610	80	50	600	35
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1757	1810		1793	1832		1802	1858		1763	1882	
Flt Permitted	0.36	1.00		0.55	1.00		0.33	1.00		0.30	1.00	
Satd. Flow (perm)	668	1810		1037	1832		627	1858		550	1882	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	155	41	93	242	46	41	629	82	52	619	36
RTOR Reduction (vph)	0	18	0	0	13	0	0	3	0	0	1	0
Lane Group Flow (vph)	46	178	0	93	275	0	41	708	0	52	654	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	19.5	19.5		19.5	19.5		58.5	58.5		58.5	58.5	
Effective Green, g (s)	19.5	19.5		19.5	19.5		58.5	58.5		58.5	58.5	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65	
Clearance Time (s)	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	
Lane Grp Cap (vph)	144	392		224	396		407	1207		357	1223	
v/s Ratio Prot		0.10			c0.15			c0.38			0.35	
v/s Ratio Perm	0.07			0.09			0.07			0.09		
v/c Ratio	0.32	0.45		0.42	0.70		0.10	0.59		0.15	0.53	
Uniform Delay, d1	29.7	30.6		30.3	32.5		5.9	8.9		6.1	8.4	
Progression Factor	1.00	1.00		1.00	1.00		0.83	1.55		1.00	1.00	
Incremental Delay, d2	1.3	0.8		1.2	5.2		0.4	1.9		0.9	1.7	
Delay (s)	31.0	31.5		31.6	37.8		5.4	15.7		6.9	10.1	
Level of Service	C	C		C	D		A	B		A	B	
Approach Delay (s)		31.4			36.3			15.2			9.9	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	10	255	10	20	265
Future Volume (vph)	10	10	255	10	20	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	11	11	277	11	22	288
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	11	277	11	22	288
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.8%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	10	255	10	20	265
Future Volume (Veh/h)	10	10	255	10	20	265
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	277	11	22	288
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			23		577	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			23		577	12
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			83		94	73
cM capacity (veh/h)			1591		398	1071

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	11	11	277	11	310
Volume Left	0	0	277	0	22
Volume Right	0	11	0	0	288
cSH	1700	1700	1591	1700	1152
Volume to Capacity	0.01	0.01	0.17	0.01	0.27
Queue Length 95th (m)	0.0	0.0	5.0	0.0	8.7
Control Delay (s)	0.0	0.0	7.7	0.0	9.9
Lane LOS			A		A
Approach Delay (s)	0.0		7.4		9.9
Approach LOS					A

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	290	115	55	355	45	105	500	50	95	510	90
Future Volume (vph)	75	290	115	55	355	45	105	500	50	95	510	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.957			0.983			0.986			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1788	0	1805	1843	0	1805	1865	0	1736	1845	0
Flt Permitted	0.314			0.306			0.258			0.300		
Satd. Flow (perm)	591	1788	0	578	1843	0	489	1865	0	547	1845	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			9			10			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	81	312	124	59	382	48	113	538	54	102	548	97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	81	436	0	59	430	0	113	592	0	102	645	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

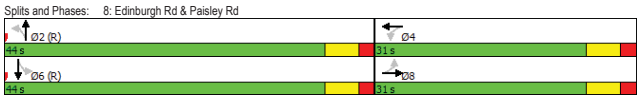
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.41	0.71		0.31	0.69		0.46	0.62		0.37	0.68	
Control Delay	26.8	28.0		24.0	28.2		19.4	16.7		16.1	18.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.8	28.0		24.0	28.2		19.4	16.7		16.1	18.2	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		27.8			27.7			17.2			17.9	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 84.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	81	436	59	430	113	592	102	645
v/c Ratio	0.41	0.71	0.31	0.69	0.46	0.62	0.37	0.68
Control Delay	26.8	28.0	24.0	28.2	19.4	16.7	16.1	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	28.0	24.0	28.2	19.4	16.7	16.1	18.2
Queue Length 50th (m)	10.5	59.1	6.4	53.5	10.1	58.6	8.7	66.2
Queue Length 95th (m)	25.4	95.2	16.8	85.5	25.6	91.4	20.9	103.9
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	197	615	192	620	247	949	277	943
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.71	0.31	0.69	0.46	0.62	0.37	0.68

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	290	115	55	355	45	105	500	50	95	510	90
Future Volume (vph)	75	290	115	55	355	45	105	500	50	95	510	90
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	
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	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.99		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)	1789	1789		1794	1844		1799	1866		1732	1846	
Flt Permitted	0.31	1.00		0.31	1.00		0.26	1.00		0.30	1.00	
Satd. Flow (perm)	591	1789		578	1844		488	1866		547	1846	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	81	312	124	59	382	48	113	538	54	102	548	97
RTOR Reduction (vph)	0	19	0	0	6	0	0	5	0	0	8	0
Lane Group Flow (vph)	81	417	0	59	424	0	113	587	0	102	637	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	197	596		192	614		247	945		277	935	
v/s Ratio Prot		c0.23			0.23			0.31			c0.34	
v/s Ratio Perm	0.14			0.10			0.23			0.19		
v/c Ratio	0.41	0.70		0.31	0.69		0.46	0.62		0.37	0.68	
Uniform Delay, d1	19.3	21.7		18.6	21.7		11.9	13.3		11.2	13.9	
Progression Factor	1.00	1.03		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	6.2		4.1	6.3		6.0	3.1		3.7	4.0	
Delay (s)	25.2	28.6		22.7	27.9		17.9	16.4		15.0	17.9	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		28.0			27.3			16.6			17.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	385	10	5	400	190	2	0	0	215	3	295
Future Volume (vph)	280	385	10	5	400	190	2	0	0	215	3	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			0.99			1.00		0.99	0.99	
Frt		0.996			0.957						0.851	
Flt Protected	0.950							0.950		0.950		
Satd. Flow (prot)	1805	1873	0	0	1792	0	0	1770	0	1787	1594	0
Flt Permitted	0.336				0.997					0.930		
Satd. Flow (perm)	638	1873	0	0	1787	0	0	1861	0	1737	1594	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			34						321	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	304	418	11	5	435	207	2	0	0	234	3	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	304	429	0	0	647	0	0	2	0	234	324	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

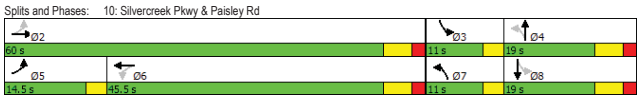
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		2.5	5.0		4.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		7.5	19.0		9.0	19.0	
Total Split (s)	14.5	60.0		45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%		50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0		39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.2	54.2			42.4			6.0		11.5	8.5	
Actuated g/C Ratio	0.76	0.72			0.57			0.08		0.15	0.11	
v/c Ratio	0.49	0.32			0.63			0.01		0.86	0.70	
Control Delay	5.9	5.1			15.4			34.0		58.8	12.5	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	5.9	5.1			15.4			34.0		58.8	12.5	
LOS	A	A			B			C		E	B	
Approach Delay		5.4			15.4			34.0			31.9	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 74.8			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 16.4		Intersection LOS: B	
Intersection Capacity Utilization 87.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	304	429	647	2	234	324
v/c Ratio	0.49	0.32	0.63	0.01	0.86	0.70
Control Delay	5.9	5.1	15.4	34.0	58.8	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	5.1	15.4	34.0	58.8	12.5
Queue Length 50th (m)	7.0	14.3	48.5	0.3	~38.1	0.4
Queue Length 95th (m)	27.8	45.9	126.8	2.4	56.7	21.2
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	668	1358	1026	324	273	559
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.32	0.63	0.01	0.86	0.58

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	385	10	5	400	190	2	0	0	215	3	295
Future Volume (vph)	280	385	10	5	400	190	2	0	0	215	3	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99			1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00		0.99	1.00	
Frt	1.00	1.00			0.96			1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.95		0.95	1.00	
Satd. Flow (prot)	1804	1873			1791			1768		1778	1596	
Flt Permitted	0.34	1.00			1.00			1.00		0.93	1.00	
Satd. Flow (perm)	639	1873			1787			1861		1741	1596	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	418	11	5	435	207	2	0	0	234	3	321
RTOR Reduction (vph)	0	1	0	0	16	0	0	0	0	0	267	0
Lane Group Flow (vph)	304	428	0	0	631	0	0	2	0	234	57	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.2	54.2			42.3			1.3		13.5	13.5	
Effective Green, g (s)	54.2	54.2			42.3			1.3		13.5	13.5	
Actuated g/C Ratio	0.68	0.68			0.53			0.02		0.17	0.17	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	564	1273			948			30		299	270	
v/s Ratio Prot	c0.06	0.23								c0.09	0.04	
v/s Ratio Perm	0.31				c0.35			0.00		c0.04		
v/c Ratio	0.54	0.34			0.67			0.07		0.78	0.21	
Uniform Delay, d1	6.7	5.3			13.6			38.6		31.7	28.5	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.7			3.7			0.9		12.5	0.4	
Delay (s)	7.7	6.0			17.3			39.5		44.2	28.9	
Level of Service	A	A			B			D		D	C	
Approach Delay (s)		6.7			17.3			39.5			35.3	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 0.0% ICU Level of Service A
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary

Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		46.7			34.7			279.7			92.6	
Travel Time (s)		3.4			2.5			20.1			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
13: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	530	0	160	495	0	120	425	0	60	450	0
Future Volume (vph)	75	530	0	160	495	0	120	425	0	60	450	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.360			0.273			0.428			0.500		
Satd. Flow (perm)	682	3539	0	508	3539	0	810	3610	0	924	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	77	541	0	163	505	0	122	434	0	61	459	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	541	0	163	505	0	122	434	0	61	459	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

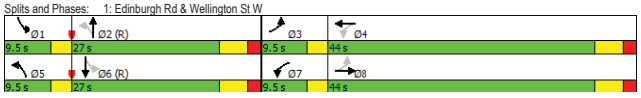
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	28.9	19.5		29.6	21.4		50.9	40.7		47.5	37.6	
Actuated g/C Ratio	0.32	0.22		0.33	0.24		0.57	0.45		0.53	0.42	
v/c Ratio	0.26	0.71		0.63	0.60		0.22	0.27		0.11	0.30	
Control Delay	20.5	37.5		32.1	33.8		10.7	17.5		8.0	18.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.5	37.5		32.1	33.8		10.7	17.5		8.0	18.2	
LOS	C	D		C	C		B	B		A	B	
Approach Delay		35.4			33.4			16.0			17.0	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80.5 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 26.2		Intersection LOS: C	
Intersection Capacity Utilization 61.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	541	163	505	122	434	61	459
v/c Ratio	0.26	0.71	0.63	0.60	0.22	0.27	0.11	0.30
Control Delay	20.5	37.5	32.1	33.8	10.7	17.5	8.0	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	37.5	32.1	33.8	10.7	17.5	8.0	18.2
Queue Length 50th (m)	9.3	48.2	20.8	44.5	9.3	25.8	3.2	31.4
Queue Length 95th (m)	17.0	60.6	32.3	56.4	20.2	42.7	8.1	50.3
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	301	1494	258	1494	552	1634	558	1507
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.36	0.63	0.34	0.22	0.27	0.11	0.30

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	530	0	160	495	0	120	425	0	60	450	0
Future Volume (vph)	75	530	0	160	495	0	120	425	0	60	450	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3539		1769	3539		1802	3610		1762	3610	
Flt Permitted	0.36	1.00		0.27	1.00		0.43	1.00		0.50	1.00	
Satd. Flow (perm)	683	3539		508	3539		813	3610		927	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	77	541	0	163	505	0	122	434	0	61	459	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	77	541	0	163	505	0	122	434	0	61	459	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.3	20.1		27.9	21.4		48.0	39.6		42.8	37.0	
Effective Green, g (s)	25.3	20.1		27.9	21.4		48.0	39.6		42.8	37.0	
Actuated g/C Ratio	0.28	0.22		0.31	0.24		0.53	0.44		0.48	0.41	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	256	790		248	841		525	1588		494	1484	
v/s Ratio Prot	0.02	0.15		c0.05	0.14		c0.02	0.12		0.01	c0.13	
v/s Ratio Perm	0.07			c0.16			0.10			0.05		
v/c Ratio	0.30	0.68		0.66	0.60		0.23	0.27		0.12	0.31	
Uniform Delay, d1	24.4	32.0		24.1	30.5		10.7	16.0		12.8	17.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.78	0.93	
Incremental Delay, d2	0.7	2.5		6.2	1.2		0.2	0.4		0.1	0.5	
Delay (s)	25.1	34.5		30.2	31.7		10.9	16.5		10.1	17.2	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		33.3			31.4			15.2			16.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	545	0	0	700	10	275	50	155	3	0	160
Future Volume (vph)	90	545	0	0	700	10	275	50	155	3	0	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.998				0.850			0.850
Flt Protected	0.950						0.950	0.967		0.950		
Satd. Flow (prot)	1787	5136	0	0	5125	0	1698	1733	1599	1805	0	1599
Flt Permitted	0.297						0.950	0.967		0.613		
Satd. Flow (perm)	558	5136	0	0	5125	0	1698	1733	1599	1165	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2				160			165
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	93	562	0	0	722	10	284	52	160	3	0	165
Shared Lane Traffic (%)							41%					
Lane Group Flow (vph)	93	562	0	0	732	0	168	168	160	3	0	165
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

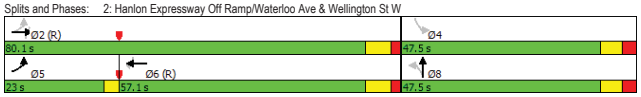
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.31		0.39
v/c Ratio	0.18	0.19			0.36		0.32	0.31	0.16	0.01		0.23
Control Delay	11.4	13.3			28.1		35.4	35.3	2.2	30.3		4.4
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	11.4	13.3			28.1		35.4	35.3	2.2	30.3		4.4
LOS	B	B			C		D	D	A	C		A
Approach Delay		13.1			28.1			24.7			4.9	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.36
Intersection Signal Delay: 20.6 — Intersection LOS: C
Intersection Capacity Utilization 59.4% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	93	562	732	168	168	160	3	165
v/c Ratio	0.18	0.19	0.36	0.32	0.31	0.16	0.01	0.23
Control Delay	11.4	13.3	28.1	35.4	35.3	2.2	30.3	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	13.3	28.1	35.4	35.3	2.2	30.3	4.4
Queue Length 50th (m)	9.7	25.0	49.5	35.5	35.5	0.0	0.6	0.0
Queue Length 95th (m)	17.3	31.6	61.0	56.8	56.5	9.6	3.0	14.1
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	529	2938	2009	532	543	983	365	726
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.19	0.36	0.32	0.31	0.16	0.01	0.23

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	545	0	0	700	10	275	50	155	3	0	160
Future Volume (vph)	90	545	0	0	700	10	275	50	155	3	0	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5124		1698	1733	1599	1805		1599
Flt Permitted	0.30	1.00			1.00		0.95	0.97	1.00	0.61		1.00
Satd. Flow (perm)	559	5136			5124		1698	1733	1599	1164		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	93	562	0	0	722	10	284	52	160	3	0	165
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	68	0	0	100
Lane Group Flow (vph)	93	562	0	0	731	0	168	168	92	3	0	65
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Grp Cap (vph)	512	2938			2007		532	543	914	364		626
v/s Ratio Prot	0.03	c0.11			c0.14							
v/s Ratio Perm	0.08						c0.10	0.10	0.06	0.00		0.04
v/c Ratio	0.18	0.19			0.36		0.32	0.31	0.10	0.01		0.10
Uniform Delay, d1	12.7	13.1			27.5		33.4	33.3	12.4	30.1		24.6
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.8	0.1			0.5		1.6	1.5	0.2	0.0		0.3
Delay (s)	13.5	13.3			28.0		34.9	34.8	12.6	30.2		24.9
Level of Service	B	B			C		C	C	B	C		C
Approach Delay (s)		13.3			28.0			27.7			25.0	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	575	375	0	830	0	0	0	0	150	0	125
Future Volume (vph)	0	575	375	0	830	0	0	0	0	150	0	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.941										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4804	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4804	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		372										132
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	605	395	0	874	0	0	0	0	158	0	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1000	0	0	874	0	0	0	0	158	0	132
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					24.7		56.9
Total Split (%)		69.7%			69.7%					30.3%		69.7%
Maximum Green (s)		50.0			50.0					18.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
v/c Ratio		0.32			0.28					0.21		0.13

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

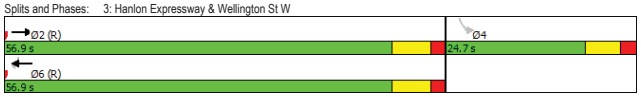
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		4.8			7.7					26.8		1.6
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		4.8			7.7					26.8		1.6
LOS		A			A					C		A
Approach Delay		4.8			7.7						15.4	
Approach LOS		A			A						B	

Intersection Summary

Area Type: Other
Cycle Length: 81.6
Actuated Cycle Length: 81.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.32
Intersection Signal Delay: 7.4 — Intersection LOS: A
Intersection Capacity Utilization 35.3% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1000	874	158	132
v/c Ratio	0.32	0.28	0.21	0.13
Control Delay	4.8	7.7	26.8	1.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.8	7.7	26.8	1.6
Queue Length 50th (m)	15.1	21.9	10.9	0.0
Queue Length 95th (m)	21.2	28.3	19.0	6.1
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	3087	3147	764	984
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.32	0.28	0.21	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	575	375	0	830	0	0	0	0	150	0	125
Future Volume (vph)	0	575	375	0	830	0	0	0	0	150	0	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4803			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4803			5136					3467		1524
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)	0	605	395	0	874	0	0	0	0	158	0	132
RTOR Reduction (vph)	0	144	0	0	0	0	0	0	0	0	0	51
Lane Group Flow (vph)	0	856	0	0	874	0	0	0	0	158	0	81
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					18.0		50.0
Effective Green, g (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2943			3147					764		933
v/s Ratio Prot		c0.18			0.17							
v/s Ratio Perm										c0.05		0.05
v/c Ratio		0.29			0.28					0.21		0.09
Uniform Delay, d1		7.4			7.4					26.0		6.5
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.3			0.2					0.6		0.2
Delay (s)		7.7			7.6					26.6		6.6
Level of Service		A			A					C		A
Approach Delay (s)		7.7			7.6			0.0			17.5	
Approach LOS		A			A			A			B	

Intersection Summary

HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	565	540	295	375	55
Future Volume (vph)	65	565	540	295	375	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.947			0.850
Flt Protected		0.995			0.950	
Satd. Flow (prot)	0	3529	3328	0	1787	1615
Flt Permitted		0.781			0.950	
Satd. Flow (perm)	0	2770	3328	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			179			57
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Adj. Flow (vph)	67	582	557	304	387	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	649	861	0	387	57
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

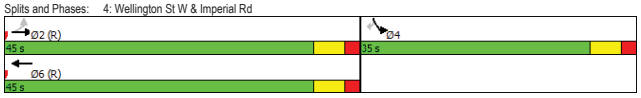
06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		45.6	45.6		22.4	22.4
Actuated g/C Ratio		0.57	0.57		0.28	0.28
v/c Ratio		0.41	0.44		0.77	0.12
Control Delay		11.7	9.2		36.9	6.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.7	9.2		36.9	6.0
LOS		B	A		D	A
Approach Delay		11.7	9.2		33.0	
Approach LOS		B	A		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 15.4		Intersection LOS: B	
Intersection Capacity Utilization 77.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	649	861	387	57
v/c Ratio	0.41	0.44	0.77	0.12
Control Delay	11.7	9.2	36.9	6.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.7	9.2	36.9	6.0
Queue Length 50th (m)	28.5	29.2	56.4	0.0
Queue Length 95th (m)	49.1	51.7	78.3	7.2
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1578	1974	647	621
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.41	0.44	0.60	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	565	540	295	375	55
Future Volume (vph)	65	565	540	295	375	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		0.99	1.00		0.95	1.00
Satd. Flow (prot)		3528	3328		1787	1615
Flt Permitted		0.78	1.00		0.95	1.00
Satd. Flow (perm)		2769	3328		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	582	557	304	387	57
RTOR Reduction (vph)	0	0	77	0	0	41
Lane Group Flow (vph)	0	649	784	0	387	16
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		45.6	45.6		22.4	22.4
Effective Green, g (s)		45.6	45.6		22.4	22.4
Actuated g/C Ratio		0.57	0.57		0.28	0.28
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1578	1896		500	452
v/s Ratio Prot			c0.24		c0.22	
v/s Ratio Perm		0.23				0.01
v/c Ratio		0.41	0.41		0.77	0.04
Uniform Delay, d1		9.7	9.7		26.5	20.9
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.8	0.7		7.3	0.0
Delay (s)		10.5	10.3		33.8	21.0
Level of Service		B	B		C	C
Approach Delay (s)		10.5	10.3		32.2	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	295	0	185	305	25	350	1035	0	35	945	130
Future Volume (vph)	125	295	0	185	305	25	350	1035	0	35	945	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.989							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3566	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.444			0.337			0.950			0.950		
Satd. Flow (perm)	834	3574	0	639	3566	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4							134
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	129	304	0	191	314	26	361	1067	0	36	974	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	304	0	191	340	0	361	1067	0	36	974	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

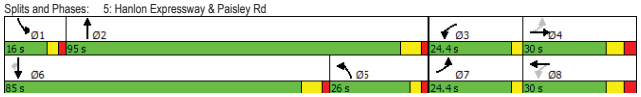
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	37.5	18.2		43.9	21.9		19.6	91.4		8.4	77.8	77.8
Actuated g/C Ratio	0.24	0.12		0.28	0.14		0.12	0.58		0.05	0.50	0.50
v/c Ratio	0.45	0.73		0.61	0.68		0.83	0.54		0.38	0.57	0.15
Control Delay	49.0	78.7		54.2	71.4		84.7	23.1		84.9	30.4	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	49.0	78.7		54.2	71.4		84.7	23.1		84.9	30.4	3.9
LOS	D	E		D	E		F	C		F	C	A
Approach Delay		69.8			65.2			38.7			29.0	
Approach LOS		E			E			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 157.1			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 43.3		Intersection LOS: D	
Intersection Capacity Utilization 75.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	129	304	191	340	361	1067	36	974	134
v/c Ratio	0.45	0.73	0.61	0.68	0.83	0.54	0.38	0.57	0.15
Control Delay	49.0	78.7	54.2	71.4	84.7	23.1	84.9	30.4	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	78.7	54.2	71.4	84.7	23.1	84.9	30.4	3.9
Queue Length 50th (m)	33.4	52.4	51.3	56.5	61.2	116.3	11.9	120.5	0.0
Queue Length 95th (m)	52.2	71.1	75.2	77.6	#87.2	153.6	25.5	152.6	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	358	502	337	536	464	1963	126	1719	867
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.61	0.57	0.63	0.78	0.54	0.29	0.57	0.15

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	295	0	185	305	25	350	1035	0	35	945	130
Future Volume (vph)	125	295	0	185	305	25	350	1035	0	35	945	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1786	3574		1804	3565		3467	3374		1805	3471	1615
Flt Permitted	0.44	1.00		0.34	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	835	3574		639	3565		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	129	304	0	191	314	26	361	1067	0	36	974	134
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	68
Lane Group Flow (vph)	129	304	0	191	337	0	361	1067	0	36	974	66
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	32.6	18.3		39.2	21.9		20.8	91.4		7.2	77.8	77.8
Effective Green, g (s)	32.6	18.3		39.2	21.9		20.8	91.4		7.2	77.8	77.8
Actuated g/C Ratio	0.21	0.12		0.25	0.14		0.13	0.58		0.05	0.49	0.49
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	258	413		290	493		455	1949		82	1706	794
v/s Ratio Prot	0.05	0.09		c0.07	c0.09		c0.10	0.32		0.02	c0.28	
v/s Ratio Perm	0.06			0.09								0.04
v/c Ratio	0.50	0.74		0.66	0.68		0.79	0.55		0.44	0.57	0.08
Uniform Delay, d1	53.8	67.6		50.3	64.8		66.6	20.6		73.5	28.4	21.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	6.7		5.3	3.9		9.2	1.1		3.7	1.4	0.2
Delay (s)	55.3	74.3		55.7	68.7		75.8	21.7		77.3	29.8	21.5
Level of Service	E	E		E	E		E	C		E	C	C
Approach Delay (s)		68.7			64.0			35.4			30.3	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	42.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	158.2	Sum of lost time (s)	23.4
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	90	25	55	85	40	30	475	60	30	470	20
Future Volume (vph)	45	90	25	55	85	40	30	475	60	30	470	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.967			0.952			0.983			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1807	0	1805	1782	0	1805	1859	0	1770	1887	0
Flt Permitted	0.664			0.681			0.458			0.432		
Satd. Flow (perm)	1224	1807	0	1284	1782	0	868	1859	0	801	1887	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			40			8			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	46	93	26	57	88	41	31	490	62	31	485	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	119	0	57	129	0	31	552	0	31	506	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

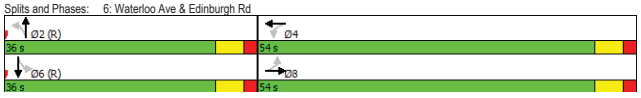
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.3	10.3		10.3	10.3		67.7	67.7		67.7	67.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.75	0.75		0.75	0.75	
v/c Ratio	0.33	0.52		0.39	0.54		0.05	0.39		0.05	0.36	
Control Delay	41.7	37.3		43.5	33.6		3.1	8.5		3.8	5.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.7	37.3		43.5	33.6		3.1	8.5		3.8	5.0	
LOS	D	D		D	C		A	A		A	A	
Approach Delay		38.5			36.7			8.2			4.9	
Approach LOS		D			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 14.0		Intersection LOS: B	
Intersection Capacity Utilization 58.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	119	57	129	31	552	31	506
v/c Ratio	0.33	0.52	0.39	0.54	0.05	0.39	0.05	0.36
Control Delay	41.7	37.3	43.5	33.6	3.1	8.5	3.8	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	37.3	43.5	33.6	3.1	8.5	3.8	5.0
Queue Length 50th (m)	7.8	16.5	9.8	15.4	1.0	25.1	1.2	24.7
Queue Length 95th (m)	17.6	31.7	20.7	31.4	2.9	73.3	4.1	47.7
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	652	974	684	969	653	1400	602	1420
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.12	0.08	0.13	0.05	0.39	0.05	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	90	25	55	85	40	30	475	60	30	470	20
Future Volume (vph)	45	90	25	55	85	40	30	475	60	30	470	20
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.98		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)	1751	1807		1791	1783		1800	1859		1759	1886	
Flt Permitted	0.66	1.00		0.68	1.00		0.46	1.00		0.43	1.00	
Satd. Flow (perm)	1224	1807		1283	1783		868	1859		799	1886	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	93	26	57	88	41	31	490	62	31	485	21
RTOR Reduction (vph)	0	21	0	0	35	0	0	2	0	0	1	0
Lane Group Flow (vph)	46	98	0	57	94	0	31	550	0	31	505	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	10.3	10.3		10.3	10.3		67.7	67.7		67.7	67.7	
Effective Green, g (s)	10.3	10.3		10.3	10.3		67.7	67.7		67.7	67.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.75	0.75		0.75	0.75	
Clearance Time (s)	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	
Lane Grp Cap (vph)	140	206		146	204		652	1398		601	1418	
v/s Ratio Prot		c0.05			0.05			c0.30			0.27	
v/s Ratio Perm	0.04			0.04			0.04			0.04		
v/c Ratio	0.33	0.47		0.39	0.46		0.05	0.39		0.05	0.36	
Uniform Delay, d1	36.7	37.3		36.9	37.2		2.9	3.9		2.9	3.8	
Progression Factor	1.00	1.00		1.00	1.00		0.82	1.73		1.00	1.00	
Incremental Delay, d2	1.4	1.7		1.7	1.6		0.1	0.8		0.2	0.7	
Delay (s)	38.0	39.0		38.7	38.9		2.5	7.6		3.0	4.5	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		38.8			38.8			7.3			4.4	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	4	15	165	5	10	155
Future Volume (vph)	4	15	165	5	10	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	4	16	179	5	11	168
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	16	179	5	11	168
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.8%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	4	15	165	5	10	155
Future Volume (Veh/h)	4	15	165	5	10	155
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	16	179	5	11	168
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			21		368	5
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			21		368	5
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		98	84
cM capacity (veh/h)			1593		564	1080

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	4	16	179	5	179
Volume Left	0	0	179	0	11
Volume Right	0	16	0	0	168
cSH	1700	1700	1593	1700	1151
Volume to Capacity	0.00	0.01	0.11	0.00	0.16
Queue Length 95th (m)	0.0	0.0	3.0	0.0	4.4
Control Delay (s)	0.0	0.0	7.5	0.0	9.1
Lane LOS			A		A
Approach Delay (s)	0.0		7.3		9.1
Approach LOS					A

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	255	90	35	230	60	105	415	25	55	390	65
Future Volume (vph)	80	255	90	35	230	60	105	415	25	55	390	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.961			0.969			0.991			0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1797	0	1805	1812	0	1805	1878	0	1736	1849	0
Flt Permitted	0.468			0.390			0.385			0.399		
Satd. Flow (perm)	879	1797	0	736	1812	0	728	1878	0	727	1849	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			19			6			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	86	274	97	38	247	65	113	446	27	59	419	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	371	0	38	312	0	113	473	0	59	489	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

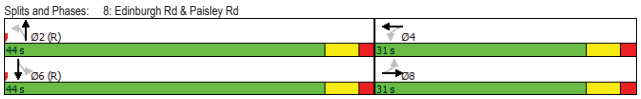
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.29	0.60		0.16	0.51		0.31	0.50		0.16	0.52	
Control Delay	22.2	24.9		19.7	22.2		13.7	14.3		11.4	14.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.2	24.9		19.7	22.2		13.7	14.3		11.4	14.4	
LOS	C	C		B	C		B	B		B	B	
Approach Delay		24.4			22.0			14.2			14.0	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 75.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	86	371	38	312	113	473	59	489
v/c Ratio	0.29	0.60	0.16	0.51	0.31	0.50	0.16	0.52
Control Delay	22.2	24.9	19.7	22.2	13.7	14.3	11.4	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	24.9	19.7	22.2	13.7	14.3	11.4	14.4
Queue Length 50th (m)	10.6	47.6	3.9	34.3	9.2	42.9	4.4	44.1
Queue Length 95th (m)	23.6	78.2	10.9	57.9	20.5	67.7	11.1	69.9
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	293	615	245	616	368	954	368	944
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.60	0.16	0.51	0.31	0.50	0.16	0.52

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	255	90	35	230	60	105	415	25	55	390	65
Future Volume (vph)	80	255	90	35	230	60	105	415	25	55	390	65
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	
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	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		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)	1784	1796		1792	1811		1797	1879		1730	1848	
Flt Permitted	0.47	1.00		0.39	1.00		0.39	1.00		0.40	1.00	
Satd. Flow (perm)	880	1796		735	1811		729	1879		727	1848	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	274	97	38	247	65	113	446	27	59	419	70
RTOR Reduction (vph)	0	17	0	0	13	0	0	3	0	0	8	0
Lane Group Flow (vph)	86	354	0	38	299	0	113	470	0	59	481	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	293	598		245	603		369	952		368	936	
v/s Ratio Prot		c0.20			0.17			0.25			c0.26	
v/s Ratio Perm	0.10			0.05			0.16			0.08		
v/c Ratio	0.29	0.59		0.16	0.50		0.31	0.49		0.16	0.51	
Uniform Delay, d1	18.5	20.8		17.6	20.0		10.8	12.2		9.9	12.3	
Progression Factor	1.02	1.04		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	4.1		1.3	2.9		2.1	1.8		0.9	2.0	
Delay (s)	21.2	25.7		18.9	22.9		12.9	14.0		10.9	14.4	
Level of Service	C	C		B	C		B	B		B	B	
Approach Delay (s)		24.9			22.4			13.8			14.0	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	315	10	3	310	145	5	4	3	190	5	205
Future Volume (vph)	205	315	10	3	310	145	5	4	3	190	5	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			0.99			0.99		0.99	0.99	
Frt		0.995			0.957			0.966			0.853	
Flt Protected	0.950							0.980		0.950		
Satd. Flow (prot)	1805	1871	0	0	1792	0	0	1772	0	1787	1598	0
Flt Permitted	0.416				0.998					0.930		
Satd. Flow (perm)	789	1871	0	0	1789	0	0	1807	0	1738	1598	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			33			3			223	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	223	342	11	3	337	158	5	4	3	207	5	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	353	0	0	498	0	0	12	0	207	228	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

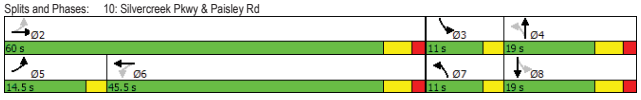
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0		45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%		50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0		39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.2	54.2			43.1			6.0		11.4	8.4	
Actuated g/C Ratio	0.77	0.73			0.58			0.08		0.15	0.11	
v/c Ratio	0.31	0.26			0.48			0.08		0.76	0.60	
Control Delay	4.2	4.6			11.8			31.0		48.6	12.1	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	4.2	4.6			11.8			31.0		48.6	12.1	
LOS	A	A			B			C		D	B	
Approach Delay		4.5			11.8			31.0			29.5	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 74.6			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 78.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	223	353	498	12	207	228
v/c Ratio	0.31	0.26	0.48	0.08	0.76	0.60
Control Delay	4.2	4.6	11.8	31.0	48.6	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	4.6	11.8	31.0	48.6	12.1
Queue Length 50th (m)	4.9	11.3	31.2	1.2	29.7	0.7
Queue Length 95th (m)	20.2	36.4	85.6	6.6	50.5	18.6
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	762	1359	1046	318	271	480
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.48	0.04	0.76	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	315	10	3	310	145	5	4	3	190	5	205
Future Volume (vph)	205	315	10	3	310	145	5	4	3	190	5	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99			0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00		1.00	1.00	
Frt	1.00	1.00			0.96			0.97		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1804	1872			1792			1771		1778	1599	
Flt Permitted	0.42	1.00			1.00			1.00		0.93	1.00	
Satd. Flow (perm)	790	1872			1790			1808		1741	1599	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	342	11	3	337	158	5	4	3	207	5	223
RTOR Reduction (vph)	0	1	0	0	15	0	0	3	0	0	186	0
Lane Group Flow (vph)	223	352	0	0	483	0	0	9	0	207	42	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.2	54.2			43.1			1.3		13.3	13.3	
Effective Green, g (s)	54.2	54.2			43.1			1.3		13.3	13.3	
Actuated g/C Ratio	0.68	0.68			0.54			0.02		0.17	0.17	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	641	1276			970			29		295	267	
v/s Ratio Prot	c0.04	0.19								c0.08	0.03	
v/s Ratio Perm	0.20				c0.27			0.01		c0.04		
v/c Ratio	0.35	0.28			0.50			0.31		0.70	0.16	
Uniform Delay, d1	5.5	5.0			11.4			38.7		31.2	28.3	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5			1.8			6.1		7.3	0.3	
Delay (s)	5.8	5.5			13.2			44.7		38.5	28.6	
Level of Service	A	A			B			D		D	C	
Approach Delay (s)		5.6			13.2			44.7			33.3	
Approach LOS		A			B			D			C	

Intersection Summary

HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary

Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		46.7			84.7			279.7			92.6	
Travel Time (s)		3.4			6.1			20.1			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
13: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	795	0	110	520	0	175	565	0	60	530	0
Future Volume (vph)	110	795	0	110	520	0	175	565	0	60	530	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3471	0	1703	3438	0	1752	3539	0	1703	3505	0
Flt Permitted	0.338			0.153			0.267			0.355		
Satd. Flow (perm)	634	3471	0	274	3438	0	490	3539	0	629	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Adj. Flow (vph)	124	893	0	124	584	0	197	635	0	67	596	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	893	0	124	584	0	197	635	0	67	596	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

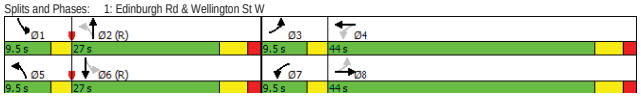
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	39.1	29.6		39.1	29.6		41.3	30.3		35.7	25.4	
Actuated g/C Ratio	0.43	0.33		0.43	0.33		0.46	0.34		0.40	0.28	
v/c Ratio	0.35	0.78		0.56	0.52		0.53	0.53		0.20	0.60	
Control Delay	15.4	32.2		22.7	25.5		22.7	28.4		12.2	27.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.4	32.2		22.7	25.5		22.7	28.4		12.2	27.4	
LOS	B	C		C	C		C	C		B	C	
Approach Delay		30.1			25.0			27.0			25.9	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 27.3		Intersection LOS: C	
Intersection Capacity Utilization 69.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	124	893	124	584	197	635	67	596
v/c Ratio	0.35	0.78	0.56	0.52	0.53	0.53	0.20	0.60
Control Delay	15.4	32.2	22.7	25.5	22.7	28.4	12.2	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	32.2	22.7	25.5	22.7	28.4	12.2	27.4
Queue Length 50th (m)	12.4	76.4	12.4	44.7	20.9	50.3	4.2	54.0
Queue Length 95th (m)	19.2	87.3	19.4	53.4	#41.3	75.9	8.5	67.3
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	358	1465	222	1451	371	1191	340	989
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.61	0.56	0.40	0.53	0.53	0.20	0.60

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	795	0	110	520	0	175	565	0	60	530	0
Future Volume (vph)	110	795	0	110	520	0	175	565	0	60	530	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1786	3471		1703	3438		1751	3539		1695	3505	
Flt Permitted	0.34	1.00		0.15	1.00		0.27	1.00		0.36	1.00	
Satd. Flow (perm)	635	3471		275	3438		492	3539		633	3505	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	124	893	0	124	584	0	197	635	0	67	596	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	124	893	0	124	584	0	197	635	0	67	596	0
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	36.1	29.6		36.1	29.6		38.9	29.7		31.6	25.4	
Effective Green, g (s)	36.1	29.6		36.1	29.6		38.9	29.7		31.6	25.4	
Actuated g/C Ratio	0.40	0.33		0.40	0.33		0.43	0.33		0.35	0.28	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	337	1141		213	1130		359	1167		295	989	
v/s Ratio Prot	0.03	c0.26		c0.04	0.17		c0.06	0.18		0.02	c0.17	
v/s Ratio Perm	0.12			0.19			0.17			0.06		
v/c Ratio	0.37	0.78		0.58	0.52		0.55	0.54		0.23	0.60	
Uniform Delay, d1	17.6	27.3		19.1	24.4		17.2	24.6		19.8	27.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.70	0.85	
Incremental Delay, d2	0.7	3.6		4.0	0.4		1.7	1.8		0.4	2.5	
Delay (s)	18.3	30.9		23.1	24.8		18.9	26.4		14.1	26.1	
Level of Service	B	C		C	C		B	C		B	C	
Approach Delay (s)		29.3			24.5			24.7			24.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	860	0	0	740	15	185	100	225	16	0	310
Future Volume (vph)	175	860	0	0	740	15	185	100	225	16	0	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.997				0.850			0.850
Flt Protected	0.950						0.950	0.985		0.950		
Satd. Flow (prot)	1736	4988	0	0	4974	0	1633	1739	1599	1805	0	1583
Flt Permitted	0.256						0.950	0.985		0.627		
Satd. Flow (perm)	467	4988	0	0	4974	0	1633	1739	1599	1191	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3				247			341
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Adj. Flow (vph)	192	945	0	0	813	16	203	110	247	18	0	341
Shared Lane Traffic (%)							24%					
Lane Group Flow (vph)	192	945	0	0	829	0	154	159	247	18	0	341
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

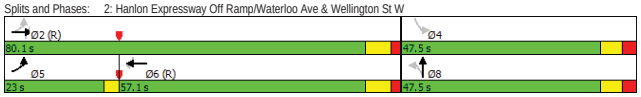
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.31		0.39
v/c Ratio	0.40	0.33			0.43		0.30	0.29	0.24	0.05		0.41
Control Delay	13.9	14.8			29.0		35.2	34.9	2.1	31.2		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	13.9	14.8			29.0		35.2	34.9	2.1	31.2		4.2
LOS	B	B			C		D	C	A	C		A
Approach Delay		14.7			29.0			20.5			5.5	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type:	Other
Cycle Length: 127.6	
Actuated Cycle Length: 127.6	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 95	
Control Type: Pretimed	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 18.8	Intersection LOS: B
Intersection Capacity Utilization 67.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	192	945	829	154	159	247	18	341
v/c Ratio	0.40	0.33	0.43	0.30	0.29	0.24	0.05	0.41
Control Delay	13.9	14.8	29.0	35.2	34.9	2.1	31.2	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	14.8	29.0	35.2	34.9	2.1	31.2	4.2
Queue Length 50th (m)	21.4	46.1	57.7	32.5	33.3	0.0	3.3	0.0
Queue Length 95th (m)	33.3	55.3	70.3	52.6	53.6	11.4	9.5	19.0
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	481	2853	1950	511	545	1020	373	827
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.33	0.43	0.30	0.29	0.24	0.05	0.41

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	860	0	0	740	15	185	100	225	16	0	310
Future Volume (vph)	175	860	0	0	740	15	185	100	225	16	0	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1735	4988			4975		1633	1739	1599	1805		1583
Flt Permitted	0.26	1.00			1.00		0.95	0.98	1.00	0.63		1.00
Satd. Flow (perm)	467	4988			4975		1633	1739	1599	1192		1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	192	945	0	0	813	16	203	110	247	18	0	341
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	106	0	0	207
Lane Group Flow (vph)	192	945	0	0	827	0	154	159	141	18	0	134
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Grp Cap (vph)	465	2853			1949		511	545	914	373		620
v/s Ratio Prot	c0.06	0.19			0.17							
v/s Ratio Perm	c0.17						c0.09	0.09	0.09	0.02		0.08
v/c Ratio	0.41	0.33			0.42		0.30	0.29	0.15	0.05		0.22
Uniform Delay, d1	13.9	14.4			28.3		33.2	33.1	12.8	30.5		25.8
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.7	0.3			0.7		1.5	1.4	0.4	0.2		0.8
Delay (s)	16.6	14.7			29.0		34.7	34.5	13.2	30.8		26.6
Level of Service	B	B			C		C	C	B	C		C
Approach Delay (s)		15.0			29.0			25.1			26.8	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	935	445	0	850	0	0	0	0	165	0	100
Future Volume (vph)	0	935	445	0	850	0	0	0	0	165	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.952										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4703	0	0	4988	0	0	0	0	3242	0	1455
Flt Permitted										0.950		
Satd. Flow (perm)	0	4703	0	0	4988	0	0	0	0	3242	0	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		177										105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	1					1						
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
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Adj. Flow (vph)	0	984	468	0	895	0	0	0	0	174	0	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1452	0	0	895	0	0	0	0	174	0	105
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			29.9					24.7		29.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		0.0			7.0					0.0		7.0
Flash Dont Walk (s)		0.0			16.0					0.0		16.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.59			0.35					0.15		0.13

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

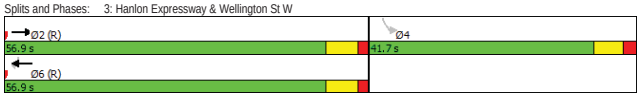
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		15.9			15.1					22.2		3.0
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		15.9			15.1					22.2		3.0
LOS		B			B					C		A
Approach Delay		15.9			15.1						15.0	
Approach LOS		B			B						B	

Intersection Summary

Area Type: Other
Cycle Length: 98.6
Actuated Cycle Length: 98.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 15.5 — Intersection LOS: B
Intersection Capacity Utilization 41.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1452	895	174	105
v/c Ratio	0.59	0.35	0.15	0.13
Control Delay	15.9	15.1	22.2	3.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.9	15.1	22.2	3.0
Queue Length 50th (m)	62.7	37.8	12.1	0.0
Queue Length 95th (m)	77.3	47.4	19.8	8.1
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2472	2529	1150	789
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.59	0.35	0.15	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	935	445	0	850	0	0	0	0	165	0	100
Future Volume (vph)	0	935	445	0	850	0	0	0	0	165	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4701			4988					3242		1455
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4701			4988					3242		1455
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)	0	984	468	0	895	0	0	0	0	174	0	105
RTOR Reduction (vph)	0	87	0	0	0	0	0	0	0	0	0	52
Lane Group Flow (vph)	0	1365	0	0	895	0	0	0	0	174	0	53
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2383			2529					1150		737
v/s Ratio Prot		c0.29			0.18							
v/s Ratio Perm										c0.05		0.04
v/c Ratio		0.57			0.35					0.15		0.07
Uniform Delay, d1		16.9			14.6					21.7		12.4
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		1.0			0.4					0.3		0.2
Delay (s)		17.9			15.0					22.0		12.6
Level of Service		B			B					C		B
Approach Delay (s)		17.9			15.0			0.0			18.4	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	945	695	165	420	70
Future Volume (vph)	60	945	695	165	420	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	1.00			
Frt			0.971			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3397	3319	0	1770	1599
Flt Permitted		0.829			0.950	
Satd. Flow (perm)	0	2825	3319	0	1770	1599
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			50			73
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Adj. Flow (vph)	63	984	724	172	438	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1047	896	0	438	73
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

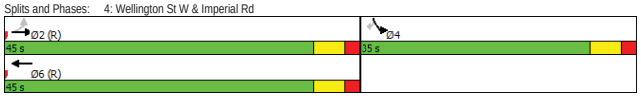
Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	-1.0
Total Lost Time (s)		6.0	6.0		6.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		43.8	43.8		24.2	25.2
Actuated g/C Ratio		0.55	0.55		0.30	0.32
v/c Ratio		0.68	0.49		0.82	0.13
Control Delay		16.8	12.4		38.7	5.1
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.8	12.4		38.7	5.1
LOS		B	B		D	A
Approach Delay		16.8	12.4		33.9	
Approach LOS		B	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 90.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1047	896	438	73
v/c Ratio	0.68	0.49	0.82	0.13
Control Delay	16.8	12.4	38.7	5.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.8	12.4	38.7	5.1
Queue Length 50th (m)	60.3	41.5	63.4	0.0
Queue Length 95th (m)	93.6	64.1	91.3	7.9
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1548	1841	641	645
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.68	0.49	0.68	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

10-17-2019

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	945	695	165	420	70
Future Volume (vph)	60	945	695	165	420	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.97		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3397	3319		1770	1599
Flt Permitted		0.83	1.00		0.95	1.00
Satd. Flow (perm)		2826	3319		1770	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	984	724	172	438	73
RTOR Reduction (vph)	0	0	23	0	0	50
Lane Group Flow (vph)	0	1047	873	0	438	23
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		43.8	43.8		24.2	24.2
Effective Green, g (s)		43.8	43.8		24.2	25.2
Actuated g/C Ratio		0.55	0.55		0.30	0.31
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1547	1817		535	503
v/s Ratio Prot			0.26		c0.25	
v/s Ratio Perm		c0.37				0.01
v/c Ratio		0.68	0.48		0.82	0.05
Uniform Delay, d1		13.0	11.1		25.9	19.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.4	0.9		9.5	0.0
Delay (s)		15.4	12.0		35.3	19.1
Level of Service		B	B		D	B
Approach Delay (s)		15.4	12.0		33.0	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	330	0	195	210	70	160	1245	0	45	935	45
Future Volume (vph)	95	330	0	195	210	70	160	1245	0	45	935	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Frt					0.963							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	3438	0	1787	3392	0	3303	3343	0	1597	3282	1482
Flt Permitted	0.577			0.301			0.950			0.950		
Satd. Flow (perm)	1025	3438	0	566	3392	0	3303	3343	0	1597	3282	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					23							102
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Adj. Flow (vph)	97	337	0	199	214	71	163	1270	0	46	954	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	337	0	199	285	0	163	1270	0	46	954	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

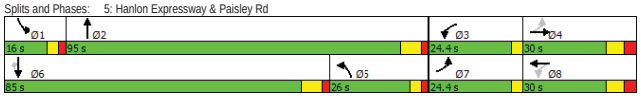
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	59.4	59.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	36.7	19.4		45.6	25.3		17.6	89.0		9.1	78.0	78.0
Actuated g/C Ratio	0.23	0.12		0.29	0.16		0.11	0.57		0.06	0.50	0.50
v/c Ratio	0.33	0.79		0.65	0.50		0.44	0.67		0.50	0.58	0.06
Control Delay	45.6	81.7		55.1	59.0		69.4	27.6		92.3	31.0	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	45.6	81.7		55.1	59.0		69.4	27.6		92.3	31.0	0.1
LOS	D	F		E	E		E	C		F	C	A
Approach Delay		73.6			57.4			32.4			32.4	
Approach LOS		E			E			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 156.7			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 41.2		Intersection LOS: D	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	97	337	199	285	163	1270	46	954	46
v/c Ratio	0.33	0.79	0.65	0.50	0.44	0.67	0.50	0.58	0.06
Control Delay	45.6	81.7	55.1	59.0	69.4	27.6	92.3	31.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	81.7	55.1	59.0	69.4	27.6	92.3	31.0	0.1
Queue Length 50th (m)	24.5	58.8	53.3	42.4	26.6	163.0	15.3	122.7	0.0
Queue Length 95th (m)	41.3	79.0	78.4	61.2	40.1	199.7	30.8	152.2	0.0
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	380	485	332	581	445	1898	112	1633	788
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.69	0.60	0.49	0.37	0.67	0.41	0.58	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	330	0	195	210	70	160	1245	0	45	935	45
Future Volume (vph)	95	330	0	195	210	70	160	1245	0	45	935	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00		1.00	0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1687	3438		1787	3390		3303	3343		1597	3282	1482
Flt Permitted	0.58	1.00		0.30	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1025	3438		566	3390		3303	3343		1597	3282	1482
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	337	0	199	214	71	163	1270	0	46	954	46
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	0	23
Lane Group Flow (vph)	97	337	0	199	266	0	163	1270	0	46	954	23
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	31.7	19.4		40.6	25.3		18.8	89.0		7.8	78.0	78.0
Effective Green, g (s)	31.7	19.4		40.6	25.3		18.8	89.0		7.8	78.0	78.0
Actuated g/C Ratio	0.20	0.12		0.26	0.16		0.12	0.56		0.05	0.49	0.49
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	257	422		286	543		393	1885		78	1622	732
v/s Ratio Prot	0.03	c0.10		c0.08	0.08		0.05	c0.38		0.03	c0.29	
v/s Ratio Perm	0.05			0.10								0.02
v/c Ratio	0.38	0.80		0.70	0.49		0.41	0.67		0.59	0.59	0.03
Uniform Delay, d1	53.5	67.3		49.4	60.4		64.4	24.2		73.4	28.4	20.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	10.1		7.2	0.7		0.7	1.9		10.9	1.6	0.1
Delay (s)	54.4	77.4		56.5	61.1		65.1	26.1		84.3	30.0	20.6
Level of Service	D	E		E	E		E	C		F	C	C
Approach Delay (s)		72.3			59.2			30.6			32.0	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	157.8	Sum of lost time (s)	23.4
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	240	55	75	130	25	25	550	90	40	470	50
Future Volume (vph)	85	240	55	75	130	25	25	550	90	40	470	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.972			0.976			0.979			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1771	0	1752	1788	0	1805	1820	0	1770	1834	0
Flt Permitted	0.620			0.336			0.377			0.292		
Satd. Flow (perm)	1145	1771	0	614	1788	0	713	1820	0	542	1834	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			16			10			6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	92	261	60	82	141	27	27	598	98	43	511	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	321	0	82	168	0	27	696	0	43	565	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

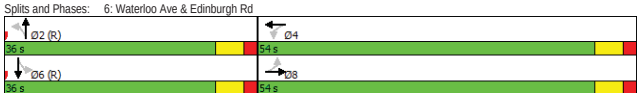
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	21.7	21.7		21.7	21.7		56.3	56.3		56.3	56.3	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.63	0.63		0.63	0.63	
v/c Ratio	0.33	0.73		0.56	0.38		0.06	0.61		0.13	0.49	
Control Delay	29.6	38.5		42.9	26.7		20.1	30.1		10.1	12.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.6	38.5		42.9	26.7		20.1	30.1		10.1	12.1	
LOS	C	D		D	C		C	C		B	B	
Approach Delay		36.5			32.0			29.7			12.0	
Approach LOS		D			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 26.0		Intersection LOS: C	
Intersection Capacity Utilization 70.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	92	321	82	168	27	696	43	565
v/c Ratio	0.33	0.73	0.56	0.38	0.06	0.61	0.13	0.49
Control Delay	29.6	38.5	42.9	26.7	20.1	30.1	10.1	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	38.5	42.9	26.7	20.1	30.1	10.1	12.1
Queue Length 50th (m)	13.9	50.7	13.1	23.1	1.9	85.1	2.9	49.6
Queue Length 95th (m)	24.5	70.0	25.6	36.1	m8.6	152.2	9.8	96.3
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	610	953	327	961	445	1142	339	1149
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.34	0.25	0.17	0.06	0.61	0.13	0.49

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	240	55	75	130	25	25	550	90	40	470	50
Future Volume (vph)	85	240	55	75	130	25	25	550	90	40	470	50
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	
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	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1756	1771		1739	1788		1794	1820		1762	1833	
Flt Permitted	0.62	1.00		0.34	1.00		0.38	1.00		0.29	1.00	
Satd. Flow (perm)	1146	1771		615	1788		711	1820		542	1833	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	261	60	82	141	27	27	598	98	43	511	54
RTOR Reduction (vph)	0	15	0	0	12	0	0	4	0	0	2	0
Lane Group Flow (vph)	92	306	0	82	156	0	27	692	0	43	563	0
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	21.7	21.7		21.7	21.7		56.3	56.3		56.3	56.3	
Effective Green, g (s)	21.7	21.7		21.7	21.7		56.3	56.3		56.3	56.3	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.63	0.63		0.63	0.63	
Clearance Time (s)	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	
Lane Grp Cap (vph)	276	427		148	431		444	1138		339	1146	
v/s Ratio Prot		c0.17			0.09			c0.38			0.31	
v/s Ratio Perm	0.08			0.13			0.04			0.08		
v/c Ratio	0.33	0.72		0.55	0.36		0.06	0.61		0.13	0.49	
Uniform Delay, d1	28.2	31.3		29.9	28.4		6.6	10.2		6.9	9.1	
Progression Factor	1.00	1.00		1.00	1.00		2.24	2.34		1.00	1.00	
Incremental Delay, d2	0.7	5.6		4.4	0.5		0.2	2.1		0.8	1.5	
Delay (s)	28.9	37.0		34.3	28.9		14.9	26.0		7.6	10.6	
Level of Service	C	D		C	C		B	C		A	B	
Approach Delay (s)		35.2			30.7			25.5			10.4	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	65	79	245	35	50	245
Future Volume (vph)	65	79	245	35	50	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1568
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1568
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		7	7			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	3%
Adj. Flow (vph)	71	86	266	38	54	266
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	86	266	38	54	266
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.6%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	65	79	245	35	50	245
Future Volume (Veh/h)	65	79	245	35	50	245
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	86	266	38	54	266
Pedestrians				1	7	
Lane Width (m)				3.6	3.6	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			164		648	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			164		648	79
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			81		85	73
cM capacity (veh/h)			1406		353	972

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	71	86	266	38	320
Volume Left	0	0	266	0	54
Volume Right	0	86	0	0	266
cSH	1700	1700	1406	1700	1169
Volume to Capacity	0.04	0.05	0.19	0.02	0.27
Queue Length 95th (m)	0.0	0.0	5.6	0.0	8.9
Control Delay (s)	0.0	0.0	8.2	0.0	11.3
Lane LOS			A		B
Approach Delay (s)	0.0		7.1		11.3
Approach LOS					B

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	345	70	45	245	75	75	470	55	90	400	80
Future Volume (vph)	90	345	70	45	245	75	75	470	55	90	400	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.99		0.99	1.00		1.00	0.99	
Frt		0.975			0.965			0.984			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1760	0	1805	1753	0	1770	1830	0	1656	1796	0
Flt Permitted	0.420			0.287			0.358			0.317		
Satd. Flow (perm)	735	1760	0	542	1753	0	660	1830	0	551	1796	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			22			11			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Adj. Flow (vph)	98	375	76	49	266	82	82	511	60	98	435	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	451	0	49	348	0	82	571	0	98	522	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.40	0.76		0.27	0.58		0.25	0.61		0.35	0.57	
Control Delay	22.9	29.6		23.3	24.0		12.9	16.5		15.7	15.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.9	29.6		23.3	24.0		12.9	16.5		15.7	15.3	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		28.4			23.9			16.0			15.4	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 20.3		Intersection LOS: C	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd

Queues
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	98	451	49	348	82	571	98	522
v/c Ratio	0.40	0.76	0.27	0.58	0.25	0.61	0.35	0.57
Control Delay	22.9	29.6	23.3	24.0	12.9	16.5	15.7	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	29.6	23.3	24.0	12.9	16.5	15.7	15.3
Queue Length 50th (m)	12.4	64.1	5.3	39.4	6.5	55.9	8.2	48.6
Queue Length 95th (m)	28.1	#106.9	14.5	66.0	15.4	87.9	20.0	77.4
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	245	596	180	599	334	932	279	919
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.76	0.27	0.58	0.25	0.61	0.35	0.57

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	345	70	45	245	75	75	470	55	90	400	80
Future Volume (vph)	90	345	70	45	245	75	75	470	55	90	400	80
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	
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	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		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)	1663	1760		1795	1752		1750	1831		1650	1796	
Flt Permitted	0.42	1.00		0.29	1.00		0.36	1.00		0.32	1.00	
Satd. Flow (perm)	735	1760		542	1752		659	1831		551	1796	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	375	76	49	266	82	82	511	60	98	435	87
RTOR Reduction (vph)	0	10	0	0	15	0	0	5	0	0	9	0
Lane Group Flow (vph)	98	441	0	49	333	0	82	566	0	98	513	0
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	245	586		180	584		333	927		279	909	
v/s Ratio Prot		c0.25			0.19			c0.31			0.29	
v/s Ratio Perm	0.13			0.09			0.12			0.18		
v/c Ratio	0.40	0.75		0.27	0.57		0.25	0.61		0.35	0.56	
Uniform Delay, d1	19.2	22.2		18.3	20.6		10.4	13.2		11.1	12.8	
Progression Factor	0.91	0.96		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	7.7		3.7	4.0		1.8	3.0		3.5	2.5	
Delay (s)	21.7	29.1		22.0	24.6		12.2	16.2		14.6	15.3	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		27.8			24.3			15.7			15.2	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	340	61	35	295	145	95	34	55	170	21	130
Future Volume (vph)	200	340	61	35	295	145	95	34	55	170	21	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99		0.98	1.00	0.98		0.99	0.95		0.95	0.98	
Frt			0.850		0.951			0.907			0.871	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1792	1615	1805	1714	0	1805	1637	0	1770	1567	0
Flt Permitted	0.370			0.541			0.613			0.560		
Satd. Flow (perm)	675	1792	1587	1025	1714	0	1154	1637	0	986	1567	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73		35			60			141	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Adj. Flow (vph)	217	370	66	38	321	158	103	37	60	185	23	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	217	370	66	38	479	0	103	97	0	185	164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	64.0	61.0	61.0	48.8	48.8		17.2	8.2		17.6	8.2	
Actuated g/C Ratio	0.71	0.68	0.68	0.54	0.54		0.19	0.09		0.20	0.09	
v/c Ratio	0.37	0.31	0.06	0.07	0.51		0.37	0.48		0.70	0.61	
Control Delay	7.2	7.8	1.8	13.4	16.3		30.7	25.1		44.2	19.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.2	7.8	1.8	13.4	16.3		30.7	25.1		44.2	19.4	
LOS	A	A	A	B	B		C	C		D	B	
Approach Delay		7.0			16.1			28.0			32.6	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 70.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd

Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	217	370	66	38	479	103	97	185	164
v/c Ratio	0.37	0.31	0.06	0.07	0.51	0.37	0.48	0.70	0.61
Control Delay	7.2	7.8	1.8	13.4	16.3	30.7	25.1	44.2	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	7.8	1.8	13.4	16.3	30.7	25.1	44.2	19.4
Queue Length 50th (m)	11.8	25.5	0.0	3.2	49.7	15.2	6.4	28.7	4.0
Queue Length 95th (m)	24.7	47.9	4.4	10.0	93.8	26.6	20.2	44.7	21.7
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	617	1213	1098	555	944	282	287	263	346
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.31	0.06	0.07	0.51	0.37	0.34	0.70	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	340	61	35	295	145	95	34	55	170	21	130
Future Volume (vph)	200	340	61	35	295	145	95	34	55	170	21	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.98		1.00	0.95		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1792	1587	1799	1713		1795	1637		1721	1567	
Flt Permitted	0.37	1.00	1.00	0.54	1.00		0.61	1.00		0.56	1.00	
Satd. Flow (perm)	679	1792	1587	1025	1713		1158	1637		1015	1567	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	370	66	38	321	158	103	37	60	185	23	141
RTOR Reduction (vph)	0	0	22	0	16	0	0	55	0	0	127	0
Lane Group Flow (vph)	217	370	44	38	463	0	103	42	0	185	37	0
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	59.8	59.8	59.8	47.6	47.6		13.5	7.1		16.9	8.8	
Effective Green, g (s)	59.8	59.8	59.8	47.6	47.6		13.5	7.1		16.9	8.8	
Actuated g/C Ratio	0.66	0.66	0.66	0.53	0.53		0.15	0.08		0.19	0.10	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	560	1190	1054	542	905		218	129		254	153	
v/s Ratio Prot	c0.04	0.21			c0.27		0.03	0.03		c0.07	0.02	
v/s Ratio Perm	0.22		0.03	0.04			0.04			c0.07		
v/c Ratio	0.39	0.31	0.04	0.07	0.51		0.47	0.32		0.73	0.24	
Uniform Delay, d1	6.9	6.4	5.2	10.4	13.7		34.5	39.2		33.4	37.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.7	0.1	0.3	2.1		1.6	1.5		10.0	0.8	
Delay (s)	7.4	7.1	5.3	10.6	15.7		36.1	40.6		43.4	38.3	
Level of Service	A	A	A	B	B		D	D		D	D	
Approach Delay (s)		7.0			15.4			38.3			41.0	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy & North Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	5	40	25	5	30	30	80	10	10	55	50
Future Volume (vph)	55	5	40	25	5	30	30	80	10	10	55	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.946			0.931			0.983			0.929	
Flt Protected		0.973			0.980		0.950			0.950		
Satd. Flow (prot)	0	1715	0	0	1700	0	1770	1831	0	1770	1730	0
Flt Permitted		0.973			0.980		0.950			0.950		
Satd. Flow (perm)	0	1715	0	0	1700	0	1770	1831	0	1770	1730	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	5	43	27	5	33	33	87	11	11	60	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	0	0	65	0	33	98	0	11	114	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.3%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy & North Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	40	25	5	30	30	80	10	10	55	50
Future Volume (Veh/h)	55	5	40	25	5	30	30	80	10	10	55	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	5	43	27	5	33	33	87	11	11	60	54
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	298	273	87	286	294	92	114			98		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	298	273	87	286	294	92	114			98		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	99	96	96	99	97	98			99		
cM capacity (veh/h)	614	615	971	619	598	965	1475			1495		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	108	65	33	98	11	114
Volume Left	60	27	33	0	11	0
Volume Right	43	33	0	11	0	54
cSH	720	754	1475	1700	1495	1700
Volume to Capacity	0.15	0.09	0.02	0.06	0.01	0.07
Queue Length 95th (m)	4.2	2.3	0.5	0.0	0.2	0.0
Control Delay (s)	10.9	10.2	7.5	0.0	7.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	10.9	10.2	1.9		0.7	
Approach LOS	B	B				

Intersection Summary

Average Delay	5.1		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy & South Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	5	40	25	5	30	25	40	10	10	65	45
Future Volume (vph)	50	5	40	25	5	30	25	40	10	10	65	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.943			0.931			0.969			0.939	
Flt Protected		0.974			0.980		0.950			0.950		
Satd. Flow (prot)	0	1711	0	0	1700	0	1770	1805	0	1770	1749	0
Flt Permitted		0.974			0.980		0.950			0.950		
Satd. Flow (perm)	0	1711	0	0	1700	0	1770	1805	0	1770	1749	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	5	43	27	5	33	27	43	11	11	71	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	65	0	27	54	0	11	120	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.5%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy & South Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	40	25	5	30	25	40	10	10	65	45
Future Volume (Veh/h)	50	5	40	25	5	30	25	40	10	10	65	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	5	43	27	5	33	27	43	11	11	71	49
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	250	226	96	241	244	48	120			54		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250	226	96	241	244	48	120			54		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	96	96	99	97	98			99		
cM capacity (veh/h)	664	657	961	664	641	1020	1468			1551		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	102	65	27	54	11	120
Volume Left	54	27	27	0	11	0
Volume Right	43	33	0	11	0	49
cSH	763	804	1468	1700	1551	1700
Volume to Capacity	0.13	0.08	0.02	0.03	0.01	0.07
Queue Length 95th (m)	3.7	2.1	0.4	0.0	0.2	0.0
Control Delay (s)	10.4	9.9	7.5	0.0	7.3	0.0
Lane LOS	B	A	A		A	
Approach Delay (s)	10.4	9.9	2.5		0.6	
Approach LOS	B	A				

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	635	0	230	745	0	190	665	0	55	650	0
Future Volume (vph)	110	635	0	230	745	0	190	665	0	55	650	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.213			0.251			0.247			0.361		
Satd. Flow (perm)	404	3539	0	467	3539	0	468	3610	0	670	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	112	648	0	235	760	0	194	679	0	56	663	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	648	0	235	760	0	194	679	0	56	663	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

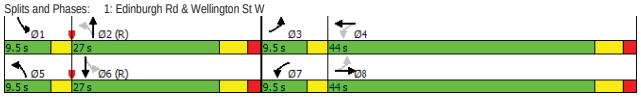
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	34.7	25.2		35.3	27.1		46.3	35.0		38.8	28.8	
Actuated g/C Ratio	0.39	0.28		0.39	0.30		0.51	0.39		0.43	0.32	
v/c Ratio	0.44	0.65		0.85	0.71		0.47	0.48		0.15	0.58	
Control Delay	20.3	31.3		46.9	32.0		17.3	24.4		12.8	24.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.3	31.3		46.9	32.0		17.3	24.4		12.8	24.8	
LOS	C	C		D	C		B	C		B	C	
Approach Delay		29.7			35.5			22.8			23.9	
Approach LOS		C			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 71 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 28.4		Intersection LOS: C	
Intersection Capacity Utilization 75.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	112	648	235	760	194	679	56	663
v/c Ratio	0.44	0.65	0.85	0.71	0.47	0.48	0.15	0.58
Control Delay	20.3	31.3	46.9	32.0	17.3	24.4	12.8	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	31.3	46.9	32.0	17.3	24.4	12.8	24.8
Queue Length 50th (m)	12.1	53.9	27.5	65.8	18.6	50.1	3.9	50.9
Queue Length 95th (m)	19.7	65.0	#48.8	78.0	36.4	78.1	m8.6	72.0
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	256	1494	277	1494	412	1402	380	1153
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.43	0.85	0.51	0.47	0.48	0.15	0.58

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	635	0	230	745	0	190	665	0	55	650	0
Future Volume (vph)	110	635	0	230	745	0	190	665	0	55	650	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3539		1769	3539		1804	3610		1766	3610	
Flt Permitted	0.21	1.00		0.25	1.00		0.25	1.00		0.36	1.00	
Satd. Flow (perm)	405	3539		468	3539		469	3610		670	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	648	0	235	760	0	194	679	0	56	663	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	112	648	0	235	760	0	194	679	0	56	663	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	31.0	25.8		33.6	27.1		42.7	33.7		34.1	28.1	
Effective Green, g (s)	31.0	25.8		33.6	27.1		42.7	33.7		34.1	28.1	
Actuated g/C Ratio	0.34	0.29		0.37	0.30		0.47	0.37		0.38	0.31	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	220	1014		268	1065		394	1351		326	1127	
v/s Ratio Prot	0.03	0.18		c0.06	0.21		c0.06	0.19		0.01	c0.18	
v/s Ratio Perm	0.15			c0.26			0.17			0.05		
v/c Ratio	0.51	0.64		0.88	0.71		0.49	0.50		0.17	0.59	
Uniform Delay, d1	21.4	28.0		23.9	28.0		15.0	21.7		18.0	26.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.89	0.83	
Incremental Delay, d2	1.9	1.3		25.8	2.3		1.0	1.3		0.2	2.0	
Delay (s)	23.2	29.4		49.7	30.3		16.0	23.0		16.2	23.5	
Level of Service	C	C		D	C		B	C		B	C	
Approach Delay (s)		28.5			34.9			21.5			22.9	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	740	0	0	965	50	395	155	140	40	0	340
Future Volume (vph)	215	740	0	0	965	50	395	155	140	40	0	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.993				0.850			0.850
Flt Protected	0.950						0.950	0.978		0.950		
Satd. Flow (prot)	1787	5136	0	0	5097	0	1698	1758	1599	1805	0	1599
Flt Permitted	0.178						0.950	0.978		0.435		
Satd. Flow (perm)	335	5136	0	0	5097	0	1698	1758	1599	826	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					7				144			351
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	222	763	0	0	995	52	407	160	144	41	0	351
Shared Lane Traffic (%)							31%					
Lane Group Flow (vph)	222	763	0	0	1047	0	281	286	144	41	0	351
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	24.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	3.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

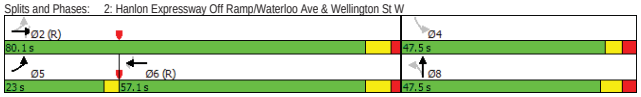
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.32		0.39
v/c Ratio	0.52	0.26			0.52		0.53	0.52	0.15	0.15		0.42
Control Delay	16.0	14.0			30.6		40.4	40.0	2.3	33.0		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	16.0	14.0			30.6		40.4	40.0	2.3	33.0		4.2
LOS	B	B			C		D	D	A	C		A
Approach Delay		14.4			30.6			32.5			7.2	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 23.0 — Intersection LOS: C
Intersection Capacity Utilization 76.6% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	222	763	1047	281	286	144	41	351
v/c Ratio	0.52	0.26	0.52	0.53	0.52	0.15	0.15	0.42
Control Delay	16.0	14.0	30.6	40.4	40.0	2.3	33.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	14.0	30.6	40.4	40.0	2.3	33.0	4.2
Queue Length 50th (m)	25.1	35.4	76.3	64.3	65.2	0.0	7.7	0.0
Queue Length 95th (m)	38.1	43.3	90.6	94.7	96.0	9.1	17.4	19.4
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	430	2938	2001	532	551	976	265	840
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.26	0.52	0.53	0.52	0.15	0.15	0.42

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	740	0	0	965	50	395	155	140	40	0	340
Future Volume (vph)	215	740	0	0	965	50	395	155	140	40	0	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5094		1698	1758	1599	1805		1599
Flt Permitted	0.18	1.00			1.00		0.95	0.98	1.00	0.43		1.00
Satd. Flow (perm)	335	5136			5094		1698	1758	1599	826		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	222	763	0	0	995	52	407	160	144	41	0	351
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	62	0	0	213
Lane Group Flow (vph)	222	763	0	0	1043	0	281	286	82	41	0	138
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.32		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Grp Cap (vph)	419	2938			1996		532	551	914	265		626
v/s Ratio Prot	c0.08	0.15			0.20							
v/s Ratio Perm	c0.22						c0.17	0.16	0.05	0.05		0.09
v/c Ratio	0.53	0.26			0.52		0.53	0.52	0.09	0.15		0.22
Uniform Delay, d1	15.4	13.7			29.7		36.0	35.9	12.3	30.9		25.8
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	4.7	0.2			1.0		3.7	3.5	0.2	1.2		0.8
Delay (s)	20.1	13.9			30.7		39.8	39.4	12.5	32.2		26.6
Level of Service	C	B			C		D	D	B	C		C
Approach Delay (s)		15.3			30.7			34.1			27.2	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	860	490	0	1265	0	0	0	0	175	0	85
Future Volume (vph)	0	860	490	0	1265	0	0	0	0	175	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.946										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4828	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4828	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		211										89
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	905	516	0	1332	0	0	0	0	184	0	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1421	0	0	1332	0	0	0	0	184	0	89
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.56			0.51					0.15		0.11

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

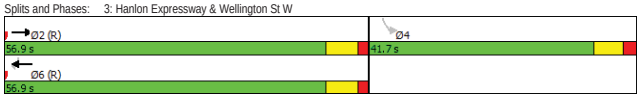
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		14.9			17.0					22.1		3.2
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		14.9			17.0					22.1		3.2
LOS		B			B					C		A
Approach Delay		14.9			17.0						15.9	
Approach LOS		B			B						B	

Intersection Summary

Area Type:	Other
Cycle Length: 98.6	
Actuated Cycle Length: 98.6	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 15.9	Intersection LOS: B
Intersection Capacity Utilization 41.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1421	1332	184	89
v/c Ratio	0.56	0.51	0.15	0.11
Control Delay	14.9	17.0	22.1	3.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.9	17.0	22.1	3.2
Queue Length 50th (m)	57.9	62.4	12.8	0.0
Queue Length 95th (m)	71.6	75.3	20.6	7.6
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2552	2604	1230	816
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.56	0.51	0.15	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	860	490	0	1265	0	0	0	0	175	0	85
Future Volume (vph)	0	860	490	0	1265	0	0	0	0	175	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4825			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4825			5136					3467		1524
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)	0	905	516	0	1332	0	0	0	0	184	0	89
RTOR Reduction (vph)	0	104	0	0	0	0	0	0	0	0	0	44
Lane Group Flow (vph)	0	1317	0	0	1332	0	0	0	0	184	0	45
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2446			2604					1230		772
v/s Ratio Prot		c0.27			0.26							
v/s Ratio Perm										c0.05		0.03
v/c Ratio		0.54			0.51					0.15		0.06
Uniform Delay, d1		16.5			16.2					21.7		12.3
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.9			0.7					0.3		0.1
Delay (s)		17.3			16.9					21.9		12.5
Level of Service		B			B					C		B
Approach Delay (s)		17.3			16.9			0.0			18.8	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	940	855	390	355	60
Future Volume (vph)	70	940	855	390	355	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.953			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3566	3348	0	1787	1615
Flt Permitted		0.706			0.950	
Satd. Flow (perm)	0	2525	3348	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			129			62
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Adj. Flow (vph)	72	969	881	402	366	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1041	1283	0	366	62
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

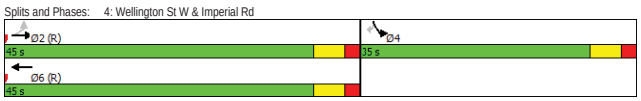
10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		46.4	46.4		21.6	21.6
Actuated g/C Ratio		0.58	0.58		0.27	0.27
v/c Ratio		0.71	0.64		0.76	0.13
Control Delay		17.0	12.8		36.8	6.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		17.0	12.8		36.8	6.0
LOS		B	B		D	A
Approach Delay		17.0	12.8		32.4	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 98.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1041	1283	366	62
v/c Ratio	0.71	0.64	0.76	0.13
Control Delay	17.0	12.8	36.8	6.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.0	12.8	36.8	6.0
Queue Length 50th (m)	57.6	59.3	53.4	0.0
Queue Length 95th (m)	#102.1	99.7	74.2	7.6
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1464	1995	647	624
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.71	0.64	0.57	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

10-17-2019

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	940	855	390	355	60
Future Volume (vph)	70	940	855	390	355	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3564	3348		1787	1615
Flt Permitted		0.71	1.00		0.95	1.00
Satd. Flow (perm)		2524	3348		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	969	881	402	366	62
RTOR Reduction (vph)	0	0	54	0	0	45
Lane Group Flow (vph)	0	1041	1229	0	366	17
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		46.4	46.4		21.6	21.6
Effective Green, g (s)		46.4	46.4		21.6	21.6
Actuated g/C Ratio		0.58	0.58		0.27	0.27
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1463	1941		482	436
v/s Ratio Prot			0.37		c0.20	
v/s Ratio Perm		c0.41				0.01
v/c Ratio		0.71	0.63		0.76	0.04
Uniform Delay, d1		12.0	11.2		26.8	21.5
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		3.0	1.6		6.8	0.0
Delay (s)		15.0	12.7		33.6	21.6
Level of Service		B	B		C	C
Approach Delay (s)		15.0	12.7		31.8	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	380	0	265	450	70	400	1045	0	95	1400	130
Future Volume (vph)	115	380	0	265	450	70	400	1045	0	95	1400	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.980							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3531	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.242			0.228			0.950			0.950		
Satd. Flow (perm)	455	3574	0	433	3531	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					9							134
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	119	392	0	273	464	72	412	1077	0	98	1443	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	392	0	273	536	0	412	1077	0	98	1443	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

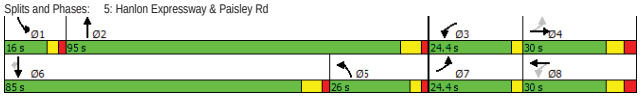
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	13.0	30.0		9.5	30.0		10.0	60.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	39.6	21.0		50.0	28.4		20.9	87.7		10.8	77.6	77.6
Actuated g/C Ratio	0.24	0.13		0.31	0.17		0.13	0.54		0.07	0.47	0.47
v/c Ratio	0.54	0.86		0.89	0.87		0.93	0.60		0.82	0.88	0.16
Control Delay	52.3	88.1		77.1	79.6		98.8	28.0		120.4	46.6	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	52.3	88.1		77.1	79.6		98.8	28.0		120.4	46.6	3.9
LOS	D	F		E	E		F	C		F	D	A
Approach Delay		79.8			78.8			47.6			47.5	
Approach LOS		E			E			D			D	

Intersection Summary

Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 163.9			
Natural Cycle: 115			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 56.8		Intersection LOS: E	
Intersection Capacity Utilization 95.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	119	392	273	536	412	1077	98	1443	134
v/c Ratio	0.54	0.86	0.89	0.87	0.93	0.60	0.82	0.88	0.16
Control Delay	52.3	88.1	77.1	79.6	98.8	28.0	120.4	46.6	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	88.1	77.1	79.6	98.8	28.0	120.4	46.6	3.9
Queue Length 50th (m)	30.6	70.7	77.2	94.1	74.1	132.8	34.2	236.3	0.0
Queue Length 95th (m)	49.0	#95.3	#117.7	#140.0	#107.6	155.6	#69.6	271.9	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	305	479	311	618	444	1805	121	1643	835
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.82	0.88	0.87	0.93	0.60	0.81	0.88	0.16

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	380	0	265	450	70	400	1045	0	95	1400	130
Future Volume (vph)	115	380	0	265	450	70	400	1045	0	95	1400	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574		1805	3530		3467	3374		1805	3471	1615
Flt Permitted	0.24	1.00		0.23	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	455	3574		433	3530		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	392	0	273	464	72	412	1077	0	98	1443	134
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	0	0	0	71
Lane Group Flow (vph)	119	392	0	273	529	0	412	1077	0	98	1443	63
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	34.6	21.0		45.0	28.4		20.9	87.7		10.8	77.6	77.6
Effective Green, g (s)	34.6	21.0		45.0	28.4		20.9	87.7		10.8	77.6	77.6
Actuated g/C Ratio	0.21	0.13		0.27	0.17		0.13	0.54		0.07	0.47	0.47
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	206	457		294	611		442	1805		118	1643	764
v/s Ratio Prot	0.05	0.11		c0.12	0.15		c0.12	0.32		0.05	c0.42	
v/s Ratio Perm	0.07			c0.14								0.04
v/c Ratio	0.58	0.86		0.93	0.87		0.93	0.60		0.83	0.88	0.08
Uniform Delay, d1	55.0	70.0		51.7	65.9		70.8	26.0		75.6	38.9	23.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.9	14.7		33.8	12.2		26.6	1.5		36.7	7.0	0.2
Delay (s)	58.9	84.7		85.5	78.1		97.4	27.5		112.4	45.9	23.9
Level of Service	E	F		F	E		F	C		F	D	C
Approach Delay (s)		78.7			80.6			46.8			48.0	
Approach LOS		E			F			D			D	

Intersection Summary

HCM 2000 Control Delay	57.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	163.9	Sum of lost time (s)	23.4
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	160	50	90	255	45	50	615	80	50	605	70
Future Volume (vph)	75	160	50	90	255	45	50	615	80	50	605	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.964			0.978			0.983			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1800	0	1805	1836	0	1805	1858	0	1770	1865	0
Flt Permitted	0.341			0.517			0.298			0.286		
Satd. Flow (perm)	630	1800	0	976	1836	0	566	1858	0	531	1865	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			15			8			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	77	165	52	93	263	46	52	634	82	52	624	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	217	0	93	309	0	52	716	0	52	696	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

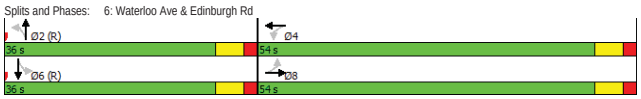
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.7	20.7		20.7	20.7		57.3	57.3		57.3	57.3	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.64	0.64		0.64	0.64	
v/c Ratio	0.53	0.50		0.42	0.71		0.14	0.60		0.15	0.58	
Control Delay	42.6	29.1		33.6	39.1		8.2	19.3		9.9	13.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	42.6	29.1		33.6	39.1		8.2	19.3		9.9	13.1	
LOS	D	C		C	D		A	B		A	B	
Approach Delay		32.7			37.8			18.5			12.9	
Approach LOS		C			D			B			B	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 22.0		Intersection LOS: C	
Intersection Capacity Utilization 77.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	217	93	309	52	716	52	696
v/c Ratio	0.53	0.50	0.42	0.71	0.14	0.60	0.15	0.58
Control Delay	42.6	29.1	33.6	39.1	8.2	19.3	9.9	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	29.1	33.6	39.1	8.2	19.3	9.9	13.1
Queue Length 50th (m)	12.4	30.1	14.5	49.6	1.9	50.3	3.4	65.0
Queue Length 95th (m)	24.5	45.9	26.1	69.3	m7.5	111.8	11.1	124.6
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	336	972	520	986	360	1186	338	1190
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.22	0.18	0.31	0.14	0.60	0.15	0.58

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	160	50	90	255	45	50	615	80	50	605	70
Future Volume (vph)	75	160	50	90	255	45	50	615	80	50	605	70
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		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)	1758	1800		1794	1835		1802	1858		1763	1866	
Flt Permitted	0.34	1.00		0.52	1.00		0.30	1.00		0.29	1.00	
Satd. Flow (perm)	631	1800		977	1835		566	1858		531	1866	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	165	52	93	263	46	52	634	82	52	624	72
RTOR Reduction (vph)	0	21	0	0	12	0	0	3	0	0	3	0
Lane Group Flow (vph)	77	196	0	93	297	0	52	713	0	52	693	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.7	20.7		20.7	20.7		57.3	57.3		57.3	57.3	
Effective Green, g (s)	20.7	20.7		20.7	20.7		57.3	57.3		57.3	57.3	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.64	0.64		0.64	0.64	
Clearance Time (s)	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	
Lane Grp Cap (vph)	145	414		224	422		360	1182		338	1188	
v/s Ratio Prot		0.11			c0.16			c0.38			0.37	
v/s Ratio Perm	0.12			0.10			0.09			0.10		
v/c Ratio	0.53	0.47		0.42	0.70		0.14	0.60		0.15	0.58	
Uniform Delay, d1	30.4	29.9		29.5	31.8		6.5	9.6		6.6	9.5	
Progression Factor	1.00	1.00		1.00	1.00		0.85	1.53		1.00	1.00	
Incremental Delay, d2	3.7	0.9		1.2	5.3		0.8	2.0		1.0	2.1	
Delay (s)	34.1	30.8		30.7	37.1		6.3	16.8		7.6	11.6	
Level of Service	C	C		C	D		A	B		A	B	
Approach Delay (s)		31.7			35.7			16.1			11.3	
Approach LOS		C			D			B			B	

Intersection Summary

HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	60	125	255	75	155	265
Future Volume (vph)	60	125	255	75	155	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	65	136	277	82	168	288
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	136	277	82	168	288
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	60	125	255	75	155	265
Future Volume (Veh/h)	60	125	255	75	155	265
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	136	277	82	168	288
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			202		702	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			202		702	66
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			80		48	71
cM capacity (veh/h)			1369		325	1000

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	65	136	277	82	456
Volume Left	0	0	277	0	168
Volume Right	0	136	0	0	288
cSH	1700	1700	1369	1700	881
Volume to Capacity	0.04	0.08	0.20	0.05	0.52
Queue Length 95th (m)	0.0	0.0	6.1	0.0	24.3
Control Delay (s)	0.0	0.0	8.3	0.0	16.4
Lane LOS			A		C
Approach Delay (s)	0.0		6.4		16.4
Approach LOS					C

Intersection Summary

Average Delay	9.6		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	320	120	55	390	45	110	530	50	95	545	110
Future Volume (vph)	90	320	120	55	390	45	110	530	50	95	545	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	1.00		1.00	1.00		1.00	0.99	
Frt		0.959			0.985			0.987			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1793	0	1805	1847	0	1805	1868	0	1736	1840	0
Flt Permitted	0.267			0.259			0.212			0.275		
Satd. Flow (perm)	503	1793	0	489	1847	0	402	1868	0	501	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			8			9			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	97	344	129	59	419	48	118	570	54	102	586	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	473	0	59	467	0	118	624	0	102	704	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

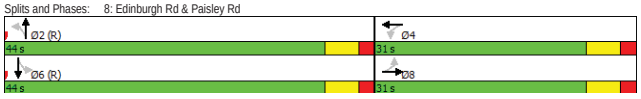
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.58	0.77		0.36	0.75		0.58	0.66		0.40	0.75	
Control Delay	36.4	30.8		26.8	31.2		27.5	17.6		17.6	20.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.4	30.8		26.8	31.2		27.5	17.6		17.6	20.4	
LOS	D	C		C	C		C	B		B	C	
Approach Delay		31.7			30.7			19.2			20.0	
Approach LOS		C			C			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 24.4		Intersection LOS: C	
Intersection Capacity Utilization 90.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	97	473	59	467	118	624	102	704
v/c Ratio	0.58	0.77	0.36	0.75	0.58	0.66	0.40	0.75
Control Delay	36.4	30.8	26.8	31.2	27.5	17.6	17.6	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	30.8	26.8	31.2	27.5	17.6	17.6	20.4
Queue Length 50th (m)	13.3	66.2	6.6	60.0	11.5	63.4	8.8	75.9
Queue Length 95th (m)	#34.5	#110.8	17.7	#104.0	#36.7	99.2	22.0	119.5
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	167	615	163	621	203	950	253	942
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.77	0.36	0.75	0.58	0.66	0.40	0.75

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	320	120	55	390	45	110	530	50	95	545	110
Future Volume (vph)	90	320	120	55	390	45	110	530	50	95	545	110
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	
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	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.99		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)	1791	1793		1795	1847		1800	1868		1732	1840	
Flt Permitted	0.27	1.00		0.26	1.00		0.21	1.00		0.27	1.00	
Satd. Flow (perm)	503	1793		490	1847		401	1868		500	1840	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	97	344	129	59	419	48	118	570	54	102	586	118
RTOR Reduction (vph)	0	18	0	0	5	0	0	4	0	0	10	0
Lane Group Flow (vph)	97	455	0	59	462	0	118	620	0	102	694	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	167	597		163	615		203	946		253	932	
v/s Ratio Prot		c0.25			0.25			0.33			c0.38	
v/s Ratio Perm	0.19			0.12			0.29			0.20		
v/c Ratio	0.58	0.76		0.36	0.75		0.58	0.65		0.40	0.74	
Uniform Delay, d1	20.7	22.3		19.0	22.2		12.9	13.7		11.5	14.7	
Progression Factor	0.99	1.01		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.8	8.2		6.1	8.2		11.6	3.5		4.7	5.4	
Delay (s)	33.3	30.8		25.1	30.4		24.5	17.2		16.2	20.0	
Level of Service	C	C		C	C		C	B		B	C	
Approach Delay (s)		31.2			29.8			18.4			19.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

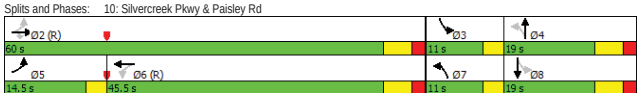
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	385	120	65	400	190	95	30	50	215	40	295
Future Volume (vph)	280	385	120	65	400	190	95	30	50	215	40	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.99	1.00	0.99		1.00	0.98		0.99	0.99	
Frt			0.850		0.952			0.907			0.868	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	1805	1783	0	1770	1695	0	1787	1629	0
Flt Permitted	0.231			0.518			0.500			0.578		
Satd. Flow (perm)	438	1881	1594	984	1783	0	931	1695	0	1081	1629	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			130		34			54			321	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	304	418	130	71	435	207	103	33	54	234	43	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	304	418	130	71	642	0	103	87	0	234	364	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		2.5	5.0		4.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		7.5	19.0		9.0	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	63.1	60.1	60.1	46.5	46.5		18.1	9.1		18.5	9.1	
Actuated g/C Ratio	0.70	0.67	0.67	0.52	0.52		0.20	0.10		0.21	0.10	
v/c Ratio	0.65	0.33	0.12	0.14	0.69		0.40	0.40		0.82	0.81	
Control Delay	13.0	8.4	1.7	15.3	22.5		30.7	22.3		53.3	21.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.0	8.4	1.7	15.3	22.5		30.7	22.3		53.3	21.4	
LOS	B	A	A	B	C		C	C		D	C	
Approach Delay		9.0			21.7			26.8			33.9	
Approach LOS		A			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 20.6		Intersection LOS: C	
Intersection Capacity Utilization 90.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	304	418	130	71	642	103	87	234	364
v/c Ratio	0.65	0.33	0.12	0.14	0.69	0.40	0.40	0.82	0.81
Control Delay	13.0	8.4	1.7	15.3	22.5	30.7	22.3	53.3	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.0	8.4	1.7	15.3	22.5	30.7	22.3	53.3	21.4
Queue Length 50th (m)	18.3	30.5	0.0	6.9	84.7	14.9	5.7	36.8	7.4
Queue Length 95th (m)	34.6	54.4	6.7	16.5	#146.6	26.6	18.9	#56.6	36.1
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	484	1256	1107	508	937	264	291	285	509
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.33	0.12	0.14	0.69	0.39	0.30	0.82	0.72

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	385	120	65	400	190	95	30	50	215	40	295
Future Volume (vph)	280	385	120	65	400	190	95	30	50	215	40	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1881	1594	1804	1782		1769	1694		1781	1628	
Flt Permitted	0.23	1.00	1.00	0.52	1.00		0.50	1.00		0.58	1.00	
Satd. Flow (perm)	439	1881	1594	983	1782		931	1694		1083	1628	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	418	130	71	435	207	103	33	54	234	43	321
RTOR Reduction (vph)	0	0	45	0	17	0	0	49	0	0	286	0
Lane Group Flow (vph)	304	418	85	71	625	0	103	38	0	234	78	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	58.9	58.9	58.9	45.3	45.3		14.4	8.0		17.8	9.7	
Effective Green, g (s)	58.9	58.9	58.9	45.3	45.3		14.4	8.0		17.8	9.7	
Actuated g/C Ratio	0.65	0.65	0.65	0.50	0.50		0.16	0.09		0.20	0.11	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	448	1231	1043	494	896		208	150		277	175	
v/s Ratio Prot	c0.08	0.22			0.35		0.04	0.02		c0.08	0.05	
v/s Ratio Perm	c0.36		0.05	0.07			0.04			c0.09		
v/c Ratio	0.68	0.34	0.08	0.14	0.70		0.50	0.25		0.84	0.44	
Uniform Delay, d1	10.7	6.9	5.7	12.0	17.1		33.8	38.2		33.9	37.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	0.7	0.2	0.6	4.5		1.9	0.9		20.4	1.8	
Delay (s)	14.8	7.7	5.8	12.6	21.6		35.7	39.1		54.3	39.4	
Level of Service	B	A	A	B	C		D	D		D	D	
Approach Delay (s)		9.9			20.7			37.2			45.2	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy & North Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	3	50	15	3	20	50	85	25	30	100	75
Future Volume (vph)	70	3	50	15	3	20	50	85	25	30	100	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.945			0.928			0.966			0.936	
Flt Protected		0.972			0.981		0.950			0.950		
Satd. Flow (prot)	0	1711	0	0	1696	0	1770	1799	0	1770	1744	0
Flt Permitted		0.972			0.981		0.950			0.950		
Satd. Flow (perm)	0	1711	0	0	1696	0	1770	1799	0	1770	1744	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	3	54	16	3	22	54	92	27	33	109	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	133	0	0	41	0	54	119	0	33	191	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy & North Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	3	50	15	3	20	50	85	25	30	100	75
Future Volume (Veh/h)	70	3	50	15	3	20	50	85	25	30	100	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	3	54	16	3	22	54	92	27	33	109	82
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	440	443	150	444	470	106	191			119		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440	443	150	444	470	106	191			119		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	99	94	97	99	98	96			98		
cM capacity (veh/h)	489	478	896	468	461	949	1383			1469		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	133	41	54	119	33	191
Volume Left	76	16	54	0	33	0
Volume Right	54	22	0	27	0	82
cSH	599	642	1383	1700	1469	1700
Volume to Capacity	0.22	0.06	0.04	0.07	0.02	0.11
Queue Length 95th (m)	6.7	1.6	1.0	0.0	0.6	0.0
Control Delay (s)	12.7	11.0	7.7	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.7	11.0	2.4		1.1	
Approach LOS	B	B				

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy & South Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	3	90	15	3	10	95	80	25	30	60	75
Future Volume (vph)	70	3	90	15	3	10	95	80	25	30	60	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.925			0.950			0.964			0.916	
Flt Protected		0.979			0.974		0.950			0.950		
Satd. Flow (prot)	0	1687	0	0	1724	0	1770	1796	0	1770	1706	0
Flt Permitted		0.979			0.974		0.950			0.950		
Satd. Flow (perm)	0	1687	0	0	1724	0	1770	1796	0	1770	1706	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	3	98	16	3	11	103	87	27	33	65	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	0	0	30	0	103	114	0	33	147	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy & South Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	3	90	15	3	10	95	80	25	30	60	75
Future Volume (Veh/h)	70	3	90	15	3	10	95	80	25	30	60	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	3	98	16	3	11	103	87	27	33	65	82
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	478	492	106	537	520	100	147			114		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478	492	106	537	520	100	147			114		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	99	90	96	99	99	93			98		
cM capacity (veh/h)	455	433	948	377	418	955	1435			1475		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	177	30	103	114	33	147
Volume Left	76	16	103	0	33	0
Volume Right	98	11	0	27	0	82
cSH	638	491	1435	1700	1475	1700
Volume to Capacity	0.28	0.06	0.07	0.07	0.02	0.09
Queue Length 95th (m)	9.0	1.6	1.9	0.0	0.5	0.0
Control Delay (s)	12.8	12.8	7.7	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.8	12.8	3.7		1.4	
Approach LOS	B	B				

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	550	0	160	515	0	120	440	0	60	465	0
Future Volume (vph)	75	550	0	160	515	0	120	440	0	60	465	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.344			0.262			0.418			0.492		
Satd. Flow (perm)	651	3539	0	488	3539	0	791	3610	0	910	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	77	561	0	163	526	0	122	449	0	61	474	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	561	0	163	526	0	122	449	0	61	474	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

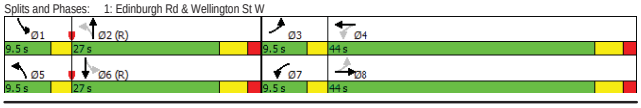
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	29.4	20.0		30.1	21.9		50.4	40.2		47.0	37.0	
Actuated g/C Ratio	0.33	0.22		0.33	0.24		0.56	0.45		0.52	0.41	
v/c Ratio	0.26	0.71		0.64	0.61		0.23	0.28		0.11	0.32	
Control Delay	20.2	37.3		32.0	33.6		11.0	18.0		8.1	18.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.2	37.3		32.0	33.6		11.0	18.0		8.1	18.3	
LOS	C	D		C	C		B	B		A	B	
Approach Delay		35.2			33.2			16.5			17.1	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80.5 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 26.3		Intersection LOS: C	
Intersection Capacity Utilization 61.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	561	163	526	122	449	61	474
v/c Ratio	0.26	0.71	0.64	0.61	0.23	0.28	0.11	0.32
Control Delay	20.2	37.3	32.0	33.6	11.0	18.0	8.1	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	37.3	32.0	33.6	11.0	18.0	8.1	18.3
Queue Length 50th (m)	9.2	50.0	20.6	46.3	9.4	27.1	3.1	33.2
Queue Length 95th (m)	16.8	62.3	31.9	58.3	20.5	44.8	7.1	52.7
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	297	1494	256	1494	539	1612	546	1484
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.38	0.64	0.35	0.23	0.28	0.11	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	550	0	160	515	0	120	440	0	60	465	0
Future Volume (vph)	75	550	0	160	515	0	120	440	0	60	465	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3539		1769	3539		1802	3610		1763	3610	
Flt Permitted	0.34	1.00		0.26	1.00		0.42	1.00		0.49	1.00	
Satd. Flow (perm)	654	3539		488	3539		792	3610		914	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	77	561	0	163	526	0	122	449	0	61	474	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	77	561	0	163	526	0	122	449	0	61	474	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.8	20.6		28.4	21.9		47.4	39.0		42.4	36.5	
Effective Green, g (s)	25.8	20.6		28.4	21.9		47.4	39.0		42.4	36.5	
Actuated g/C Ratio	0.29	0.23		0.32	0.24		0.53	0.43		0.47	0.41	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	253	810		246	861		511	1564		486	1464	
v/s Ratio Prot	0.02	0.16		c0.05	0.15		c0.02	0.12		0.01	c0.13	
v/s Ratio Perm	0.07			c0.16			0.10			0.05		
v/c Ratio	0.30	0.69		0.66	0.61		0.24	0.29		0.13	0.32	
Uniform Delay, d1	24.1	31.8		23.8	30.3		11.0	16.5		13.0	18.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.76	0.91	
Incremental Delay, d2	0.7	2.6		6.6	1.3		0.2	0.5		0.1	0.6	
Delay (s)	24.8	34.4		30.3	31.6		11.2	17.0		10.0	17.3	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		33.2			31.3			15.7			16.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	525	0	0	680	50	275	85	155	45	0	245
Future Volume (vph)	145	525	0	0	680	50	275	85	155	45	0	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.990				0.850			0.850
Flt Protected	0.950						0.950	0.974		0.950		
Satd. Flow (prot)	1787	5136	0	0	5080	0	1698	1749	1599	1805	0	1599
Flt Permitted	0.288						0.950	0.974		0.582		
Satd. Flow (perm)	541	5136	0	0	5080	0	1698	1749	1599	1106	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					11				160			253
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	149	541	0	0	701	52	284	88	160	46	0	253
Shared Lane Traffic (%)							35%					
Lane Group Flow (vph)	149	541	0	0	753	0	185	187	160	46	0	253
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	47.5	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	47.5	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	37.2%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	4.5	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	3.0	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	33.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

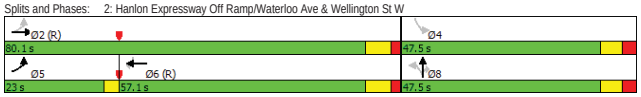
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.31	0.31		0.39
v/c Ratio	0.29	0.18			0.38		0.35	0.34	0.26	0.13		0.32
Control Delay	12.4	13.3			27.9		36.1	35.9	5.8	32.8		4.1
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	12.4	13.3			27.9		36.1	35.9	5.8	32.8		4.1
LOS	B	B			C		D	D	A	C		A
Approach Delay		13.1			27.9			26.9			8.6	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type:	Other		
Cycle Length: 127.6			
Actuated Cycle Length: 127.6			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 20.6		Intersection LOS: C	
Intersection Capacity Utilization 65.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	149	541	753	185	187	160	46	253
v/c Ratio	0.29	0.18	0.38	0.35	0.34	0.26	0.13	0.32
Control Delay	12.4	13.3	27.9	36.1	35.9	5.8	32.8	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	13.3	27.9	36.1	35.9	5.8	32.8	4.1
Queue Length 50th (m)	16.1	23.9	50.7	39.6	40.0	0.0	8.7	0.0
Queue Length 95th (m)	26.1	30.4	62.3	62.4	62.3	16.1	18.8	17.0
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	522	2938	1997	532	548	611	346	780
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.18	0.38	0.35	0.34	0.26	0.13	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	525	0	0	680	50	275	85	155	45	0	245
Future Volume (vph)	145	525	0	0	680	50	275	85	155	45	0	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5078		1698	1749	1599	1805		1599
Flt Permitted	0.29	1.00			1.00		0.95	0.97	1.00	0.58		1.00
Satd. Flow (perm)	541	5136			5078		1698	1749	1599	1107		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	541	0	0	701	52	284	88	160	46	0	253
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	110	0	0	154
Lane Group Flow (vph)	149	541	0	0	746	0	185	187	50	46	0	99
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.31	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Grp Cap (vph)	504	2938			1989		532	548	501	347		626
v/s Ratio Prot	c0.05	0.11			c0.15							
v/s Ratio Perm	0.12						c0.11	0.11	0.03	0.04		0.06
v/c Ratio	0.30	0.18			0.38		0.35	0.34	0.10	0.13		0.16
Uniform Delay, d1	13.2	13.1			27.7		33.7	33.7	31.0	31.4		25.2
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.5	0.1			0.5		1.8	1.7	0.4	0.8		0.5
Delay (s)	14.7	13.2			28.2		35.5	35.4	31.4	32.2		25.7
Level of Service	B	B			C		D	D	C	C		C
Approach Delay (s)		13.5			28.2			34.2			26.7	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	630	375	0	865	0	0	0	0	150	0	145
Future Volume (vph)	0	630	375	0	865	0	0	0	0	150	0	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.944										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4818	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4818	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		341										153
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	663	395	0	911	0	0	0	0	158	0	153
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1058	0	0	911	0	0	0	0	158	0	153
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					24.7		56.9
Total Split (%)		69.7%			69.7%					30.3%		69.7%
Maximum Green (s)		50.0			50.0					18.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
v/c Ratio		0.34			0.29					0.21		0.15

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

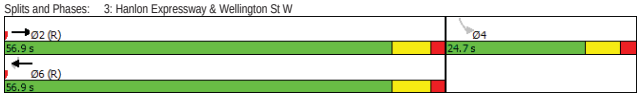
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		5.3			7.7					26.8		1.6
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		5.3			7.7					26.8		1.6
LOS		A			A					C		A
Approach Delay		5.3			7.7						14.4	
Approach LOS		A			A						B	

Intersection Summary

Area Type: Other
Cycle Length: 81.6
Actuated Cycle Length: 81.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.34
Intersection Signal Delay: 7.5 — Intersection LOS: A
Intersection Capacity Utilization 37.2% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1058	911	158	153
v/c Ratio	0.34	0.29	0.21	0.15
Control Delay	5.3	7.7	26.8	1.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.3	7.7	26.8	1.6
Queue Length 50th (m)	17.6	23.1	10.9	0.0
Queue Length 95th (m)	24.1	29.7	19.0	6.5
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	3084	3147	764	993
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.34	0.29	0.21	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	630	375	0	865	0	0	0	0	150	0	145
Future Volume (vph)	0	630	375	0	865	0	0	0	0	150	0	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4818			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4818			5136					3467		1524
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)	0	663	395	0	911	0	0	0	0	158	0	153
RTOR Reduction (vph)	0	132	0	0	0	0	0	0	0	0	0	59
Lane Group Flow (vph)	0	926	0	0	911	0	0	0	0	158	0	94
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					18.0		50.0
Effective Green, g (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2952			3147					764		933
v/s Ratio Prot		c0.19			0.18							
v/s Ratio Perm										c0.05		0.06
v/c Ratio		0.31			0.29					0.21		0.10
Uniform Delay, d1		7.6			7.4					26.0		6.5
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.3			0.2					0.6		0.2
Delay (s)		7.9			7.7					26.6		6.7
Level of Service		A			A					C		A
Approach Delay (s)		7.9			7.7			0.0			16.8	
Approach LOS		A			A			A			B	

Intersection Summary

HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	620	595	295	375	55
Future Volume (vph)	65	620	595	295	375	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.950			0.850
Flt Protected		0.995			0.950	
Satd. Flow (prot)	0	3528	3338	0	1787	1615
Flt Permitted		0.780			0.950	
Satd. Flow (perm)	0	2766	3338	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			149			57
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Adj. Flow (vph)	67	639	613	304	387	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	706	917	0	387	57
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

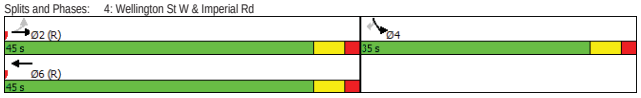
10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		45.6	45.6		22.4	22.4
Actuated g/C Ratio		0.57	0.57		0.28	0.28
v/c Ratio		0.45	0.47		0.77	0.12
Control Delay		12.1	10.0		36.9	6.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		12.1	10.0		36.9	6.0
LOS		B	A		D	A
Approach Delay		12.1	10.0		33.0	
Approach LOS		B	A		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 15.6		Intersection LOS: B	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	706	917	387	57
v/c Ratio	0.45	0.47	0.77	0.12
Control Delay	12.1	10.0	36.9	6.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.1	10.0	36.9	6.0
Queue Length 50th (m)	31.8	34.2	56.4	0.0
Queue Length 95th (m)	54.5	58.8	78.3	7.2
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1576	1966	647	621
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.47	0.60	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

10-17-2019

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	620	595	295	375	55
Future Volume (vph)	65	620	595	295	375	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3529	3339		1787	1615
Flt Permitted		0.78	1.00		0.95	1.00
Satd. Flow (perm)		2764	3339		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	639	613	304	387	57
RTOR Reduction (vph)	0	0	64	0	0	41
Lane Group Flow (vph)	0	706	853	0	387	16
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		45.6	45.6		22.4	22.4
Effective Green, g (s)		45.6	45.6		22.4	22.4
Actuated g/C Ratio		0.57	0.57		0.28	0.28
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1575	1903		500	452
v/s Ratio Prot			c0.26		c0.22	
v/s Ratio Perm		0.26				0.01
v/c Ratio		0.45	0.45		0.77	0.04
Uniform Delay, d1		9.9	9.9		26.5	20.9
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.9	0.8		7.3	0.0
Delay (s)		10.9	10.7		33.8	21.0
Level of Service		B	B		C	C
Approach Delay (s)		10.9	10.7		32.2	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	320	0	225	335	70	350	1035	0	85	945	130
Future Volume (vph)	125	320	0	225	335	70	350	1035	0	85	945	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.974							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3507	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.361			0.303			0.950			0.950		
Satd. Flow (perm)	678	3574	0	575	3507	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					12							134
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	129	330	0	232	345	72	361	1067	0	88	974	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	330	0	232	417	0	361	1067	0	88	974	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

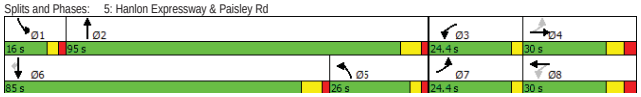
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	38.6	19.3		46.7	24.6		20.5	87.8		10.5	77.7	77.7
Actuated g/C Ratio	0.24	0.12		0.29	0.15		0.13	0.55		0.07	0.48	0.48
v/c Ratio	0.49	0.77		0.73	0.76		0.81	0.58		0.75	0.58	0.16
Control Delay	50.2	81.4		60.5	73.4		83.9	26.4		108.8	32.1	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	50.2	81.4		60.5	73.4		83.9	26.4		108.8	32.1	3.9
LOS	D	F		E	E		F	C		F	C	A
Approach Delay		72.6			68.8			40.9			34.6	
Approach LOS		E			E			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 160.6			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 47.6		Intersection LOS: D	
Intersection Capacity Utilization 78.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	129	330	232	417	361	1067	88	974	134
v/c Ratio	0.49	0.77	0.73	0.76	0.81	0.58	0.75	0.58	0.16
Control Delay	50.2	81.4	60.5	73.4	83.9	26.4	108.8	32.1	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	81.4	60.5	73.4	83.9	26.4	108.8	32.1	3.9
Queue Length 50th (m)	33.4	58.4	63.9	69.9	63.0	128.0	30.2	126.8	0.0
Queue Length 95th (m)	52.2	76.8	91.3	#94.3	#87.2	153.6	#60.3	152.6	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	337	490	331	556	454	1843	124	1680	850
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.67	0.70	0.75	0.80	0.58	0.71	0.58	0.16

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	320	0	225	335	70	350	1035	0	85	945	130
Future Volume (vph)	125	320	0	225	335	70	350	1035	0	85	945	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1786	3574		1804	3508		3467	3374		1805	3471	1615
Flt Permitted	0.36	1.00		0.30	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	679	3574		575	3508		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	129	330	0	232	345	72	361	1067	0	88	974	134
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	0	69
Lane Group Flow (vph)	129	330	0	232	407	0	361	1067	0	88	974	65
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	33.6	19.3		41.9	24.6		20.5	87.7		10.5	77.7	77.7
Effective Green, g (s)	33.6	19.3		41.9	24.6		20.5	87.7		10.5	77.7	77.7
Actuated g/C Ratio	0.21	0.12		0.26	0.15		0.13	0.55		0.07	0.48	0.48
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	240	429		300	537		442	1843		118	1680	781
v/s Ratio Prot	0.05	0.09		c0.09	0.12		c0.10	c0.32		c0.05	0.28	
v/s Ratio Perm	0.06			c0.11								0.04
v/c Ratio	0.54	0.77		0.77	0.76		0.82	0.58		0.75	0.58	0.08
Uniform Delay, d1	54.2	68.4		50.7	65.1		68.2	24.2		73.7	29.7	22.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.3	8.1		11.7	6.1		11.1	1.3		22.3	1.5	0.2
Delay (s)	56.5	76.5		62.4	71.1		79.3	25.5		96.0	31.2	22.5
Level of Service	E	E		E	E		E	C		F	C	C
Approach Delay (s)		70.9			68.0			39.1			35.0	
Approach LOS		E			E			D			C	

Intersection Summary				
HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	160.5	Sum of lost time (s)	23.4	
Intersection Capacity Utilization	78.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	110	35	55	105	40	40	480	60	30	475	55
Future Volume (vph)	80	110	35	55	105	40	40	480	60	30	475	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.964			0.959			0.983			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1800	0	1805	1797	0	1805	1859	0	1770	1865	0
Flt Permitted	0.602			0.602			0.430			0.424		
Satd. Flow (perm)	1110	1800	0	1135	1797	0	815	1859	0	787	1865	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			33			8			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	82	113	36	57	108	41	41	495	62	31	490	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	149	0	57	149	0	41	557	0	31	547	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

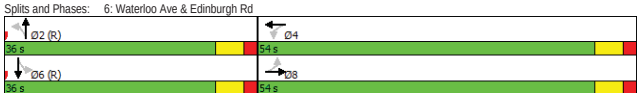
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	11.7	11.7		11.7	11.7		66.3	66.3		66.3	66.3	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.74	0.74		0.74	0.74	
v/c Ratio	0.57	0.58		0.39	0.57		0.07	0.41		0.05	0.40	
Control Delay	50.9	38.2		41.9	36.1		3.7	9.7		4.5	5.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	50.9	38.2		41.9	36.1		3.7	9.7		4.5	5.9	
LOS	D	D		D	D		A	A		A	A	
Approach Delay		42.7			37.7			9.3			5.9	
Approach LOS		D			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 63.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	149	57	149	41	557	31	547
v/c Ratio	0.57	0.58	0.39	0.57	0.07	0.41	0.05	0.40
Control Delay	50.9	38.2	41.9	36.1	3.7	9.7	4.5	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	38.2	41.9	36.1	3.7	9.7	4.5	5.9
Queue Length 50th (m)	14.3	21.1	9.7	20.0	1.4	25.8	1.3	29.7
Queue Length 95th (m)	27.4	37.7	20.3	36.6	4.1	78.8	4.6	58.7
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	592	972	605	973	600	1370	579	1375
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.15	0.09	0.15	0.07	0.41	0.05	0.40

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	110	35	55	105	40	40	480	60	30	475	55
Future Volume (vph)	80	110	35	55	105	40	40	480	60	30	475	55
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	
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	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	0.98		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)	1752	1800		1792	1796		1800	1859		1759	1865	
Flt Permitted	0.60	1.00		0.60	1.00		0.43	1.00		0.42	1.00	
Satd. Flow (perm)	1110	1800		1135	1796		814	1859		785	1865	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	113	36	57	108	41	41	495	62	31	490	57
RTOR Reduction (vph)	0	23	0	0	29	0	0	2	0	0	2	0
Lane Group Flow (vph)	82	126	0	57	120	0	41	555	0	31	545	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	11.7	11.7		11.7	11.7		66.3	66.3		66.3	66.3	
Effective Green, g (s)	11.7	11.7		11.7	11.7		66.3	66.3		66.3	66.3	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.74	0.74		0.74	0.74	
Clearance Time (s)	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	
Lane Grp Cap (vph)	144	234		147	233		599	1369		578	1373	
v/s Ratio Prot		0.07			0.07			c0.30			0.29	
v/s Ratio Perm	c0.07			0.05			0.05			0.04		
v/c Ratio	0.57	0.54		0.39	0.52		0.07	0.41		0.05	0.40	
Uniform Delay, d1	36.8	36.6		35.9	36.5		3.3	4.4		3.2	4.4	
Progression Factor	1.00	1.00		1.00	1.00		0.81	1.72		1.00	1.00	
Incremental Delay, d2	5.1	2.4		1.7	1.9		0.2	0.9		0.2	0.9	
Delay (s)	41.9	39.0		37.6	38.4		2.9	8.5		3.4	5.3	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		40.0			38.2			8.1			5.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	70	140	165	70	140	155
Future Volume (vph)	70	140	165	70	140	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	76	152	179	76	152	168
Shared Lane Traffic (%)						
Lane Group Flow (vph)	76	152	179	76	152	168
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.2%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	70	140	165	70	140	155
Future Volume (Veh/h)	70	140	165	70	140	155
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	152	179	76	152	168
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			229		511	77
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			229		511	77
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			87		67	83
cM capacity (veh/h)			1338		455	986

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	76	152	179	76	320
Volume Left	0	0	179	0	152
Volume Right	0	152	0	0	168
cSH	1700	1700	1338	1700	959
Volume to Capacity	0.04	0.09	0.13	0.04	0.33
Queue Length 95th (m)	0.0	0.0	3.7	0.0	11.8
Control Delay (s)	0.0	0.0	8.1	0.0	12.9
Lane LOS			A		B
Approach Delay (s)	0.0		5.7		12.9
Approach LOS					B

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	30.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	290	95	35	270	60	110	450	25	55	425	85
Future Volume (vph)	100	290	95	35	270	60	110	450	25	55	425	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00	1.00		1.00	0.99	
Frt		0.963			0.973			0.992			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1801	0	1805	1821	0	1805	1880	0	1736	1840	0
Flt Permitted	0.411			0.334			0.336			0.367		
Satd. Flow (perm)	773	1801	0	631	1821	0	636	1880	0	669	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			16			5			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	108	312	102	38	290	65	118	484	27	59	457	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	414	0	38	355	0	118	511	0	59	548	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.42	0.67		0.18	0.58		0.37	0.54		0.17	0.58	
Control Delay	25.5	26.8		20.6	24.1		15.4	15.0		11.7	15.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.5	26.8		20.6	24.1		15.4	15.0		11.7	15.6	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		26.6			23.8			15.1			15.2	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 19.5		Intersection LOS: B	
Intersection Capacity Utilization 80.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd

Queues
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	108	414	38	355	118	511	59	548
v/c Ratio	0.42	0.67	0.18	0.58	0.37	0.54	0.17	0.58
Control Delay	25.5	26.8	20.6	24.1	15.4	15.0	11.7	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	26.8	20.6	24.1	15.4	15.0	11.7	15.6
Queue Length 50th (m)	13.8	55.2	4.0	41.0	10.0	47.8	4.5	51.6
Queue Length 95th (m)	30.1	89.1	11.2	67.4	22.8	74.9	11.3	81.7
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	257	616	210	617	322	955	338	941
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.67	0.18	0.58	0.37	0.54	0.17	0.58

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	290	95	35	270	60	110	450	25	55	425	85
Future Volume (vph)	100	290	95	35	270	60	110	450	25	55	425	85
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	
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	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		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)	1786	1801		1794	1820		1798	1880		1731	1840	
Flt Permitted	0.41	1.00		0.33	1.00		0.34	1.00		0.37	1.00	
Satd. Flow (perm)	772	1801		631	1820		636	1880		668	1840	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	108	312	102	38	290	65	118	484	27	59	457	91
RTOR Reduction (vph)	0	16	0	0	11	0	0	2	0	0	9	0
Lane Group Flow (vph)	108	398	0	38	344	0	118	509	0	59	539	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	257	600		210	606		322	952		338	932	
v/s Ratio Prot		c0.22			0.19			0.27			c0.29	
v/s Ratio Perm	0.14			0.06			0.19			0.09		
v/c Ratio	0.42	0.66		0.18	0.57		0.37	0.53		0.17	0.58	
Uniform Delay, d1	19.4	21.4		17.7	20.6		11.2	12.5		10.0	12.9	
Progression Factor	1.01	1.03		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.7	5.3		1.9	3.8		3.2	2.1		1.1	2.6	
Delay (s)	24.3	27.4		19.6	24.4		14.4	14.7		11.1	15.5	
Level of Service	C	C		B	C		B	B		B	B	
Approach Delay (s)		26.7			23.9			14.6			15.1	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	315	125	70	310	145	120	40	65	190	45	205
Future Volume (vph)	205	315	125	70	310	145	120	40	65	190	45	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.99	1.00	0.99		1.00	0.98		0.99	0.99	
Frt			0.850		0.952			0.907			0.877	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	1805	1783	0	1770	1695	0	1787	1647	0
Flt Permitted	0.335			0.555			0.494			0.532		
Satd. Flow (perm)	635	1881	1594	1054	1783	0	919	1695	0	995	1647	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136		33			71			213	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	223	342	136	76	337	158	130	43	71	207	49	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	342	136	76	495	0	130	114	0	207	272	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	15.0	60.0	60.0	45.0	45.0		11.0	19.0		11.0	19.0	
Total Split (%)	16.7%	66.7%	66.7%	50.0%	50.0%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	12.0	54.0	54.0	39.0	39.0		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	61.0	58.0	58.0	45.4	45.4		18.3	9.2		20.6	9.2	
Actuated g/C Ratio	0.68	0.64	0.64	0.50	0.50		0.20	0.10		0.23	0.10	
v/c Ratio	0.40	0.28	0.13	0.14	0.54		0.50	0.48		0.65	0.76	
Control Delay	8.2	8.3	1.7	14.9	18.1		33.6	23.3		38.8	24.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.2	8.3	1.7	14.9	18.1		33.6	23.3		38.8	24.2	
LOS	A	A	A	B	B		C	C		D	C	
Approach Delay		7.0			17.7			28.8			30.5	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 18.4		Intersection LOS: B	
Intersection Capacity Utilization 75.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd

Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	223	342	136	76	495	130	114	207	272
v/c Ratio	0.40	0.28	0.13	0.14	0.54	0.50	0.48	0.65	0.76
Control Delay	8.2	8.3	1.7	14.9	18.1	33.6	23.3	38.8	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	8.3	1.7	14.9	18.1	33.6	23.3	38.8	24.2
Queue Length 50th (m)	13.0	24.2	0.0	7.0	54.1	19.0	7.4	31.8	10.2
Queue Length 95th (m)	25.1	43.1	6.7	17.5	97.2	32.5	22.6	49.6	35.2
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	586	1211	1075	531	916	264	305	317	420
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.28	0.13	0.14	0.54	0.49	0.37	0.65	0.65

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	315	125	70	310	145	120	40	65	190	45	205
Future Volume (vph)	205	315	125	70	310	145	120	40	65	190	45	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.91		1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	1881	1594	1804	1783		1769	1694		1782	1647	
Flt Permitted	0.33	1.00	1.00	0.56	1.00		0.49	1.00		0.53	1.00	
Satd. Flow (perm)	636	1881	1594	1054	1783		919	1694		999	1647	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	342	136	76	337	158	130	43	71	207	49	223
RTOR Reduction (vph)	0	0	50	0	17	0	0	65	0	0	188	0
Lane Group Flow (vph)	223	342	86	76	478	0	130	49	0	207	84	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	56.7	56.7	56.7	44.1	44.1		16.0	8.1		20.6	10.4	
Effective Green, g (s)	56.7	56.7	56.7	44.1	44.1		16.0	8.1		20.6	10.4	
Actuated g/C Ratio	0.63	0.63	0.63	0.49	0.49		0.18	0.09		0.23	0.12	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	525	1185	1004	516	873		237	152		317	190	
v/s Ratio Prot	c0.05	0.18			c0.27		0.05	0.03		c0.07	0.05	
v/s Ratio Perm	0.22		0.05	0.07			0.05			c0.08		
v/c Ratio	0.42	0.29	0.09	0.15	0.55		0.55	0.32		0.65	0.44	
Uniform Delay, d1	8.6	7.5	6.5	12.6	16.0		32.9	38.4		30.3	37.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.6	0.2	0.6	2.5		2.6	1.2		4.8	1.6	
Delay (s)	9.1	8.1	6.7	13.2	18.5		35.5	39.6		35.1	38.7	
Level of Service	A	A	A	B	B		D	D		D	D	
Approach Delay (s)		8.2			17.8			37.4			37.1	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy & North Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	4	50	25	4	25	55	105	25	25	110	85
Future Volume (vph)	80	4	50	25	4	25	55	105	25	25	110	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.950			0.937			0.971			0.935	
Flt Protected		0.971			0.977		0.950			0.950		
Satd. Flow (prot)	0	1718	0	0	1705	0	1770	1809	0	1770	1742	0
Flt Permitted		0.971			0.977		0.950			0.950		
Satd. Flow (perm)	0	1718	0	0	1705	0	1770	1809	0	1770	1742	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	4	54	27	4	27	60	114	27	27	120	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	145	0	0	58	0	60	141	0	27	212	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.2%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy & North Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	4	50	25	4	25	55	105	25	25	110	85
Future Volume (Veh/h)	80	4	50	25	4	25	55	105	25	25	110	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	4	54	27	4	27	60	114	27	27	120	92
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	483	481	166	478	514	128	212			141		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	483	481	166	478	514	128	212			141		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	81	99	94	94	99	97	96			98		
cM capacity (veh/h)	454	454	878	442	436	923	1358			1442		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	145	58	60	141	27	212
Volume Left	87	27	60	0	27	0
Volume Right	54	27	0	27	0	92
cSH	553	583	1358	1700	1442	1700
Volume to Capacity	0.26	0.10	0.04	0.08	0.02	0.12
Queue Length 95th (m)	8.4	2.6	1.1	0.0	0.5	0.0
Control Delay (s)	13.8	11.9	7.8	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.8	11.9	2.3		0.9	
Approach LOS	B	B				

Intersection Summary

Average Delay	5.2		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy & South Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	4	90	25	4	25	95	80	20	25	75	85
Future Volume (vph)	80	4	90	25	4	25	95	80	20	25	75	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.930			0.937			0.970			0.921	
Flt Protected		0.978			0.977		0.950			0.950		
Satd. Flow (prot)	0	1694	0	0	1705	0	1770	1807	0	1770	1716	0
Flt Permitted		0.978			0.977		0.950			0.950		
Satd. Flow (perm)	0	1694	0	0	1705	0	1770	1807	0	1770	1716	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	4	98	27	4	27	103	87	22	27	82	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	189	0	0	58	0	103	109	0	27	174	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.2%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy & South Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	4	90	25	4	25	95	80	20	25	75	85
Future Volume (Veh/h)	80	4	90	25	4	25	95	80	20	25	75	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	4	98	27	4	27	103	87	22	27	82	92
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	504	497	128	540	532	98	174			109		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	504	497	128	540	532	98	174			109		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	99	89	93	99	97	93			98		
cM capacity (veh/h)	430	432	922	374	412	958	1403			1481		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	189	58	103	109	27	174
Volume Left	87	27	103	0	27	0
Volume Right	98	27	0	22	0	92
cSH	594	527	1403	1700	1481	1700
Volume to Capacity	0.32	0.11	0.07	0.06	0.02	0.10
Queue Length 95th (m)	10.9	3.0	1.9	0.0	0.4	0.0
Control Delay (s)	13.9	12.7	7.8	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.9	12.7	3.8		1.0	
Approach LOS	B	B				

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	245	35	50	245	65	79
Future Volume (vph)	245	35	50	245	65	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		60.0	0.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt		0.850	0.875			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1615	3082	0	1805	3610
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1615	3082	0	1805	3610
Link Speed (k/h)	50		50			50
Link Distance (m)	538.7		138.7			117.5
Travel Time (s)	38.8		10.0			8.5
Confl. Peds. (#/hr)	7			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	3%	0%	0%
Adj. Flow (vph)	266	38	54	266	71	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	266	38	320	0	71	86
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.7%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	245	35	50	245	65	79
Future Volume (Veh/h)	245	35	50	245	65	79
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	266	38	54	266	71	86
Pedestrians	1		7			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	0		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			139			
pX, platoon unblocked						
vC, conflicting volume	380	161			321	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	380	161			321	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	52	96			94	
cM capacity (veh/h)	557	861			1249	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	266	38	36	284	71	43	43
Volume Left	266	0	0	0	71	0	0
Volume Right	0	38	0	266	0	0	0
cSH	557	861	1700	1700	1249	1700	1700
Volume to Capacity	0.48	0.04	0.02	0.17	0.06	0.03	0.03
Queue Length 95th (m)	20.5	1.1	0.0	0.0	1.4	0.0	0.0
Control Delay (s)	17.2	9.4	0.0	0.0	8.1	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	16.2		0.0		3.6		
Approach LOS	C						

Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	255	75	155	265	60	125
Future Volume (vph)	255	75	155	265	60	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		60.0	0.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt		0.850	0.905			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1615	3247	0	1805	3610
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1615	3247	0	1805	3610
Link Speed (k/h)	50		50			50
Link Distance (m)	538.7		138.7			117.5
Travel Time (s)	38.8		10.0			8.5
Confl. Peds. (#/hr)	1					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	277	82	168	288	65	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	82	456	0	65	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.3%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	255	75	155	265	60	125
Future Volume (Veh/h)	255	75	155	265	60	125
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	277	82	168	288	65	136
Pedestrians			1			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			139			
pX, platoon unblocked						
vC, conflicting volume	511	228			456	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	511	228			456	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	40	89			94	
cM capacity (veh/h)	463	781			1115	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	277	82	112	344	65	68	68
Volume Left	277	0	0	0	65	0	0
Volume Right	0	82	0	288	0	0	0
cSH	463	781	1700	1700	1115	1700	1700
Volume to Capacity	0.60	0.11	0.07	0.20	0.06	0.04	0.04
Queue Length 95th (m)	30.7	2.8	0.0	0.0	1.5	0.0	0.0
Control Delay (s)	23.7	10.2	0.0	0.0	8.4	0.0	0.0
Lane LOS	C	B			A		
Approach Delay (s)	20.6		0.0		2.7		
Approach LOS	C						

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	165	70	140	155	70	140
Future Volume (vph)	165	70	140	155	70	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		60.0	0.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt		0.850	0.921			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1615	3307	0	1805	3610
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1615	3307	0	1805	3610
Link Speed (k/h)	50		50			50
Link Distance (m)	538.7		138.7			117.5
Travel Time (s)	38.8		10.0			8.5
Confl. Peds. (#/hr)	1					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	179	76	152	168	76	152
Shared Lane Traffic (%)						
Lane Group Flow (vph)	179	76	320	0	76	152
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.9%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	165	70	140	155	70	140
Future Volume (Veh/h)	165	70	140	155	70	140
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	179	76	152	168	76	152
Pedestrians			1			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			139			
pX, platoon unblocked						
vC, conflicting volume	465	160			320	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	465	160			320	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	64	91			94	
cM capacity (veh/h)	494	863			1251	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	179	76	101	219	76	76	76
Volume Left	179	0	0	0	76	0	0
Volume Right	0	76	0	168	0	0	0
cSH	494	863	1700	1700	1251	1700	1700
Volume to Capacity	0.36	0.09	0.06	0.13	0.06	0.04	0.04
Queue Length 95th (m)	13.1	2.3	0.0	0.0	1.5	0.0	0.0
Control Delay (s)	16.4	9.6	0.0	0.0	8.1	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	14.4		0.0		2.7		
Approach LOS	B						

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	800	0	110	520	0	180	570	0	60	530	0
Future Volume (vph)	115	800	0	110	520	0	180	570	0	60	530	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3471	0	1703	3438	0	1752	3539	0	1703	3505	0
Flt Permitted	0.340			0.153			0.264			0.351		
Satd. Flow (perm)	638	3471	0	274	3438	0	485	3539	0	622	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Adj. Flow (vph)	129	899	0	124	584	0	202	640	0	67	596	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	899	0	124	584	0	202	640	0	67	596	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

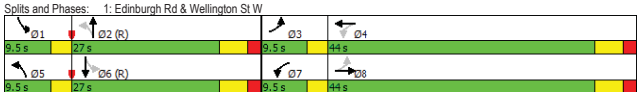
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	39.4	29.9		39.4	29.9		41.0	30.1		35.3	25.1	
Actuated g/C Ratio	0.44	0.33		0.44	0.33		0.46	0.33		0.39	0.28	
v/c Ratio	0.36	0.78		0.56	0.51		0.55	0.54		0.20	0.61	
Control Delay	15.4	31.9		22.4	25.2		24.0	28.7		12.3	28.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.4	31.9		22.4	25.2		24.0	28.7		12.3	28.2	
LOS	B	C		C	C		C	C		B	C	
Approach Delay		29.8			24.7			27.5			26.6	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 27.5		Intersection LOS: C	
Intersection Capacity Utilization 69.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	129	899	124	584	202	640	67	596
v/c Ratio	0.36	0.78	0.56	0.51	0.55	0.54	0.20	0.61
Control Delay	15.4	31.9	22.4	25.2	24.0	28.7	12.3	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	31.9	22.4	25.2	24.0	28.7	12.3	28.2
Queue Length 50th (m)	12.9	76.8	12.4	44.5	21.5	51.0	4.4	54.2
Queue Length 95th (m)	19.5	86.9	19.1	52.7	#47.2	76.6	8.5	73.2
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	362	1465	223	1451	369	1184	334	978
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.61	0.56	0.40	0.55	0.54	0.20	0.61

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	800	0	110	520	0	180	570	0	60	530	0
Future Volume (vph)	115	800	0	110	520	0	180	570	0	60	530	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1786	3471		1703	3438		1751	3539		1695	3505	
Flt Permitted	0.34	1.00		0.15	1.00		0.26	1.00		0.35	1.00	
Satd. Flow (perm)	639	3471		275	3438		487	3539		627	3505	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	129	899	0	124	584	0	202	640	0	67	596	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	129	899	0	124	584	0	202	640	0	67	596	0
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	36.4	29.9		36.4	29.9		38.6	29.5		31.2	25.1	
Effective Green, g (s)	36.4	29.9		36.4	29.9		38.6	29.5		31.2	25.1	
Actuated g/C Ratio	0.40	0.33		0.40	0.33		0.43	0.33		0.35	0.28	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	341	1153		214	1142		356	1160		289	977	
v/s Ratio Prot	0.03	c0.26		c0.04	0.17		c0.07	0.18		0.02	0.17	
v/s Ratio Perm	0.13			0.19			c0.18			0.06		
v/c Ratio	0.38	0.78		0.58	0.51		0.57	0.55		0.23	0.61	
Uniform Delay, d1	17.5	27.1		18.9	24.2		17.4	24.8		20.1	28.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.69	0.86	
Incremental Delay, d2	0.7	3.4		3.8	0.4		2.1	1.9		0.4	2.6	
Delay (s)	18.2	30.5		22.7	24.6		19.5	26.7		14.2	26.9	
Level of Service	B	C		C	C		B	C		B	C	
Approach Delay (s)		28.9			24.2			25.0			25.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	880	0	0	755	5	190	85	230	1	0	255
Future Volume (vph)	160	880	0	0	755	5	190	85	230	1	0	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.999				0.850			0.850
Flt Protected	0.950						0.950	0.981		0.950		
Satd. Flow (prot)	1736	4988	0	0	4983	0	1633	1726	1599	1805	0	1583
Flt Permitted	0.253						0.950	0.981		0.635		
Satd. Flow (perm)	462	4988	0	0	4983	0	1633	1726	1599	1206	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				117			280
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Adj. Flow (vph)	176	967	0	0	830	5	209	93	253	1	0	280
Shared Lane Traffic (%)							29%					
Lane Group Flow (vph)	176	967	0	0	835	0	148	154	253	1	0	280
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	47.5	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	47.5	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	37.2%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	4.5	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	3.0	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	33.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

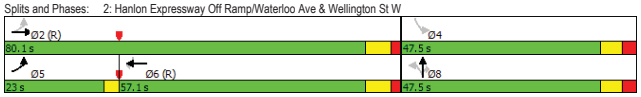
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.31	0.31		0.39
v/c Ratio	0.37	0.34			0.43		0.29	0.28	0.44	0.00		0.35
Control Delay	13.5	14.9			29.2		35.0	34.8	20.7	30.0		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	13.5	14.9			29.2		35.0	34.8	20.7	30.0		4.2
LOS	B	B			C		D	C	C	C		A
Approach Delay		14.7			29.2			28.5			4.3	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 20.7 — Intersection LOS: C
Intersection Capacity Utilization 63.9% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	176	967	835	148	154	253	1	280
v/c Ratio	0.37	0.34	0.43	0.29	0.28	0.44	0.00	0.35
Control Delay	13.5	14.9	29.2	35.0	34.8	20.7	30.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	14.9	29.2	35.0	34.8	20.7	30.0	4.2
Queue Length 50th (m)	19.3	47.5	58.4	31.0	32.3	27.5	0.2	0.0
Queue Length 95th (m)	30.7	56.8	70.9	50.8	52.2	52.9	1.7	17.5
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	478	2853	1953	511	541	581	378	790
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.34	0.43	0.29	0.28	0.44	0.00	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	880	0	0	755	5	190	85	230	1	0	255
Future Volume (vph)	160	880	0	0	755	5	190	85	230	1	0	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1735	4988			4984		1633	1725	1599	1805		1583
Flt Permitted	0.25	1.00			1.00		0.95	0.98	1.00	0.64		1.00
Satd. Flow (perm)	462	4988			4984		1633	1725	1599	1207		1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	176	967	0	0	830	5	209	93	253	1	0	280
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	80	0	0	170
Lane Group Flow (vph)	176	967	0	0	834	0	148	154	173	1	0	110
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.31	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Grp Cap (vph)	463	2853			1952		511	540	501	378		620
v/s Ratio Prot	c0.06	0.19			c0.17							
v/s Ratio Perm	0.16						0.09	0.09	c0.11	0.00		0.07
v/c Ratio	0.38	0.34			0.43		0.29	0.29	0.34	0.00		0.18
Uniform Delay, d1	13.8	14.5			28.3		33.1	33.0	33.7	30.1		25.4
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.4	0.3			0.7		1.4	1.3	1.9	0.0		0.6
Delay (s)	16.1	14.8			29.0		34.5	34.3	35.6	30.1		26.0
Level of Service	B	B			C		C	C	D	C		C
Approach Delay (s)		15.0			29.0			35.0			26.0	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	930	455	0	845	0	0	0	0	180	0	90
Future Volume (vph)	0	930	455	0	845	0	0	0	0	180	0	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.951										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4698	0	0	4988	0	0	0	0	3242	0	1455
Flt Permitted										0.950		
Satd. Flow (perm)	0	4698	0	0	4988	0	0	0	0	3242	0	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		182										95
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	1					1						
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
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Adj. Flow (vph)	0	979	479	0	889	0	0	0	0	189	0	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1458	0	0	889	0	0	0	0	189	0	95
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			29.9					24.7		29.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		0.0			7.0					0.0		7.0
Flash Dont Walk (s)		0.0			16.0					0.0		16.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.59			0.35					0.16		0.12

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

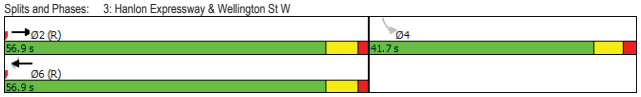
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		15.8			15.1					22.3		3.1
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		15.8			15.1					22.3		3.1
LOS		B			B					C		A
Approach Delay		15.8			15.1						15.9	
Approach LOS		B			B						B	

Intersection Summary

Area Type:	Other		
Cycle Length: 98.6			
Actuated Cycle Length: 98.6			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 15.6		Intersection LOS: B	
Intersection Capacity Utilization 42.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1458	889	189	95
v/c Ratio	0.59	0.35	0.16	0.12
Control Delay	15.8	15.1	22.3	3.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.8	15.1	22.3	3.1
Queue Length 50th (m)	62.8	37.5	13.2	0.0
Queue Length 95th (m)	77.5	47.1	21.2	7.8
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2472	2529	1150	784
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.59	0.35	0.16	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	930	455	0	845	0	0	0	0	180	0	90
Future Volume (vph)	0	930	455	0	845	0	0	0	0	180	0	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4697			4988					3242		1455
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4697			4988					3242		1455
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)	0	979	479	0	889	0	0	0	0	189	0	95
RTOR Reduction (vph)	0	90	0	0	0	0	0	0	0	0	0	47
Lane Group Flow (vph)	0	1368	0	0	889	0	0	0	0	189	0	48
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2381			2529					1150		737
v/s Ratio Prot		c0.29			0.18							
v/s Ratio Perm										c0.06		0.03
v/c Ratio		0.57			0.35					0.16		0.07
Uniform Delay, d1		16.9			14.6					21.8		12.4
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		1.0			0.4					0.3		0.2
Delay (s)		17.9			15.0					22.1		12.6
Level of Service		B			B					C		B
Approach Delay (s)		17.9			15.0			0.0			18.9	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	935	665	170	430	70
Future Volume (vph)	60	935	665	170	430	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	1.00			
Frt			0.969			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3397	3311	0	1770	1599
Flt Permitted		0.832			0.950	
Satd. Flow (perm)	0	2835	3311	0	1770	1599
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			55			73
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Adj. Flow (vph)	63	974	693	177	448	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1037	870	0	448	73
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

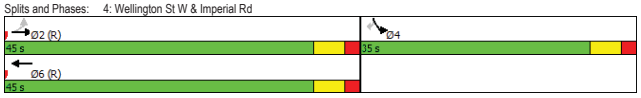
06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	-1.0
Total Lost Time (s)		6.0	6.0		6.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		43.5	43.5		24.5	25.5
Actuated g/C Ratio		0.54	0.54		0.31	0.32
v/c Ratio		0.67	0.48		0.83	0.13
Control Delay		16.9	12.3		39.1	5.1
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.9	12.3		39.1	5.1
LOS		B	B		D	A
Approach Delay		16.9	12.3		34.4	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 90.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1037	870	448	73
v/c Ratio	0.67	0.48	0.83	0.13
Control Delay	16.9	12.3	39.1	5.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.9	12.3	39.1	5.1
Queue Length 50th (m)	60.1	40.1	64.9	0.0
Queue Length 95th (m)	91.9	61.3	94.0	7.9
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1543	1827	641	645
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.67	0.48	0.70	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	935	665	170	430	70
Future Volume (vph)	60	935	665	170	430	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.97		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3397	3312		1770	1599
Flt Permitted		0.83	1.00		0.95	1.00
Satd. Flow (perm)		2836	3312		1770	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	974	693	177	448	73
RTOR Reduction (vph)	0	0	25	0	0	50
Lane Group Flow (vph)	0	1037	845	0	448	23
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		43.5	43.5		24.5	24.5
Effective Green, g (s)		43.5	43.5		24.5	25.5
Actuated g/C Ratio		0.54	0.54		0.31	0.32
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1542	1800		542	509
v/s Ratio Prot			0.26		c0.25	
v/s Ratio Perm		c0.37				0.01
v/c Ratio		0.67	0.47		0.83	0.05
Uniform Delay, d1		13.1	11.2		25.8	18.8
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.4	0.9		10.0	0.0
Delay (s)		15.5	12.1		35.8	18.9
Level of Service		B	B		D	B
Approach Delay (s)		15.5	12.1		33.4	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	325	0	170	195	30	165	1340	0	25	1005	45
Future Volume (vph)	95	325	0	170	195	30	165	1340	0	25	1005	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Frt					0.980							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	3438	0	1787	3459	0	3303	3343	0	1597	3282	1482
Flt Permitted	0.608			0.311			0.950			0.950		
Satd. Flow (perm)	1080	3438	0	585	3459	0	3303	3343	0	1597	3282	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					9							102
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Adj. Flow (vph)	97	332	0	173	199	31	168	1367	0	26	1026	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	332	0	173	230	0	168	1367	0	26	1026	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

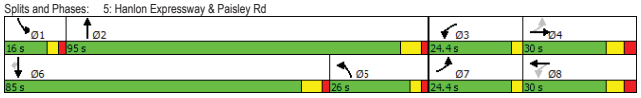
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	59.4	59.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	36.2	19.0		43.7	23.5		15.5	90.4		8.0	78.0	78.0
Actuated g/C Ratio	0.24	0.12		0.29	0.15		0.10	0.59		0.05	0.51	0.51
v/c Ratio	0.32	0.78		0.58	0.43		0.50	0.69		0.31	0.61	0.06
Control Delay	44.7	78.8		51.5	59.5		71.0	26.2		82.6	30.1	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	44.7	78.8		51.5	59.5		71.0	26.2		82.6	30.1	0.1
LOS	D	E		D	E		E	C		F	C	A
Approach Delay		71.1			56.1			31.1			30.1	
Approach LOS		E			E			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 152.7			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 38.6		Intersection LOS: D	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	97	332	173	230	168	1367	26	1026	46
v/c Ratio	0.32	0.78	0.58	0.43	0.50	0.69	0.31	0.61	0.06
Control Delay	44.7	78.8	51.5	59.5	71.0	26.2	82.6	30.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.7	78.8	51.5	59.5	71.0	26.2	82.6	30.1	0.1
Queue Length 50th (m)	24.0	56.0	44.7	34.6	26.9	170.5	8.4	127.5	0.0
Queue Length 95th (m)	41.3	78.0	68.8	51.5	41.0	224.8	20.2	168.2	0.0
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	388	498	336	566	456	1978	115	1677	807
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.67	0.51	0.41	0.37	0.69	0.23	0.61	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	325	0	170	195	30	165	1340	0	25	1005	45
Future Volume (vph)	95	325	0	170	195	30	165	1340	0	25	1005	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1687	3438		1787	3459		3303	3343		1597	3282	1482
Flt Permitted	0.61	1.00		0.31	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1080	3438		585	3459		3303	3343		1597	3282	1482
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	332	0	173	199	31	168	1367	0	26	1026	46
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	0	0	0	23
Lane Group Flow (vph)	97	332	0	173	222	0	168	1367	0	26	1026	23
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	31.2	19.0		38.7	23.5		17.7	90.4		5.3	78.0	78.0
Effective Green, g (s)	31.2	19.0		38.7	23.5		17.7	90.4		5.3	78.0	78.0
Actuated g/C Ratio	0.20	0.12		0.25	0.15		0.11	0.58		0.03	0.50	0.50
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	265	421		275	525		377	1952		54	1653	746
v/s Ratio Prot	0.03	c0.10		c0.07	0.06		0.05	c0.41		0.02	c0.31	
v/s Ratio Perm	0.04			0.09								0.02
v/c Ratio	0.37	0.79		0.63	0.42		0.45	0.70		0.48	0.62	0.03
Uniform Delay, d1	52.4	65.9		48.6	59.5		64.0	22.7		73.4	27.7	19.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	9.5		4.5	0.6		0.8	2.1		6.6	1.8	0.1
Delay (s)	53.2	75.4		53.0	60.1		64.8	24.8		80.0	29.5	19.4
Level of Service	D	E		D	E		E	C		F	C	B
Approach Delay (s)		70.4			57.0			29.2			30.3	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	154.8	Sum of lost time (s)	23.4
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	230	45	75	125	25	20	560	95	45	475	35
Future Volume (vph)	55	230	45	75	125	25	20	560	95	45	475	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		0.99	0.99		1.00	1.00	
Frt		0.975			0.975			0.978			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1779	0	1752	1786	0	1805	1818	0	1770	1842	0
Flt Permitted	0.624			0.357			0.390			0.290		
Satd. Flow (perm)	1153	1779	0	652	1786	0	737	1818	0	539	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			17			10			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	60	250	49	82	136	27	22	609	103	49	516	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	299	0	82	163	0	22	712	0	49	554	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

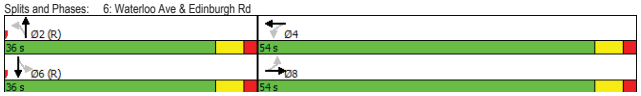
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.5	20.5		20.5	20.5		57.5	57.5		57.5	57.5	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.64	0.64		0.64	0.64	
v/c Ratio	0.23	0.72		0.55	0.39		0.05	0.61		0.14	0.47	
Control Delay	28.1	39.3		43.6	27.5		19.6	29.7		9.7	11.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.1	39.3		43.6	27.5		19.6	29.7		9.7	11.1	
LOS	C	D		D	C		B	C		A	B	
Approach Delay		37.4			32.9			29.4			11.0	
Approach LOS		D			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 25.6		Intersection LOS: C	
Intersection Capacity Utilization 72.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	60	299	82	163	22	712	49	554
v/c Ratio	0.23	0.72	0.55	0.39	0.05	0.61	0.14	0.47
Control Delay	28.1	39.3	43.6	27.5	19.6	29.7	9.7	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	39.3	43.6	27.5	19.6	29.7	9.7	11.1
Queue Length 50th (m)	9.0	47.7	13.3	22.5	1.6	89.5	3.2	46.2
Queue Length 95th (m)	17.7	67.3	25.8	35.9	m6.9	155.5	10.6	89.7
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	614	956	347	960	470	1165	344	1178
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.31	0.24	0.17	0.05	0.61	0.14	0.47

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	230	45	75	125	25	20	560	95	45	475	35
Future Volume (vph)	55	230	45	75	125	25	20	560	95	45	475	35
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		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)	1755	1780		1738	1786		1793	1818		1762	1841	
Flt Permitted	0.62	1.00		0.36	1.00		0.39	1.00		0.29	1.00	
Satd. Flow (perm)	1154	1780		652	1786		736	1818		537	1841	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	250	49	82	136	27	22	609	103	49	516	38
RTOR Reduction (vph)	0	13	0	0	13	0	0	4	0	0	1	0
Lane Group Flow (vph)	60	286	0	82	150	0	22	708	0	49	553	0
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.5	20.5		20.5	20.5		57.5	57.5		57.5	57.5	
Effective Green, g (s)	20.5	20.5		20.5	20.5		57.5	57.5		57.5	57.5	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.64	0.64		0.64	0.64	
Clearance Time (s)	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	
Lane Grp Cap (vph)	262	405		148	406		470	1161		343	1176	
v/s Ratio Prot		c0.16			0.08			c0.39			0.30	
v/s Ratio Perm	0.05			0.13			0.03			0.09		
v/c Ratio	0.23	0.71		0.55	0.37		0.05	0.61		0.14	0.47	
Uniform Delay, d1	28.3	32.0		30.7	29.3		6.0	9.6		6.5	8.4	
Progression Factor	1.00	1.00		1.00	1.00		2.36	2.44		1.00	1.00	
Incremental Delay, d2	0.4	5.5		4.4	0.6		0.2	2.1		0.9	1.3	
Delay (s)	28.8	37.5		35.1	29.9		14.5	25.6		7.3	9.7	
Level of Service	C	D		D	C		B	C		A	A	
Approach Delay (s)		36.0			31.6			25.3			9.5	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	4	250	5	5	250
Future Volume (vph)	10	4	250	5	5	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1568
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1568
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		7	7			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	3%
Adj. Flow (vph)	11	4	272	5	5	272
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	4	272	5	5	272
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.8%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	4	250	5	5	250
Future Volume (Veh/h)	10	4	250	5	5	250
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	4	272	5	5	272
Pedestrians				1	7	
Lane Width (m)				3.6	3.6	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			22		567	19
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			22		567	19
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			83		99	74
cM capacity (veh/h)			1584		402	1049

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	11	4	272	5	277
Volume Left	0	0	272	0	5
Volume Right	0	4	0	0	272
cSH	1700	1700	1584	1700	1069
Volume to Capacity	0.01	0.00	0.17	0.00	0.26
Queue Length 95th (m)	0.0	0.0	5.0	0.0	8.3
Control Delay (s)	0.0	0.0	7.7	0.0	9.7
Lane LOS			A		A
Approach Delay (s)	0.0		7.6		9.7
Approach LOS					A

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	325	70	50	230	75	75	450	60	95	395	70
Future Volume (vph)	75	325	70	50	230	75	75	450	60	95	395	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.98		0.99	1.00		1.00	0.99	
Frt		0.973			0.963			0.982			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1756	0	1805	1749	0	1770	1824	0	1656	1802	0
Flt Permitted	0.441			0.315			0.372			0.331		
Satd. Flow (perm)	771	1756	0	595	1749	0	685	1824	0	575	1802	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			24			13			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Adj. Flow (vph)	82	353	76	54	250	82	82	489	65	103	429	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	429	0	54	332	0	82	554	0	103	505	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

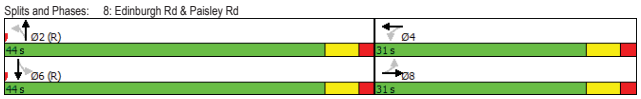
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.32	0.72		0.27	0.55		0.24	0.60		0.35	0.55	
Control Delay	20.9	28.0		22.9	23.1		12.7	16.1		15.5	15.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.9	28.0		22.9	23.1		12.7	16.1		15.5	15.0	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		26.9			23.1			15.6			15.1	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 19.5		Intersection LOS: B	
Intersection Capacity Utilization 78.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	429	54	332	82	554	103	505
v/c Ratio	0.32	0.72	0.27	0.55	0.24	0.60	0.35	0.55
Control Delay	20.9	28.0	22.9	23.1	12.7	16.1	15.5	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	28.0	22.9	23.1	12.7	16.1	15.5	15.0
Queue Length 50th (m)	10.1	60.0	5.8	36.8	6.4	53.3	8.7	46.5
Queue Length 95th (m)	23.3	#98.6	15.3	62.1	15.2	84.0	20.6	73.9
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	257	596	198	599	347	930	291	921
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.72	0.27	0.55	0.24	0.60	0.35	0.55

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	325	70	50	230	75	75	450	60	95	395	70
Future Volume (vph)	75	325	70	50	230	75	75	450	60	95	395	70
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	
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	0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		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)	1661	1757		1794	1749		1750	1825		1650	1803	
Flt Permitted	0.44	1.00		0.31	1.00		0.37	1.00		0.33	1.00	
Satd. Flow (perm)	772	1757		595	1749		685	1825		575	1803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	353	76	54	250	82	82	489	65	103	429	76
RTOR Reduction (vph)	0	11	0	0	16	0	0	6	0	0	8	0
Lane Group Flow (vph)	82	418	0	54	316	0	82	548	0	103	497	0
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	257	585		198	583		347	924		291	913	
v/s Ratio Prot		c0.24			0.18			c0.30			0.28	
v/s Ratio Perm	0.11			0.09			0.12			0.18		
v/c Ratio	0.32	0.72		0.27	0.54		0.24	0.59		0.35	0.54	
Uniform Delay, d1	18.7	21.9		18.3	20.3		10.4	13.0		11.1	12.6	
Progression Factor	0.91	0.97		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	6.6		3.4	3.6		1.6	2.8		3.4	2.3	
Delay (s)	19.9	27.9		21.7	23.9		12.0	15.8		14.5	14.9	
Level of Service	B	C		C	C		B	B		B	B	
Approach Delay (s)		26.6			23.6			15.3			14.8	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	350	1	0	305	150	10	4	5	170	1	130
Future Volume (vph)	205	350	1	0	305	150	10	4	5	170	1	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.98			0.97		0.94	0.98	
Frt					0.956			0.966			0.851	
Flt Protected	0.950							0.973		0.950		
Satd. Flow (prot)	1752	1793	0	0	1723	0	0	1750	0	1770	1518	0
Flt Permitted	0.338									0.744		
Satd. Flow (perm)	617	1793	0	0	1723	0	0	1788	0	1302	1518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					35			5			141	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Adj. Flow (vph)	223	380	1	0	332	163	11	4	5	185	1	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	381	0	0	495	0	0	20	0	185	142	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

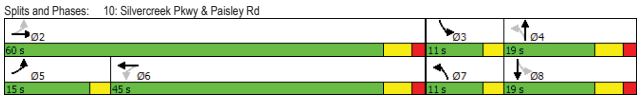
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	15.0	60.0		45.0	45.0		11.0	19.0		11.0	19.0	
Total Split (%)	16.7%	66.7%		50.0%	50.0%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	12.0	54.0		39.0	39.0		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		Min	None		Min	None	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.1	54.1			41.9			8.7		18.4	7.1	
Actuated g/C Ratio	0.70	0.66			0.51			0.11		0.23	0.09	
v/c Ratio	0.40	0.32			0.55			0.10		0.50	0.54	
Control Delay	6.8	7.1			16.2			23.4		32.4	15.0	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	6.8	7.1			16.2			23.4		32.4	15.0	
LOS	A	A			B			C		C	B	
Approach Delay		7.0			16.2			23.4			24.8	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 81.7			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 77.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	223	381	495	20	185	142
v/c Ratio	0.40	0.32	0.55	0.10	0.50	0.54
Control Delay	6.8	7.1	16.2	23.4	32.4	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	7.1	16.2	23.4	32.4	15.0
Queue Length 50th (m)	9.7	21.6	45.0	1.9	26.2	0.2
Queue Length 95th (m)	21.8	43.2	90.9	7.7	45.2	16.5
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	597	1186	900	342	371	360
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.32	0.55	0.06	0.50	0.39

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	350	1	0	305	150	10	4	5	170	1	130
Future Volume (vph)	205	350	1	0	305	150	10	4	5	170	1	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.98			0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00			0.99		0.96	1.00	
Frt	1.00	1.00			0.96			0.97		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1746	1792			1723			1743		1695	1519	
Flt Permitted	0.34	1.00			1.00			1.00		0.74	1.00	
Satd. Flow (perm)	621	1792			1723			1791		1328	1519	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	380	1	0	332	163	11	4	5	185	1	141
RTOR Reduction (vph)	0	0	0	0	18	0	0	5	0	0	123	0
Lane Group Flow (vph)	223	381	0	0	477	0	0	15	0	185	19	0
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.0	54.0			41.9			8.3		19.3	10.8	
Effective Green, g (s)	54.0	54.0			41.9			8.3		19.3	10.8	
Actuated g/C Ratio	0.63	0.63			0.49			0.10		0.23	0.13	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	513	1134			846			171		358	192	
v/s Ratio Prot	c0.05	0.21			c0.28			0.01		c0.08	0.01	
v/s Ratio Perm	0.23							0.00		c0.04		
v/c Ratio	0.43	0.34			0.56			0.09		0.52	0.10	
Uniform Delay, d1	8.0	7.3			15.3			35.1		28.7	32.9	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.8			2.7			0.2		1.3	0.2	
Delay (s)	8.6	8.1			18.0			35.3		29.9	33.2	
Level of Service	A	A			B			D		C	C	
Approach Delay (s)		8.3			18.0			35.3			31.3	
Approach LOS		A			B			D			C	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	85.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary

Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		46.7			66.0			279.7			92.6	
Travel Time (s)		3.4			4.8			20.1			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
13: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	640	0	235	740	0	195	665	0	60	650	0
Future Volume (vph)	115	640	0	235	740	0	195	665	0	60	650	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.215			0.247			0.245			0.363		
Satd. Flow (perm)	408	3539	0	460	3539	0	464	3610	0	673	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	117	653	0	240	755	0	199	679	0	61	663	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	653	0	240	755	0	199	679	0	61	663	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

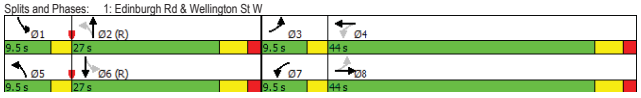
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	34.6	25.1		35.2	27.0		46.4	34.9		38.7	28.5	
Actuated g/C Ratio	0.38	0.28		0.39	0.30		0.52	0.39		0.43	0.32	
v/c Ratio	0.46	0.66		0.88	0.71		0.48	0.49		0.16	0.58	
Control Delay	20.8	31.5		51.3	32.0		17.4	24.5		12.1	24.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.8	31.5		51.3	32.0		17.4	24.5		12.1	24.6	
LOS	C	C		D	C		B	C		B	C	
Approach Delay		29.9			36.6			22.9			23.5	
Approach LOS		C			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 71 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 28.7		Intersection LOS: C	
Intersection Capacity Utilization 76.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	117	653	240	755	199	679	61	663
v/c Ratio	0.46	0.66	0.88	0.71	0.48	0.49	0.16	0.58
Control Delay	20.8	31.5	51.3	32.0	17.4	24.5	12.1	24.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	31.5	51.3	32.0	17.4	24.5	12.1	24.6
Queue Length 50th (m)	12.7	54.5	28.2	65.3	19.0	50.1	4.1	56.0
Queue Length 95th (m)	20.5	65.6	#51.7	77.5	37.2	78.4	m8.5	70.2
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	257	1494	274	1494	416	1399	382	1143
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.44	0.88	0.51	0.48	0.49	0.16	0.58

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	640	0	235	740	0	195	665	0	60	650	0
Future Volume (vph)	115	640	0	235	740	0	195	665	0	60	650	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3539		1769	3539		1804	3610		1766	3610	
Flt Permitted	0.22	1.00		0.25	1.00		0.25	1.00		0.36	1.00	
Satd. Flow (perm)	409	3539		460	3539		466	3610		675	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	117	653	0	240	755	0	199	679	0	61	663	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	117	653	0	240	755	0	199	679	0	61	663	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	30.9	25.7		33.5	27.0		42.8	33.7		34.0	27.9	
Effective Green, g (s)	30.9	25.7		33.5	27.0		42.8	33.7		34.0	27.9	
Actuated g/C Ratio	0.34	0.29		0.37	0.30		0.48	0.37		0.38	0.31	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	221	1010		265	1061		398	1351		328	1119	
v/s Ratio Prot	0.03	0.18		c0.07	0.21		c0.07	0.19		0.01	c0.18	
v/s Ratio Perm	0.15			c0.27			0.17			0.06		
v/c Ratio	0.53	0.65		0.91	0.71		0.50	0.50		0.19	0.59	
Uniform Delay, d1	21.5	28.2		24.4	28.0		15.0	21.7		18.1	26.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.84	0.81	
Incremental Delay, d2	2.3	1.4		31.5	2.3		1.0	1.3		0.2	2.1	
Delay (s)	23.8	29.6		55.8	30.3		16.0	23.0		15.3	23.3	
Level of Service	C	C		E	C		B	C		B	C	
Approach Delay (s)		28.7			36.5			21.4			22.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	785	0	0	1010	10	405	120	145	5	0	265
Future Volume (vph)	160	785	0	0	1010	10	405	120	145	5	0	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.999				0.850			0.850
Flt Protected	0.950						0.950	0.973		0.950		
Satd. Flow (prot)	1787	5136	0	0	5130	0	1698	1747	1599	1805	0	1599
Flt Permitted	0.177						0.950	0.973		0.452		
Satd. Flow (perm)	333	5136	0	0	5130	0	1698	1747	1599	859	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				149			273
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	165	809	0	0	1041	10	418	124	149	5	0	273
Shared Lane Traffic (%)							36%					
Lane Group Flow (vph)	165	809	0	0	1051	0	268	274	149	5	0	273
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	24.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	3.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

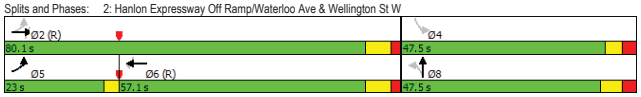
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.32		0.39
v/c Ratio	0.38	0.28			0.52		0.50	0.50	0.15	0.02		0.34
Control Delay	13.8	14.2			30.8		39.7	39.5	2.3	30.0		4.1
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	13.8	14.2			30.8		39.7	39.5	2.3	30.0		4.1
LOS	B	B			C		D	D	A	C		A
Approach Delay		14.1			30.8			31.6			4.6	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 23.1 — Intersection LOS: C
Intersection Capacity Utilization 71.4% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	165	809	1051	268	274	149	5	273
v/c Ratio	0.38	0.28	0.52	0.50	0.50	0.15	0.02	0.34
Control Delay	13.8	14.2	30.8	39.7	39.5	2.3	30.0	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	14.2	30.8	39.7	39.5	2.3	30.0	4.1
Queue Length 50th (m)	18.0	38.0	76.9	60.8	62.0	0.0	0.9	0.0
Queue Length 95th (m)	28.6	46.2	91.3	90.4	91.8	9.2	4.2	17.3
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	429	2938	2010	532	547	978	276	792
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.28	0.52	0.50	0.50	0.15	0.02	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	785	0	0	1010	10	405	120	145	5	0	265
Future Volume (vph)	160	785	0	0	1010	10	405	120	145	5	0	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5128		1698	1747	1599	1805		1599
Flt Permitted	0.18	1.00			1.00		0.95	0.97	1.00	0.45		1.00
Satd. Flow (perm)	332	5136			5128		1698	1747	1599	859		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	165	809	0	0	1041	10	418	124	149	5	0	273
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	64	0	0	166
Lane Group Flow (vph)	165	809	0	0	1050	0	268	274	85	5	0	107
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.32		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Grp Cap (vph)	417	2938			2009		532	547	914	276		626
v/s Ratio Prot	c0.06	0.16			c0.20							
v/s Ratio Perm	0.16						c0.16	0.16	0.05	0.01		0.07
v/c Ratio	0.40	0.28			0.52		0.50	0.50	0.09	0.02		0.17
Uniform Delay, d1	14.6	13.9			29.7		35.7	35.7	12.3	29.6		25.3
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.8	0.2			1.0		3.4	3.3	0.2	0.1		0.6
Delay (s)	17.4	14.1			30.7		39.1	38.9	12.5	29.7		25.9
Level of Service	B	B			C		D	D	B	C		C
Approach Delay (s)		14.7			30.7			33.3			25.9	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	825	505	0	1270	0	0	0	0	190	0	80
Future Volume (vph)	0	825	505	0	1270	0	0	0	0	190	0	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.943										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4813	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4813	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		228										84
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	868	532	0	1337	0	0	0	0	200	0	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1400	0	0	1337	0	0	0	0	200	0	84
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.55			0.51					0.16		0.10

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

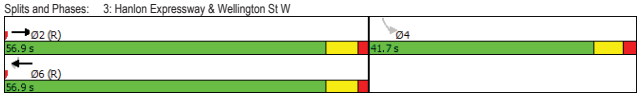
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		14.5			17.1					22.2		3.2
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		14.5			17.1					22.2		3.2
LOS		B			B					C		A
Approach Delay		14.5			17.1						16.6	
Approach LOS		B			B						B	

Intersection Summary

Area Type: Other
Cycle Length: 98.6
Actuated Cycle Length: 98.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 15.8 — Intersection LOS: B
Intersection Capacity Utilization 41.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1400	1337	200	84
v/c Ratio	0.55	0.51	0.16	0.10
Control Delay	14.5	17.1	22.2	3.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.5	17.1	22.2	3.2
Queue Length 50th (m)	55.7	62.7	13.9	0.0
Queue Length 95th (m)	69.3	75.6	22.2	7.4
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2553	2604	1230	814
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.55	0.51	0.16	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	825	505	0	1270	0	0	0	0	190	0	80
Future Volume (vph)	0	825	505	0	1270	0	0	0	0	190	0	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4813			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4813			5136					3467		1524
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)	0	868	532	0	1337	0	0	0	0	200	0	84
RTOR Reduction (vph)	0	112	0	0	0	0	0	0	0	0	0	41
Lane Group Flow (vph)	0	1288	0	0	1337	0	0	0	0	200	0	43
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2440			2604					1230		772
v/s Ratio Prot		c0.27			0.26							
v/s Ratio Perm										c0.06		0.03
v/c Ratio		0.53			0.51					0.16		0.06
Uniform Delay, d1		16.4			16.2					21.8		12.3
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.8			0.7					0.3		0.1
Delay (s)		17.2			16.9					22.1		12.5
Level of Service		B			B					C		B
Approach Delay (s)		17.2			16.9			0.0			19.2	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	905	830	400	360	60
Future Volume (vph)	70	905	830	400	360	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.951			0.850
Flt Protected		0.996			0.950	
Satd. Flow (prot)	0	3562	3342	0	1787	1615
Flt Permitted		0.705			0.950	
Satd. Flow (perm)	0	2522	3342	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			142			62
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Adj. Flow (vph)	72	933	856	412	371	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1005	1268	0	371	62
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

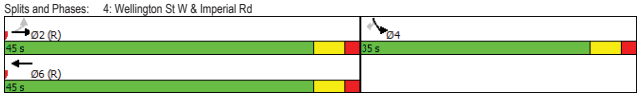
06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		46.2	46.2		21.8	21.8
Actuated g/C Ratio		0.58	0.58		0.27	0.27
v/c Ratio		0.69	0.64		0.76	0.13
Control Delay		16.5	12.7		36.8	6.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.5	12.7		36.8	6.0
LOS		B	B		D	A
Approach Delay		16.5	12.7		32.4	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 17.2		Intersection LOS: B	
Intersection Capacity Utilization 97.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1005	1268	371	62
v/c Ratio	0.69	0.64	0.76	0.13
Control Delay	16.5	12.7	36.8	6.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.5	12.7	36.8	6.0
Queue Length 50th (m)	54.8	57.8	54.0	0.0
Queue Length 95th (m)	96.1	97.7	75.0	7.6
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1456	1990	647	624
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.69	0.64	0.57	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	905	830	400	360	60
Future Volume (vph)	70	905	830	400	360	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3564	3342		1787	1615
Flt Permitted		0.71	1.00		0.95	1.00
Satd. Flow (perm)		2523	3342		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	933	856	412	371	62
RTOR Reduction (vph)	0	0	60	0	0	45
Lane Group Flow (vph)	0	1005	1208	0	371	17
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		46.2	46.2		21.8	21.8
Effective Green, g (s)		46.2	46.2		21.8	21.8
Actuated g/C Ratio		0.58	0.58		0.27	0.27
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1457	1930		486	440
v/s Ratio Prot			0.36		c0.21	
v/s Ratio Perm		c0.40				0.01
v/c Ratio		0.69	0.63		0.76	0.04
Uniform Delay, d1		11.9	11.2		26.7	21.4
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.7	1.5		7.0	0.0
Delay (s)		14.6	12.7		33.7	21.4
Level of Service		B	B		C	C
Approach Delay (s)		14.6	12.7		32.0	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	365	0	235	440	35	410	1130	0	50	1510	135
Future Volume (vph)	120	365	0	235	440	35	410	1130	0	50	1510	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.989							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3567	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.270			0.244			0.950			0.950		
Satd. Flow (perm)	508	3574	0	463	3567	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4							139
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	124	376	0	242	454	36	423	1165	0	52	1557	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	376	0	242	490	0	423	1165	0	52	1557	139
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

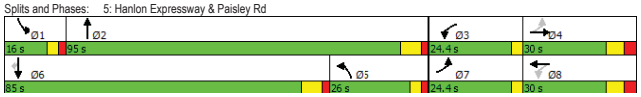
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	13.0	30.0		9.5	30.0		10.0	60.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	39.6	20.6		48.5	26.6		21.0	91.7		9.3	77.7	77.7
Actuated g/C Ratio	0.24	0.13		0.30	0.16		0.13	0.56		0.06	0.48	0.48
v/c Ratio	0.53	0.83		0.80	0.83		0.95	0.61		0.50	0.94	0.16
Control Delay	51.8	85.9		66.2	78.4		100.3	26.8		91.7	52.6	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	51.8	85.9		66.2	78.4		100.3	26.8		91.7	52.6	3.9
LOS	D	F		E	E		F	C		F	D	A
Approach Delay		77.5			74.3			46.4			49.9	
Approach LOS		E			E			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 162.7			
Natural Cycle: 125			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 55.6		Intersection LOS: E	
Intersection Capacity Utilization 97.1%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	124	376	242	490	423	1165	52	1557	139
v/c Ratio	0.53	0.83	0.80	0.83	0.95	0.61	0.50	0.94	0.16
Control Delay	51.8	85.9	66.2	78.4	100.3	26.8	91.7	52.6	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.8	85.9	66.2	78.4	100.3	26.8	91.7	52.6	3.9
Queue Length 50th (m)	32.0	67.5	67.1	85.5	76.3	147.6	17.8	270.3	0.0
Queue Length 95th (m)	50.4	87.5	#99.2	#124.3	#112.0	174.1	33.5	#324.6	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	313	483	314	587	447	1901	122	1656	843
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.78	0.77	0.83	0.95	0.61	0.43	0.94	0.16

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	365	0	235	440	35	410	1130	0	50	1510	135
Future Volume (vph)	120	365	0	235	440	35	410	1130	0	50	1510	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574		1805	3566		3467	3374		1805	3471	1615
Flt Permitted	0.27	1.00		0.24	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	509	3574		464	3566		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	376	0	242	454	36	423	1165	0	52	1557	139
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	73
Lane Group Flow (vph)	124	376	0	242	487	0	423	1165	0	52	1557	66
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	34.6	20.6		43.7	26.7		22.0	91.7		8.0	77.7	77.7
Effective Green, g (s)	34.6	20.6		43.7	26.7		22.0	91.7		8.0	77.7	77.7
Actuated g/C Ratio	0.21	0.13		0.27	0.16		0.13	0.56		0.05	0.47	0.47
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	216	449		288	581		465	1888		88	1646	766
v/s Ratio Prot	0.05	0.11		c0.10	0.14		c0.12	0.35		0.03	c0.45	
v/s Ratio Perm	0.07			c0.12								0.04
v/c Ratio	0.57	0.84		0.84	0.84		0.91	0.62		0.59	0.95	0.09
Uniform Delay, d1	55.0	70.0		51.5	66.4		69.9	24.2		76.3	41.0	23.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.7	12.8		19.3	10.2		21.4	1.5		10.2	12.6	0.2
Delay (s)	58.7	82.8		70.8	76.7		91.4	25.8		86.5	53.7	23.8
Level of Service	E	F		E	E		F	C		F	D	C
Approach Delay (s)		76.8			74.7			43.2			52.3	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	55.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	163.8	Sum of lost time (s)	23.4
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	155	40	90	240	45	40	625	85	50	615	35
Future Volume (vph)	45	155	40	90	240	45	40	625	85	50	615	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.969			0.976			0.982			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1832	0	1805	1856	0	1770	1882	0
Flt Permitted	0.356			0.542			0.320			0.282		
Satd. Flow (perm)	658	1811	0	1023	1832	0	607	1856	0	524	1882	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			16			8			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	46	160	41	93	247	46	41	644	88	52	634	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	201	0	93	293	0	41	732	0	52	670	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

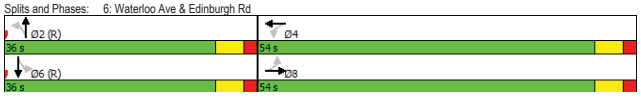
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	19.8	19.8		19.8	19.8		58.2	58.2		58.2	58.2	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65	
v/c Ratio	0.32	0.49		0.42	0.71		0.10	0.61		0.15	0.55	
Control Delay	33.4	30.0		34.2	39.5		7.8	19.4		9.4	12.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.4	30.0		34.2	39.5		7.8	19.4		9.4	12.0	
LOS	C	C		C	D		A	B		A	B	
Approach Delay		30.6			38.2			18.8			11.8	
Approach LOS		C			D			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 21.3		Intersection LOS: C	
Intersection Capacity Utilization 76.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	201	93	293	41	732	52	670
v/c Ratio	0.32	0.49	0.42	0.71	0.10	0.61	0.15	0.55
Control Delay	33.4	30.0	34.2	39.5	7.8	19.4	9.4	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	30.0	34.2	39.5	7.8	19.4	9.4	12.0
Queue Length 50th (m)	7.1	28.5	14.6	46.9	1.5	52.9	3.3	59.1
Queue Length 95th (m)	15.7	44.2	26.4	66.5	m6.0	116.2	10.8	113.4
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	350	976	545	984	393	1203	339	1218
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.21	0.17	0.30	0.10	0.61	0.15	0.55

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	155	40	90	240	45	40	625	85	50	615	35
Future Volume (vph)	45	155	40	90	240	45	40	625	85	50	615	35
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1757	1812		1794	1833		1802	1856		1763	1882	
Flt Permitted	0.36	1.00		0.54	1.00		0.32	1.00		0.28	1.00	
Satd. Flow (perm)	659	1812		1022	1833		606	1856		524	1882	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	160	41	93	247	46	41	644	88	52	634	36
RTOR Reduction (vph)	0	17	0	0	12	0	0	3	0	0	1	0
Lane Group Flow (vph)	46	184	0	93	281	0	41	729	0	52	669	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	19.8	19.8		19.8	19.8		58.2	58.2		58.2	58.2	
Effective Green, g (s)	19.8	19.8		19.8	19.8		58.2	58.2		58.2	58.2	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65	
Clearance Time (s)	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	
Lane Grp Cap (vph)	144	398		224	403		391	1200		338	1217	
v/s Ratio Prot		0.10			c0.15			c0.39			0.36	
v/s Ratio Perm	0.07			0.09			0.07			0.10		
v/c Ratio	0.32	0.46		0.42	0.70		0.10	0.61		0.15	0.55	
Uniform Delay, d1	29.4	30.5		30.1	32.3		6.0	9.3		6.2	8.7	
Progression Factor	1.00	1.00		1.00	1.00		0.91	1.60		1.00	1.00	
Incremental Delay, d2	1.3	0.9		1.2	5.2		0.5	2.0		1.0	1.8	
Delay (s)	30.7	31.3		31.4	37.5		5.9	16.8		7.2	10.5	
Level of Service	C	C		C	D		A	B		A	B	
Approach Delay (s)		31.2			36.0			16.3			10.3	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	10	260	10	20	270
Future Volume (vph)	10	10	260	10	20	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	11	11	283	11	22	293
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	11	283	11	22	293
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.1%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	10	260	10	20	270
Future Volume (Veh/h)	10	10	260	10	20	270
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	283	11	22	293
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			23		589	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			23		589	12
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		94	73
cM capacity (veh/h)			1591		389	1071

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	11	11	283	11	315
Volume Left	0	0	283	0	22
Volume Right	0	11	0	0	293
cSH	1700	1700	1591	1700	1151
Volume to Capacity	0.01	0.01	0.18	0.01	0.27
Queue Length 95th (m)	0.0	0.0	5.2	0.0	8.9
Control Delay (s)	0.0	0.0	7.8	0.0	10.0
Lane LOS			A		A
Approach Delay (s)	0.0		7.5		10.0
Approach LOS					A

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	300	115	55	360	45	105	515	55	100	525	90
Future Volume (vph)	75	300	115	55	360	45	105	515	55	100	525	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.958			0.983			0.986			0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1790	0	1805	1843	0	1805	1865	0	1736	1847	0
Flt Permitted	0.307			0.292			0.244			0.283		
Satd. Flow (perm)	578	1790	0	552	1843	0	462	1865	0	516	1847	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			9			10			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	81	323	124	59	387	48	113	554	59	108	565	97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	81	447	0	59	435	0	113	613	0	108	662	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

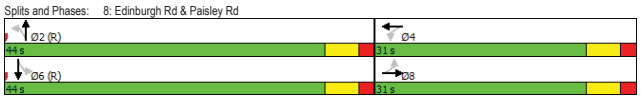
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.42	0.73		0.32	0.70		0.48	0.65		0.41	0.70	
Control Delay	27.1	28.7		24.7	28.5		20.8	17.3		17.7	18.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.1	28.7		24.7	28.5		20.8	17.3		17.7	18.8	
LOS	C	C		C	C		C	B		B	B	
Approach Delay		28.5			28.0			17.8			18.6	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 22.3		Intersection LOS: C	
Intersection Capacity Utilization 86.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	81	447	59	435	113	613	108	662
v/c Ratio	0.42	0.73	0.32	0.70	0.48	0.65	0.41	0.70
Control Delay	27.1	28.7	24.7	28.5	20.8	17.3	17.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	28.7	24.7	28.5	20.8	17.3	17.7	18.8
Queue Length 50th (m)	10.5	61.3	6.5	54.4	10.3	61.8	9.4	69.0
Queue Length 95th (m)	25.5	#100.4	17.0	86.9	26.8	96.5	23.1	108.4
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	192	615	184	620	234	949	261	944
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.73	0.32	0.70	0.48	0.65	0.41	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	300	115	55	360	45	105	515	55	100	525	90
Future Volume (vph)	75	300	115	55	360	45	105	515	55	100	525	90
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	
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	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.99		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)	1790	1791		1795	1844		1799	1864		1732	1847	
Flt Permitted	0.31	1.00		0.29	1.00		0.24	1.00		0.28	1.00	
Satd. Flow (perm)	579	1791		552	1844		463	1864		516	1847	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	81	323	124	59	387	48	113	554	59	108	565	97
RTOR Reduction (vph)	0	19	0	0	6	0	0	5	0	0	8	0
Lane Group Flow (vph)	81	428	0	59	429	0	113	608	0	108	654	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	193	597		184	614		234	944		261	935	
v/s Ratio Prot		c0.24			0.23			0.33			c0.35	
v/s Ratio Perm	0.14			0.11			0.24			0.21		
v/c Ratio	0.42	0.72		0.32	0.70		0.48	0.64		0.41	0.70	
Uniform Delay, d1	19.4	21.9		18.7	21.7		12.1	13.5		11.5	14.1	
Progression Factor	0.99	1.02		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	6.7		4.5	6.5		7.0	3.4		4.8	4.3	
Delay (s)	25.3	29.1		23.2	28.2		19.1	16.9		16.3	18.5	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		28.5			27.6			17.3			18.2	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	285	395	10	5	410	195	2	0	0	215	3	295
Future Volume (vph)	285	395	10	5	410	195	2	0	0	215	3	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			0.99			1.00		0.99	0.99	
Frt		0.996			0.957						0.851	
Flt Protected	0.950							0.950		0.950		
Satd. Flow (prot)	1805	1873	0	0	1792	0	0	1770	0	1787	1594	0
Flt Permitted	0.291				0.997					0.800		
Satd. Flow (perm)	552	1873	0	0	1787	0	0	1861	0	1495	1594	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			33						321	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	310	429	11	5	446	212	2	0	0	234	3	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	310	440	0	0	663	0	0	2	0	234	324	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

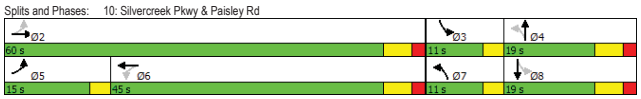
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		2.5	5.0		4.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		7.5	19.0		9.0	19.0	
Total Split (s)	15.0	60.0		45.0	45.0		11.0	19.0		11.0	19.0	
Total Split (%)	16.7%	66.7%		50.0%	50.0%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	12.0	54.0		39.0	39.0		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		Min	None		Min	None	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.1	54.1			40.9			9.0		19.1	7.7	
Actuated g/C Ratio	0.69	0.66			0.50			0.11		0.23	0.09	
v/c Ratio	0.58	0.36			0.73			0.01		0.58	0.74	
Control Delay	9.7	7.7			22.9			26.0		34.1	15.4	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	9.7	7.7			22.9			26.0		34.1	15.4	
LOS	A	A			C			C		C	B	
Approach Delay		8.5			22.9			26.0			23.2	
Approach LOS		A			C			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 82.3			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 17.5		Intersection LOS: B	
Intersection Capacity Utilization 88.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	310	440	663	2	234	324
v/c Ratio	0.58	0.36	0.73	0.01	0.58	0.74
Control Delay	9.7	7.7	22.9	26.0	34.1	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	7.7	22.9	26.0	34.1	15.4
Queue Length 50th (m)	14.2	25.5	73.5	0.3	34.1	0.5
Queue Length 95th (m)	32.4	53.0	#158.1	2.0	56.3	24.5
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	565	1231	903	348	404	522
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.36	0.73	0.01	0.58	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	285	395	10	5	410	195	2	0	0	215	3	295
Future Volume (vph)	285	395	10	5	410	195	2	0	0	215	3	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99			1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00		0.99	1.00	
Frt	1.00	1.00			0.96			1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.95		0.95	1.00	
Satd. Flow (prot)	1804	1874			1791			1767		1778	1595	
Flt Permitted	0.29	1.00			1.00			1.00		0.80	1.00	
Satd. Flow (perm)	553	1874			1786			1860		1497	1595	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	429	11	5	446	212	2	0	0	234	3	321
RTOR Reduction (vph)	0	1	0	0	18	0	0	0	0	0	275	0
Lane Group Flow (vph)	310	439	0	0	645	0	0	2	0	234	49	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.1	54.1			40.9			7.5		21.1	12.6	
Effective Green, g (s)	54.1	54.1			40.9			7.5		21.1	12.6	
Actuated g/C Ratio	0.62	0.62			0.47			0.09		0.24	0.14	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	489	1162			837			154		414	230	
v/s Ratio Prot	c0.07	0.23						0.00		c0.10	0.03	
v/s Ratio Perm	0.32				c0.36			0.00		c0.03		
v/c Ratio	0.63	0.38			0.77			0.01		0.57	0.21	
Uniform Delay, d1	10.3	8.2			19.3			36.5		28.9	32.9	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	2.7	0.9			6.8			0.0		1.8	0.5	
Delay (s)	13.0	9.1			26.1			36.5		30.6	33.4	
Level of Service	B	A			C			D		C	C	
Approach Delay (s)		10.7			26.1			36.5			32.2	
Approach LOS		B			C			D			C	

Intersection Summary

HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary

Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		46.7			34.7			279.7			92.6	
Travel Time (s)		3.4			2.5			20.1			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
13: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	545	0	165	510	0	120	440	0	60	460	0
Future Volume (vph)	75	545	0	165	510	0	120	440	0	60	460	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.349			0.265			0.421			0.492		
Satd. Flow (perm)	661	3539	0	493	3539	0	797	3610	0	910	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	77	556	0	168	520	0	122	449	0	61	469	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	556	0	168	520	0	122	449	0	61	469	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

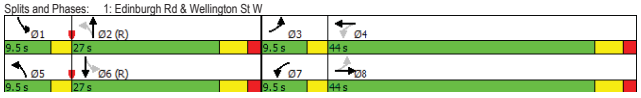
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	29.3	19.9		30.0	21.8		50.5	40.3		47.1	37.1	
Actuated g/C Ratio	0.33	0.22		0.33	0.24		0.56	0.45		0.52	0.41	
v/c Ratio	0.26	0.71		0.66	0.61		0.23	0.28		0.11	0.31	
Control Delay	20.2	37.2		33.1	33.6		10.9	18.0		8.2	18.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.2	37.2		33.1	33.6		10.9	18.0		8.2	18.5	
LOS	C	D		C	C		B	B		A	B	
Approach Delay		35.2			33.4			16.5			17.3	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80.5 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	556	168	520	122	449	61	469
v/c Ratio	0.26	0.71	0.66	0.61	0.23	0.28	0.11	0.31
Control Delay	20.2	37.2	33.1	33.6	10.9	18.0	8.2	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	37.2	33.1	33.6	10.9	18.0	8.2	18.5
Queue Length 50th (m)	9.2	49.5	21.3	45.7	9.4	27.0	3.3	32.4
Queue Length 95th (m)	16.8	61.8	32.9	57.6	20.5	44.6	8.4	51.7
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	298	1494	256	1494	542	1616	547	1489
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.37	0.66	0.35	0.23	0.28	0.11	0.31

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	545	0	165	510	0	120	440	0	60	460	0
Future Volume (vph)	75	545	0	165	510	0	120	440	0	60	460	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3539		1769	3539		1802	3610		1763	3610	
Flt Permitted	0.35	1.00		0.26	1.00		0.42	1.00		0.49	1.00	
Satd. Flow (perm)	663	3539		493	3539		799	3610		914	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	77	556	0	168	520	0	122	449	0	61	469	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	77	556	0	168	520	0	122	449	0	61	469	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.7	20.5		28.3	21.8		47.5	39.1		42.5	36.6	
Effective Green, g (s)	25.7	20.5		28.3	21.8		47.5	39.1		42.5	36.6	
Actuated g/C Ratio	0.29	0.23		0.31	0.24		0.53	0.43		0.47	0.41	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	255	806		247	857		515	1568		487	1468	
v/s Ratio Prot	0.02	0.16		c0.05	0.15		c0.02	0.12		0.01	c0.13	
v/s Ratio Perm	0.07			c0.16			0.10			0.05		
v/c Ratio	0.30	0.69		0.68	0.61		0.24	0.29		0.13	0.32	
Uniform Delay, d1	24.1	31.8		23.9	30.3		10.9	16.4		13.0	18.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.77	0.93	
Incremental Delay, d2	0.7	2.5		7.5	1.2		0.2	0.5		0.1	0.6	
Delay (s)	24.8	34.3		31.4	31.5		11.2	16.9		10.1	17.5	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		33.2			31.5			15.7			16.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	560	0	0	715	10	285	50	160	3	0	165
Future Volume (vph)	90	560	0	0	715	10	285	50	160	3	0	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.998				0.850			0.850
Flt Protected	0.950						0.950	0.966		0.950		
Satd. Flow (prot)	1787	5136	0	0	5125	0	1698	1731	1599	1805	0	1599
Flt Permitted	0.290						0.950	0.966		0.601		
Satd. Flow (perm)	545	5136	0	0	5125	0	1698	1731	1599	1142	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2				165			170
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	93	577	0	0	737	10	294	52	165	3	0	170
Shared Lane Traffic (%)							42%					
Lane Group Flow (vph)	93	577	0	0	747	0	171	175	165	3	0	170
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	47.5	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	47.5	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	37.2%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	4.5	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	3.0	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	33.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

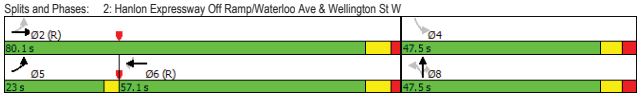
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.31	0.31		0.39
v/c Ratio	0.18	0.20			0.37		0.32	0.32	0.27	0.01		0.23
Control Delay	11.4	13.4			28.2		35.5	35.5	5.8	30.3		4.4
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	11.4	13.4			28.2		35.5	35.5	5.8	30.3		4.4
LOS	B	B			C		D	D	A	C		A
Approach Delay		13.1			28.2			25.9			4.9	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 20.9 — Intersection LOS: C
Intersection Capacity Utilization 60.0% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	93	577	747	171	175	165	3	170
v/c Ratio	0.18	0.20	0.37	0.32	0.32	0.27	0.01	0.23
Control Delay	11.4	13.4	28.2	35.5	35.5	5.8	30.3	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	13.4	28.2	35.5	35.5	5.8	30.3	4.4
Queue Length 50th (m)	9.7	25.7	50.8	36.3	37.1	0.0	0.6	0.0
Queue Length 95th (m)	17.3	32.5	62.4	57.7	58.9	16.1	3.0	14.5
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	523	2938	2009	532	542	614	357	729
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.20	0.37	0.32	0.32	0.27	0.01	0.23

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	560	0	0	715	10	285	50	160	3	0	165
Future Volume (vph)	90	560	0	0	715	10	285	50	160	3	0	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5124		1698	1732	1599	1805		1599
Flt Permitted	0.29	1.00			1.00		0.95	0.97	1.00	0.60		1.00
Satd. Flow (perm)	546	5136			5124		1698	1732	1599	1143		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	93	577	0	0	737	10	294	52	165	3	0	170
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	113	0	0	103
Lane Group Flow (vph)	93	577	0	0	746	0	171	175	52	3	0	67
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.31	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Grp Cap (vph)	506	2938			2007		532	542	501	358		626
v/s Ratio Prot	0.03	c0.11			c0.15							
v/s Ratio Perm	0.08						0.10	0.10	0.03	0.00		0.04
v/c Ratio	0.18	0.20			0.37		0.32	0.32	0.10	0.01		0.11
Uniform Delay, d1	12.8	13.2			27.6		33.4	33.5	31.1	30.1		24.6
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.8	0.1			0.5		1.6	1.6	0.4	0.0		0.3
Delay (s)	13.6	13.3			28.1		35.0	35.0	31.5	30.2		25.0
Level of Service	B	B			C		D	D	C	C		C
Approach Delay (s)		13.3			28.1			33.9			25.1	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	590	385	0	850	0	0	0	0	165	0	135
Future Volume (vph)	0	590	385	0	850	0	0	0	0	165	0	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.941										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4804	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4804	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		372										142
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	621	405	0	895	0	0	0	0	174	0	142
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1026	0	0	895	0	0	0	0	174	0	142
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					24.7		56.9
Total Split (%)		69.7%			69.7%					30.3%		69.7%
Maximum Green (s)		50.0			50.0					18.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
v/c Ratio		0.33			0.28					0.23		0.14

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

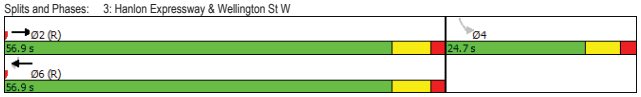
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		4.9			7.7					27.1		1.6
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		4.9			7.7					27.1		1.6
LOS		A			A					C		A
Approach Delay		4.9			7.7						15.6	
Approach LOS		A			A						B	

Intersection Summary

Area Type: Other
Cycle Length: 81.6
Actuated Cycle Length: 81.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.33
Intersection Signal Delay: 7.6 — Intersection LOS: A
Intersection Capacity Utilization 36.3% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1026	895	174	142
v/c Ratio	0.33	0.28	0.23	0.14
Control Delay	4.9	7.7	27.1	1.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.9	7.7	27.1	1.6
Queue Length 50th (m)	15.7	22.6	12.1	0.0
Queue Length 95th (m)	22.0	29.2	20.6	6.3
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	3087	3147	764	988
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.28	0.23	0.14

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	590	385	0	850	0	0	0	0	165	0	135
Future Volume (vph)	0	590	385	0	850	0	0	0	0	165	0	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4803			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4803			5136					3467		1524
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)	0	621	405	0	895	0	0	0	0	174	0	142
RTOR Reduction (vph)	0	144	0	0	0	0	0	0	0	0	0	55
Lane Group Flow (vph)	0	882	0	0	895	0	0	0	0	174	0	87
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					18.0		50.0
Effective Green, g (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2943			3147					764		933
v/s Ratio Prot		c0.18			0.17							
v/s Ratio Perm										c0.05		0.06
v/c Ratio		0.30			0.28					0.23		0.09
Uniform Delay, d1		7.5			7.4					26.1		6.5
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.3			0.2					0.7		0.2
Delay (s)		7.8			7.6					26.8		6.7
Level of Service		A			A					C		A
Approach Delay (s)		7.8			7.6			0.0			17.8	
Approach LOS		A			A			A			B	

Intersection Summary

HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	580	555	300	385	55
Future Volume (vph)	65	580	555	300	385	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.947			0.850
Flt Protected		0.995			0.950	
Satd. Flow (prot)	0	3528	3328	0	1787	1615
Flt Permitted		0.780			0.950	
Satd. Flow (perm)	0	2766	3328	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			175			57
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Adj. Flow (vph)	67	598	572	309	397	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	665	881	0	397	57
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

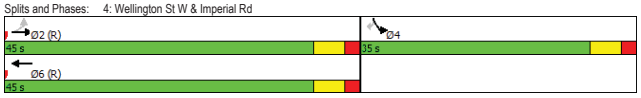
Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		45.3	45.3		22.7	22.7
Actuated g/C Ratio		0.57	0.57		0.28	0.28
v/c Ratio		0.42	0.45		0.78	0.11
Control Delay		12.0	9.5		37.2	5.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		12.0	9.5		37.2	5.9
LOS		B	A		D	A
Approach Delay		12.0	9.5		33.3	
Approach LOS		B	A		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 15.7		Intersection LOS: B	
Intersection Capacity Utilization 79.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	665	881	397	57
v/c Ratio	0.42	0.45	0.78	0.11
Control Delay	12.0	9.5	37.2	5.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.0	9.5	37.2	5.9
Queue Length 50th (m)	29.8	31.1	57.8	0.0
Queue Length 95th (m)	50.6	53.7	80.5	7.2
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1565	1959	647	621
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.42	0.45	0.61	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	580	555	300	385	55
Future Volume (vph)	65	580	555	300	385	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		0.99	1.00		0.95	1.00
Satd. Flow (prot)		3528	3329		1787	1615
Flt Permitted		0.78	1.00		0.95	1.00
Satd. Flow (perm)		2764	3329		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	598	572	309	397	57
RTOR Reduction (vph)	0	0	76	0	0	41
Lane Group Flow (vph)	0	665	805	0	397	16
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		45.3	45.3		22.7	22.7
Effective Green, g (s)		45.3	45.3		22.7	22.7
Actuated g/C Ratio		0.57	0.57		0.28	0.28
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1565	1885		507	458
v/s Ratio Prot			c0.24		c0.22	
v/s Ratio Perm		0.24				0.01
v/c Ratio		0.42	0.43		0.78	0.04
Uniform Delay, d1		9.9	9.9		26.4	20.7
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.8	0.7		7.7	0.0
Delay (s)		10.8	10.6		34.1	20.8
Level of Service		B	B		C	C
Approach Delay (s)		10.8	10.6		32.4	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	300	0	190	315	25	360	1115	0	40	1020	130
Future Volume (vph)	130	300	0	190	315	25	360	1115	0	40	1020	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.989							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3566	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.419			0.329			0.950			0.950		
Satd. Flow (perm)	787	3574	0	624	3566	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4							134
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	134	309	0	196	325	26	371	1149	0	41	1052	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	309	0	196	351	0	371	1149	0	41	1052	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

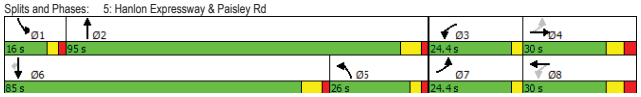
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	38.1	18.5		44.3	22.0		19.9	91.4		8.7	77.8	77.8
Actuated g/C Ratio	0.24	0.12		0.28	0.14		0.13	0.58		0.06	0.49	0.49
v/c Ratio	0.47	0.74		0.63	0.70		0.85	0.59		0.41	0.61	0.16
Control Delay	49.6	79.0		54.9	72.8		86.2	24.5		86.3	32.0	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	49.6	79.0		54.9	72.8		86.2	24.5		86.3	32.0	3.9
LOS	D	E		D	E		F	C		F	C	A
Approach Delay		70.1			66.4			39.6			30.7	
Approach LOS		E			E			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 157.8			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 44.2		Intersection LOS: D	
Intersection Capacity Utilization 77.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	134	309	196	351	371	1149	41	1052	134
v/c Ratio	0.47	0.74	0.63	0.70	0.85	0.59	0.41	0.61	0.16
Control Delay	49.6	79.0	54.9	72.8	86.2	24.5	86.3	32.0	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.6	79.0	54.9	72.8	86.2	24.5	86.3	32.0	3.9
Queue Length 50th (m)	34.8	53.5	52.8	58.8	63.5	132.1	13.6	135.6	0.0
Queue Length 95th (m)	54.4	72.3	77.2	80.3	#91.3	170.6	28.0	169.2	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	352	499	335	532	462	1953	126	1711	864
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.62	0.59	0.66	0.80	0.59	0.33	0.61	0.16

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	300	0	190	315	25	360	1115	0	40	1020	130
Future Volume (vph)	130	300	0	190	315	25	360	1115	0	40	1020	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1786	3574		1804	3566		3467	3374		1805	3471	1615
Flt Permitted	0.42	1.00		0.33	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	789	3574		625	3566		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	309	0	196	325	26	371	1149	0	41	1052	134
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	68
Lane Group Flow (vph)	134	309	0	196	348	0	371	1149	0	41	1052	66
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	33.2	18.5		39.7	22.0		21.1	91.4		7.5	77.8	77.8
Effective Green, g (s)	33.2	18.5		39.7	22.0		21.1	91.4		7.5	77.8	77.8
Actuated g/C Ratio	0.21	0.12		0.25	0.14		0.13	0.57		0.05	0.49	0.49
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	256	415		291	493		460	1939		85	1698	790
v/s Ratio Prot	0.05	0.09		c0.08	c0.10		c0.11	0.34		0.02	c0.30	
v/s Ratio Perm	0.06			0.09								0.04
v/c Ratio	0.52	0.74		0.67	0.70		0.81	0.59		0.48	0.62	0.08
Uniform Delay, d1	53.9	68.0		50.5	65.4		67.0	21.8		73.9	29.8	21.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.9	7.1		6.0	4.6		10.0	1.3		4.3	1.7	0.2
Delay (s)	55.8	75.1		56.6	70.0		76.9	23.1		78.1	31.5	21.8
Level of Service	E	E		E	E		E	C		E	C	C
Approach Delay (s)		69.2			65.2			36.3			32.0	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	43.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	159.0	Sum of lost time (s)	23.4
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	90	25	55	85	40	35	490	65	30	485	20
Future Volume (vph)	45	90	25	55	85	40	35	490	65	30	485	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.967			0.952			0.982			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1807	0	1805	1782	0	1805	1856	0	1770	1887	0
Flt Permitted	0.664			0.681			0.449			0.420		
Satd. Flow (perm)	1224	1807	0	1284	1782	0	851	1856	0	779	1887	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			40			8			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	46	93	26	57	88	41	36	505	67	31	500	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	119	0	57	129	0	36	572	0	31	521	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

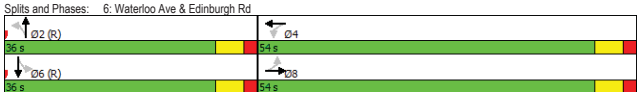
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.3	10.3		10.3	10.3		67.7	67.7		67.7	67.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.75	0.75		0.75	0.75	
v/c Ratio	0.33	0.52		0.39	0.54		0.06	0.41		0.05	0.37	
Control Delay	41.7	37.3		43.5	33.6		3.2	9.2		3.9	5.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.7	37.3		43.5	33.6		3.2	9.2		3.9	5.1	
LOS	D	D		D	C		A	A		A	A	
Approach Delay		38.5			36.7			8.8			5.0	
Approach LOS		D			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 14.1		Intersection LOS: B	
Intersection Capacity Utilization 59.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	119	57	129	36	572	31	521
v/c Ratio	0.33	0.52	0.39	0.54	0.06	0.41	0.05	0.37
Control Delay	41.7	37.3	43.5	33.6	3.2	9.2	3.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	37.3	43.5	33.6	3.2	9.2	3.9	5.1
Queue Length 50th (m)	7.8	16.5	9.8	15.4	1.2	26.9	1.2	25.9
Queue Length 95th (m)	17.6	31.7	20.7	31.4	3.2	80.3	4.1	49.3
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	652	974	684	969	640	1398	586	1420
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.12	0.08	0.13	0.06	0.41	0.05	0.37

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	90	25	55	85	40	35	490	65	30	485	20
Future Volume (vph)	45	90	25	55	85	40	35	490	65	30	485	20
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.98		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)	1751	1807		1791	1783		1800	1857		1760	1887	
Flt Permitted	0.66	1.00		0.68	1.00		0.45	1.00		0.42	1.00	
Satd. Flow (perm)	1224	1807		1283	1783		852	1857		778	1887	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	93	26	57	88	41	36	505	67	31	500	21
RTOR Reduction (vph)	0	21	0	0	35	0	0	2	0	0	1	0
Lane Group Flow (vph)	46	98	0	57	94	0	36	570	0	31	520	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	10.3	10.3		10.3	10.3		67.7	67.7		67.7	67.7	
Effective Green, g (s)	10.3	10.3		10.3	10.3		67.7	67.7		67.7	67.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.75	0.75		0.75	0.75	
Clearance Time (s)	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	
Lane Grp Cap (vph)	140	206		146	204		640	1396		585	1419	
v/s Ratio Prot		c0.05			0.05			c0.31			0.28	
v/s Ratio Perm	0.04			0.04			0.04			0.04		
v/c Ratio	0.33	0.47		0.39	0.46		0.06	0.41		0.05	0.37	
Uniform Delay, d1	36.7	37.3		36.9	37.2		2.9	4.0		2.9	3.8	
Progression Factor	1.00	1.00		1.00	1.00		0.82	1.84		1.00	1.00	
Incremental Delay, d2	1.4	1.7		1.7	1.6		0.2	0.9		0.2	0.7	
Delay (s)	38.0	39.0		38.7	38.9		2.5	8.2		3.0	4.5	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		38.8			38.8			7.9			4.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	4	15	170	5	10	160
Future Volume (vph)	4	15	170	5	10	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	4	16	185	5	11	174
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	16	185	5	11	174
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.1%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	4	15	170	5	10	160
Future Volume (Veh/h)	4	15	170	5	10	160
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	16	185	5	11	174
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			21		380	5
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			21		380	5
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		98	84
cM capacity (veh/h)			1593		553	1080

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	4	16	185	5	185
Volume Left	0	0	185	0	11
Volume Right	0	16	0	0	174
cSH	1700	1700	1593	1700	1148
Volume to Capacity	0.00	0.01	0.12	0.00	0.16
Queue Length 95th (m)	0.0	0.0	3.1	0.0	4.6
Control Delay (s)	0.0	0.0	7.6	0.0	9.1
Lane LOS			A		A
Approach Delay (s)	0.0		7.4		9.1
Approach LOS					A

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	26.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	265	90	35	235	60	105	425	30	55	400	65
Future Volume (vph)	80	265	90	35	235	60	105	425	30	55	400	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.962			0.969			0.990			0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1799	0	1805	1812	0	1805	1875	0	1736	1850	0
Flt Permitted	0.460			0.375			0.376			0.385		
Satd. Flow (perm)	864	1799	0	708	1812	0	711	1875	0	701	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			18			7			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	86	285	97	38	253	65	113	457	32	59	430	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	382	0	38	318	0	113	489	0	59	500	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

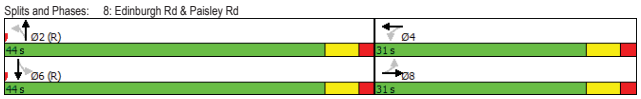
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.30	0.62		0.16	0.52		0.31	0.51		0.17	0.53	
Control Delay	22.1	25.3		19.9	22.5		13.9	14.5		11.5	14.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.1	25.3		19.9	22.5		13.9	14.5		11.5	14.6	
LOS	C	C		B	C		B	B		B	B	
Approach Delay		24.7			22.3			14.4			14.3	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 18.2		Intersection LOS: B	
Intersection Capacity Utilization 76.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	86	382	38	318	113	489	59	500
v/c Ratio	0.30	0.62	0.16	0.52	0.31	0.51	0.17	0.53
Control Delay	22.1	25.3	19.9	22.5	13.9	14.5	11.5	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	25.3	19.9	22.5	13.9	14.5	11.5	14.6
Queue Length 50th (m)	10.6	49.4	3.9	35.3	9.3	44.8	4.5	45.4
Queue Length 95th (m)	23.7	81.0	11.0	59.1	20.7	70.5	11.2	72.1
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	288	616	236	616	360	953	355	945
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.62	0.16	0.52	0.31	0.51	0.17	0.53

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	265	90	35	235	60	105	425	30	55	400	65
Future Volume (vph)	80	265	90	35	235	60	105	425	30	55	400	65
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	
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	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		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)	1785	1799		1793	1813		1797	1876		1731	1850	
Flt Permitted	0.46	1.00		0.38	1.00		0.38	1.00		0.39	1.00	
Satd. Flow (perm)	865	1799		708	1813		711	1876		702	1850	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	285	97	38	253	65	113	457	32	59	430	70
RTOR Reduction (vph)	0	17	0	0	12	0	0	3	0	0	8	0
Lane Group Flow (vph)	86	365	0	38	306	0	113	486	0	59	492	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	288	599		236	604		360	950		355	937	
v/s Ratio Prot		c0.20			0.17			0.26			c0.27	
v/s Ratio Perm	0.10			0.05			0.16			0.08		
v/c Ratio	0.30	0.61		0.16	0.51		0.31	0.51		0.17	0.53	
Uniform Delay, d1	18.5	20.9		17.6	20.1		10.9	12.3		10.0	12.4	
Progression Factor	1.01	1.03		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	4.3		1.5	3.0		2.3	2.0		1.0	2.1	
Delay (s)	21.2	26.0		19.1	23.1		13.1	14.3		11.0	14.5	
Level of Service	C	C		B	C		B	B		B	B	
Approach Delay (s)		25.1			22.6			14.1			14.2	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	325	10	3	315	145	5	4	3	190	5	205
Future Volume (vph)	210	325	10	3	315	145	5	4	3	190	5	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			0.99			0.99		0.99	0.99	
Frt		0.995			0.958			0.966			0.853	
Flt Protected	0.950							0.980		0.950		
Satd. Flow (prot)	1805	1871	0	0	1794	0	0	1772	0	1787	1598	0
Flt Permitted	0.413				0.998					0.930		
Satd. Flow (perm)	783	1871	0	0	1791	0	0	1807	0	1738	1598	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			33			3			223	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	228	353	11	3	342	158	5	4	3	207	5	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	364	0	0	503	0	0	12	0	207	228	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

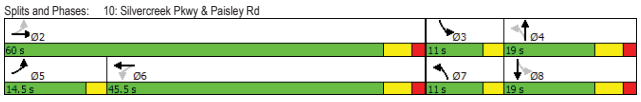
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0		45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%		50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0		39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		None	None	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.2	54.2			43.0			6.0		11.4	8.4	
Actuated g/C Ratio	0.77	0.73			0.58			0.08		0.15	0.11	
v/c Ratio	0.32	0.27			0.48			0.08		0.76	0.60	
Control Delay	4.2	4.7			11.9			31.0		48.6	12.1	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	4.2	4.7			11.9			31.0		48.6	12.1	
LOS	A	A			B			C		D	B	
Approach Delay		4.5			11.9			31.0			29.5	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 74.6			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 78.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	228	364	503	12	207	228
v/c Ratio	0.32	0.27	0.48	0.08	0.76	0.60
Control Delay	4.2	4.7	11.9	31.0	48.6	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	4.7	11.9	31.0	48.6	12.1
Queue Length 50th (m)	5.0	11.7	31.9	1.2	29.7	0.7
Queue Length 95th (m)	20.6	37.7	86.9	6.6	50.5	18.6
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	758	1359	1046	318	271	480
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.27	0.48	0.04	0.76	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	325	10	3	315	145	5	4	3	190	5	205
Future Volume (vph)	210	325	10	3	315	145	5	4	3	190	5	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99			0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00		1.00	1.00	
Frt	1.00	1.00			0.96			0.97		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1804	1872			1794			1771		1778	1599	
Flt Permitted	0.41	1.00			1.00			1.00		0.93	1.00	
Satd. Flow (perm)	784	1872			1791			1808		1741	1599	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	353	11	3	342	158	5	4	3	207	5	223
RTOR Reduction (vph)	0	1	0	0	15	0	0	3	0	0	186	0
Lane Group Flow (vph)	228	363	0	0	488	0	0	9	0	207	42	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.2	54.2			43.0			1.3		13.3	13.3	
Effective Green, g (s)	54.2	54.2			43.0			1.3		13.3	13.3	
Actuated g/C Ratio	0.68	0.68			0.54			0.02		0.17	0.17	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	639	1276			968			29		295	267	
v/s Ratio Prot	c0.04	0.19								c0.08	0.03	
v/s Ratio Perm	0.21				c0.27			0.01		c0.04		
v/c Ratio	0.36	0.28			0.50			0.31		0.70	0.16	
Uniform Delay, d1	5.5	5.0			11.5			38.7		31.2	28.3	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.6			1.9			6.1		7.3	0.3	
Delay (s)	5.9	5.6			13.4			44.7		38.5	28.6	
Level of Service	A	A			B			D		D	C	
Approach Delay (s)		5.7			13.4			44.7			33.3	
Approach LOS		A			B			D			C	

Intersection Summary

HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary

Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		46.7			84.7			279.7			92.6	
Travel Time (s)		3.4			6.1			20.1			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
13: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	815	0	110	530	0	180	580	0	60	545	0
Future Volume (vph)	115	815	0	110	530	0	180	580	0	60	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3471	0	1703	3438	0	1752	3539	0	1703	3505	0
Flt Permitted	0.334			0.149			0.250			0.342		
Satd. Flow (perm)	626	3471	0	267	3438	0	459	3539	0	606	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Adj. Flow (vph)	129	916	0	124	596	0	202	652	0	67	612	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	916	0	124	596	0	202	652	0	67	612	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

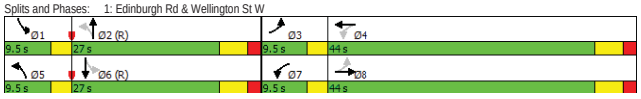
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	39.8	30.3		39.8	30.3		40.6	29.8		34.8	24.7	
Actuated g/C Ratio	0.44	0.34		0.44	0.34		0.45	0.33		0.39	0.27	
v/c Ratio	0.36	0.78		0.56	0.52		0.56	0.56		0.21	0.64	
Control Delay	15.2	31.8		22.4	25.0		25.3	29.2		12.4	28.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.2	31.8		22.4	25.0		25.3	29.2		12.4	28.3	
LOS	B	C		C	C		C	C		B	C	
Approach Delay		29.7			24.6			28.3			26.7	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 27.6		Intersection LOS: C	
Intersection Capacity Utilization 70.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	129	916	124	596	202	652	67	612
v/c Ratio	0.36	0.78	0.56	0.52	0.56	0.56	0.21	0.64
Control Delay	15.2	31.8	22.4	25.0	25.3	29.2	12.4	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	31.8	22.4	25.0	25.3	29.2	12.4	28.3
Queue Length 50th (m)	12.7	78.2	12.3	45.3	21.7	52.5	4.1	56.5
Queue Length 95th (m)	19.3	88.3	18.9	53.4	#43.4	78.3	m8.3	67.5
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	360	1465	221	1451	358	1171	324	960
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.63	0.56	0.41	0.56	0.56	0.21	0.64

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	815	0	110	530	0	180	580	0	60	545	0
Future Volume (vph)	115	815	0	110	530	0	180	580	0	60	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1786	3471		1703	3438		1751	3539		1696	3505	
Flt Permitted	0.33	1.00		0.15	1.00		0.25	1.00		0.34	1.00	
Satd. Flow (perm)	627	3471		266	3438		460	3539		610	3505	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	129	916	0	124	596	0	202	652	0	67	612	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	129	916	0	124	596	0	202	652	0	67	612	0
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	36.8	30.3		36.8	30.3		38.2	29.2		30.7	24.7	
Effective Green, g (s)	36.8	30.3		36.8	30.3		38.2	29.2		30.7	24.7	
Actuated g/C Ratio	0.41	0.34		0.41	0.34		0.42	0.32		0.34	0.27	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	340	1168		212	1157		345	1148		280	961	
v/s Ratio Prot	0.03	c0.26		c0.04	0.17		c0.07	0.18		0.02	0.17	
v/s Ratio Perm	0.13			0.20			c0.18			0.07		
v/c Ratio	0.38	0.78		0.58	0.52		0.59	0.57		0.24	0.64	
Uniform Delay, d1	17.2	26.9		18.8	24.0		17.8	25.2		20.4	28.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.68	0.84	
Incremental Delay, d2	0.7	3.5		4.1	0.4		2.5	2.0		0.4	2.9	
Delay (s)	17.9	30.4		22.8	24.3		20.3	27.2		14.4	27.0	
Level of Service	B	C		C	C		C	C		B	C	
Approach Delay (s)		28.9			24.1			25.6			25.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	880	0	0	755	15	190	100	230	16	0	315
Future Volume (vph)	180	880	0	0	755	15	190	100	230	16	0	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.997				0.850			0.850
Flt Protected	0.950						0.950	0.984		0.950		
Satd. Flow (prot)	1736	4988	0	0	4974	0	1633	1736	1599	1805	0	1583
Flt Permitted	0.249						0.950	0.984		0.622		
Satd. Flow (perm)	455	4988	0	0	4974	0	1633	1736	1599	1182	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3				253			346
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Adj. Flow (vph)	198	967	0	0	830	16	209	110	253	18	0	346
Shared Lane Traffic (%)							25%					
Lane Group Flow (vph)	198	967	0	0	846	0	157	162	253	18	0	346
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

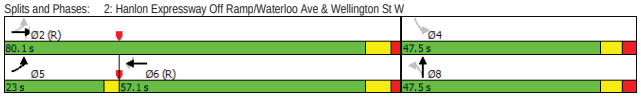
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.31		0.39
v/c Ratio	0.42	0.34			0.43		0.31	0.30	0.25	0.05		0.42
Control Delay	14.1	14.9			29.2		35.3	35.1	2.1	31.2		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	14.1	14.9			29.2		35.3	35.1	2.1	31.2		4.2
LOS	B	B			C		D	D	A	C		A
Approach Delay		14.8			29.2			20.5			5.5	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.43
Intersection Signal Delay: 18.9 — Intersection LOS: B
Intersection Capacity Utilization 68.0% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	198	967	846	157	162	253	18	346
v/c Ratio	0.42	0.34	0.43	0.31	0.30	0.25	0.05	0.42
Control Delay	14.1	14.9	29.2	35.3	35.1	2.1	31.2	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	14.9	29.2	35.3	35.1	2.1	31.2	4.2
Queue Length 50th (m)	22.1	47.5	59.1	33.1	34.1	0.0	3.3	0.0
Queue Length 95th (m)	34.3	56.8	71.8	53.4	54.7	11.5	9.5	19.2
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	475	2853	1950	511	544	1023	370	830
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.34	0.43	0.31	0.30	0.25	0.05	0.42

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	880	0	0	755	15	190	100	230	16	0	315
Future Volume (vph)	180	880	0	0	755	15	190	100	230	16	0	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1735	4988			4975		1633	1737	1599	1805		1583
Flt Permitted	0.25	1.00			1.00		0.95	0.98	1.00	0.62		1.00
Satd. Flow (perm)	454	4988			4975		1633	1737	1599	1182		1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	198	967	0	0	830	16	209	110	253	18	0	346
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	108	0	0	210
Lane Group Flow (vph)	198	967	0	0	844	0	157	162	145	18	0	136
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Grp Cap (vph)	460	2853			1949		511	544	914	370		620
v/s Ratio Prot	c0.07	0.19			0.17							
v/s Ratio Perm	c0.18						c0.10	0.09	0.09	0.02		0.09
v/c Ratio	0.43	0.34			0.43		0.31	0.30	0.16	0.05		0.22
Uniform Delay, d1	14.0	14.5			28.4		33.3	33.2	12.8	30.5		25.8
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.9	0.3			0.7		1.6	1.4	0.4	0.2		0.8
Delay (s)	17.0	14.8			29.1		34.8	34.6	13.2	30.8		26.6
Level of Service	B	B			C		C	C	B	C		C
Approach Delay (s)		15.2			29.1			25.2			26.8	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	960	455	0	875	0	0	0	0	180	0	105
Future Volume (vph)	0	960	455	0	875	0	0	0	0	180	0	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.952										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4703	0	0	4988	0	0	0	0	3242	0	1455
Flt Permitted										0.950		
Satd. Flow (perm)	0	4703	0	0	4988	0	0	0	0	3242	0	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		176										111
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	1					1						
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
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Adj. Flow (vph)	0	1011	479	0	921	0	0	0	0	189	0	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1490	0	0	921	0	0	0	0	189	0	111
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			29.9					24.7		29.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		0.0			7.0					0.0		7.0
Flash Dont Walk (s)		0.0			16.0					0.0		16.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.60			0.36					0.16		0.14

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

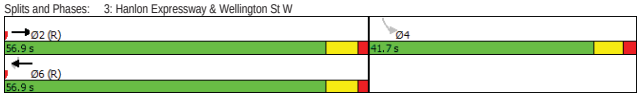
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		16.2			15.2					22.3		3.0
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		16.2			15.2					22.3		3.0
LOS		B			B					C		A
Approach Delay		16.2			15.2						15.1	
Approach LOS		B			B						B	

Intersection Summary

Area Type: Other
Cycle Length: 98.6
Actuated Cycle Length: 98.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 15.7 — Intersection LOS: B
Intersection Capacity Utilization 42.9% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1490	921	189	111
v/c Ratio	0.60	0.36	0.16	0.14
Control Delay	16.2	15.2	22.3	3.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.2	15.2	22.3	3.0
Queue Length 50th (m)	65.3	39.2	13.2	0.0
Queue Length 95th (m)	80.4	48.9	21.2	8.3
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2471	2529	1150	792
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.60	0.36	0.16	0.14

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	960	455	0	875	0	0	0	0	180	0	105
Future Volume (vph)	0	960	455	0	875	0	0	0	0	180	0	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4702			4988					3242		1455
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4702			4988					3242		1455
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)	0	1011	479	0	921	0	0	0	0	189	0	111
RTOR Reduction (vph)	0	87	0	0	0	0	0	0	0	0	0	55
Lane Group Flow (vph)	0	1403	0	0	921	0	0	0	0	189	0	56
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2384			2529					1150		737
v/s Ratio Prot		c0.30			0.18							
v/s Ratio Perm										c0.06		0.04
v/c Ratio		0.59			0.36					0.16		0.08
Uniform Delay, d1		17.1			14.7					21.8		12.5
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		1.1			0.4					0.3		0.2
Delay (s)		18.1			15.1					22.1		12.7
Level of Service		B			B					C		B
Approach Delay (s)		18.1			15.1			0.0			18.6	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	965	710	170	430	70
Future Volume (vph)	60	965	710	170	430	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	1.00			
Frt			0.971			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3397	3318	0	1770	1599
Flt Permitted		0.828			0.950	
Satd. Flow (perm)	0	2821	3318	0	1770	1599
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			51			73
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Adj. Flow (vph)	63	1005	740	177	448	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1068	917	0	448	73
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

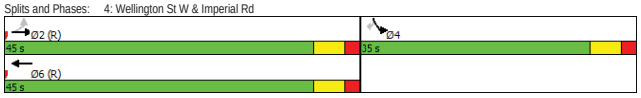
Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	-1.0
Total Lost Time (s)		6.0	6.0		6.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		43.5	43.5		24.5	25.5
Actuated g/C Ratio		0.54	0.54		0.31	0.32
v/c Ratio		0.70	0.50		0.83	0.13
Control Delay		17.5	12.7		39.1	5.1
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		17.5	12.7		39.1	5.1
LOS		B	B		D	A
Approach Delay		17.5	12.7		34.4	
Approach LOS		B	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 19.2		Intersection LOS: B	
Intersection Capacity Utilization 92.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1068	917	448	73
v/c Ratio	0.70	0.50	0.83	0.13
Control Delay	17.5	12.7	39.1	5.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.5	12.7	39.1	5.1
Queue Length 50th (m)	63.1	43.5	64.9	0.0
Queue Length 95th (m)	96.7	66.2	94.0	7.9
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1535	1829	641	645
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.70	0.50	0.70	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

10-17-2019

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	60	965	710	170	430	70
Future Volume (vph)	60	965	710	170	430	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.97		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3397	3319		1770	1599
Flt Permitted		0.83	1.00		0.95	1.00
Satd. Flow (perm)		2821	3319		1770	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	1005	740	177	448	73
RTOR Reduction (vph)	0	0	23	0	0	50
Lane Group Flow (vph)	0	1068	894	0	448	23
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		43.5	43.5		24.5	24.5
Effective Green, g (s)		43.5	43.5		24.5	25.5
Actuated g/C Ratio		0.54	0.54		0.31	0.32
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1533	1804		542	509
v/s Ratio Prot			0.27		c0.25	
v/s Ratio Perm		c0.38				0.01
v/c Ratio		0.70	0.50		0.83	0.05
Uniform Delay, d1		13.4	11.4		25.8	18.8
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.6	1.0		10.0	0.0
Delay (s)		16.0	12.4		35.8	18.9
Level of Service		B	B		D	B
Approach Delay (s)		16.0	12.4		33.4	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	340	0	195	215	70	165	1340	0	45	1005	45
Future Volume (vph)	95	340	0	195	215	70	165	1340	0	45	1005	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Frt					0.963							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	3438	0	1787	3392	0	3303	3343	0	1597	3282	1482
Flt Permitted	0.574			0.289			0.950			0.950		
Satd. Flow (perm)	1019	3438	0	544	3392	0	3303	3343	0	1597	3282	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					22							102
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Adj. Flow (vph)	97	347	0	199	219	71	168	1367	0	46	1026	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	347	0	199	290	0	168	1367	0	46	1026	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

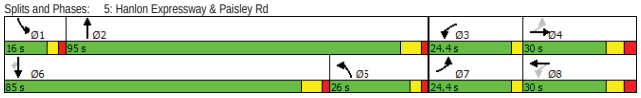
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	59.4	59.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	37.0	19.7		45.9	25.6		17.6	89.0		9.1	78.0	78.0
Actuated g/C Ratio	0.24	0.13		0.29	0.16		0.11	0.57		0.06	0.50	0.50
v/c Ratio	0.33	0.81		0.66	0.51		0.45	0.72		0.50	0.63	0.06
Control Delay	45.5	82.6		55.4	59.4		69.8	29.6		92.4	32.5	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	45.5	82.6		55.4	59.4		69.8	29.6		92.4	32.5	0.1
LOS	D	F		E	E		E	C		F	C	A
Approach Delay		74.5			57.8			34.0			33.6	
Approach LOS		E			E			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 157			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 42.1		Intersection LOS: D	
Intersection Capacity Utilization 81.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	97	347	199	290	168	1367	46	1026	46
v/c Ratio	0.33	0.81	0.66	0.51	0.45	0.72	0.50	0.63	0.06
Control Delay	45.5	82.6	55.4	59.4	69.8	29.6	92.4	32.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	82.6	55.4	59.4	69.8	29.6	92.4	32.5	0.1
Queue Length 50th (m)	24.5	60.7	53.3	43.5	27.6	185.3	15.4	137.1	0.0
Queue Length 95th (m)	41.3	81.3	78.4	62.4	41.0	224.8	30.8	168.2	0.0
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	380	484	328	583	443	1894	112	1630	787
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.72	0.61	0.50	0.38	0.72	0.41	0.63	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	340	0	195	215	70	165	1340	0	45	1005	45
Future Volume (vph)	95	340	0	195	215	70	165	1340	0	45	1005	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00		1.00	0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1687	3438		1787	3393		3303	3343		1597	3282	1482
Flt Permitted	0.57	1.00		0.29	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1020	3438		544	3393		3303	3343		1597	3282	1482
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	347	0	199	219	71	168	1367	0	46	1026	46
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	0	0	0	23
Lane Group Flow (vph)	97	347	0	199	272	0	168	1367	0	46	1026	23
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	32.0	19.7		40.9	25.6		18.8	89.0		7.8	78.0	78.0
Effective Green, g (s)	32.0	19.7		40.9	25.6		18.8	89.0		7.8	78.0	78.0
Actuated g/C Ratio	0.20	0.12		0.26	0.16		0.12	0.56		0.05	0.49	0.49
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	258	428		283	549		392	1881		78	1619	731
v/s Ratio Prot	0.03	c0.10		c0.08	0.08		0.05	c0.41		0.03	c0.31	
v/s Ratio Perm	0.05			0.10								0.02
v/c Ratio	0.38	0.81		0.70	0.49		0.43	0.73		0.59	0.63	0.03
Uniform Delay, d1	53.4	67.4		49.3	60.4		64.7	25.6		73.6	29.5	20.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	11.1		7.7	0.7		0.8	2.5		10.9	1.9	0.1
Delay (s)	54.3	78.5		57.0	61.1		65.4	28.1		84.5	31.4	20.7
Level of Service	D	E		E	E		E	C		F	C	C
Approach Delay (s)		73.2			59.4			32.1			33.2	
Approach LOS		E			E			C			C	

Intersection Summary					
HCM 2000 Control Delay		41.3	HCM 2000 Level of Service		D
HCM 2000 Volume to Capacity ratio		0.74			
Actuated Cycle Length (s)		158.1	Sum of lost time (s)		23.4
Intersection Capacity Utilization		81.7%	ICU Level of Service		D
Analysis Period (min)		15			
c Critical Lane Group					

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	245	55	75	135	25	25	565	95	45	480	50
Future Volume (vph)	85	245	55	75	135	25	25	565	95	45	480	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.972			0.977			0.978			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1771	0	1752	1789	0	1805	1818	0	1770	1834	0
Flt Permitted	0.610			0.332			0.368			0.277		
Satd. Flow (perm)	1127	1771	0	607	1789	0	696	1818	0	515	1834	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			16			10			6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	92	266	60	82	147	27	27	614	103	49	522	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	326	0	82	174	0	27	717	0	49	576	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

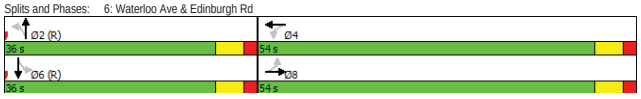
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	22.0	22.0		22.0	22.0		56.0	56.0		56.0	56.0	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.62	0.62		0.62	0.62	
v/c Ratio	0.33	0.73		0.55	0.39		0.06	0.63		0.15	0.50	
Control Delay	29.4	38.4		42.5	26.7		21.0	31.5		10.8	12.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.4	38.4		42.5	26.7		21.0	31.5		10.8	12.5	
LOS	C	D		D	C		C	C		B	B	
Approach Delay		36.4			31.8			31.1			12.4	
Approach LOS		D			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 26.5		Intersection LOS: C	
Intersection Capacity Utilization 73.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	92	326	82	174	27	717	49	576
v/c Ratio	0.33	0.73	0.55	0.39	0.06	0.63	0.15	0.50
Control Delay	29.4	38.4	42.5	26.7	21.0	31.5	10.8	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	38.4	42.5	26.7	21.0	31.5	10.8	12.5
Queue Length 50th (m)	13.8	51.6	13.1	23.9	2.2	92.2	3.4	51.5
Queue Length 95th (m)	24.4	71.3	25.4	37.1	m8.5	156.6	11.3	100.2
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	601	953	323	961	433	1134	320	1143
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.34	0.25	0.18	0.06	0.63	0.15	0.50

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	245	55	75	135	25	25	565	95	45	480	50
Future Volume (vph)	85	245	55	75	135	25	25	565	95	45	480	50
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1756	1772		1739	1789		1794	1819		1763	1834	
Flt Permitted	0.61	1.00		0.33	1.00		0.37	1.00		0.28	1.00	
Satd. Flow (perm)	1127	1772		608	1789		694	1819		514	1834	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	266	60	82	147	27	27	614	103	49	522	54
RTOR Reduction (vph)	0	14	0	0	12	0	0	4	0	0	2	0
Lane Group Flow (vph)	92	312	0	82	162	0	27	713	0	49	574	0
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	22.0	22.0		22.0	22.0		56.0	56.0		56.0	56.0	
Effective Green, g (s)	22.0	22.0		22.0	22.0		56.0	56.0		56.0	56.0	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.62	0.62		0.62	0.62	
Clearance Time (s)	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	
Lane Grp Cap (vph)	275	433		148	437		431	1131		319	1141	
v/s Ratio Prot		c0.18			0.09			c0.39			0.31	
v/s Ratio Perm	0.08			0.13			0.04			0.10		
v/c Ratio	0.33	0.72		0.55	0.37		0.06	0.63		0.15	0.50	
Uniform Delay, d1	28.0	31.2		29.7	28.2		6.7	10.6		7.1	9.3	
Progression Factor	1.00	1.00		1.00	1.00		2.29	2.34		1.00	1.00	
Incremental Delay, d2	0.7	5.7		4.4	0.5		0.2	2.3		1.0	1.6	
Delay (s)	28.7	36.8		34.1	28.8		15.5	27.1		8.1	10.9	
Level of Service	C	D		C	C		B	C		A	B	
Approach Delay (s)		35.0			30.5			26.6			10.7	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	65	79	250	35	50	250
Future Volume (vph)	65	79	250	35	50	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1568
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1568
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		7	7			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	3%
Adj. Flow (vph)	71	86	272	38	54	272
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	86	272	38	54	272
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.8%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	65	79	250	35	50	250
Future Volume (Veh/h)	65	79	250	35	50	250
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	86	272	38	54	272
Pedestrians				1	7	
Lane Width (m)				3.6	3.6	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			164		660	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			164		660	79
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			81		84	72
cM capacity (veh/h)			1406		346	972

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	71	86	272	38	326
Volume Left	0	0	272	0	54
Volume Right	0	86	0	0	272
cSH	1700	1700	1406	1700	1165
Volume to Capacity	0.04	0.05	0.19	0.02	0.28
Queue Length 95th (m)	0.0	0.0	5.7	0.0	9.2
Control Delay (s)	0.0	0.0	8.2	0.0	11.3
Lane LOS			A		B
Approach Delay (s)	0.0		7.2		11.3
Approach LOS					B

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	355	75	50	250	75	80	480	60	95	410	80
Future Volume (vph)	90	355	75	50	250	75	80	480	60	95	410	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.99		0.99	1.00		1.00	0.99	
Frt		0.974			0.965			0.983			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1758	0	1805	1753	0	1770	1827	0	1656	1799	0
Flt Permitted	0.412			0.266			0.349			0.304		
Satd. Flow (perm)	721	1758	0	503	1753	0	643	1827	0	528	1799	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			22			12			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Adj. Flow (vph)	98	386	82	54	272	82	87	522	65	103	446	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	468	0	54	354	0	87	587	0	103	533	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.41	0.79		0.32	0.59		0.27	0.63		0.39	0.58	
Control Delay	23.1	31.2		25.3	24.2		13.4	16.9		16.8	15.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.1	31.2		25.3	24.2		13.4	16.9		16.8	15.6	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		29.8			24.4			16.4			15.8	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 21.0		Intersection LOS: C	
Intersection Capacity Utilization 81.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd

Queues
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	98	468	54	354	87	587	103	533
v/c Ratio	0.41	0.79	0.32	0.59	0.27	0.63	0.39	0.58
Control Delay	23.1	31.2	25.3	24.2	13.4	16.9	16.8	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	31.2	25.3	24.2	13.4	16.9	16.8	15.6
Queue Length 50th (m)	12.5	67.6	5.9	40.3	6.9	58.2	8.8	50.0
Queue Length 95th (m)	m28.1	#113.7	16.1	67.1	16.5	91.5	21.7	79.5
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	240	596	167	599	325	931	267	920
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.79	0.32	0.59	0.27	0.63	0.39	0.58

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	355	75	50	250	75	80	480	60	95	410	80
Future Volume (vph)	90	355	75	50	250	75	80	480	60	95	410	80
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	
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	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		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)	1663	1758		1795	1753		1751	1828		1651	1798	
Flt Permitted	0.41	1.00		0.27	1.00		0.35	1.00		0.30	1.00	
Satd. Flow (perm)	721	1758		502	1753		642	1828		529	1798	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	386	82	54	272	82	87	522	65	103	446	87
RTOR Reduction (vph)	0	10	0	0	15	0	0	6	0	0	9	0
Lane Group Flow (vph)	98	458	0	54	339	0	87	581	0	103	524	0
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	240	586		167	584		325	926		268	910	
v/s Ratio Prot		c0.26			0.19			c0.32			0.29	
v/s Ratio Perm	0.14			0.11			0.14			0.19		
v/c Ratio	0.41	0.78		0.32	0.58		0.27	0.63		0.38	0.58	
Uniform Delay, d1	19.3	22.5		18.7	20.7		10.6	13.4		11.3	12.9	
Progression Factor	0.91	0.96		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	8.8		5.1	4.2		2.0	3.2		4.1	2.6	
Delay (s)	21.9	30.5		23.7	24.9		12.6	16.6		15.5	15.5	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		29.0			24.7			16.1			15.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	350	61	35	305	150	95	34	55	170	21	130
Future Volume (vph)	205	350	61	35	305	150	95	34	55	170	21	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99		0.98	1.00	0.98		0.99	0.95		0.95	0.98	
Frt			0.850		0.951			0.907			0.871	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1792	1615	1805	1714	0	1805	1637	0	1770	1567	0
Flt Permitted	0.357			0.536			0.613			0.560		
Satd. Flow (perm)	651	1792	1587	1015	1714	0	1154	1637	0	986	1567	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73		35			60			141	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Adj. Flow (vph)	223	380	66	38	332	163	103	37	60	185	23	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	380	66	38	495	0	103	97	0	185	164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	64.0	61.0	61.0	48.7	48.7		17.2	8.2		17.6	8.2	
Actuated g/C Ratio	0.71	0.68	0.68	0.54	0.54		0.19	0.09		0.20	0.09	
v/c Ratio	0.39	0.31	0.06	0.07	0.53		0.37	0.48		0.70	0.61	
Control Delay	7.4	7.9	1.8	13.5	16.8		30.7	25.1		44.2	19.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.4	7.9	1.8	13.5	16.8		30.7	25.1		44.2	19.4	
LOS	A	A	A	B	B		C	C		D	B	
Approach Delay		7.1			16.5			28.0			32.6	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 71.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd

Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	223	380	66	38	495	103	97	185	164
v/c Ratio	0.39	0.31	0.06	0.07	0.53	0.37	0.48	0.70	0.61
Control Delay	7.4	7.9	1.8	13.5	16.8	30.7	25.1	44.2	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	7.9	1.8	13.5	16.8	30.7	25.1	44.2	19.4
Queue Length 50th (m)	12.2	26.3	0.0	3.3	52.6	15.2	6.4	28.7	4.0
Queue Length 95th (m)	25.4	49.5	4.4	10.0	98.2	26.6	20.2	44.7	21.7
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	603	1213	1098	548	942	282	287	263	346
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.31	0.06	0.07	0.53	0.37	0.34	0.70	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	350	61	35	305	150	95	34	55	170	21	130
Future Volume (vph)	205	350	61	35	305	150	95	34	55	170	21	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.98		1.00	0.95		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1746	1792	1587	1799	1713		1795	1637		1721	1567	
Flt Permitted	0.36	1.00	1.00	0.54	1.00		0.61	1.00		0.56	1.00	
Satd. Flow (perm)	656	1792	1587	1016	1713		1158	1637		1015	1567	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	380	66	38	332	163	103	37	60	185	23	141
RTOR Reduction (vph)	0	0	22	0	17	0	0	55	0	0	127	0
Lane Group Flow (vph)	223	380	44	38	478	0	103	42	0	185	37	0
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	59.8	59.8	59.8	47.5	47.5		13.5	7.1		16.9	8.8	
Effective Green, g (s)	59.8	59.8	59.8	47.5	47.5		13.5	7.1		16.9	8.8	
Actuated g/C Ratio	0.66	0.66	0.66	0.53	0.53		0.15	0.08		0.19	0.10	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	548	1190	1054	536	904		218	129		254	153	
v/s Ratio Prot	c0.04	0.21			c0.28		0.03	0.03		c0.07	0.02	
v/s Ratio Perm	0.23		0.03	0.04			0.04			c0.07		
v/c Ratio	0.41	0.32	0.04	0.07	0.53		0.47	0.32		0.73	0.24	
Uniform Delay, d1	7.1	6.4	5.2	10.4	13.9		34.5	39.2		33.4	37.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.7	0.1	0.3	2.2		1.6	1.5		10.0	0.8	
Delay (s)	7.6	7.1	5.3	10.7	16.1		36.1	40.6		43.4	38.3	
Level of Service	A	A	A	B	B		D	D		D	D	
Approach Delay (s)		7.1			15.8			38.3			41.0	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy & North Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	5	40	25	5	30	30	80	10	10	55	50
Future Volume (vph)	55	5	40	25	5	30	30	80	10	10	55	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.946			0.931			0.983			0.929	
Flt Protected		0.973			0.980		0.950			0.950		
Satd. Flow (prot)	0	1715	0	0	1700	0	1770	1831	0	1770	1730	0
Flt Permitted		0.973			0.980		0.950			0.950		
Satd. Flow (perm)	0	1715	0	0	1700	0	1770	1831	0	1770	1730	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	5	43	27	5	33	33	87	11	11	60	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	0	0	65	0	33	98	0	11	114	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.3%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy & North Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	40	25	5	30	30	80	10	10	55	50
Future Volume (Veh/h)	55	5	40	25	5	30	30	80	10	10	55	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	5	43	27	5	33	33	87	11	11	60	54
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	298	273	87	286	294	92	114			98		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	298	273	87	286	294	92	114			98		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	99	96	96	99	97	98			99		
cM capacity (veh/h)	614	615	971	619	598	965	1475			1495		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	108	65	33	98	11	114
Volume Left	60	27	33	0	11	0
Volume Right	43	33	0	11	0	54
cSH	720	754	1475	1700	1495	1700
Volume to Capacity	0.15	0.09	0.02	0.06	0.01	0.07
Queue Length 95th (m)	4.2	2.3	0.5	0.0	0.2	0.0
Control Delay (s)	10.9	10.2	7.5	0.0	7.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	10.9	10.2	1.9		0.7	
Approach LOS	B	B				

Intersection Summary

Average Delay	5.1		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy & South Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	5	40	25	5	30	25	40	10	10	65	45
Future Volume (vph)	50	5	40	25	5	30	25	40	10	10	65	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.943			0.931			0.969			0.939	
Flt Protected		0.974			0.980		0.950			0.950		
Satd. Flow (prot)	0	1711	0	0	1700	0	1770	1805	0	1770	1749	0
Flt Permitted		0.974			0.980		0.950			0.950		
Satd. Flow (perm)	0	1711	0	0	1700	0	1770	1805	0	1770	1749	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	5	43	27	5	33	27	43	11	11	71	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	65	0	27	54	0	11	120	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.5%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy & South Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	40	25	5	30	25	40	10	10	65	45
Future Volume (Veh/h)	50	5	40	25	5	30	25	40	10	10	65	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	5	43	27	5	33	27	43	11	11	71	49
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	250	226	96	241	244	48	120			54		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250	226	96	241	244	48	120			54		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	96	96	99	97	98			99		
cM capacity (veh/h)	664	657	961	664	641	1020	1468			1551		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	102	65	27	54	11	120
Volume Left	54	27	27	0	11	0
Volume Right	43	33	0	11	0	49
cSH	763	804	1468	1700	1551	1700
Volume to Capacity	0.13	0.08	0.02	0.03	0.01	0.07
Queue Length 95th (m)	3.7	2.1	0.4	0.0	0.2	0.0
Control Delay (s)	10.4	9.9	7.5	0.0	7.3	0.0
Lane LOS	B	A	A		A	
Approach Delay (s)	10.4	9.9	2.5		0.6	
Approach LOS	B	A				

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	655	0	235	760	0	195	680	0	60	665	0
Future Volume (vph)	115	655	0	235	760	0	195	680	0	60	665	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.208			0.243			0.230			0.351		
Satd. Flow (perm)	394	3539	0	452	3539	0	436	3610	0	651	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	117	668	0	240	776	0	199	694	0	61	679	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	668	0	240	776	0	199	694	0	61	679	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

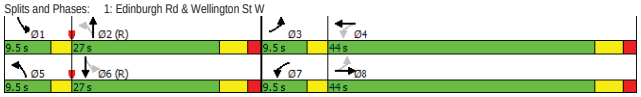
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	35.2	25.7		35.8	27.6		45.7	34.3		38.0	27.8	
Actuated g/C Ratio	0.39	0.29		0.40	0.31		0.51	0.38		0.42	0.31	
v/c Ratio	0.46	0.66		0.88	0.72		0.49	0.50		0.17	0.61	
Control Delay	20.6	31.1		50.7	31.7		18.1	25.2		13.4	26.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.6	31.1		50.7	31.7		18.1	25.2		13.4	26.0	
LOS	C	C		D	C		B	C		B	C	
Approach Delay		29.5			36.2			23.6			25.0	
Approach LOS		C			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 71 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 29.0		Intersection LOS: C	
Intersection Capacity Utilization 77.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	117	668	240	776	199	694	61	679
v/c Ratio	0.46	0.66	0.88	0.72	0.49	0.50	0.17	0.61
Control Delay	20.6	31.1	50.7	31.7	18.1	25.2	13.4	26.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	31.1	50.7	31.7	18.1	25.2	13.4	26.0
Queue Length 50th (m)	12.6	55.5	27.9	67.0	19.3	52.0	4.2	54.4
Queue Length 95th (m)	20.3	66.6	#51.3	79.2	37.6	80.9	m9.3	#77.2
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	255	1494	274	1494	403	1375	369	1115
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.45	0.88	0.52	0.49	0.50	0.17	0.61

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	655	0	235	760	0	195	680	0	60	665	0
Future Volume (vph)	115	655	0	235	760	0	195	680	0	60	665	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3539		1769	3539		1804	3610		1766	3610	
Flt Permitted	0.21	1.00		0.24	1.00		0.23	1.00		0.35	1.00	
Satd. Flow (perm)	395	3539		452	3539		437	3610		652	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	117	668	0	240	776	0	199	694	0	61	679	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	117	668	0	240	776	0	199	694	0	61	679	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	31.5	26.3		34.1	27.6		42.2	33.1		33.3	27.2	
Effective Green, g (s)	31.5	26.3		34.1	27.6		42.2	33.1		33.3	27.2	
Actuated g/C Ratio	0.35	0.29		0.38	0.31		0.47	0.37		0.37	0.30	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	219	1034		266	1085		387	1327		316	1091	
v/s Ratio Prot	0.03	0.19		c0.07	0.22		c0.07	0.19		0.01	c0.19	
v/s Ratio Perm	0.16			c0.28			0.17			0.06		
v/c Ratio	0.53	0.65		0.90	0.72		0.51	0.52		0.19	0.62	
Uniform Delay, d1	21.1	27.8		24.0	27.7		15.5	22.3		18.5	27.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.91	0.83	
Incremental Delay, d2	2.5	1.4		30.8	2.3		1.2	1.5		0.3	2.3	
Delay (s)	23.6	29.2		54.8	30.0		16.6	23.7		17.1	24.8	
Level of Service	C	C		D	C		B	C		B	C	
Approach Delay (s)		28.4			35.8			22.2			24.1	
Approach LOS		C			D			C			C	

Intersection Summary

HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	760	0	0	990	50	405	155	145	40	0	345
Future Volume (vph)	220	760	0	0	990	50	405	155	145	40	0	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.993				0.850			0.850
Flt Protected	0.950						0.950	0.978		0.950		
Satd. Flow (prot)	1787	5136	0	0	5097	0	1698	1757	1599	1805	0	1599
Flt Permitted	0.170						0.950	0.978		0.423		
Satd. Flow (perm)	320	5136	0	0	5097	0	1698	1757	1599	804	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					7				149			356
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	227	784	0	0	1021	52	418	160	149	41	0	356
Shared Lane Traffic (%)							32%					
Lane Group Flow (vph)	227	784	0	0	1073	0	284	294	149	41	0	356
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	24.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	3.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

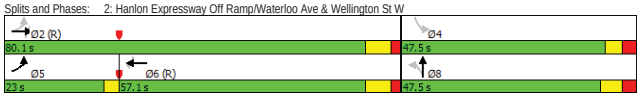
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.32		0.39
v/c Ratio	0.54	0.27			0.54		0.53	0.53	0.15	0.16		0.42
Control Delay	16.8	14.1			30.9		40.6	40.4	2.3	33.2		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	16.8	14.1			30.9		40.6	40.4	2.3	33.2		4.2
LOS	B	B			C		D	D	A	C		A
Approach Delay		14.7			30.9			32.7			7.2	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 23.2 — Intersection LOS: C
Intersection Capacity Utilization 77.2% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	227	784	1073	284	294	149	41	356
v/c Ratio	0.54	0.27	0.54	0.53	0.53	0.15	0.16	0.42
Control Delay	16.8	14.1	30.9	40.6	40.4	2.3	33.2	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	14.1	30.9	40.6	40.4	2.3	33.2	4.2
Queue Length 50th (m)	25.7	36.5	78.6	65.0	67.4	0.0	7.8	0.0
Queue Length 95th (m)	39.5	44.7	93.1	96.0	98.8	9.2	17.5	19.4
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	423	2938	2001	532	550	978	258	843
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.27	0.54	0.53	0.53	0.15	0.16	0.42

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	760	0	0	990	50	405	155	145	40	0	345
Future Volume (vph)	220	760	0	0	990	50	405	155	145	40	0	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5095		1698	1757	1599	1805		1599
Flt Permitted	0.17	1.00			1.00		0.95	0.98	1.00	0.42		1.00
Satd. Flow (perm)	320	5136			5095		1698	1757	1599	804		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	227	784	0	0	1021	52	418	160	149	41	0	356
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	64	0	0	217
Lane Group Flow (vph)	227	784	0	0	1069	0	284	294	85	41	0	139
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.32		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Grp Cap (vph)	413	2938			1996		532	550	914	258		626
v/s Ratio Prot	c0.09	0.15			0.21							
v/s Ratio Perm	c0.23						0.17	0.17	0.05	0.05		0.09
v/c Ratio	0.55	0.27			0.54		0.53	0.53	0.09	0.16		0.22
Uniform Delay, d1	15.7	13.8			29.9		36.1	36.1	12.3	31.0		25.9
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	5.2	0.2			1.0		3.8	3.7	0.2	1.3		0.8
Delay (s)	20.9	14.0			30.9		39.9	39.8	12.5	32.3		26.7
Level of Service	C	B			C		D	D	B	C		C
Approach Delay (s)		15.6			30.9			34.3			27.3	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	880	505	0	1300	0	0	0	0	190	0	95
Future Volume (vph)	0	880	505	0	1300	0	0	0	0	190	0	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.945										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4823	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4823	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		213										100
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	926	532	0	1368	0	0	0	0	200	0	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1458	0	0	1368	0	0	0	0	200	0	100
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.57			0.53					0.16		0.12

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

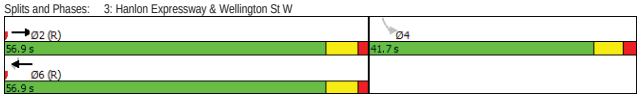
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		15.1			17.2					22.2		3.0
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		15.1			17.2					22.2		3.0
LOS		B			B					C		A
Approach Delay		15.1			17.2						15.8	
Approach LOS		B			B						B	

Intersection Summary

Area Type:	Other
Cycle Length: 98.6	
Actuated Cycle Length: 98.6	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 16.1	Intersection LOS: B
Intersection Capacity Utilization 42.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1458	1368	200	100
v/c Ratio	0.57	0.53	0.16	0.12
Control Delay	15.1	17.2	22.2	3.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.1	17.2	22.2	3.0
Queue Length 50th (m)	60.3	64.7	13.9	0.0
Queue Length 95th (m)	74.4	77.8	22.2	7.9
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2550	2604	1230	822
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.53	0.16	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	880	505	0	1300	0	0	0	0	190	0	95
Future Volume (vph)	0	880	505	0	1300	0	0	0	0	190	0	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4824			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4824			5136					3467		1524
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)	0	926	532	0	1368	0	0	0	0	200	0	100
RTOR Reduction (vph)	0	105	0	0	0	0	0	0	0	0	0	49
Lane Group Flow (vph)	0	1353	0	0	1368	0	0	0	0	200	0	51
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2446			2604					1230		772
v/s Ratio Prot		c0.28			0.27							
v/s Ratio Perm										c0.06		0.03
v/c Ratio		0.55			0.53					0.16		0.07
Uniform Delay, d1		16.6			16.3					21.8		12.4
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.9			0.8					0.3		0.2
Delay (s)		17.6			17.1					22.1		12.6
Level of Service		B			B					C		B
Approach Delay (s)		17.6			17.1			0.0			18.9	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	960	875	400	360	60
Future Volume (vph)	70	960	875	400	360	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.953			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3566	3348	0	1787	1615
Flt Permitted		0.697			0.950	
Satd. Flow (perm)	0	2493	3348	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			129			62
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Adj. Flow (vph)	72	990	902	412	371	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1062	1314	0	371	62
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

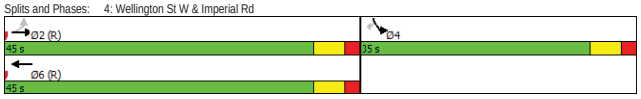
10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		46.2	46.2		21.8	21.8
Actuated g/C Ratio		0.58	0.58		0.27	0.27
v/c Ratio		0.74	0.66		0.76	0.13
Control Delay		18.2	13.3		36.8	6.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		18.2	13.3		36.8	6.0
LOS		B	B		D	A
Approach Delay		18.2	13.3		32.4	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 18.1		Intersection LOS: B	
Intersection Capacity Utilization 100.5%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1062	1314	371	62
v/c Ratio	0.74	0.66	0.76	0.13
Control Delay	18.2	13.3	36.8	6.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.2	13.3	36.8	6.0
Queue Length 50th (m)	60.6	62.5	54.0	0.0
Queue Length 95th (m)	#118.7	104.7	75.0	7.6
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1439	1987	647	624
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.74	0.66	0.57	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

10-17-2019

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	960	875	400	360	60
Future Volume (vph)	70	960	875	400	360	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3565	3348		1787	1615
Flt Permitted		0.70	1.00		0.95	1.00
Satd. Flow (perm)		2494	3348		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	990	902	412	371	62
RTOR Reduction (vph)	0	0	55	0	0	45
Lane Group Flow (vph)	0	1062	1259	0	371	17
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		46.2	46.2		21.8	21.8
Effective Green, g (s)		46.2	46.2		21.8	21.8
Actuated g/C Ratio		0.58	0.58		0.27	0.27
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1440	1933		486	440
v/s Ratio Prot			0.38		c0.21	
v/s Ratio Perm		c0.43				0.01
v/c Ratio		0.74	0.65		0.76	0.04
Uniform Delay, d1		12.4	11.4		26.7	21.4
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		3.4	1.7		7.0	0.0
Delay (s)		15.9	13.2		33.7	21.4
Level of Service		B	B		C	C
Approach Delay (s)		15.9	13.2		32.0	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	390	0	270	465	70	410	1130	0	100	1510	135
Future Volume (vph)	120	390	0	270	465	70	410	1130	0	100	1510	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.980							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3531	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.217			0.217			0.950			0.950		
Satd. Flow (perm)	408	3574	0	412	3531	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					8							139
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	124	402	0	278	479	72	423	1165	0	103	1557	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	402	0	278	551	0	423	1165	0	103	1557	139
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

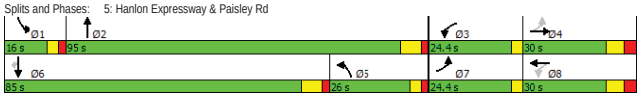
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	13.0	30.0		9.5	30.0		10.0	60.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	40.3	21.3		50.3	28.5		21.0	87.7		10.9	77.6	77.6
Actuated g/C Ratio	0.24	0.13		0.31	0.17		0.13	0.53		0.07	0.47	0.47
v/c Ratio	0.57	0.87		0.91	0.89		0.96	0.65		0.86	0.95	0.17
Control Delay	53.6	89.6		80.6	82.6		103.3	29.7		125.2	55.0	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	53.6	89.6		80.6	82.6		103.3	29.7		125.2	55.0	3.9
LOS	D	F		F	F		F	C		F	E	A
Approach Delay		81.1			81.9			49.3			55.1	
Approach LOS		F			F			D			E	

Intersection Summary

Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 164.5			
Natural Cycle: 135			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 60.7		Intersection LOS: E	
Intersection Capacity Utilization 99.7%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	124	402	278	551	423	1165	103	1557	139
v/c Ratio	0.57	0.87	0.91	0.89	0.96	0.65	0.86	0.95	0.17
Control Delay	53.6	89.6	80.6	82.6	103.3	29.7	125.2	55.0	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	89.6	80.6	82.6	103.3	29.7	125.2	55.0	3.9
Queue Length 50th (m)	32.0	72.7	78.9	97.7	76.3	149.5	36.0	270.3	0.0
Queue Length 95th (m)	50.4	#99.0	#125.1	#148.5	#112.0	174.1	#73.9	#324.6	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	297	478	307	617	442	1797	121	1637	835
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.84	0.91	0.89	0.96	0.65	0.85	0.95	0.17

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	390	0	270	465	70	410	1130	0	100	1510	135
Future Volume (vph)	120	390	0	270	465	70	410	1130	0	100	1510	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574		1805	3533		3467	3374		1805	3471	1615
Flt Permitted	0.22	1.00		0.22	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	409	3574		412	3533		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	402	0	278	479	72	423	1165	0	103	1557	139
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	0	0	0	73
Lane Group Flow (vph)	124	402	0	278	544	0	423	1165	0	103	1557	66
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	35.3	21.3		45.5	28.5		21.0	87.7		10.9	77.6	77.6
Effective Green, g (s)	35.3	21.3		45.5	28.5		21.0	87.7		10.9	77.6	77.6
Actuated g/C Ratio	0.21	0.13		0.28	0.17		0.13	0.53		0.07	0.47	0.47
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	205	462		293	612		442	1798		119	1637	761
v/s Ratio Prot	0.05	0.11		c0.12	0.15		c0.12	0.35		0.06	c0.45	
v/s Ratio Perm	0.08			c0.14								0.04
v/c Ratio	0.60	0.87		0.95	0.89		0.96	0.65		0.87	0.95	0.09
Uniform Delay, d1	54.9	70.2		52.0	66.5		71.3	27.4		76.1	41.6	23.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.0	16.2		38.5	14.8		31.6	1.8		43.8	13.3	0.2
Delay (s)	59.9	86.4		90.6	81.2		102.9	29.2		119.9	55.0	24.1
Level of Service	E	F		F	F		F	C		F	D	C
Approach Delay (s)		80.2			84.3			48.9			56.3	
Approach LOS		F			F			D			E	

Intersection Summary

HCM 2000 Control Delay	61.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	164.5	Sum of lost time (s)	23.4
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	165	50	90	260	45	50	630	85	50	620	70
Future Volume (vph)	75	165	50	90	260	45	50	630	85	50	620	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.965			0.978			0.982			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1802	0	1805	1836	0	1805	1856	0	1770	1867	0
Flt Permitted	0.335			0.509			0.288			0.272		
Satd. Flow (perm)	619	1802	0	961	1836	0	547	1856	0	505	1867	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			15			8			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	77	170	52	93	268	46	52	649	88	52	639	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	222	0	93	314	0	52	737	0	52	711	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

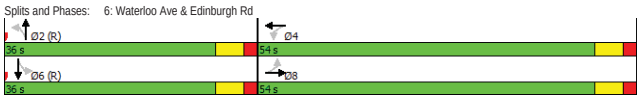
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.9	20.9		20.9	20.9		57.1	57.1		57.1	57.1	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.63	0.63		0.63	0.63	
v/c Ratio	0.54	0.51		0.42	0.72		0.15	0.62		0.16	0.60	
Control Delay	42.7	29.3		33.5	39.0		9.1	20.6		10.2	13.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	42.7	29.3		33.5	39.0		9.1	20.6		10.2	13.6	
LOS	D	C		C	D		A	C		B	B	
Approach Delay		32.8			37.8			19.8			13.4	
Approach LOS		C			D			B			B	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 22.6		Intersection LOS: C	
Intersection Capacity Utilization 77.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	222	93	314	52	737	52	711
v/c Ratio	0.54	0.51	0.42	0.72	0.15	0.62	0.16	0.60
Control Delay	42.7	29.3	33.5	39.0	9.1	20.6	10.2	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	29.3	33.5	39.0	9.1	20.6	10.2	13.6
Queue Length 50th (m)	12.4	31.0	14.5	50.4	1.9	53.4	3.5	67.7
Queue Length 95th (m)	24.5	46.8	26.1	70.0	m8.1	119.4	11.4	130.0
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	330	973	512	986	347	1180	320	1187
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.23	0.18	0.32	0.15	0.62	0.16	0.60

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	165	50	90	260	45	50	630	85	50	620	70
Future Volume (vph)	75	165	50	90	260	45	50	630	85	50	620	70
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		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)	1758	1802		1794	1836		1802	1856		1763	1866	
Flt Permitted	0.34	1.00		0.51	1.00		0.29	1.00		0.27	1.00	
Satd. Flow (perm)	620	1802		962	1836		546	1856		505	1866	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	170	52	93	268	46	52	649	88	52	639	72
RTOR Reduction (vph)	0	20	0	0	12	0	0	3	0	0	3	0
Lane Group Flow (vph)	77	202	0	93	302	0	52	734	0	52	708	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.9	20.9		20.9	20.9		57.1	57.1		57.1	57.1	
Effective Green, g (s)	20.9	20.9		20.9	20.9		57.1	57.1		57.1	57.1	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.63	0.63		0.63	0.63	
Clearance Time (s)	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	
Lane Grp Cap (vph)	143	418		223	426		346	1177		320	1183	
v/s Ratio Prot		0.11			c0.16			c0.40			0.38	
v/s Ratio Perm	0.12			0.10			0.10			0.10		
v/c Ratio	0.54	0.48		0.42	0.71		0.15	0.62		0.16	0.60	
Uniform Delay, d1	30.3	29.9		29.4	31.8		6.6	10.0		6.7	9.7	
Progression Factor	1.00	1.00		1.00	1.00		0.92	1.57		1.00	1.00	
Incremental Delay, d2	3.9	0.9		1.3	5.5		0.8	2.2		1.1	2.2	
Delay (s)	34.2	30.8		30.6	37.3		6.9	17.8		7.8	11.9	
Level of Service	C	C		C	D		A	B		A	B	
Approach Delay (s)		31.6			35.8			17.1			11.7	
Approach LOS		C			D			B			B	

Intersection Summary

HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	60	125	260	75	155	270
Future Volume (vph)	60	125	260	75	155	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	65	136	283	82	168	293
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	136	283	82	168	293
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.3%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	60	125	260	75	155	270
Future Volume (Veh/h)	60	125	260	75	155	270
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	136	283	82	168	293
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			202		714	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			202		714	66
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			79		47	71
cM capacity (veh/h)			1369		318	1000

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	65	136	283	82	461
Volume Left	0	0	283	0	168
Volume Right	0	136	0	0	293
cSH	1700	1700	1369	1700	872
Volume to Capacity	0.04	0.08	0.21	0.05	0.53
Queue Length 95th (m)	0.0	0.0	6.2	0.0	25.4
Control Delay (s)	0.0	0.0	8.3	0.0	16.7
Lane LOS			A		C
Approach Delay (s)	0.0		6.4		16.7
Approach LOS					C

Intersection Summary

Average Delay	9.8		
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	330	120	55	395	45	110	545	55	100	560	110
Future Volume (vph)	90	330	120	55	395	45	110	545	55	100	560	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.960			0.985			0.986			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1795	0	1805	1847	0	1805	1865	0	1736	1840	0
Flt Permitted	0.259			0.246			0.199			0.258		
Satd. Flow (perm)	488	1795	0	465	1847	0	377	1865	0	470	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			8			10			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	97	355	129	59	425	48	118	586	59	108	602	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	484	0	59	473	0	118	645	0	108	720	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

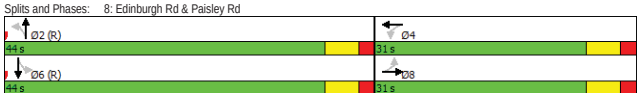
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.60	0.79		0.38	0.76		0.62	0.68		0.45	0.77	
Control Delay	37.9	31.7		27.9	31.7		31.1	18.2		19.6	21.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	37.9	31.7		27.9	31.7		31.1	18.2		19.6	21.3	
LOS	D	C		C	C		C	B		B	C	
Approach Delay		32.7			31.3			20.2			21.1	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 91.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	97	484	59	473	118	645	108	720
v/c Ratio	0.60	0.79	0.38	0.76	0.62	0.68	0.45	0.77
Control Delay	37.9	31.7	27.9	31.7	31.1	18.2	19.6	21.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	31.7	27.9	31.7	31.1	18.2	19.6	21.3
Queue Length 50th (m)	13.4	68.6	6.6	61.0	11.8	66.8	9.7	79.0
Queue Length 95th (m)	#35.6	#115.1	18.0	#106.3	#38.7	104.1	24.7	124.5
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	162	615	155	621	191	949	238	941
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.79	0.38	0.76	0.62	0.68	0.45	0.77

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	330	120	55	395	45	110	545	55	100	560	110
Future Volume (vph)	90	330	120	55	395	45	110	545	55	100	560	110
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	
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	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.99		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)	1791	1795		1796	1847		1800	1866		1732	1841	
Flt Permitted	0.26	1.00		0.25	1.00		0.20	1.00		0.26	1.00	
Satd. Flow (perm)	489	1795		465	1847		378	1866		470	1841	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	97	355	129	59	425	48	118	586	59	108	602	118
RTOR Reduction (vph)	0	17	0	0	5	0	0	5	0	0	9	0
Lane Group Flow (vph)	97	467	0	59	468	0	118	640	0	108	711	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	163	598		155	615		191	945		238	932	
v/s Ratio Prot		c0.26			0.25			0.34			c0.39	
v/s Ratio Perm	0.20			0.13			0.31			0.23		
v/c Ratio	0.60	0.78		0.38	0.76		0.62	0.68		0.45	0.76	
Uniform Delay, d1	20.8	22.5		19.1	22.3		13.3	13.9		11.9	14.9	
Progression Factor	0.98	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.7	8.9		7.0	8.6		14.1	3.9		6.1	5.9	
Delay (s)	34.1	31.5		26.1	30.9		27.4	17.8		18.0	20.7	
Level of Service	C	C		C	C		C	B		B	C	
Approach Delay (s)		32.0			30.4			19.3			20.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	285	395	120	65	410	195	95	30	50	215	40	295
Future Volume (vph)	285	395	120	65	410	195	95	30	50	215	40	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.99	1.00	0.99		1.00	0.98		0.99	0.99	
Frt			0.850		0.952			0.907			0.868	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	1805	1783	0	1770	1695	0	1787	1629	0
Flt Permitted	0.217			0.513			0.500			0.578		
Satd. Flow (perm)	412	1881	1594	974	1783	0	931	1695	0	1081	1629	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			130		34			54			321	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	310	429	130	71	446	212	103	33	54	234	43	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	310	429	130	71	658	0	103	87	0	234	364	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

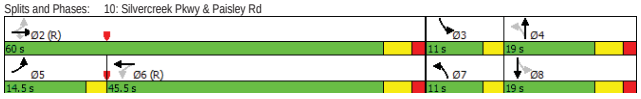
Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		2.5	5.0		4.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		7.5	19.0		9.0	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	63.1	60.1	60.1	46.2	46.2		18.1	9.1		18.5	9.1	
Actuated g/C Ratio	0.70	0.67	0.67	0.51	0.51		0.20	0.10		0.21	0.10	
v/c Ratio	0.68	0.34	0.12	0.14	0.71		0.40	0.40		0.82	0.81	
Control Delay	15.0	8.5	1.7	15.4	23.4		30.7	22.3		53.3	21.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.0	8.5	1.7	15.4	23.4		30.7	22.3		53.3	21.4	
LOS	B	A	A	B	C		C	C		D	C	
Approach Delay		9.8			22.6			26.8			33.9	
Approach LOS		A			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 21.1		Intersection LOS: C	
Intersection Capacity Utilization 91.7%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	310	429	130	71	658	103	87	234	364
v/c Ratio	0.68	0.34	0.12	0.14	0.71	0.40	0.40	0.82	0.81
Control Delay	15.0	8.5	1.7	15.4	23.4	30.7	22.3	53.3	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	8.5	1.7	15.4	23.4	30.7	22.3	53.3	21.4
Queue Length 50th (m)	18.8	31.5	0.0	7.0	89.7	14.9	5.7	36.8	7.4
Queue Length 95th (m)	#41.0	55.9	6.7	16.6	#161.7	26.6	18.9	#56.6	36.1
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	471	1256	1107	500	932	264	291	285	509
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.34	0.12	0.14	0.71	0.39	0.30	0.82	0.72

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	285	395	120	65	410	195	95	30	50	215	40	295
Future Volume (vph)	285	395	120	65	410	195	95	30	50	215	40	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1881	1594	1804	1782		1769	1694		1781	1628	
Flt Permitted	0.22	1.00	1.00	0.51	1.00		0.50	1.00		0.58	1.00	
Satd. Flow (perm)	412	1881	1594	973	1782		931	1694		1083	1628	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	429	130	71	446	212	103	33	54	234	43	321
RTOR Reduction (vph)	0	0	45	0	17	0	0	49	0	0	286	0
Lane Group Flow (vph)	310	429	85	71	641	0	103	38	0	234	78	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	58.9	58.9	58.9	45.0	45.0		14.4	8.0		17.8	9.7	
Effective Green, g (s)	58.9	58.9	58.9	45.0	45.0		14.4	8.0		17.8	9.7	
Actuated g/C Ratio	0.65	0.65	0.65	0.50	0.50		0.16	0.09		0.20	0.11	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	438	1231	1043	486	891		208	150		277	175	
v/s Ratio Prot	c0.09	0.23			0.36		0.04	0.02		c0.08	0.05	
v/s Ratio Perm	c0.38		0.05	0.07			0.04			c0.09		
v/c Ratio	0.71	0.35	0.08	0.15	0.72		0.50	0.25		0.84	0.44	
Uniform Delay, d1	11.3	7.0	5.7	12.1	17.6		33.8	38.2		33.9	37.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	0.8	0.2	0.6	5.0		1.9	0.9		20.4	1.8	
Delay (s)	16.5	7.7	5.8	12.8	22.6		35.7	39.1		54.3	39.4	
Level of Service	B	A	A	B	C		D	D		D	D	
Approach Delay (s)		10.6			21.6			37.2			45.2	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy & North Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	3	50	15	3	20	50	85	25	30	100	75
Future Volume (vph)	70	3	50	15	3	20	50	85	25	30	100	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.945			0.928			0.966			0.936	
Flt Protected		0.972			0.981		0.950			0.950		
Satd. Flow (prot)	0	1711	0	0	1696	0	1770	1799	0	1770	1744	0
Flt Permitted		0.972			0.981		0.950			0.950		
Satd. Flow (perm)	0	1711	0	0	1696	0	1770	1799	0	1770	1744	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	3	54	16	3	22	54	92	27	33	109	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	133	0	0	41	0	54	119	0	33	191	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy & North Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	3	50	15	3	20	50	85	25	30	100	75
Future Volume (Veh/h)	70	3	50	15	3	20	50	85	25	30	100	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	3	54	16	3	22	54	92	27	33	109	82
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	440	443	150	444	470	106	191			119		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440	443	150	444	470	106	191			119		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	99	94	97	99	98	96			98		
cM capacity (veh/h)	489	478	896	468	461	949	1383			1469		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	133	41	54	119	33	191
Volume Left	76	16	54	0	33	0
Volume Right	54	22	0	27	0	82
cSH	599	642	1383	1700	1469	1700
Volume to Capacity	0.22	0.06	0.04	0.07	0.02	0.11
Queue Length 95th (m)	6.7	1.6	1.0	0.0	0.6	0.0
Control Delay (s)	12.7	11.0	7.7	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.7	11.0	2.4		1.1	
Approach LOS	B	B				

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy & South Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	3	90	15	3	10	95	80	25	30	60	75
Future Volume (vph)	70	3	90	15	3	10	95	80	25	30	60	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.925			0.950			0.964			0.916	
Flt Protected		0.979			0.974		0.950			0.950		
Satd. Flow (prot)	0	1687	0	0	1724	0	1770	1796	0	1770	1706	0
Flt Permitted		0.979			0.974		0.950			0.950		
Satd. Flow (perm)	0	1687	0	0	1724	0	1770	1796	0	1770	1706	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	3	98	16	3	11	103	87	27	33	65	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	0	0	30	0	103	114	0	33	147	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy & South Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	3	90	15	3	10	95	80	25	30	60	75
Future Volume (Veh/h)	70	3	90	15	3	10	95	80	25	30	60	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	3	98	16	3	11	103	87	27	33	65	82
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	478	492	106	537	520	100	147			114		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478	492	106	537	520	100	147			114		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	99	90	96	99	99	93			98		
cM capacity (veh/h)	455	433	948	377	418	955	1435			1475		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	177	30	103	114	33	147
Volume Left	76	16	103	0	33	0
Volume Right	98	11	0	27	0	82
cSH	638	491	1435	1700	1475	1700
Volume to Capacity	0.28	0.06	0.07	0.07	0.02	0.09
Queue Length 95th (m)	9.0	1.6	1.9	0.0	0.5	0.0
Control Delay (s)	12.8	12.8	7.7	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.8	12.8	3.7		1.4	
Approach LOS	B	B				

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	565	0	165	530	0	120	455	0	60	475	0
Future Volume (vph)	75	565	0	165	530	0	120	455	0	60	475	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.335			0.255			0.407			0.485		
Satd. Flow (perm)	634	3539	0	475	3539	0	770	3610	0	897	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	77	577	0	168	541	0	122	464	0	61	485	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	577	0	168	541	0	122	464	0	61	485	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

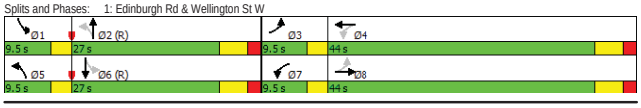
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	29.8	20.5		30.6	22.4		50.0	39.7		46.5	36.5	
Actuated g/C Ratio	0.33	0.23		0.34	0.25		0.56	0.44		0.52	0.41	
v/c Ratio	0.26	0.72		0.66	0.61		0.23	0.29		0.11	0.33	
Control Delay	19.9	37.0		33.1	33.3		11.3	18.4		8.3	18.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.9	37.0		33.1	33.3		11.3	18.4		8.3	18.6	
LOS	B	D		C	C		B	B		A	B	
Approach Delay		35.0			33.3			17.0			17.5	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80.5 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 62.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	577	168	541	122	464	61	485
v/c Ratio	0.26	0.72	0.66	0.61	0.23	0.29	0.11	0.33
Control Delay	19.9	37.0	33.1	33.3	11.3	18.4	8.3	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	37.0	33.1	33.3	11.3	18.4	8.3	18.6
Queue Length 50th (m)	9.1	51.3	21.1	47.5	9.6	28.4	3.1	34.1
Queue Length 95th (m)	16.6	63.6	32.5	59.4	20.8	46.7	7.2	54.2
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	295	1494	254	1494	526	1593	536	1464
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.39	0.66	0.36	0.23	0.29	0.11	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	565	0	165	530	0	120	455	0	60	475	0
Future Volume (vph)	75	565	0	165	530	0	120	455	0	60	475	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3539		1769	3539		1802	3610		1763	3610	
Flt Permitted	0.34	1.00		0.25	1.00		0.41	1.00		0.49	1.00	
Satd. Flow (perm)	636	3539		474	3539		772	3610		901	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	77	577	0	168	541	0	122	464	0	61	485	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	77	577	0	168	541	0	122	464	0	61	485	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	26.3	21.1		28.9	22.4		47.0	38.5		41.8	35.9	
Effective Green, g (s)	26.3	21.1		28.9	22.4		47.0	38.5		41.8	35.9	
Actuated g/C Ratio	0.29	0.23		0.32	0.25		0.52	0.43		0.46	0.40	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	253	829		245	880		500	1544		474	1439	
v/s Ratio Prot	0.02	0.16		c0.05	0.15		c0.02	0.13		0.01	c0.13	
v/s Ratio Perm	0.07			c0.17			0.10			0.05		
v/c Ratio	0.30	0.70		0.69	0.61		0.24	0.30		0.13	0.34	
Uniform Delay, d1	23.7	31.5		23.5	30.0		11.2	16.9		13.4	18.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.76	0.91	
Incremental Delay, d2	0.7	2.6		7.7	1.3		0.3	0.5		0.1	0.6	
Delay (s)	24.4	34.1		31.2	31.3		11.5	17.4		10.3	17.7	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		32.9			31.3			16.2			16.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	540	0	0	695	50	285	85	160	45	0	250
Future Volume (vph)	145	540	0	0	695	50	285	85	160	45	0	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.990				0.850			0.850
Flt Protected	0.950						0.950	0.973		0.950		
Satd. Flow (prot)	1787	5136	0	0	5080	0	1698	1747	1599	1805	0	1599
Flt Permitted	0.281						0.950	0.973		0.571		
Satd. Flow (perm)	528	5136	0	0	5080	0	1698	1747	1599	1085	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					11				165			258
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	149	557	0	0	716	52	294	88	165	46	0	258
Shared Lane Traffic (%)							36%					
Lane Group Flow (vph)	149	557	0	0	768	0	188	194	165	46	0	258
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	47.5	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	47.5	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	37.2%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	4.5	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	3.0	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	33.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

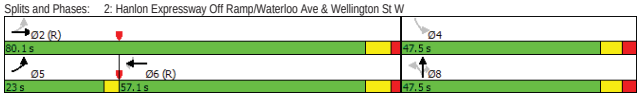
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.31	0.31		0.39
v/c Ratio	0.29	0.19			0.38		0.35	0.35	0.27	0.14		0.33
Control Delay	12.5	13.3			28.1		36.2	36.1	5.8	32.9		4.1
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	12.5	13.3			28.1		36.2	36.1	5.8	32.9		4.1
LOS	B	B			C		D	D	A	C		A
Approach Delay		13.1			28.1			27.0			8.5	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type:	Other		
Cycle Length: 127.6			
Actuated Cycle Length: 127.6			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 95			
Control Type: Pretimed			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 20.7		Intersection LOS: C	
Intersection Capacity Utilization 66.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	149	557	768	188	194	165	46	258
v/c Ratio	0.29	0.19	0.38	0.35	0.35	0.27	0.14	0.33
Control Delay	12.5	13.3	28.1	36.2	36.1	5.8	32.9	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	13.3	28.1	36.2	36.1	5.8	32.9	4.1
Queue Length 50th (m)	16.1	24.7	51.9	40.4	41.6	0.0	8.7	0.0
Queue Length 95th (m)	26.1	31.3	63.6	63.2	64.7	16.1	18.9	17.0
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	516	2938	1997	532	547	614	340	783
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.19	0.38	0.35	0.35	0.27	0.14	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	540	0	0	695	50	285	85	160	45	0	250
Future Volume (vph)	145	540	0	0	695	50	285	85	160	45	0	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5079		1698	1747	1599	1805		1599
Flt Permitted	0.28	1.00			1.00		0.95	0.97	1.00	0.57		1.00
Satd. Flow (perm)	529	5136			5079		1698	1747	1599	1086		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	557	0	0	716	52	294	88	165	46	0	258
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	113	0	0	157
Lane Group Flow (vph)	149	557	0	0	761	0	188	194	52	46	0	101
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		8	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	40.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.31	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.1
Lane Grp Cap (vph)	499	2938			1990		532	547	501	340		626
v/s Ratio Prot	c0.05	0.11			c0.15							
v/s Ratio Perm	0.12						0.11	0.11	0.03	0.04		0.06
v/c Ratio	0.30	0.19			0.38		0.35	0.35	0.10	0.14		0.16
Uniform Delay, d1	13.3	13.1			27.8		33.8	33.8	31.1	31.4		25.2
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.5	0.1			0.6		1.8	1.8	0.4	0.8		0.6
Delay (s)	14.8	13.2			28.3		35.7	35.6	31.5	32.2		25.7
Level of Service	B	B			C		D	D	C	C		C
Approach Delay (s)		13.6			28.3			34.4			26.7	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	645	385	0	885	0	0	0	0	165	0	155
Future Volume (vph)	0	645	385	0	885	0	0	0	0	165	0	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.944										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4818	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4818	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		342										163
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	679	405	0	932	0	0	0	0	174	0	163
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1084	0	0	932	0	0	0	0	174	0	163
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					24.7		56.9
Total Split (%)		69.7%			69.7%					30.3%		69.7%
Maximum Green (s)		50.0			50.0					18.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
v/c Ratio		0.35			0.30					0.23		0.16

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

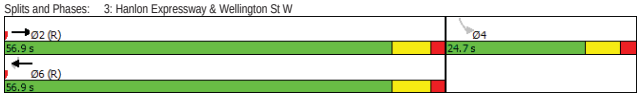
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		5.4			7.8					27.1		1.6
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		5.4			7.8					27.1		1.6
LOS		A			A					C		A
Approach Delay		5.4			7.8						14.7	
Approach LOS		A			A						B	

Intersection Summary

Area Type: Other
Cycle Length: 81.6
Actuated Cycle Length: 81.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.35
Intersection Signal Delay: 7.7 — Intersection LOS: A
Intersection Capacity Utilization 38.2% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1084	932	174	163
v/c Ratio	0.35	0.30	0.23	0.16
Control Delay	5.4	7.8	27.1	1.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.4	7.8	27.1	1.6
Queue Length 50th (m)	18.2	23.7	12.1	0.0
Queue Length 95th (m)	25.1	30.5	20.6	6.7
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	3084	3147	764	996
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.35	0.30	0.23	0.16

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	645	385	0	885	0	0	0	0	165	0	155
Future Volume (vph)	0	645	385	0	885	0	0	0	0	165	0	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4818			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4818			5136					3467		1524
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)	0	679	405	0	932	0	0	0	0	174	0	163
RTOR Reduction (vph)	0	132	0	0	0	0	0	0	0	0	0	63
Lane Group Flow (vph)	0	952	0	0	932	0	0	0	0	174	0	100
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					18.0		50.0
Effective Green, g (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2952			3147					764		933
v/s Ratio Prot		c0.20			0.18							
v/s Ratio Perm										c0.05		0.07
v/c Ratio		0.32			0.30					0.23		0.11
Uniform Delay, d1		7.6			7.5					26.1		6.5
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.3			0.2					0.7		0.2
Delay (s)		7.9			7.7					26.8		6.8
Level of Service		A			A					C		A
Approach Delay (s)		7.9			7.7			0.0			17.1	
Approach LOS		A			A			A			B	

Intersection Summary

HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	635	610	300	385	55
Future Volume (vph)	65	635	610	300	385	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.951			0.850
Flt Protected		0.995			0.950	
Satd. Flow (prot)	0	3528	3342	0	1787	1615
Flt Permitted		0.778			0.950	
Satd. Flow (perm)	0	2758	3342	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			147			57
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Adj. Flow (vph)	67	655	629	309	397	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	722	938	0	397	57
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

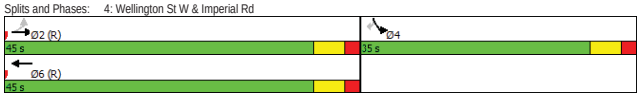
Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		45.3	45.3		22.7	22.7
Actuated g/C Ratio		0.57	0.57		0.28	0.28
v/c Ratio		0.46	0.48		0.78	0.11
Control Delay		12.4	10.3		37.2	5.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		12.4	10.3		37.2	5.9
LOS		B	B		D	A
Approach Delay		12.4	10.3		33.3	
Approach LOS		B	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 82.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	722	938	397	57
v/c Ratio	0.46	0.48	0.78	0.11
Control Delay	12.4	10.3	37.2	5.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.4	10.3	37.2	5.9
Queue Length 50th (m)	33.3	36.0	57.8	0.0
Queue Length 95th (m)	56.2	60.9	80.5	7.2
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1560	1955	647	621
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.46	0.48	0.61	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

10-17-2019

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	635	610	300	385	55
Future Volume (vph)	65	635	610	300	385	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3529	3340		1787	1615
Flt Permitted		0.78	1.00		0.95	1.00
Satd. Flow (perm)		2759	3340		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	655	629	309	397	57
RTOR Reduction (vph)	0	0	64	0	0	41
Lane Group Flow (vph)	0	722	874	0	397	16
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		45.3	45.3		22.7	22.7
Effective Green, g (s)		45.3	45.3		22.7	22.7
Actuated g/C Ratio		0.57	0.57		0.28	0.28
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1562	1891		507	458
v/s Ratio Prot			c0.26		c0.22	
v/s Ratio Perm		0.26				0.01
v/c Ratio		0.46	0.46		0.78	0.04
Uniform Delay, d1		10.2	10.2		26.4	20.7
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.0	0.8		7.7	0.0
Delay (s)		11.2	11.0		34.1	20.8
Level of Service		B	B		C	C
Approach Delay (s)		11.2	11.0		32.4	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	325	0	230	345	70	360	1115	0	90	1020	130
Future Volume (vph)	130	325	0	230	345	70	360	1115	0	90	1020	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.975							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3511	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.336			0.295			0.950			0.950		
Satd. Flow (perm)	631	3574	0	560	3511	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					12							134
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	134	335	0	237	356	72	371	1149	0	93	1052	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	335	0	237	428	0	371	1149	0	93	1052	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

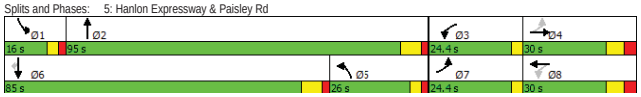
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	39.1	19.4		46.9	24.5		20.6	87.7		10.6	77.7	77.7
Actuated g/C Ratio	0.24	0.12		0.29	0.15		0.13	0.54		0.07	0.48	0.48
v/c Ratio	0.52	0.78		0.75	0.79		0.84	0.63		0.78	0.63	0.16
Control Delay	51.0	81.9		62.1	75.0		85.6	27.8		112.9	33.6	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	51.0	81.9		62.1	75.0		85.6	27.8		112.9	33.6	3.9
LOS	D	F		E	E		F	C		F	C	A
Approach Delay		73.1			70.4			41.9			36.3	
Approach LOS		E			E			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 161			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 48.6		Intersection LOS: D	
Intersection Capacity Utilization 80.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	134	335	237	428	371	1149	93	1052	134
v/c Ratio	0.52	0.78	0.75	0.79	0.84	0.63	0.78	0.63	0.16
Control Delay	51.0	81.9	62.1	75.0	85.6	27.8	112.9	33.6	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	81.9	62.1	75.0	85.6	27.8	112.9	33.6	3.9
Queue Length 50th (m)	34.8	59.4	65.5	72.3	65.1	143.3	32.0	141.7	0.0
Queue Length 95th (m)	54.4	78.1	93.4	#102.1	#91.3	170.6	#64.6	169.2	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	331	489	329	551	453	1838	123	1675	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.69	0.72	0.78	0.82	0.63	0.76	0.63	0.16

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	325	0	230	345	70	360	1115	0	90	1020	130
Future Volume (vph)	130	325	0	230	345	70	360	1115	0	90	1020	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.97		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574		1804	3510		3467	3374		1805	3471	1615
Flt Permitted	0.34	1.00		0.30	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	633	3574		561	3510		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	335	0	237	356	72	371	1149	0	93	1052	134
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	0	69
Lane Group Flow (vph)	134	335	0	237	418	0	371	1149	0	93	1052	65
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	34.1	19.4		42.2	24.5		20.6	87.7		10.6	77.7	77.7
Effective Green, g (s)	34.1	19.4		42.2	24.5		20.6	87.7		10.6	77.7	77.7
Actuated g/C Ratio	0.21	0.12		0.26	0.15		0.13	0.55		0.07	0.48	0.48
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	239	430		300	534		443	1839		118	1676	779
v/s Ratio Prot	0.05	0.09		c0.10	0.12		c0.11	c0.34		c0.05	0.30	
v/s Ratio Perm	0.07			c0.11								0.04
v/c Ratio	0.56	0.78		0.79	0.78		0.84	0.62		0.79	0.63	0.08
Uniform Delay, d1	54.2	68.7		50.8	65.6		68.5	25.2		74.0	30.9	22.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.0	8.7		13.2	7.4		12.9	1.6		28.5	1.8	0.2
Delay (s)	57.2	77.3		64.0	73.0		81.5	26.9		102.5	32.7	22.6
Level of Service	E	E		E	E		F	C		F	C	C
Approach Delay (s)		71.6			69.8			40.2			36.7	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	160.9	Sum of lost time (s)	23.4
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	110	35	55	105	40	45	495	65	30	490	55
Future Volume (vph)	80	110	35	55	105	40	45	495	65	30	490	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.964			0.959			0.983			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1800	0	1805	1797	0	1805	1858	0	1770	1867	0
Flt Permitted	0.602			0.602			0.421			0.412		
Satd. Flow (perm)	1110	1800	0	1135	1797	0	798	1858	0	765	1867	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			33			8			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	82	113	36	57	108	41	46	510	67	31	505	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	149	0	57	149	0	46	577	0	31	562	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

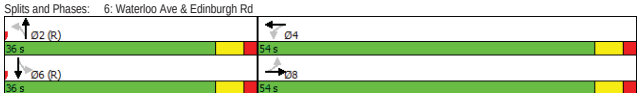
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	11.7	11.7		11.7	11.7		66.3	66.3		66.3	66.3	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.74	0.74		0.74	0.74	
v/c Ratio	0.57	0.58		0.39	0.57		0.08	0.42		0.06	0.41	
Control Delay	50.9	38.2		41.9	36.1		3.8	10.4		4.5	6.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	50.9	38.2		41.9	36.1		3.8	10.4		4.5	6.0	
LOS	D	D		D	D		A	B		A	A	
Approach Delay		42.7			37.7			9.9			5.9	
Approach LOS		D			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 67.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	149	57	149	46	577	31	562
v/c Ratio	0.57	0.58	0.39	0.57	0.08	0.42	0.06	0.41
Control Delay	50.9	38.2	41.9	36.1	3.8	10.4	4.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	38.2	41.9	36.1	3.8	10.4	4.5	6.0
Queue Length 50th (m)	14.3	21.1	9.7	20.0	1.6	27.2	1.3	30.9
Queue Length 95th (m)	27.4	37.7	20.3	36.6	4.7	84.9	4.6	60.8
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	592	972	605	973	587	1369	563	1376
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.15	0.09	0.15	0.08	0.42	0.06	0.41

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	110	35	55	105	40	45	495	65	30	490	55
Future Volume (vph)	80	110	35	55	105	40	45	495	65	30	490	55
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	
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	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	0.98		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)	1752	1800		1792	1796		1800	1858		1760	1866	
Flt Permitted	0.60	1.00		0.60	1.00		0.42	1.00		0.41	1.00	
Satd. Flow (perm)	1110	1800		1135	1796		798	1858		764	1866	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	113	36	57	108	41	46	510	67	31	505	57
RTOR Reduction (vph)	0	23	0	0	29	0	0	2	0	0	2	0
Lane Group Flow (vph)	82	126	0	57	120	0	46	575	0	31	560	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	11.7	11.7		11.7	11.7		66.3	66.3		66.3	66.3	
Effective Green, g (s)	11.7	11.7		11.7	11.7		66.3	66.3		66.3	66.3	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.74	0.74		0.74	0.74	
Clearance Time (s)	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	
Lane Grp Cap (vph)	144	234		147	233		587	1368		562	1374	
v/s Ratio Prot		0.07			0.07			c0.31			0.30	
v/s Ratio Perm	c0.07			0.05			0.06			0.04		
v/c Ratio	0.57	0.54		0.39	0.52		0.08	0.42		0.06	0.41	
Uniform Delay, d1	36.8	36.6		35.9	36.5		3.3	4.5		3.3	4.5	
Progression Factor	1.00	1.00		1.00	1.00		0.81	1.82		1.00	1.00	
Incremental Delay, d2	5.1	2.4		1.7	1.9		0.3	0.9		0.2	0.9	
Delay (s)	41.9	39.0		37.6	38.4		2.9	9.2		3.4	5.4	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		40.0			38.2			8.7			5.3	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	70	140	170	70	140	160
Future Volume (vph)	70	140	170	70	140	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	76	152	185	76	152	174
Shared Lane Traffic (%)						
Lane Group Flow (vph)	76	152	185	76	152	174
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.5%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	70	140	170	70	140	160
Future Volume (Veh/h)	70	140	170	70	140	160
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	152	185	76	152	174
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			229		523	77
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			229		523	77
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		66	82
cM capacity (veh/h)			1338		446	986

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	76	152	185	76	326
Volume Left	0	0	185	0	152
Volume Right	0	152	0	0	174
cSH	1700	1700	1338	1700	956
Volume to Capacity	0.04	0.09	0.14	0.04	0.34
Queue Length 95th (m)	0.0	0.0	3.8	0.0	12.2
Control Delay (s)	0.0	0.0	8.1	0.0	13.1
Lane LOS			A		B
Approach Delay (s)	0.0		5.8		13.1
Approach LOS					B

Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	300	95	35	275	60	110	460	30	55	435	85
Future Volume (vph)	100	300	95	35	275	60	110	460	30	55	435	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.964			0.973			0.991			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1803	0	1805	1821	0	1805	1878	0	1736	1842	0
Flt Permitted	0.403			0.320			0.327			0.354		
Satd. Flow (perm)	758	1803	0	604	1821	0	619	1878	0	645	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			16			6			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	108	323	102	38	296	65	118	495	32	59	468	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	425	0	38	361	0	118	527	0	59	559	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.43	0.69		0.19	0.59		0.38	0.55		0.18	0.59	
Control Delay	25.7	27.4		20.9	24.4		15.8	15.3		11.9	15.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.7	27.4		20.9	24.4		15.8	15.3		11.9	15.8	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		27.0			24.0			15.4			15.4	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd

Queues
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	108	425	38	361	118	527	59	559
v/c Ratio	0.43	0.69	0.19	0.59	0.38	0.55	0.18	0.59
Control Delay	25.7	27.4	20.9	24.4	15.8	15.3	11.9	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	27.4	20.9	24.4	15.8	15.3	11.9	15.8
Queue Length 50th (m)	13.9	57.4	4.0	41.8	10.1	49.8	4.5	53.1
Queue Length 95th (m)	30.3	92.3	11.3	68.7	23.2	78.0	11.5	83.6
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	252	616	201	617	313	954	326	942
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.69	0.19	0.59	0.38	0.55	0.18	0.59

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	300	95	35	275	60	110	460	30	55	435	85
Future Volume (vph)	100	300	95	35	275	60	110	460	30	55	435	85
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	
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	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		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)	1786	1803		1794	1821		1798	1877		1731	1841	
Flt Permitted	0.40	1.00		0.32	1.00		0.33	1.00		0.35	1.00	
Satd. Flow (perm)	758	1803		604	1821		619	1877		644	1841	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	108	323	102	38	296	65	118	495	32	59	468	91
RTOR Reduction (vph)	0	15	0	0	11	0	0	3	0	0	9	0
Lane Group Flow (vph)	108	410	0	38	350	0	118	524	0	59	550	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	252	601		201	607		313	951		326	932	
v/s Ratio Prot		c0.23			0.19			0.28			c0.30	
v/s Ratio Perm	0.14			0.06			0.19			0.09		
v/c Ratio	0.43	0.68		0.19	0.58		0.38	0.55		0.18	0.59	
Uniform Delay, d1	19.4	21.6		17.8	20.6		11.3	12.7		10.0	13.0	
Progression Factor	1.00	1.02		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	5.7		2.1	4.0		3.4	2.3		1.2	2.7	
Delay (s)	24.4	27.8		19.9	24.6		14.7	15.0		11.3	15.8	
Level of Service	C	C		B	C		B	B		B	B	
Approach Delay (s)		27.1			24.2			14.9			15.3	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	325	125	70	315	145	120	40	65	190	45	205
Future Volume (vph)	210	325	125	70	315	145	120	40	65	190	45	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.99	1.00	0.99		1.00	0.98		0.99	0.99	
Frt			0.850		0.953			0.907			0.877	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	1805	1785	0	1770	1695	0	1787	1647	0
Flt Permitted	0.331			0.550			0.494			0.532		
Satd. Flow (perm)	628	1881	1594	1044	1785	0	919	1695	0	995	1647	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136		33			71			213	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	228	353	136	76	342	158	130	43	71	207	49	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	353	136	76	500	0	130	114	0	207	272	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	61.0	58.0	58.0	45.4	45.4		18.3	9.2		20.6	9.2	
Actuated g/C Ratio	0.68	0.64	0.64	0.50	0.50		0.20	0.10		0.23	0.10	
v/c Ratio	0.41	0.29	0.13	0.14	0.55		0.50	0.48		0.65	0.76	
Control Delay	8.3	8.4	1.7	14.8	18.2		33.6	23.3		38.8	24.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.3	8.4	1.7	14.8	18.2		33.6	23.3		38.8	24.2	
LOS	A	A	A	B	B		C	C		D	C	
Approach Delay		7.1			17.7			28.8			30.5	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 18.3		Intersection LOS: B	
Intersection Capacity Utilization 75.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd

Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	228	353	136	76	500	130	114	207	272
v/c Ratio	0.41	0.29	0.13	0.14	0.55	0.50	0.48	0.65	0.76
Control Delay	8.3	8.4	1.7	14.8	18.2	33.6	23.3	38.8	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	8.4	1.7	14.8	18.2	33.6	23.3	38.8	24.2
Queue Length 50th (m)	13.4	25.2	0.0	7.0	55.1	19.0	7.4	31.8	10.2
Queue Length 95th (m)	25.8	44.6	6.7	17.3	97.7	32.5	22.6	49.6	35.2
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	576	1211	1075	527	917	264	305	317	420
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.29	0.13	0.14	0.55	0.49	0.37	0.65	0.65

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	325	125	70	315	145	120	40	65	190	45	205
Future Volume (vph)	210	325	125	70	315	145	120	40	65	190	45	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.91		1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	1881	1594	1804	1784		1769	1694		1782	1647	
Flt Permitted	0.33	1.00	1.00	0.55	1.00		0.49	1.00		0.53	1.00	
Satd. Flow (perm)	629	1881	1594	1044	1784		919	1694		999	1647	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	353	136	76	342	158	130	43	71	207	49	223
RTOR Reduction (vph)	0	0	50	0	17	0	0	65	0	0	188	0
Lane Group Flow (vph)	228	353	86	76	483	0	130	49	0	207	84	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	56.7	56.7	56.7	44.2	44.2		16.0	8.1		20.6	10.4	
Effective Green, g (s)	56.7	56.7	56.7	44.2	44.2		16.0	8.1		20.6	10.4	
Actuated g/C Ratio	0.63	0.63	0.63	0.49	0.49		0.18	0.09		0.23	0.12	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	520	1185	1004	512	876		237	152		317	190	
v/s Ratio Prot	c0.05	0.19			c0.27		0.05	0.03		c0.07	0.05	
v/s Ratio Perm	0.23		0.05	0.07			0.05			c0.08		
v/c Ratio	0.44	0.30	0.09	0.15	0.55		0.55	0.32		0.65	0.44	
Uniform Delay, d1	8.6	7.6	6.5	12.6	16.0		32.9	38.4		30.3	37.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.6	0.2	0.6	2.5		2.6	1.2		4.8	1.6	
Delay (s)	9.2	8.2	6.7	13.2	18.5		35.5	39.6		35.1	38.7	
Level of Service	A	A	A	B	B		D	D		D	D	
Approach Delay (s)		8.3			17.8			37.4			37.1	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy & North Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	4	50	25	4	25	55	105	25	25	110	85
Future Volume (vph)	80	4	50	25	4	25	55	105	25	25	110	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.950			0.937			0.971			0.935	
Flt Protected		0.971			0.977		0.950			0.950		
Satd. Flow (prot)	0	1718	0	0	1705	0	1770	1809	0	1770	1742	0
Flt Permitted		0.971			0.977		0.950			0.950		
Satd. Flow (perm)	0	1718	0	0	1705	0	1770	1809	0	1770	1742	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	4	54	27	4	27	60	114	27	27	120	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	145	0	0	58	0	60	141	0	27	212	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.2%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy & North Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	4	50	25	4	25	55	105	25	25	110	85
Future Volume (Veh/h)	80	4	50	25	4	25	55	105	25	25	110	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	4	54	27	4	27	60	114	27	27	120	92
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	483	481	166	478	514	128	212			141		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	483	481	166	478	514	128	212			141		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	81	99	94	94	99	97	96			98		
cM capacity (veh/h)	454	454	878	442	436	923	1358			1442		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	145	58	60	141	27	212
Volume Left	87	27	60	0	27	0
Volume Right	54	27	0	27	0	92
cSH	553	583	1358	1700	1442	1700
Volume to Capacity	0.26	0.10	0.04	0.08	0.02	0.12
Queue Length 95th (m)	8.4	2.6	1.1	0.0	0.5	0.0
Control Delay (s)	13.8	11.9	7.8	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.8	11.9	2.3		0.9	
Approach LOS	B	B				

Intersection Summary

Average Delay	5.2		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy & South Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	4	90	25	4	25	95	80	20	25	75	85
Future Volume (vph)	80	4	90	25	4	25	95	80	20	25	75	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.930			0.937			0.970			0.921	
Flt Protected		0.978			0.977		0.950			0.950		
Satd. Flow (prot)	0	1694	0	0	1705	0	1770	1807	0	1770	1716	0
Flt Permitted		0.978			0.977		0.950			0.950		
Satd. Flow (perm)	0	1694	0	0	1705	0	1770	1807	0	1770	1716	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	4	98	27	4	27	103	87	22	27	82	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	189	0	0	58	0	103	109	0	27	174	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.2%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy & South Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	4	90	25	4	25	95	80	20	25	75	85
Future Volume (Veh/h)	80	4	90	25	4	25	95	80	20	25	75	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	4	98	27	4	27	103	87	22	27	82	92
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	504	497	128	540	532	98	174			109		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	504	497	128	540	532	98	174			109		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	99	89	93	99	97	93			98		
cM capacity (veh/h)	430	432	922	374	412	958	1403			1481		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	189	58	103	109	27	174
Volume Left	87	27	103	0	27	0
Volume Right	98	27	0	22	0	92
cSH	594	527	1403	1700	1481	1700
Volume to Capacity	0.32	0.11	0.07	0.06	0.02	0.10
Queue Length 95th (m)	10.9	3.0	1.9	0.0	0.4	0.0
Control Delay (s)	13.9	12.7	7.8	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.9	12.7	3.8		1.0	
Approach LOS	B	B				

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	250	35	50	250	65	79
Future Volume (vph)	250	35	50	250	65	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		60.0	0.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt		0.850	0.875			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1615	3082	0	1805	3610
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1615	3082	0	1805	3610
Link Speed (k/h)	50		50			50
Link Distance (m)	538.7		138.7			117.5
Travel Time (s)	38.8		10.0			8.5
Confl. Peds. (#/hr)	7			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	3%	0%	0%
Adj. Flow (vph)	272	38	54	272	71	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	272	38	326	0	71	86
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.1%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	250	35	50	250	65	79
Future Volume (Veh/h)	250	35	50	250	65	79
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	272	38	54	272	71	86
Pedestrians	1		7			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	0		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			139			
pX, platoon unblocked						
vC, conflicting volume	383	164			327	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	383	164			327	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	51	96			94	
cM capacity (veh/h)	555	857			1243	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	272	38	36	290	71	43	43
Volume Left	272	0	0	0	71	0	0
Volume Right	0	38	0	272	0	0	0
cSH	555	857	1700	1700	1243	1700	1700
Volume to Capacity	0.49	0.04	0.02	0.17	0.06	0.03	0.03
Queue Length 95th (m)	21.5	1.1	0.0	0.0	1.5	0.0	0.0
Control Delay (s)	17.6	9.4	0.0	0.0	8.1	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	16.6		0.0		3.7		
Approach LOS	C						

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	260	75	155	270	60	125
Future Volume (vph)	260	75	155	270	60	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		60.0	0.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt		0.850	0.905			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1615	3246	0	1805	3610
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1615	3246	0	1805	3610
Link Speed (k/h)	50		50			50
Link Distance (m)	538.7		138.7			117.5
Travel Time (s)	38.8		10.0			8.5
Confl. Peds. (#/hr)	1					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	283	82	168	293	65	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	283	82	461	0	65	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.7%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	260	75	155	270	60	125
Future Volume (Veh/h)	260	75	155	270	60	125
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	283	82	168	293	65	136
Pedestrians			1			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			139			
pX, platoon unblocked						
vC, conflicting volume	514	230			461	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	514	230			461	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	39	89			94	
cM capacity (veh/h)	461	778			1111	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	283	82	112	349	65	68	68
Volume Left	283	0	0	0	65	0	0
Volume Right	0	82	0	293	0	0	0
cSH	461	778	1700	1700	1111	1700	1700
Volume to Capacity	0.61	0.11	0.07	0.21	0.06	0.04	0.04
Queue Length 95th (m)	32.3	2.8	0.0	0.0	1.5	0.0	0.0
Control Delay (s)	24.4	10.2	0.0	0.0	8.4	0.0	0.0
Lane LOS	C	B			A		
Approach Delay (s)	21.2		0.0		2.7		
Approach LOS	C						

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	170	70	140	160	70	140
Future Volume (vph)	170	70	140	160	70	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		60.0	0.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt		0.850	0.920			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1615	3304	0	1805	3610
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1615	3304	0	1805	3610
Link Speed (k/h)	50		50			50
Link Distance (m)	538.7		138.7			117.5
Travel Time (s)	38.8		10.0			8.5
Confl. Peds. (#/hr)	1					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	185	76	152	174	76	152
Shared Lane Traffic (%)						
Lane Group Flow (vph)	185	76	326	0	76	152
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.3%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	170	70	140	160	70	140
Future Volume (Veh/h)	170	70	140	160	70	140
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	185	76	152	174	76	152
Pedestrians			1			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			139			
pX, platoon unblocked						
vC, conflicting volume	468	163			326	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	468	163			326	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	62	91			94	
cM capacity (veh/h)	491	859			1245	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	185	76	101	225	76	76	76
Volume Left	185	0	0	0	76	0	0
Volume Right	0	76	0	174	0	0	0
cSH	491	859	1700	1700	1245	1700	1700
Volume to Capacity	0.38	0.09	0.06	0.13	0.06	0.04	0.04
Queue Length 95th (m)	13.9	2.3	0.0	0.0	1.6	0.0	0.0
Control Delay (s)	16.7	9.6	0.0	0.0	8.1	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	14.6		0.0		2.7		
Approach LOS	B						

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	820	0	115	535	0	185	585	0	60	540	0
Future Volume (vph)	115	820	0	115	535	0	185	585	0	60	540	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3471	0	1703	3438	0	1752	3539	0	1703	3505	0
Flt Permitted	0.332			0.148			0.249			0.339		
Satd. Flow (perm)	623	3471	0	265	3438	0	457	3539	0	601	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Adj. Flow (vph)	129	921	0	129	601	0	208	657	0	67	607	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	921	0	129	601	0	208	657	0	67	607	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

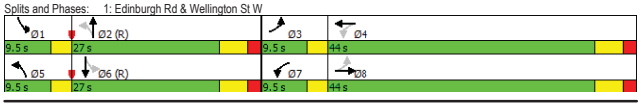
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	40.0	30.5		40.0	30.5		40.3	29.5		34.4	24.2	
Actuated g/C Ratio	0.44	0.34		0.44	0.34		0.45	0.33		0.38	0.27	
v/c Ratio	0.36	0.78		0.58	0.52		0.58	0.57		0.21	0.64	
Control Delay	15.1	31.5		23.3	24.9		26.1	29.5		12.4	28.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.1	31.5		23.3	24.9		26.1	29.5		12.4	28.9	
LOS	B	C		C	C		C	C		B	C	
Approach Delay		29.5			24.6			28.7			27.3	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 27.8		Intersection LOS: C	
Intersection Capacity Utilization 70.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	129	921	129	601	208	657	67	607
v/c Ratio	0.36	0.78	0.58	0.52	0.58	0.57	0.21	0.64
Control Delay	15.1	31.5	23.3	24.9	26.1	29.5	12.4	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	31.5	23.3	24.9	26.1	29.5	12.4	28.9
Queue Length 50th (m)	12.7	78.6	12.7	45.7	22.5	53.2	4.3	56.1
Queue Length 95th (m)	19.2	88.6	19.4	53.7	#46.5	78.8	8.4	71.4
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	361	1465	221	1451	358	1161	320	943
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.63	0.58	0.41	0.58	0.57	0.21	0.64

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	820	0	115	535	0	185	585	0	60	540	0
Future Volume (vph)	115	820	0	115	535	0	185	585	0	60	540	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1786	3471		1703	3438		1751	3539		1696	3505	
Flt Permitted	0.33	1.00		0.15	1.00		0.25	1.00		0.34	1.00	
Satd. Flow (perm)	623	3471		265	3438		460	3539		605	3505	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	129	921	0	129	601	0	208	657	0	67	607	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	129	921	0	129	601	0	208	657	0	67	607	0
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	37.0	30.5		37.0	30.5		38.0	29.0		30.3	24.3	
Effective Green, g (s)	37.0	30.5		37.0	30.5		38.0	29.0		30.3	24.3	
Actuated g/C Ratio	0.41	0.34		0.41	0.34		0.42	0.32		0.34	0.27	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	340	1176		212	1165		347	1140		276	946	
v/s Ratio Prot	0.03	c0.27		c0.04	0.17		c0.07	0.19		0.02	0.17	
v/s Ratio Perm	0.13			0.21			c0.18			0.07		
v/c Ratio	0.38	0.78		0.61	0.52		0.60	0.58		0.24	0.64	
Uniform Delay, d1	17.1	26.8		18.7	23.8		18.0	25.4		20.7	29.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.68	0.85	
Incremental Delay, d2	0.7	3.5		4.9	0.4		2.8	2.1		0.4	3.1	
Delay (s)	17.8	30.3		23.6	24.2		20.8	27.5		14.5	27.7	
Level of Service	B	C		C	C		C	C		B	C	
Approach Delay (s)		28.7			24.1			25.9			26.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	905	0	0	775	5	195	85	235	1	0	260
Future Volume (vph)	165	905	0	0	775	5	195	85	235	1	0	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.999				0.850			0.850
Flt Protected	0.950						0.950	0.980		0.950		
Satd. Flow (prot)	1736	4988	0	0	4983	0	1633	1724	1599	1805	0	1583
Flt Permitted	0.244						0.950	0.980		0.634		
Satd. Flow (perm)	446	4988	0	0	4983	0	1633	1724	1599	1205	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				258			286
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Adj. Flow (vph)	181	995	0	0	852	5	214	93	258	1	0	286
Shared Lane Traffic (%)							29%					
Lane Group Flow (vph)	181	995	0	0	857	0	152	155	258	1	0	286
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

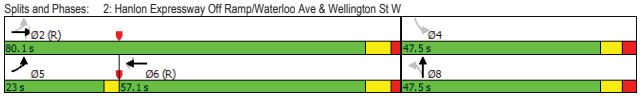
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.31		0.39
v/c Ratio	0.38	0.35			0.44		0.30	0.29	0.25	0.00		0.36
Control Delay	13.7	15.0			29.3		35.2	34.9	2.1	30.0		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	13.7	15.0			29.3		35.2	34.9	2.1	30.0		4.2
LOS	B	B			C		D	C	A	C		A
Approach Delay		14.8			29.3			20.0			4.2	
Approach LOS		B			C			B			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 19.1 — Intersection LOS: B
Intersection Capacity Utilization 64.3% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	181	995	857	152	155	258	1	286
v/c Ratio	0.38	0.35	0.44	0.30	0.29	0.25	0.00	0.36
Control Delay	13.7	15.0	29.3	35.2	34.9	2.1	30.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	15.0	29.3	35.2	34.9	2.1	30.0	4.2
Queue Length 50th (m)	20.0	49.1	60.2	32.0	32.5	0.0	0.2	0.0
Queue Length 95th (m)	31.5	58.7	73.0	52.1	52.7	11.5	1.7	17.9
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	471	2853	1953	511	540	1025	377	794
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.35	0.44	0.30	0.29	0.25	0.00	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	905	0	0	775	5	195	85	235	1	0	260
Future Volume (vph)	165	905	0	0	775	5	195	85	235	1	0	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1735	4988			4984		1633	1725	1599	1805		1583
Flt Permitted	0.24	1.00			1.00		0.95	0.98	1.00	0.63		1.00
Satd. Flow (perm)	446	4988			4984		1633	1725	1599	1204		1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	181	995	0	0	852	5	214	93	258	1	0	286
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	110	0	0	174
Lane Group Flow (vph)	181	995	0	0	856	0	152	155	148	1	0	112
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Grp Cap (vph)	457	2853			1952		511	540	914	377		620
v/s Ratio Prot	c0.06	0.20			c0.17							
v/s Ratio Perm	0.16						c0.09	0.09	0.09	0.00		0.07
v/c Ratio	0.40	0.35			0.44		0.30	0.29	0.16	0.00		0.18
Uniform Delay, d1	13.9	14.6			28.5		33.2	33.0	12.9	30.1		25.4
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.6	0.3			0.7		1.5	1.3	0.4	0.0		0.6
Delay (s)	16.5	14.9			29.2		34.6	34.4	13.2	30.1		26.0
Level of Service	B	B			C		C	C	B	C		C
Approach Delay (s)		15.2			29.2			24.8			26.0	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	950	465	0	865	0	0	0	0	190	0	100
Future Volume (vph)	0	950	465	0	865	0	0	0	0	190	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.951										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4698	0	0	4988	0	0	0	0	3242	0	1455
Flt Permitted										0.950		
Satd. Flow (perm)	0	4698	0	0	4988	0	0	0	0	3242	0	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		181										105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	1					1						
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
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Adj. Flow (vph)	0	1000	489	0	911	0	0	0	0	200	0	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1489	0	0	911	0	0	0	0	200	0	105
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			29.9					24.7		29.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		0.0			7.0					0.0		7.0
Flash Dont Walk (s)		0.0			16.0					0.0		16.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.60			0.36					0.17		0.13

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

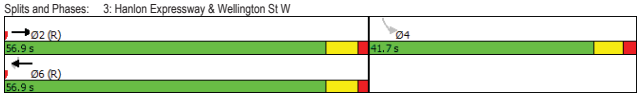
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		16.1			15.2					22.4		3.0
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		16.1			15.2					22.4		3.0
LOS		B			B					C		A
Approach Delay		16.1			15.2						15.7	
Approach LOS		B			B						B	

Intersection Summary

Area Type: Other
Cycle Length: 98.6
Actuated Cycle Length: 98.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 15.7 — Intersection LOS: B
Intersection Capacity Utilization 43.3% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1489	911	200	105
v/c Ratio	0.60	0.36	0.17	0.13
Control Delay	16.1	15.2	22.4	3.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.1	15.2	22.4	3.0
Queue Length 50th (m)	65.1	38.6	14.0	0.0
Queue Length 95th (m)	80.0	48.4	22.3	8.1
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2471	2529	1150	789
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.60	0.36	0.17	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	950	465	0	865	0	0	0	0	190	0	100
Future Volume (vph)	0	950	465	0	865	0	0	0	0	190	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4697			4988					3242		1455
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4697			4988					3242		1455
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)	0	1000	489	0	911	0	0	0	0	200	0	105
RTOR Reduction (vph)	0	89	0	0	0	0	0	0	0	0	0	52
Lane Group Flow (vph)	0	1400	0	0	911	0	0	0	0	200	0	53
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2381			2529					1150		737
v/s Ratio Prot		c0.30			0.18							
v/s Ratio Perm										c0.06		0.04
v/c Ratio		0.59			0.36					0.17		0.07
Uniform Delay, d1		17.1			14.7					21.9		12.4
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		1.1			0.4					0.3		0.2
Delay (s)		18.1			15.1					22.2		12.6
Level of Service		B			B					C		B
Approach Delay (s)		18.1			15.1			0.0			18.9	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	960	680	175	445	75
Future Volume (vph)	65	960	680	175	445	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	1.00			
Frt			0.969			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3397	3310	0	1770	1599
Flt Permitted		0.820			0.950	
Satd. Flow (perm)	0	2794	3310	0	1770	1599
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			56			78
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Adj. Flow (vph)	68	1000	708	182	464	78
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1068	890	0	464	78
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

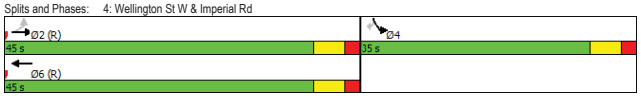
Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	-1.0
Total Lost Time (s)		6.0	6.0		6.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		43.0	43.0		25.0	26.0
Actuated g/C Ratio		0.54	0.54		0.31	0.32
v/c Ratio		0.71	0.49		0.84	0.14
Control Delay		18.2	12.7		39.6	5.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		18.2	12.7		39.6	5.0
LOS		B	B		D	A
Approach Delay		18.2	12.7		34.6	
Approach LOS		B	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 92.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBL	SBL	SBR
Lane Group Flow (vph)	1068	890	464	78
v/c Ratio	0.71	0.49	0.84	0.14
Control Delay	18.2	12.7	39.6	5.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.2	12.7	39.6	5.0
Queue Length 50th (m)	65.0	42.3	67.0	0.0
Queue Length 95th (m)	97.5	63.1	98.4	8.3
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1501	1804	641	648
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.71	0.49	0.72	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	960	680	175	445	75
Future Volume (vph)	65	960	680	175	445	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.97		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3397	3312		1770	1599
Flt Permitted		0.82	1.00		0.95	1.00
Satd. Flow (perm)		2794	3312		1770	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	68	1000	708	182	464	78
RTOR Reduction (vph)	0	0	26	0	0	53
Lane Group Flow (vph)	0	1068	864	0	464	25
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		43.0	43.0		25.0	25.0
Effective Green, g (s)		43.0	43.0		25.0	26.0
Actuated g/C Ratio		0.54	0.54		0.31	0.32
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1501	1780		553	519
v/s Ratio Prot			0.26		c0.26	
v/s Ratio Perm		c0.38				0.02
v/c Ratio		0.71	0.49		0.84	0.05
Uniform Delay, d1		13.9	11.6		25.6	18.5
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.9	1.0		10.8	0.0
Delay (s)		16.7	12.5		36.4	18.6
Level of Service		B	B		D	B
Approach Delay (s)		16.7	12.5		33.8	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	330	0	175	200	30	170	1445	0	25	1085	45
Future Volume (vph)	100	330	0	175	200	30	170	1445	0	25	1085	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Frt					0.980							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	3438	0	1787	3459	0	3303	3343	0	1597	3282	1482
Flt Permitted	0.605			0.304			0.950			0.950		
Satd. Flow (perm)	1074	3438	0	572	3459	0	3303	3343	0	1597	3282	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					8							102
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Adj. Flow (vph)	102	337	0	179	204	31	173	1474	0	26	1107	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	102	337	0	179	235	0	173	1474	0	26	1107	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

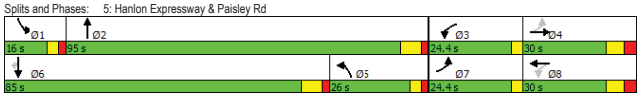
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	59.4	59.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	36.7	19.2		44.2	23.7		15.6	90.4		8.0	78.0	78.0
Actuated g/C Ratio	0.24	0.13		0.29	0.15		0.10	0.59		0.05	0.51	0.51
v/c Ratio	0.33	0.79		0.60	0.44		0.52	0.75		0.31	0.66	0.06
Control Delay	44.9	79.6		52.1	60.2		71.5	28.5		82.8	31.9	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	44.9	79.6		52.1	60.2		71.5	28.5		82.8	31.9	0.1
LOS	D	E		D	E		E	C		F	C	A
Approach Delay		71.5			56.7			33.1			31.8	
Approach LOS		E			E			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 153.3			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 39.9		Intersection LOS: D	
Intersection Capacity Utilization 83.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	102	337	179	235	173	1474	26	1107	46
v/c Ratio	0.33	0.79	0.60	0.44	0.52	0.75	0.31	0.66	0.06
Control Delay	44.9	79.6	52.1	60.2	71.5	28.5	82.8	31.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	79.6	52.1	60.2	71.5	28.5	82.8	31.9	0.1
Queue Length 50th (m)	25.3	57.1	46.4	35.7	27.9	196.7	8.4	144.3	0.0
Queue Length 95th (m)	43.0	79.0	71.0	53.2	42.3	255.3	20.2	187.3	0.0
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	388	496	335	563	454	1972	115	1670	804
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.68	0.53	0.42	0.38	0.75	0.23	0.66	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	330	0	175	200	30	170	1445	0	25	1085	45
Future Volume (vph)	100	330	0	175	200	30	170	1445	0	25	1085	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1687	3438		1787	3460		3303	3343		1597	3282	1482
Flt Permitted	0.61	1.00		0.30	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1075	3438		573	3460		3303	3343		1597	3282	1482
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	102	337	0	179	204	31	173	1474	0	26	1107	46
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	0	0	0	23
Lane Group Flow (vph)	102	337	0	179	228	0	173	1474	0	26	1107	23
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	31.7	19.2		39.2	23.7		17.8	90.5		5.3	78.0	78.0
Effective Green, g (s)	31.7	19.2		39.2	23.7		17.8	90.5		5.3	78.0	78.0
Actuated g/C Ratio	0.20	0.12		0.25	0.15		0.11	0.58		0.03	0.50	0.50
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	268	424		277	527		378	1946		54	1647	743
v/s Ratio Prot	0.03	c0.10		c0.07	0.07		0.05	c0.44		0.02	c0.34	
v/s Ratio Perm	0.05			0.09								0.02
v/c Ratio	0.38	0.79		0.65	0.43		0.46	0.76		0.48	0.67	0.03
Uniform Delay, d1	52.4	66.2		48.7	59.8		64.3	24.2		73.7	29.1	19.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	9.9		5.1	0.6		0.9	2.8		6.6	2.2	0.1
Delay (s)	53.3	76.1		53.8	60.3		65.2	27.1		80.3	31.3	19.7
Level of Service	D	E		D	E		E	C		F	C	B
Approach Delay (s)		70.8			57.5			31.1			31.9	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	39.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	155.4	Sum of lost time (s)	23.4
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	235	45	75	125	25	20	575	95	45	490	35
Future Volume (vph)	55	235	45	75	125	25	20	575	95	45	490	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.976			0.975			0.979			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1781	0	1752	1786	0	1805	1820	0	1770	1842	0
Flt Permitted	0.626			0.352			0.377			0.278		
Satd. Flow (perm)	1157	1781	0	643	1786	0	713	1820	0	516	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			17			10			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	60	255	49	82	136	27	22	625	103	49	533	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	304	0	82	163	0	22	728	0	49	571	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

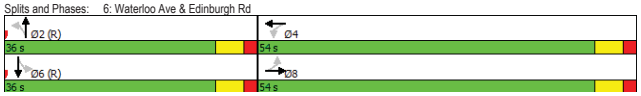
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.8	20.8		20.8	20.8		57.2	57.2		57.2	57.2	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.64	0.64		0.64	0.64	
v/c Ratio	0.22	0.72		0.55	0.38		0.05	0.63		0.15	0.49	
Control Delay	27.7	39.2		43.3	27.2		20.1	30.9		10.0	11.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.7	39.2		43.3	27.2		20.1	30.9		10.0	11.6	
LOS	C	D		D	C		C	C		A	B	
Approach Delay		37.3			32.6			30.5			11.4	
Approach LOS		D			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 26.1		Intersection LOS: C	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	60	304	82	163	22	728	49	571
v/c Ratio	0.22	0.72	0.55	0.38	0.05	0.63	0.15	0.49
Control Delay	27.7	39.2	43.3	27.2	20.1	30.9	10.0	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	39.2	43.3	27.2	20.1	30.9	10.0	11.6
Queue Length 50th (m)	8.9	48.6	13.2	22.4	1.8	95.2	3.2	48.8
Queue Length 95th (m)	17.5	68.2	25.7	35.7	m6.8	159.1	10.8	94.7
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	617	957	342	960	452	1160	327	1172
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.32	0.24	0.17	0.05	0.63	0.15	0.49

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	235	45	75	125	25	20	575	95	45	490	35
Future Volume (vph)	55	235	45	75	125	25	20	575	95	45	490	35
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		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)	1755	1781		1738	1786		1794	1819		1763	1842	
Flt Permitted	0.63	1.00		0.35	1.00		0.38	1.00		0.28	1.00	
Satd. Flow (perm)	1156	1781		644	1786		712	1819		516	1842	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	255	49	82	136	27	22	625	103	49	533	38
RTOR Reduction (vph)	0	12	0	0	13	0	0	4	0	0	1	0
Lane Group Flow (vph)	60	292	0	82	150	0	22	724	0	49	570	0
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.8	20.8		20.8	20.8		57.2	57.2		57.2	57.2	
Effective Green, g (s)	20.8	20.8		20.8	20.8		57.2	57.2		57.2	57.2	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.64	0.64		0.64	0.64	
Clearance Time (s)	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	
Lane Grp Cap (vph)	267	411		148	412		452	1156		327	1170	
v/s Ratio Prot		c0.16			0.08			c0.40			0.31	
v/s Ratio Perm	0.05			0.13			0.03			0.09		
v/c Ratio	0.22	0.71		0.55	0.36		0.05	0.63		0.15	0.49	
Uniform Delay, d1	28.1	31.8		30.5	29.0		6.2	9.9		6.6	8.7	
Progression Factor	1.00	1.00		1.00	1.00		2.38	2.45		1.00	1.00	
Incremental Delay, d2	0.4	5.5		4.4	0.5		0.2	2.2		1.0	1.5	
Delay (s)	28.5	37.4		34.9	29.6		14.8	26.5		7.6	10.1	
Level of Service	C	D		C	C		B	C		A	B	
Approach Delay (s)		35.9			31.4			26.2			9.9	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	4	255	5	5	260
Future Volume (vph)	10	4	255	5	5	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1568
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1568
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		7	7			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	3%
Adj. Flow (vph)	11	4	277	5	5	283
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	4	277	5	5	283
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.1%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	4	255	5	5	260
Future Volume (Veh/h)	10	4	255	5	5	260
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	4	277	5	5	283
Pedestrians				1	7	
Lane Width (m)				3.6	3.6	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			22		577	19
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			22		577	19
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			83		99	73
cM capacity (veh/h)			1584		395	1049

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	11	4	277	5	288
Volume Left	0	0	277	0	5
Volume Right	0	4	0	0	283
cSH	1700	1700	1584	1700	1068
Volume to Capacity	0.01	0.00	0.17	0.00	0.27
Queue Length 95th (m)	0.0	0.0	5.1	0.0	8.8
Control Delay (s)	0.0	0.0	7.8	0.0	9.8
Lane LOS			A		A
Approach Delay (s)	0.0		7.6		9.8
Approach LOS					A

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	330	70	50	235	80	75	465	60	95	405	75
Future Volume (vph)	80	330	70	50	235	80	75	465	60	95	405	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.98		0.99	1.00		1.00	0.99	
Frt		0.974			0.962			0.983			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1758	0	1805	1747	0	1770	1827	0	1656	1799	0
Flt Permitted	0.428			0.307			0.358			0.318		
Satd. Flow (perm)	749	1758	0	580	1747	0	660	1827	0	552	1799	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			25			13			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Adj. Flow (vph)	87	359	76	54	255	87	82	505	65	103	440	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	435	0	54	342	0	82	570	0	103	522	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

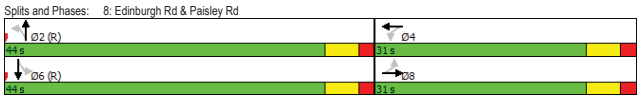
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.35	0.73		0.28	0.57		0.25	0.61		0.37	0.57	
Control Delay	21.5	28.3		23.3	23.5		12.9	16.4		16.1	15.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.5	28.3		23.3	23.5		12.9	16.4		16.1	15.3	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		27.2			23.5			16.0			15.5	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 79.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	87	435	54	342	82	570	103	522
v/c Ratio	0.35	0.73	0.28	0.57	0.25	0.61	0.37	0.57
Control Delay	21.5	28.3	23.3	23.5	12.9	16.4	16.1	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	28.3	23.3	23.5	12.9	16.4	16.1	15.3
Queue Length 50th (m)	10.9	61.3	5.8	38.2	6.5	55.5	8.7	48.7
Queue Length 95th (m)	24.9	#100.7	15.4	64.2	15.4	87.5	21.1	77.3
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	249	596	193	599	334	932	279	920
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.73	0.28	0.57	0.25	0.61	0.37	0.57

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	330	70	50	235	80	75	465	60	95	405	75
Future Volume (vph)	80	330	70	50	235	80	75	465	60	95	405	75
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	
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	0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		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)	1662	1758		1794	1746		1750	1826		1650	1800	
Flt Permitted	0.43	1.00		0.31	1.00		0.36	1.00		0.32	1.00	
Satd. Flow (perm)	749	1758		580	1746		659	1826		553	1800	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	359	76	54	255	87	82	505	65	103	440	82
RTOR Reduction (vph)	0	10	0	0	17	0	0	6	0	0	9	0
Lane Group Flow (vph)	87	425	0	54	325	0	82	564	0	103	513	0
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	249	586		193	582		333	925		280	912	
v/s Ratio Prot		c0.24			0.19			c0.31			0.29	
v/s Ratio Perm	0.12			0.09			0.12			0.19		
v/c Ratio	0.35	0.73		0.28	0.56		0.25	0.61		0.37	0.56	
Uniform Delay, d1	18.9	22.0		18.4	20.5		10.4	13.2		11.2	12.8	
Progression Factor	0.90	0.96		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.4	6.9		3.6	3.8		1.8	3.0		3.7	2.5	
Delay (s)	20.5	28.0		22.0	24.3		12.2	16.2		14.9	15.3	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		26.7			24.0			15.7			15.2	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	360	1	0	315	155	10	4	5	170	1	130
Future Volume (vph)	210	360	1	0	315	155	10	4	5	170	1	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.98			0.97		0.94	0.98	
Frt					0.956			0.966			0.851	
Flt Protected	0.950							0.973		0.950		
Satd. Flow (prot)	1752	1793	0	0	1723	0	0	1750	0	1770	1518	0
Flt Permitted	0.329									0.766		
Satd. Flow (perm)	600	1793	0	0	1723	0	0	1788	0	1340	1518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					35			5			141	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Adj. Flow (vph)	228	391	1	0	342	168	11	4	5	185	1	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	392	0	0	510	0	0	20	0	185	142	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

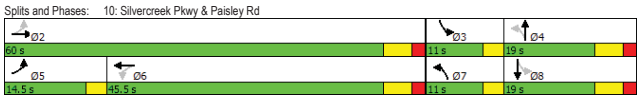
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0		45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%		50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0		39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		Max	Max	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.1	54.1			42.0			6.4		18.1	15.1	
Actuated g/C Ratio	0.70	0.67			0.52			0.08		0.22	0.19	
v/c Ratio	0.42	0.33			0.56			0.14		0.50	0.36	
Control Delay	6.9	7.1			16.2			31.7		32.5	8.1	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	6.9	7.1			16.2			31.7		32.5	8.1	
LOS	A	A			B			C		C	A	
Approach Delay		7.0			16.2			31.7			21.9	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 81.2			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 13.8		Intersection LOS: B	
Intersection Capacity Utilization 78.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	228	392	510	20	185	142
v/c Ratio	0.42	0.33	0.56	0.14	0.50	0.36
Control Delay	6.9	7.1	16.2	31.7	32.5	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	7.1	16.2	31.7	32.5	8.1
Queue Length 50th (m)	9.3	21.2	45.4	2.3	26.2	0.1
Queue Length 95th (m)	21.5	43.5	92.1	9.1	45.4	14.6
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	585	1194	908	290	367	397
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.33	0.56	0.07	0.50	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	360	1	0	315	155	10	4	5	170	1	130
Future Volume (vph)	210	360	1	0	315	155	10	4	5	170	1	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.98			0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00			0.99		0.96	1.00	
Frt	1.00	1.00			0.96			0.97		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1747	1792			1723			1743		1702	1519	
Flt Permitted	0.33	1.00			1.00			1.00		0.77	1.00	
Satd. Flow (perm)	605	1792			1723			1791		1373	1519	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	391	1	0	342	168	11	4	5	185	1	141
RTOR Reduction (vph)	0	0	0	0	18	0	0	5	0	0	110	0
Lane Group Flow (vph)	228	392	0	0	492	0	0	15	0	185	32	0
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.1	54.1			42.1			2.9		18.8	18.8	
Effective Green, g (s)	54.1	54.1			42.1			2.9		18.8	18.8	
Actuated g/C Ratio	0.64	0.64			0.50			0.03		0.22	0.22	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	506	1141			854			61		354	336	
v/s Ratio Prot	c0.05	0.22			c0.29					c0.08	0.02	
v/s Ratio Perm	0.24							0.01		c0.04		
v/c Ratio	0.45	0.34			0.58			0.25		0.52	0.10	
Uniform Delay, d1	8.0	7.2			15.1			39.9		28.9	26.3	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.8			2.8			2.1		5.4	0.6	
Delay (s)	8.6	8.0			17.9			42.1		34.3	26.9	
Level of Service	A	A			B			D		C	C	
Approach Delay (s)		8.2			17.9			42.1			31.1	
Approach LOS		A			B			D			C	

Intersection Summary

HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	84.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary

Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	1863	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	1863	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		46.7			66.0			279.7			92.6	
Travel Time (s)		3.4			4.8			20.1			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
13: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	0	0	0	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	A		
Approach Delay (s)	0.0		0.0	0.0	0.0
Approach LOS	A		A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	655	0	240	760	0	200	685	0	60	670	0
Future Volume (vph)	115	655	0	240	760	0	200	685	0	60	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.208			0.243			0.224			0.351		
Satd. Flow (perm)	394	3539	0	452	3539	0	425	3610	0	651	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	117	668	0	245	776	0	204	699	0	61	684	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	668	0	245	776	0	204	699	0	61	684	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

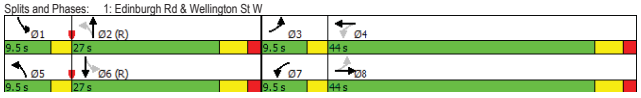
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	35.2	25.7		35.8	27.6		45.7	34.3		37.7	27.5	
Actuated g/C Ratio	0.39	0.29		0.40	0.31		0.51	0.38		0.42	0.31	
v/c Ratio	0.46	0.66		0.89	0.72		0.50	0.51		0.17	0.62	
Control Delay	20.6	31.1		53.8	31.7		18.3	25.3		12.9	26.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.6	31.1		53.8	31.7		18.3	25.3		12.9	26.3	
LOS	C	C		D	C		B	C		B	C	
Approach Delay		29.5			37.0			23.7			25.2	
Approach LOS		C			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 71 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 29.3		Intersection LOS: C	
Intersection Capacity Utilization 77.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	117	668	245	776	204	699	61	684
v/c Ratio	0.46	0.66	0.89	0.72	0.50	0.51	0.17	0.62
Control Delay	20.6	31.1	53.8	31.7	18.3	25.3	12.9	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	31.1	53.8	31.7	18.3	25.3	12.9	26.3
Queue Length 50th (m)	12.6	55.5	28.6	67.0	19.8	52.5	4.1	60.1
Queue Length 95th (m)	20.3	66.6	#53.5	79.2	38.6	81.6	m8.7	#78.0
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	255	1494	274	1494	405	1375	366	1101
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.45	0.89	0.52	0.50	0.51	0.17	0.62

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	655	0	240	760	0	200	685	0	60	670	0
Future Volume (vph)	115	655	0	240	760	0	200	685	0	60	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3539		1769	3539		1804	3610		1766	3610	
Flt Permitted	0.21	1.00		0.24	1.00		0.22	1.00		0.35	1.00	
Satd. Flow (perm)	395	3539		452	3539		426	3610		653	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	117	668	0	245	776	0	204	699	0	61	684	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	117	668	0	245	776	0	204	699	0	61	684	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	31.5	26.3		34.1	27.6		42.2	33.1		33.0	26.9	
Effective Green, g (s)	31.5	26.3		34.1	27.6		42.2	33.1		33.0	26.9	
Actuated g/C Ratio	0.35	0.29		0.38	0.31		0.47	0.37		0.37	0.30	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	219	1034		266	1085		388	1327		314	1078	
v/s Ratio Prot	0.03	0.19		c0.07	0.22		c0.07	0.19		0.01	c0.19	
v/s Ratio Perm	0.16			c0.28			0.17			0.06		
v/c Ratio	0.53	0.65		0.92	0.72		0.53	0.53		0.19	0.63	
Uniform Delay, d1	21.1	27.8		24.3	27.7		15.6	22.3		18.7	27.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.87	0.82	
Incremental Delay, d2	2.5	1.4		34.8	2.3		1.3	1.5		0.3	2.5	
Delay (s)	23.6	29.2		59.1	30.0		16.8	23.8		16.5	24.9	
Level of Service	C	C		E	C		B	C		B	C	
Approach Delay (s)		28.4			37.0			22.2			24.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	800	0	0	1035	10	415	125	150	5	0	275
Future Volume (vph)	160	800	0	0	1035	10	415	125	150	5	0	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.999				0.850			0.850
Flt Protected	0.950						0.950	0.974		0.950		
Satd. Flow (prot)	1787	5136	0	0	5130	0	1698	1749	1599	1805	0	1599
Flt Permitted	0.169						0.950	0.974		0.439		
Satd. Flow (perm)	318	5136	0	0	5130	0	1698	1749	1599	834	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				155			284
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	165	825	0	0	1067	10	428	129	155	5	0	284
Shared Lane Traffic (%)							36%					
Lane Group Flow (vph)	165	825	0	0	1077	0	274	283	155	5	0	284
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	24.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	3.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

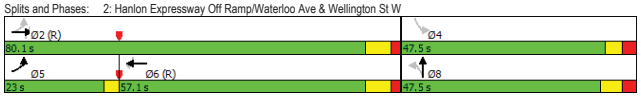
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.32		0.39
v/c Ratio	0.39	0.28			0.54		0.52	0.52	0.16	0.02		0.36
Control Delay	13.9	14.2			31.1		40.0	40.0	2.2	30.0		4.1
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	13.9	14.2			31.1		40.0	40.0	2.2	30.0		4.1
LOS	B	B			C		D	D	A	C		A
Approach Delay		14.2			31.1			31.8			4.6	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 23.3 — Intersection LOS: C
Intersection Capacity Utilization 72.4% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	165	825	1077	274	283	155	5	284
v/c Ratio	0.39	0.28	0.54	0.52	0.52	0.16	0.02	0.36
Control Delay	13.9	14.2	31.1	40.0	40.0	2.2	30.0	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	14.2	31.1	40.0	40.0	2.2	30.0	4.1
Queue Length 50th (m)	18.0	38.9	79.4	62.4	64.5	0.0	0.9	0.0
Queue Length 95th (m)	28.6	47.1	94.0	92.5	94.8	9.5	4.2	17.7
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	422	2938	2010	532	548	981	267	799
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.28	0.54	0.52	0.52	0.16	0.02	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	800	0	0	1035	10	415	125	150	5	0	275
Future Volume (vph)	160	800	0	0	1035	10	415	125	150	5	0	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5128		1698	1748	1599	1805		1599
Flt Permitted	0.17	1.00			1.00		0.95	0.97	1.00	0.44		1.00
Satd. Flow (perm)	317	5136			5128		1698	1748	1599	834		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	165	825	0	0	1067	10	428	129	155	5	0	284
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	66	0	0	173
Lane Group Flow (vph)	165	825	0	0	1076	0	274	283	89	5	0	111
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.32		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Grp Cap (vph)	411	2938			2009		532	547	914	267		626
v/s Ratio Prot	c0.06	0.16			c0.21							
v/s Ratio Perm	0.17						0.16	0.16	0.06	0.01		0.07
v/c Ratio	0.40	0.28			0.54		0.52	0.52	0.10	0.02		0.18
Uniform Delay, d1	14.7	13.9			29.9		35.9	35.9	12.4	29.6		25.4
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.9	0.2			1.0		3.5	3.5	0.2	0.1		0.6
Delay (s)	17.7	14.2			30.9		39.4	39.4	12.6	29.7		26.0
Level of Service	B	B			C		D	D	B	C		C
Approach Delay (s)		14.7			30.9			33.5			26.0	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Pkwy/Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	845	515	0	1300	0	0	0	0	205	0	85
Future Volume (vph)	0	845	515	0	1300	0	0	0	0	205	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.943										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4813	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4813	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		227										89
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	889	542	0	1368	0	0	0	0	216	0	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1431	0	0	1368	0	0	0	0	216	0	89
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.56			0.53					0.18		0.11

Lanes, Volumes, Timings
3: Hanlon Pkwy/Hanlon Expressway & Wellington St W

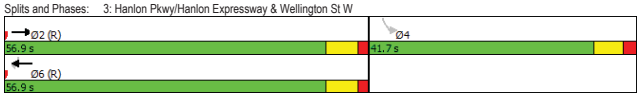
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		14.7			17.2					22.4		3.2
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		14.7			17.2					22.4		3.2
LOS		B			B					C		A
Approach Delay		14.7			17.2						16.8	
Approach LOS		B			B						B	

Intersection Summary

Area Type: Other
Cycle Length: 98.6
Actuated Cycle Length: 98.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 16.0 — Intersection LOS: B
Intersection Capacity Utilization 42.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Pkwy/Hanlon Expressway & Wellington St W



Queues
3: Hanlon Pkwy/Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1431	1368	216	89
v/c Ratio	0.56	0.53	0.18	0.11
Control Delay	14.7	17.2	22.4	3.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.7	17.2	22.4	3.2
Queue Length 50th (m)	57.9	64.7	15.2	0.0
Queue Length 95th (m)	71.6	77.8	23.7	7.6
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2552	2604	1230	816
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.56	0.53	0.18	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Pkwy/Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	845	515	0	1300	0	0	0	0	205	0	85
Future Volume (vph)	0	845	515	0	1300	0	0	0	0	205	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4814			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4814			5136					3467		1524
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)	0	889	542	0	1368	0	0	0	0	216	0	89
RTOR Reduction (vph)	0	112	0	0	0	0	0	0	0	0	0	44
Lane Group Flow (vph)	0	1319	0	0	1368	0	0	0	0	216	0	45
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2441			2604					1230		772
v/s Ratio Prot		c0.27			0.27							
v/s Ratio Perm										c0.06		0.03
v/c Ratio		0.54			0.53					0.18		0.06
Uniform Delay, d1		16.5			16.3					21.9		12.3
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.9			0.8					0.3		0.1
Delay (s)		17.4			17.1					22.2		12.5
Level of Service		B			B					C		B
Approach Delay (s)		17.4			17.1			0.0			19.4	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	930	850	410	370	60
Future Volume (vph)	70	930	850	410	370	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.951			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3566	3342	0	1787	1615
Flt Permitted		0.696			0.950	
Satd. Flow (perm)	0	2489	3342	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			142			62
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Adj. Flow (vph)	72	959	876	423	381	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1031	1299	0	381	62
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

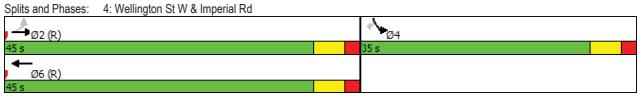
06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		45.8	45.8		22.2	22.2
Actuated g/C Ratio		0.57	0.57		0.28	0.28
v/c Ratio		0.72	0.66		0.77	0.13
Control Delay		17.9	13.3		36.9	5.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		17.9	13.3		36.9	5.9
LOS		B	B		D	A
Approach Delay		17.9	13.3		32.5	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 18.1		Intersection LOS: B	
Intersection Capacity Utilization 99.9%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1031	1299	381	62
v/c Ratio	0.72	0.66	0.77	0.13
Control Delay	17.9	13.3	36.9	5.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.9	13.3	36.9	5.9
Queue Length 50th (m)	58.5	61.2	55.6	0.0
Queue Length 95th (m)	#113.8	102.5	76.7	7.5
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1425	1975	647	624
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.72	0.66	0.59	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	930	850	410	370	60
Future Volume (vph)	70	930	850	410	370	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3564	3342		1787	1615
Flt Permitted		0.70	1.00		0.95	1.00
Satd. Flow (perm)		2490	3342		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	959	876	423	381	62
RTOR Reduction (vph)	0	0	61	0	0	45
Lane Group Flow (vph)	0	1031	1238	0	381	17
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		45.8	45.8		22.2	22.2
Effective Green, g (s)		45.8	45.8		22.2	22.2
Actuated g/C Ratio		0.57	0.57		0.28	0.28
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1425	1913		495	448
v/s Ratio Prot			0.37		c0.21	
v/s Ratio Perm		c0.41				0.01
v/c Ratio		0.72	0.65		0.77	0.04
Uniform Delay, d1		12.5	11.6		26.6	21.1
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		3.2	1.7		7.1	0.0
Delay (s)		15.7	13.3		33.6	21.1
Level of Service		B	B		C	C
Approach Delay (s)		15.7	13.3		31.9	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	375	0	245	450	35	420	1215	0	50	1625	140
Future Volume (vph)	120	375	0	245	450	35	420	1215	0	50	1625	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.989							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3567	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.274			0.236			0.950			0.950		
Satd. Flow (perm)	515	3574	0	448	3567	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4							143
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	122	383	0	250	459	36	429	1240	0	51	1658	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	383	0	250	495	0	429	1240	0	51	1658	143
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

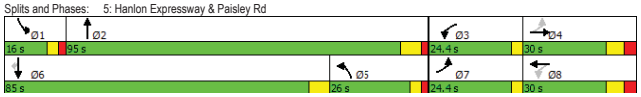
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	28.0		9.5	29.4		10.0	60.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	79.6	79.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	5.4	5.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	39.6	20.7		49.1	27.3		21.0	91.7		9.3	79.6	79.6
Actuated g/C Ratio	0.24	0.13		0.30	0.17		0.13	0.56		0.06	0.49	0.49
v/c Ratio	0.52	0.84		0.82	0.83		0.96	0.65		0.50	0.98	0.17
Control Delay	51.4	86.9		68.5	77.3		103.8	28.2		91.6	58.3	3.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	51.4	86.9		68.5	77.3		103.8	28.2		91.6	58.3	3.7
LOS	D	F		E	E		F	C		F	E	A
Approach Delay		78.3			74.3			47.6			55.0	
Approach LOS		E			E			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 163.2			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 57.9		Intersection LOS: E	
Intersection Capacity Utilization 99.7%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	122	383	250	495	429	1240	51	1658	143
v/c Ratio	0.52	0.84	0.82	0.83	0.96	0.65	0.50	0.98	0.17
Control Delay	51.4	86.9	68.5	77.3	103.8	28.2	91.6	58.3	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	86.9	68.5	77.3	103.8	28.2	91.6	58.3	3.7
Queue Length 50th (m)	31.4	68.9	69.7	86.5	77.6	162.5	17.4	296.4	0.0
Queue Length 95th (m)	49.8	#90.1	#98.0	#125.4	#114.2	191.1	33.1	#354.1	12.8
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	314	482	312	599	446	1895	122	1693	861
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.79	0.80	0.83	0.96	0.65	0.42	0.98	0.17

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	375	0	245	450	35	420	1215	0	50	1625	140
Future Volume (vph)	120	375	0	245	450	35	420	1215	0	50	1625	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	5.4	5.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574		1805	3567		3467	3374		1805	3471	1615
Flt Permitted	0.27	1.00		0.24	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	516	3574		448	3567		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	122	383	0	250	459	36	429	1240	0	51	1658	143
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	74
Lane Group Flow (vph)	122	383	0	250	492	0	429	1240	0	51	1658	69
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	34.7	20.8		44.2	27.3		22.1	91.7		8.0	79.6	79.6
Effective Green, g (s)	34.7	20.8		44.2	27.3		22.1	91.7		8.0	79.6	79.6
Actuated g/C Ratio	0.21	0.13		0.27	0.17		0.13	0.56		0.05	0.48	0.48
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	5.4	5.4
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)	216	452		289	592		466	1883		87	1681	782
v/s Ratio Prot	0.05	0.11		c0.11	0.14		c0.12	0.37		0.03	c0.48	
v/s Ratio Perm	0.07			c0.13								0.04
v/c Ratio	0.56	0.85		0.87	0.83		0.92	0.66		0.59	0.99	0.09
Uniform Delay, d1	55.1	70.2		51.7	66.3		70.2	25.4		76.5	41.8	22.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.4	13.7		22.6	9.6		23.5	1.8		9.7	18.9	0.2
Delay (s)	58.5	83.9		74.2	75.9		93.8	27.2		86.2	60.8	23.0
Level of Service	E	F		E	E		F	C		F	E	C
Approach Delay (s)		77.8			75.3			44.3			58.5	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	58.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	164.3	Sum of lost time (s)	23.4
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	160	40	90	245	45	40	640	85	50	630	40
Future Volume (vph)	45	160	40	90	245	45	40	640	85	50	630	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.970			0.977			0.982			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1814	0	1805	1834	0	1805	1856	0	1770	1880	0
Flt Permitted	0.350			0.534			0.306			0.271		
Satd. Flow (perm)	647	1814	0	1008	1834	0	581	1856	0	504	1880	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			16			8			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	46	165	41	93	253	46	41	660	88	52	649	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	206	0	93	299	0	41	748	0	52	690	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

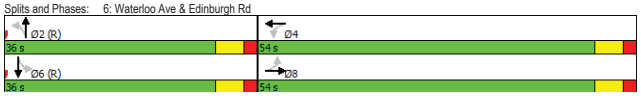
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.1	20.1		20.1	20.1		57.9	57.9		57.9	57.9	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.64	0.64		0.64	0.64	
v/c Ratio	0.32	0.49		0.41	0.71		0.11	0.62		0.16	0.57	
Control Delay	33.2	30.1		33.9	39.3		8.6	20.5		9.8	12.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.2	30.1		33.9	39.3		8.6	20.5		9.8	12.5	
LOS	C	C		C	D		A	C		A	B	
Approach Delay		30.6			38.0			19.9			12.3	
Approach LOS		C			D			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 21.8		Intersection LOS: C	
Intersection Capacity Utilization 77.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	206	93	299	41	748	52	690
v/c Ratio	0.32	0.49	0.41	0.71	0.11	0.62	0.16	0.57
Control Delay	33.2	30.1	33.9	39.3	8.6	20.5	9.8	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	30.1	33.9	39.3	8.6	20.5	9.8	12.5
Queue Length 50th (m)	7.1	29.4	14.6	47.9	1.5	55.8	3.4	62.5
Queue Length 95th (m)	15.6	45.0	26.3	67.5	m6.4	122.0	11.1	120.4
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	345	977	537	985	374	1197	324	1211
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.21	0.17	0.30	0.11	0.62	0.16	0.57

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	160	40	90	245	45	40	640	85	50	630	40
Future Volume (vph)	45	160	40	90	245	45	40	640	85	50	630	40
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1757	1814		1794	1834		1802	1857		1764	1880	
Flt Permitted	0.35	1.00		0.53	1.00		0.31	1.00		0.27	1.00	
Satd. Flow (perm)	647	1814		1008	1834		580	1857		502	1880	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	165	41	93	253	46	41	660	88	52	649	41
RTOR Reduction (vph)	0	16	0	0	12	0	0	3	0	0	1	0
Lane Group Flow (vph)	46	190	0	93	287	0	41	745	0	52	689	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.1	20.1		20.1	20.1		57.9	57.9		57.9	57.9	
Effective Green, g (s)	20.1	20.1		20.1	20.1		57.9	57.9		57.9	57.9	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.64	0.64		0.64	0.64	
Clearance Time (s)	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	
Lane Grp Cap (vph)	144	405		225	409		373	1194		322	1209	
v/s Ratio Prot		0.10			c0.16			c0.40			0.37	
v/s Ratio Perm	0.07			0.09			0.07			0.10		
v/c Ratio	0.32	0.47		0.41	0.70		0.11	0.62		0.16	0.57	
Uniform Delay, d1	29.2	30.3		29.9	32.2		6.2	9.6		6.4	9.0	
Progression Factor	1.00	1.00		1.00	1.00		0.97	1.63		1.00	1.00	
Incremental Delay, d2	1.3	0.9		1.2	5.4		0.5	2.2		1.1	2.0	
Delay (s)	30.5	31.2		31.1	37.5		6.5	17.8		7.5	11.0	
Level of Service	C	C		C	D		A	B		A	B	
Approach Delay (s)		31.1			36.0			17.2			10.7	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	15	265	10	20	280
Future Volume (vph)	10	15	265	10	20	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	11	16	288	11	22	304
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	16	288	11	22	304
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 31.3% ICU Level of Service A
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	15	265	10	20	280
Future Volume (Veh/h)	10	15	265	10	20	280
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	16	288	11	22	304
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			28		599	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			28		599	12
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		94	72
cM capacity (veh/h)			1584		382	1071

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	11	16	288	11	326
Volume Left	0	0	288	0	22
Volume Right	0	16	0	0	304
cSH	1700	1700	1584	1700	1148
Volume to Capacity	0.01	0.01	0.18	0.01	0.28
Queue Length 95th (m)	0.0	0.0	5.3	0.0	9.4
Control Delay (s)	0.0	0.0	7.8	0.0	10.0
Lane LOS			A		B
Approach Delay (s)	0.0		7.5		10.0
Approach LOS					B

Intersection Summary

Average Delay 8.5
Intersection Capacity Utilization 31.3% ICU Level of Service A
Analysis Period (min) 15

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	305	120	60	370	45	110	525	55	100	535	90
Future Volume (vph)	75	305	120	60	370	45	110	525	55	100	535	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.958			0.984			0.986			0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1790	0	1805	1845	0	1805	1865	0	1736	1847	0
Flt Permitted	0.293			0.279			0.237			0.275		
Satd. Flow (perm)	552	1790	0	527	1845	0	449	1865	0	501	1847	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			9			10			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	81	328	129	65	398	48	118	565	59	108	575	97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	81	457	0	65	446	0	118	624	0	108	672	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

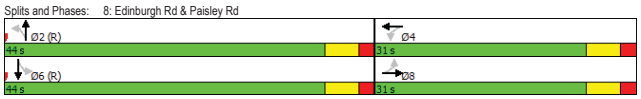
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.44	0.74		0.37	0.72		0.52	0.66		0.43	0.71	
Control Delay	28.0	29.5		26.6	29.3		22.6	17.6		18.3	19.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.0	29.5		26.6	29.3		22.6	17.6		18.3	19.2	
LOS	C	C		C	C		C	B		B	B	
Approach Delay		29.3			29.0			18.4			19.0	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 75
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 23.0 Intersection LOS: C
Intersection Capacity Utilization 87.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	81	457	65	446	118	624	108	672
v/c Ratio	0.44	0.74	0.37	0.72	0.52	0.66	0.43	0.71
Control Delay	28.0	29.5	26.6	29.3	22.6	17.6	18.3	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	29.5	26.6	29.3	22.6	17.6	18.3	19.2
Queue Length 50th (m)	10.6	63.3	7.3	56.2	11.0	63.5	9.5	70.7
Queue Length 95th (m)	25.9	#104.4	18.8	89.4	29.3	99.1	23.6	110.9
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	184	615	175	621	227	949	253	943
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.74	0.37	0.72	0.52	0.66	0.43	0.71

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	305	120	60	370	45	110	525	55	100	535	90
Future Volume (vph)	75	305	120	60	370	45	110	525	55	100	535	90
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	
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	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.99		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)	1790	1790		1795	1845		1800	1865		1732	1848	
Flt Permitted	0.29	1.00		0.28	1.00		0.24	1.00		0.27	1.00	
Satd. Flow (perm)	553	1790		528	1845		448	1865		500	1848	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	81	328	129	65	398	48	118	565	59	108	575	97
RTOR Reduction (vph)	0	19	0	0	6	0	0	5	0	0	8	0
Lane Group Flow (vph)	81	438	0	65	440	0	118	619	0	108	664	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	184	596		176	615		226	944		253	936	
v/s Ratio Prot		c0.24			0.24			0.33			c0.36	
v/s Ratio Perm	0.15			0.12			0.26			0.22		
v/c Ratio	0.44	0.74		0.37	0.72		0.52	0.66		0.43	0.71	
Uniform Delay, d1	19.5	22.1		19.0	21.9		12.4	13.7		11.6	14.2	
Progression Factor	0.99	1.02		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.9	7.3		5.9	7.0		8.4	3.6		5.2	4.5	
Delay (s)	26.2	29.8		24.9	28.9		20.8	17.2		16.8	18.8	
Level of Service	C	C		C	C		C	B		B	B	
Approach Delay (s)		29.3			28.4			17.8			18.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	405	10	5	420	195	2	0	0	215	3	0
Future Volume (vph)	290	405	10	5	420	195	2	0	0	215	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98	1.00	0.99		1.00			0.99		
Frt			0.850		0.952							
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	1805	1783	0	1770	1900	0	1787	1900	0
Flt Permitted	0.243			0.507			0.000			0.950		
Satd. Flow (perm)	462	1881	1580	962	1783	0	0	1900	0	1775	1900	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73		33							
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	315	440	11	5	457	212	2	0	0	234	3	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	315	440	11	5	669	0	2	0	0	234	3	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

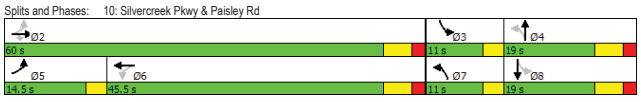
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt			pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		2.5	5.0		4.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		7.5	19.0		9.0	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	Max	Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	57.1	54.1	54.1	40.7	40.7		5.6			10.3	5.7	
Actuated g/C Ratio	0.78	0.74	0.74	0.55	0.55		0.08			0.14	0.08	
v/c Ratio	0.57	0.32	0.01	0.01	0.67		0.01			0.93	0.02	
Control Delay	7.1	4.5	0.0	9.4	16.2		33.5			74.9	33.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0			0.0	0.0	
Total Delay	7.1	4.5	0.0	9.4	16.2		33.5			74.9	33.3	
LOS	A	A	A	A	B		C			E	C	
Approach Delay		5.5			16.1			33.5			74.4	
Approach LOS		A			B			C			E	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 73.5			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 19.5		Intersection LOS: B	
Intersection Capacity Utilization 82.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	SBL	SBT
Lane Group Flow (vph)	315	440	11	5	669	2	234	3
v/c Ratio	0.57	0.32	0.01	0.01	0.67	0.01	0.93	0.02
Control Delay	7.1	4.5	0.0	9.4	16.2	33.5	74.9	33.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	4.5	0.0	9.4	16.2	33.5	74.9	33.3
Queue Length 50th (m)	7.3	14.8	0.0	0.3	57.5	0.3	~38.1	0.4
Queue Length 95th (m)	24.9	41.6	0.0	2.2	124.8	2.3	57.6	3.1
Internal Link Dist (m)		178.0			665.0			362.4
Turn Bay Length (m)	80.0							
Base Capacity (vph)	569	1385	1183	532	1002	193	251	336
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.32	0.01	0.01	0.67	0.01	0.93	0.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	405	10	5	420	195	2	0	0	215	3	0
Future Volume (vph)	290	405	10	5	420	195	2	0	0	215	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0			3.0	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	1.00	0.98	1.00	0.99		1.00			1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00			1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95			0.95	1.00	
Satd. Flow (prot)	1805	1881	1580	1804	1784		1770			1787	1900	
Flt Permitted	0.24	1.00	1.00	0.51	1.00		0.00			0.95	1.00	
Satd. Flow (perm)	462	1881	1580	963	1784		0			1787	1900	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	440	11	5	457	212	2	0	0	234	3	0
RTOR Reduction (vph)	0	0	3	0	15	0	0	0	0	0	0	0
Lane Group Flow (vph)	315	440	8	5	654	0	2	0	0	234	3	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt			pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	54.1	54.1	54.1	40.7	40.7		1.1			12.8	5.7	
Effective Green, g (s)	54.1	54.1	54.1	40.7	40.7		1.1			12.8	5.7	
Actuated g/C Ratio	0.71	0.71	0.71	0.54	0.54		0.01			0.17	0.08	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0			3.0	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)	513	1340	1126	516	956		25			301	142	
v/s Ratio Prot	c0.08	0.23			c0.37		0.00			c0.13	0.00	
v/s Ratio Perm	0.35		0.00	0.01								
v/c Ratio	0.61	0.33	0.01	0.01	0.68		0.08			0.78	0.02	
Uniform Delay, d1	7.3	4.1	3.1	8.2	12.9		36.9			30.2	32.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2	2.2	0.7	0.0	0.0	4.0		1.4			11.9	0.1	
Delay (s)	9.5	4.7	3.2	8.2	16.8		38.3			42.1	32.6	
Level of Service	A	A	A	A	B		D			D	C	
Approach Delay (s)		6.7			16.8			38.3			42.0	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	75.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary

Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	1863	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	1863	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		46.7			34.7			279.7			92.6	
Travel Time (s)		3.4			2.5			20.1			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
13: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	0	0	0	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	A		
Approach Delay (s)	0.0		0.0	0.0	0.0
Approach LOS	A		A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	560	0	170	525	0	125	450	0	60	475	0
Future Volume (vph)	80	560	0	170	525	0	125	450	0	60	475	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.338			0.257			0.406			0.488		
Satd. Flow (perm)	640	3539	0	478	3539	0	768	3610	0	902	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	82	571	0	173	536	0	128	459	0	61	485	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	571	0	173	536	0	128	459	0	61	485	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

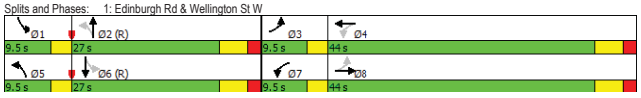
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	29.7	20.3		30.4	22.2		50.3	39.9		46.5	36.5	
Actuated g/C Ratio	0.33	0.23		0.34	0.25		0.56	0.44		0.52	0.41	
v/c Ratio	0.28	0.71		0.68	0.61		0.24	0.29		0.11	0.33	
Control Delay	20.3	37.1		34.5	33.4		11.3	18.3		8.3	18.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.3	37.1		34.5	33.4		11.3	18.3		8.3	18.9	
LOS	C	D		C	C		B	B		A	B	
Approach Delay		35.0			33.7			16.8			17.7	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80.5 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 26.6		Intersection LOS: C	
Intersection Capacity Utilization 62.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	571	173	536	128	459	61	485
v/c Ratio	0.28	0.71	0.68	0.61	0.24	0.29	0.11	0.33
Control Delay	20.3	37.1	34.5	33.4	11.3	18.3	8.3	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	37.1	34.5	33.4	11.3	18.3	8.3	18.9
Queue Length 50th (m)	9.8	50.8	21.9	47.1	10.0	28.0	3.4	34.0
Queue Length 95th (m)	17.5	63.3	33.5	59.0	21.6	46.1	8.3	53.9
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	296	1494	254	1494	529	1599	538	1465
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.38	0.68	0.36	0.24	0.29	0.11	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	560	0	170	525	0	125	450	0	60	475	0
Future Volume (vph)	80	560	0	170	525	0	125	450	0	60	475	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3539		1769	3539		1802	3610		1763	3610	
Flt Permitted	0.34	1.00		0.26	1.00		0.41	1.00		0.49	1.00	
Satd. Flow (perm)	641	3539		479	3539		771	3610		905	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	82	571	0	173	536	0	128	459	0	61	485	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	82	571	0	173	536	0	128	459	0	61	485	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	26.1	20.9		28.7	22.2		47.3	38.7		41.9	36.0	
Effective Green, g (s)	26.1	20.9		28.7	22.2		47.3	38.7		41.9	36.0	
Actuated g/C Ratio	0.29	0.23		0.32	0.25		0.53	0.43		0.47	0.40	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	253	821		245	872		503	1552		477	1444	
v/s Ratio Prot	0.02	0.16		c0.05	0.15		c0.02	0.13		0.01	c0.13	
v/s Ratio Perm	0.08			c0.17			0.11			0.05		
v/c Ratio	0.32	0.70		0.71	0.61		0.25	0.30		0.13	0.34	
Uniform Delay, d1	23.9	31.6		23.9	30.1		11.1	16.8		13.3	18.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.76	0.92	
Incremental Delay, d2	0.7	2.6		8.9	1.3		0.3	0.5		0.1	0.6	
Delay (s)	24.7	34.2		32.8	31.4		11.4	17.2		10.3	17.9	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		33.0			31.7			16.0			17.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	575	0	0	735	10	290	50	160	3	0	170
Future Volume (vph)	95	575	0	0	735	10	290	50	160	3	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.998				0.850			0.850
Flt Protected	0.950						0.950	0.966		0.950		
Satd. Flow (prot)	1787	5136	0	0	5125	0	1698	1731	1599	1805	0	1599
Flt Permitted	0.281						0.950	0.966		0.597		
Satd. Flow (perm)	528	5136	0	0	5125	0	1698	1731	1599	1134	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2				165			175
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	98	593	0	0	758	10	299	52	165	3	0	175
Shared Lane Traffic (%)							42%					
Lane Group Flow (vph)	98	593	0	0	768	0	173	178	165	3	0	175
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

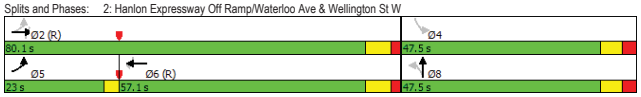
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.31		0.39
v/c Ratio	0.19	0.20			0.38		0.33	0.33	0.17	0.01		0.24
Control Delay	11.5	13.4			28.4		35.6	35.6	2.2	30.3		4.4
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	11.5	13.4			28.4		35.6	35.6	2.2	30.3		4.4
LOS	B	B			C		D	D	A	C		A
Approach Delay		13.2			28.4			24.9			4.8	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.38
Intersection Signal Delay: 20.7 — Intersection LOS: C
Intersection Capacity Utilization 60.5% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	98	593	768	173	178	165	3	175
v/c Ratio	0.19	0.20	0.38	0.33	0.33	0.17	0.01	0.24
Control Delay	11.5	13.4	28.4	35.6	35.6	2.2	30.3	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	13.4	28.4	35.6	35.6	2.2	30.3	4.4
Queue Length 50th (m)	10.3	26.5	52.4	36.7	37.8	0.0	0.6	0.0
Queue Length 95th (m)	18.1	33.3	64.2	58.3	60.0	9.6	3.0	14.6
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	516	2938	2009	532	542	985	355	732
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.20	0.38	0.33	0.33	0.17	0.01	0.24

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	575	0	0	735	10	290	50	160	3	0	170
Future Volume (vph)	95	575	0	0	735	10	290	50	160	3	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5125		1698	1731	1599	1805		1599
Flt Permitted	0.28	1.00			1.00		0.95	0.97	1.00	0.60		1.00
Satd. Flow (perm)	529	5136			5125		1698	1731	1599	1134		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	98	593	0	0	758	10	299	52	165	3	0	175
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	71	0	0	106
Lane Group Flow (vph)	98	593	0	0	767	0	173	178	94	3	0	69
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Grp Cap (vph)	499	2938			2008		532	542	914	355		626
v/s Ratio Prot	0.03	c0.12			c0.15							
v/s Ratio Perm	0.08						0.10	0.10	0.06	0.00		0.04
v/c Ratio	0.20	0.20			0.38		0.33	0.33	0.10	0.01		0.11
Uniform Delay, d1	12.8	13.2			27.7		33.5	33.5	12.4	30.1		24.7
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.9	0.2			0.6		1.6	1.6	0.2	0.0		0.4
Delay (s)	13.7	13.4			28.3		35.1	35.1	12.6	30.2		25.0
Level of Service	B	B			C		D	D	B	C		C
Approach Delay (s)		13.4			28.3			27.9			25.1	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	605	395	0	870	0	0	0	0	175	0	145
Future Volume (vph)	0	605	395	0	870	0	0	0	0	175	0	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.941										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4804	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4804	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		373										153
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	637	416	0	916	0	0	0	0	184	0	153
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1053	0	0	916	0	0	0	0	184	0	153
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					24.7		56.9
Total Split (%)		69.7%			69.7%					30.3%		69.7%
Maximum Green (s)		50.0			50.0					18.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
v/c Ratio		0.34			0.29					0.24		0.15

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

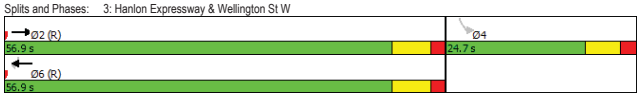
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		5.0			7.7					27.2		1.6
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		5.0			7.7					27.2		1.6
LOS		A			A					C		A
Approach Delay		5.0			7.7						15.6	
Approach LOS		A			A						B	

Intersection Summary

Area Type:	Other		
Cycle Length: 81.6			
Actuated Cycle Length: 81.6			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.34			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 37.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1053	916	184	153
v/c Ratio	0.34	0.29	0.24	0.15
Control Delay	5.0	7.7	27.2	1.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.0	7.7	27.2	1.6
Queue Length 50th (m)	16.5	23.2	12.8	0.0
Queue Length 95th (m)	22.8	29.9	21.5	6.5
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	3088	3147	764	993
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.34	0.29	0.24	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	605	395	0	870	0	0	0	0	175	0	145
Future Volume (vph)	0	605	395	0	870	0	0	0	0	175	0	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4803			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4803			5136					3467		1524
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)	0	637	416	0	916	0	0	0	0	184	0	153
RTOR Reduction (vph)	0	144	0	0	0	0	0	0	0	0	0	59
Lane Group Flow (vph)	0	909	0	0	916	0	0	0	0	184	0	94
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					18.0		50.0
Effective Green, g (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2943			3147					764		933
v/s Ratio Prot		c0.19			0.18							
v/s Ratio Perm										c0.05		0.06
v/c Ratio		0.31			0.29					0.24		0.10
Uniform Delay, d1		7.5			7.4					26.2		6.5
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.3			0.2					0.7		0.2
Delay (s)		7.8			7.7					26.9		6.7
Level of Service		A			A					C		A
Approach Delay (s)		7.8			7.7			0.0			17.8	
Approach LOS		A			A			A			B	

Intersection Summary

HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	595	570	310	395	60
Future Volume (vph)	65	595	570	310	395	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.947			0.850
Flt Protected		0.995			0.950	
Satd. Flow (prot)	0	3528	3328	0	1787	1615
Flt Permitted		0.777			0.950	
Satd. Flow (perm)	0	2755	3328	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			178			62
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Adj. Flow (vph)	67	613	588	320	407	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	680	908	0	407	62
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

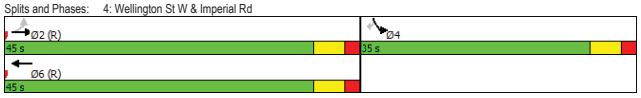
06/20/2018

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		45.0	45.0		23.0	23.0
Actuated g/C Ratio		0.56	0.56		0.29	0.29
v/c Ratio		0.44	0.47		0.79	0.12
Control Delay		12.3	9.8		37.6	5.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		12.3	9.8		37.6	5.8
LOS		B	A		D	A
Approach Delay		12.3	9.8		33.4	
Approach LOS		B	A		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 80.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

06/20/2018

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	680	908	407	62
v/c Ratio	0.44	0.47	0.79	0.12
Control Delay	12.3	9.8	37.6	5.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.3	9.8	37.6	5.8
Queue Length 50th (m)	31.1	33.0	59.1	0.0
Queue Length 95th (m)	52.1	56.0	83.1	7.5
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1549	1949	647	624
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.47	0.63	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

06/20/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	595	570	310	395	60
Future Volume (vph)	65	595	570	310	395	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3529	3329		1787	1615
Flt Permitted		0.78	1.00		0.95	1.00
Satd. Flow (perm)		2755	3329		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	613	588	320	407	62
RTOR Reduction (vph)	0	0	78	0	0	44
Lane Group Flow (vph)	0	680	830	0	407	18
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		45.0	45.0		23.0	23.0
Effective Green, g (s)		45.0	45.0		23.0	23.0
Actuated g/C Ratio		0.56	0.56		0.29	0.29
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1549	1872		513	464
v/s Ratio Prot			c0.25		c0.23	
v/s Ratio Perm		0.25				0.01
v/c Ratio		0.44	0.44		0.79	0.04
Uniform Delay, d1		10.2	10.2		26.3	20.5
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.9	0.8		8.2	0.0
Delay (s)		11.1	11.0		34.5	20.6
Level of Service		B	B		C	C
Approach Delay (s)		11.1	11.0		32.7	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	310	0	195	320	25	370	1200	0	40	1100	135
Future Volume (vph)	130	310	0	195	320	25	370	1200	0	40	1100	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.989							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3567	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.418			0.315			0.950			0.950		
Satd. Flow (perm)	785	3574	0	598	3567	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4							139
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	134	320	0	201	330	26	381	1237	0	41	1134	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	320	0	201	356	0	381	1237	0	41	1134	139
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

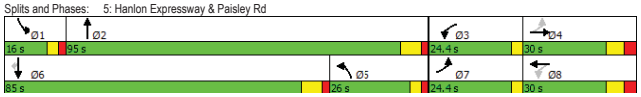
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	38.6	18.9		45.0	22.6		20.2	91.6		8.7	77.8	77.8
Actuated g/C Ratio	0.24	0.12		0.28	0.14		0.13	0.58		0.05	0.49	0.49
v/c Ratio	0.47	0.75		0.65	0.70		0.86	0.64		0.41	0.67	0.16
Control Delay	49.5	79.9		55.9	72.4		87.9	26.1		86.8	33.9	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	49.5	79.9		55.9	72.4		87.9	26.1		86.8	33.9	3.9
LOS	D	E		E	E		F	C		F	C	A
Approach Delay		70.9			66.4			40.6			32.4	
Approach LOS		E			E			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 158.7			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 45.0		Intersection LOS: D	
Intersection Capacity Utilization 80.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	134	320	201	356	381	1237	41	1134	139
v/c Ratio	0.47	0.75	0.65	0.70	0.86	0.64	0.41	0.67	0.16
Control Delay	49.5	79.9	55.9	72.4	87.9	26.1	86.8	33.9	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	79.9	55.9	72.4	87.9	26.1	86.8	33.9	3.9
Queue Length 50th (m)	34.8	55.7	54.3	59.7	65.8	150.4	13.7	153.1	0.0
Queue Length 95th (m)	54.4	74.6	79.2	81.4	#95.4	190.4	28.0	187.7	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	352	496	332	536	459	1947	125	1701	862
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.65	0.61	0.66	0.83	0.64	0.33	0.67	0.16

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	310	0	195	320	25	370	1200	0	40	1100	135
Future Volume (vph)	130	310	0	195	320	25	370	1200	0	40	1100	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1786	3574		1804	3567		3467	3374		1805	3471	1615
Flt Permitted	0.42	1.00		0.31	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	786	3574		598	3567		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	320	0	201	330	26	381	1237	0	41	1134	139
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	71
Lane Group Flow (vph)	134	320	0	201	353	0	381	1237	0	41	1134	68
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	33.6	18.9		40.3	22.6		21.3	91.6		7.5	77.8	77.8
Effective Green, g (s)	33.6	18.9		40.3	22.6		21.3	91.6		7.5	77.8	77.8
Actuated g/C Ratio	0.21	0.12		0.25	0.14		0.13	0.57		0.05	0.49	0.49
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	257	422		289	504		462	1934		84	1689	786
v/s Ratio Prot	0.05	0.09		c0.08	c0.10		c0.11	0.37		0.02	c0.33	
v/s Ratio Perm	0.06			0.10								0.04
v/c Ratio	0.52	0.76		0.70	0.70		0.82	0.64		0.49	0.67	0.09
Uniform Delay, d1	53.9	68.2		50.6	65.4		67.4	23.0		74.3	31.3	22.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.9	7.6		7.1	4.2		11.4	1.6		4.4	2.1	0.2
Delay (s)	55.8	75.9		57.7	69.6		78.8	24.6		78.7	33.4	22.2
Level of Service	E	E		E	E		E	C		E	C	C
Approach Delay (s)		70.0			65.3			37.4			33.6	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	159.8	Sum of lost time (s)	23.4
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	95	25	55	85	40	35	500	65	35	495	20
Future Volume (vph)	45	95	25	55	85	40	35	500	65	35	495	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.969			0.952			0.983			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1782	0	1805	1858	0	1770	1887	0
Flt Permitted	0.666			0.677			0.443			0.414		
Satd. Flow (perm)	1227	1811	0	1277	1782	0	840	1858	0	768	1887	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			40			8			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	46	98	26	57	88	41	36	515	67	36	510	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	124	0	57	129	0	36	582	0	36	531	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

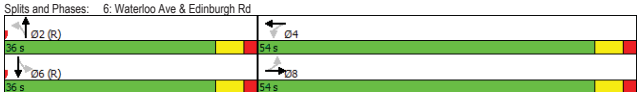
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.5	10.5		10.5	10.5		67.5	67.5		67.5	67.5	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.75	0.75		0.75	0.75	
v/c Ratio	0.32	0.53		0.38	0.53		0.06	0.42		0.06	0.38	
Control Delay	41.0	38.0		42.8	32.9		3.2	9.8		4.0	5.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.0	38.0		42.8	32.9		3.2	9.8		4.0	5.2	
LOS	D	D		D	C		A	A		A	A	
Approach Delay		38.8			36.0			9.4			5.2	
Approach LOS		D			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 59.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	124	57	129	36	582	36	531
v/c Ratio	0.32	0.53	0.38	0.53	0.06	0.42	0.06	0.38
Control Delay	41.0	38.0	42.8	32.9	3.2	9.8	4.0	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	38.0	42.8	32.9	3.2	9.8	4.0	5.2
Queue Length 50th (m)	7.8	17.5	9.8	15.3	1.2	27.9	1.4	27.0
Queue Length 95th (m)	17.6	33.2	20.7	31.2	3.1	84.5	4.7	51.6
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	654	976	681	969	629	1394	575	1414
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.13	0.08	0.13	0.06	0.42	0.06	0.38

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	95	25	55	85	40	35	500	65	35	495	20
Future Volume (vph)	45	95	25	55	85	40	35	500	65	35	495	20
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.98		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)	1751	1810		1791	1783		1800	1858		1760	1887	
Flt Permitted	0.67	1.00		0.68	1.00		0.44	1.00		0.41	1.00	
Satd. Flow (perm)	1226	1810		1277	1783		839	1858		767	1887	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	46	98	26	57	88	41	36	515	67	36	510	21
RTOR Reduction (vph)	0	20	0	0	35	0	0	2	0	0	1	0
Lane Group Flow (vph)	46	104	0	57	94	0	36	580	0	36	531	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	10.5	10.5		10.5	10.5		67.5	67.5		67.5	67.5	
Effective Green, g (s)	10.5	10.5		10.5	10.5		67.5	67.5		67.5	67.5	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.75	0.75		0.75	0.75	
Clearance Time (s)	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	
Lane Grp Cap (vph)	143	211		148	208		629	1393		575	1415	
v/s Ratio Prot		c0.06			0.05			c0.31			0.28	
v/s Ratio Perm	0.04			0.04			0.04			0.05		
v/c Ratio	0.32	0.49		0.39	0.45		0.06	0.42		0.06	0.37	
Uniform Delay, d1	36.5	37.2		36.8	37.1		2.9	4.1		3.0	3.9	
Progression Factor	1.00	1.00		1.00	1.00		0.81	1.91		1.00	1.00	
Incremental Delay, d2	1.3	1.8		1.7	1.5		0.2	0.9		0.2	0.8	
Delay (s)	37.8	39.0		38.4	38.6		2.6	8.7		3.2	4.7	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		38.7			38.6			8.3			4.6	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	4	15	175	5	10	165
Future Volume (vph)	4	15	175	5	10	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	4	16	190	5	11	179
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	16	190	5	11	179
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.4%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

06/20/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	4	15	175	5	10	165
Future Volume (Veh/h)	4	15	175	5	10	165
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	16	190	5	11	179
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			21		390	5
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			21		390	5
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		98	83
cM capacity (veh/h)			1593		544	1080

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	4	16	190	5	190
Volume Left	0	0	190	0	11
Volume Right	0	16	0	0	179
cSH	1700	1700	1593	1700	1147
Volume to Capacity	0.00	0.01	0.12	0.00	0.17
Queue Length 95th (m)	0.0	0.0	3.2	0.0	4.7
Control Delay (s)	0.0	0.0	7.6	0.0	9.2
Lane LOS			A		A
Approach Delay (s)	0.0		7.4		9.2
Approach LOS					A

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	270	95	35	240	60	110	435	30	55	410	65
Future Volume (vph)	85	270	95	35	240	60	110	435	30	55	410	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.961			0.970			0.990			0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1797	0	1805	1814	0	1805	1875	0	1736	1850	0
Flt Permitted	0.453			0.362			0.367			0.376		
Satd. Flow (perm)	851	1797	0	683	1814	0	694	1875	0	685	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			18			7			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	91	290	102	38	258	65	118	468	32	59	441	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	392	0	38	323	0	118	500	0	59	511	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

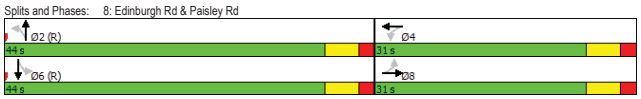
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.32	0.64		0.17	0.52		0.34	0.52		0.17	0.54	
Control Delay	22.3	25.5		20.1	22.7		14.4	14.7		11.6	14.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.3	25.5		20.1	22.7		14.4	14.7		11.6	14.8	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		24.9			22.4			14.7			14.5	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 18.4		Intersection LOS: B	
Intersection Capacity Utilization 77.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	91	392	38	323	118	500	59	511
v/c Ratio	0.32	0.64	0.17	0.52	0.34	0.52	0.17	0.54
Control Delay	22.3	25.5	20.1	22.7	14.4	14.7	11.6	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	25.5	20.1	22.7	14.4	14.7	11.6	14.8
Queue Length 50th (m)	11.3	51.2	4.0	36.0	9.8	46.2	4.5	47.0
Queue Length 95th (m)	25.0	83.7	11.1	60.2	21.9	72.7	11.3	74.2
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	283	615	227	616	351	953	347	944
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.64	0.17	0.52	0.34	0.52	0.17	0.54

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	270	95	35	240	60	110	435	30	55	410	65
Future Volume (vph)	85	270	95	35	240	60	110	435	30	55	410	65
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	
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	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		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)	1785	1797		1793	1814		1797	1876		1731	1851	
Flt Permitted	0.45	1.00		0.36	1.00		0.37	1.00		0.38	1.00	
Satd. Flow (perm)	852	1797		684	1814		694	1876		685	1851	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	290	102	38	258	65	118	468	32	59	441	70
RTOR Reduction (vph)	0	17	0	0	12	0	0	3	0	0	7	0
Lane Group Flow (vph)	91	375	0	38	311	0	118	497	0	59	504	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	284	599		228	604		351	950		347	937	
v/s Ratio Prot		c0.21			0.17			0.26			c0.27	
v/s Ratio Perm	0.11			0.06			0.17			0.09		
v/c Ratio	0.32	0.63		0.17	0.51		0.34	0.52		0.17	0.54	
Uniform Delay, d1	18.7	21.1		17.6	20.1		11.0	12.4		10.0	12.5	
Progression Factor	0.99	1.02		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.8	4.6		1.6	3.1		2.6	2.1		1.1	2.2	
Delay (s)	21.3	26.2		19.2	23.2		13.6	14.5		11.0	14.8	
Level of Service	C	C		B	C		B	B		B	B	
Approach Delay (s)		25.3			22.8			14.3			14.4	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	330	10	3	325	150	5	4	3	190	4	205
Future Volume (vph)	215	330	10	3	325	150	5	4	3	190	4	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			0.99			0.99		0.99	0.99	
Frt		0.996			0.958			0.966			0.853	
Flt Protected	0.950							0.980		0.950		
Satd. Flow (prot)	1805	1873	0	0	1794	0	0	1772	0	1787	1598	0
Flt Permitted	0.379				0.998					0.909		
Satd. Flow (perm)	719	1873	0	0	1791	0	0	1807	0	1698	1598	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			32			3			223	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	234	359	11	3	353	163	5	4	3	207	4	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	370	0	0	519	0	0	12	0	207	227	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

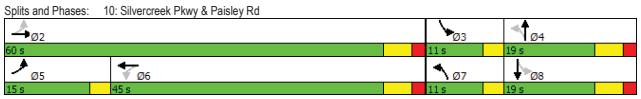
06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	15.0	60.0		45.0	45.0		11.0	19.0		11.0	19.0	
Total Split (%)	16.7%	66.7%		50.0%	50.0%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	12.0	54.0		39.0	39.0		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		Max	Max	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.0	54.0			42.1			6.1		17.0	14.0	
Actuated g/C Ratio	0.71	0.68			0.53			0.08		0.21	0.18	
v/c Ratio	0.37	0.29			0.54			0.09		0.55	0.49	
Control Delay	5.8	6.2			15.1			32.1		34.2	8.5	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	5.8	6.2			15.1			32.1		34.2	8.5	
LOS	A	A			B			C		C	A	
Approach Delay		6.0			15.1			32.1			20.8	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 80			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 79.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	234	370	519	12	207	227
v/c Ratio	0.37	0.29	0.54	0.09	0.55	0.49
Control Delay	5.8	6.2	15.1	32.1	34.2	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	6.2	15.1	32.1	34.2	8.5
Queue Length 50th (m)	9.5	19.3	46.2	1.4	29.7	0.5
Queue Length 95th (m)	21.1	38.4	91.7	6.6	50.5	18.4
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	675	1265	956	295	376	463
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.29	0.54	0.04	0.55	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	330	10	3	325	150	5	4	3	190	4	205
Future Volume (vph)	215	330	10	3	325	150	5	4	3	190	4	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99			0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00		0.99	1.00	
Frt	1.00	1.00			0.96			0.97		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1804	1872			1793			1771		1778	1598	
Flt Permitted	0.38	1.00			1.00			1.00		0.91	1.00	
Satd. Flow (perm)	720	1872			1791			1808		1701	1598	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	359	11	3	353	163	5	4	3	207	4	223
RTOR Reduction (vph)	0	1	0	0	16	0	0	3	0	0	173	0
Lane Group Flow (vph)	234	369	0	0	503	0	0	9	0	207	54	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.1	54.1			42.1			1.4		18.9	18.9	
Effective Green, g (s)	54.1	54.1			42.1			1.4		18.9	18.9	
Actuated g/C Ratio	0.64	0.64			0.50			0.02		0.22	0.22	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	573	1191			887			29		391	355	
v/s Ratio Prot	c0.04	0.20								c0.09	0.03	
v/s Ratio Perm	0.22				c0.28			0.01		c0.03		
v/c Ratio	0.41	0.31			0.57			0.31		0.53	0.15	
Uniform Delay, d1	7.8	7.0			15.1			41.3		29.1	26.6	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.7			2.6			6.1		5.1	0.9	
Delay (s)	8.3	7.7			17.7			47.4		34.1	27.5	
Level of Service	A	A			B			D		C	C	
Approach Delay (s)		7.9			17.7			47.4			30.7	
Approach LOS		A			B			D			C	

Intersection Summary

HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary

Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	0	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	0.0	0.0	0.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
13: Silvercreek Pkwy

06/20/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	1863	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	1863	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		46.7			84.7			279.7			92.6	
Travel Time (s)		3.4			6.1			20.1			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	0.0%	ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
13: Silvercreek Pkwy

06/20/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1023	896	1085	1023	896	1085	1623			1623		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	0	0	0	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A	A		
Approach Delay (s)	0.0		0.0	0.0	0.0
Approach LOS	A		A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	835	0	115	545	0	185	595	0	60	555	0
Future Volume (vph)	115	835	0	115	545	0	185	595	0	60	555	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3471	0	1703	3438	0	1752	3539	0	1703	3505	0
Flt Permitted	0.328			0.145			0.233			0.326		
Satd. Flow (perm)	615	3471	0	260	3438	0	428	3539	0	578	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Adj. Flow (vph)	129	938	0	129	612	0	208	669	0	67	624	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	938	0	129	612	0	208	669	0	67	624	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

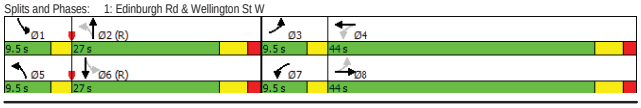
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	40.6	31.1		40.6	31.1		39.7	29.1		33.9	23.8	
Actuated g/C Ratio	0.45	0.35		0.45	0.35		0.44	0.32		0.38	0.26	
v/c Ratio	0.36	0.78		0.58	0.52		0.60	0.59		0.22	0.67	
Control Delay	14.8	31.2		23.0	24.5		28.0	30.2		12.7	29.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.8	31.2		23.0	24.5		28.0	30.2		12.7	29.2	
LOS	B	C		C	C		C	C		B	C	
Approach Delay		29.2			24.3			29.7			27.6	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 27.9		Intersection LOS: C	
Intersection Capacity Utilization 71.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	129	938	129	612	208	669	67	624
v/c Ratio	0.36	0.78	0.58	0.52	0.60	0.59	0.22	0.67
Control Delay	14.8	31.2	23.0	24.5	28.0	30.2	12.7	29.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	31.2	23.0	24.5	28.0	30.2	12.7	29.2
Queue Length 50th (m)	12.4	78.9	12.4	45.7	23.1	55.5	4.3	58.3
Queue Length 95th (m)	19.1	90.1	19.2	54.3	#50.9	#81.7	m8.0	66.7
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	361	1465	221	1451	344	1143	309	928
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.64	0.58	0.42	0.60	0.59	0.22	0.67

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	835	0	115	545	0	185	595	0	60	555	0
Future Volume (vph)	115	835	0	115	545	0	185	595	0	60	555	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1786	3471		1703	3438		1751	3539		1696	3505	
Flt Permitted	0.33	1.00		0.15	1.00		0.23	1.00		0.33	1.00	
Satd. Flow (perm)	616	3471		261	3438		429	3539		583	3505	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	129	938	0	129	612	0	208	669	0	67	624	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	129	938	0	129	612	0	208	669	0	67	624	0
Confl. Peds. (#/hr)	3		5	5		3	8		24	24		8
Heavy Vehicles (%)	1%	4%	5%	6%	5%	0%	3%	2%	4%	6%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	37.6	31.1		37.6	31.1		37.4	28.5		29.7	23.8	
Effective Green, g (s)	37.6	31.1		37.6	31.1		37.4	28.5		29.7	23.8	
Actuated g/C Ratio	0.42	0.35		0.42	0.35		0.42	0.32		0.33	0.26	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	341	1199		213	1188		333	1120		265	926	
v/s Ratio Prot	0.03	c0.27		c0.04	0.18		c0.07	0.19		0.02	0.18	
v/s Ratio Perm	0.13			0.21			c0.19			0.07		
v/c Ratio	0.38	0.78		0.61	0.52		0.62	0.60		0.25	0.67	
Uniform Delay, d1	16.8	26.4		18.4	23.4		18.5	25.9		21.1	29.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.67	0.83	
Incremental Delay, d2	0.7	3.4		4.8	0.4		3.6	2.4		0.5	3.5	
Delay (s)	17.5	29.8		23.2	23.8		22.1	28.3		14.7	28.1	
Level of Service	B	C		C	C		C	C		B	C	
Approach Delay (s)		28.3			23.7			26.8			26.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	905	0	0	775	15	195	100	235	15	0	320
Future Volume (vph)	185	905	0	0	775	15	195	100	235	15	0	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.997				0.850			0.850
Flt Protected	0.950						0.950	0.983		0.950		
Satd. Flow (prot)	1736	4988	0	0	4974	0	1633	1734	1599	1805	0	1583
Flt Permitted	0.240						0.950	0.983		0.616		
Satd. Flow (perm)	438	4988	0	0	4974	0	1633	1734	1599	1170	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2				258			352
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Adj. Flow (vph)	203	995	0	0	852	16	214	110	258	16	0	352
Shared Lane Traffic (%)							26%					
Lane Group Flow (vph)	203	995	0	0	868	0	158	166	258	16	0	352
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

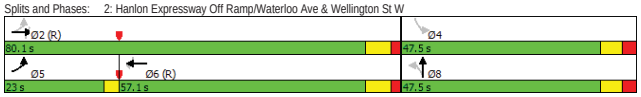
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.31		0.39
v/c Ratio	0.43	0.35			0.45		0.31	0.31	0.25	0.04		0.42
Control Delay	14.4	15.0			29.4		35.4	35.2	2.1	31.1		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	14.4	15.0			29.4		35.4	35.2	2.1	31.1		4.2
LOS	B	B			C		D	D	A	C		A
Approach Delay		14.9			29.4			20.6			5.4	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 19.0 — Intersection LOS: B
Intersection Capacity Utilization 68.4% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	203	995	868	158	166	258	16	352
v/c Ratio	0.43	0.35	0.45	0.31	0.31	0.25	0.04	0.42
Control Delay	14.4	15.0	29.4	35.4	35.2	2.1	31.1	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	15.0	29.4	35.4	35.2	2.1	31.1	4.2
Queue Length 50th (m)	22.7	49.1	61.0	33.3	35.0	0.0	3.0	0.0
Queue Length 95th (m)	35.0	58.7	74.0	54.0	56.0	11.5	8.7	19.2
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	468	2853	1950	511	543	1025	366	834
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.35	0.45	0.31	0.31	0.25	0.04	0.42

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	905	0	0	775	15	195	100	235	15	0	320
Future Volume (vph)	185	905	0	0	775	15	195	100	235	15	0	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1735	4988			4975		1633	1734	1599	1805		1583
Flt Permitted	0.24	1.00			1.00		0.95	0.98	1.00	0.62		1.00
Satd. Flow (perm)	439	4988			4975		1633	1734	1599	1170		1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	203	995	0	0	852	16	214	110	258	16	0	352
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	110	0	0	214
Lane Group Flow (vph)	203	995	0	0	867	0	158	166	148	16	0	138
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Grp Cap (vph)	454	2853			1949		511	543	914	366		620
v/s Ratio Prot	c0.07	0.20			0.17							
v/s Ratio Perm	c0.19						c0.10	0.10	0.09	0.01		0.09
v/c Ratio	0.45	0.35			0.44		0.31	0.31	0.16	0.04		0.22
Uniform Delay, d1	14.2	14.6			28.6		33.3	33.3	12.9	30.5		25.8
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	3.2	0.3			0.7		1.6	1.5	0.4	0.2		0.8
Delay (s)	17.3	14.9			29.3		34.9	34.7	13.2	30.7		26.7
Level of Service	B	B			C		C	C	B	C		C
Approach Delay (s)		15.3			29.3			25.2			26.9	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	980	465	0	895	0	0	0	0	190	0	115
Future Volume (vph)	0	980	465	0	895	0	0	0	0	190	0	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.952										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4703	0	0	4988	0	0	0	0	3242	0	1455
Flt Permitted										0.950		
Satd. Flow (perm)	0	4703	0	0	4988	0	0	0	0	3242	0	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		176										121
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	1					1						
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
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Adj. Flow (vph)	0	1032	489	0	942	0	0	0	0	200	0	121
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1521	0	0	942	0	0	0	0	200	0	121
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			29.9					24.7		29.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		0.0			7.0					0.0		7.0
Flash Dont Walk (s)		0.0			16.0					0.0		16.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.62			0.37					0.17		0.15

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

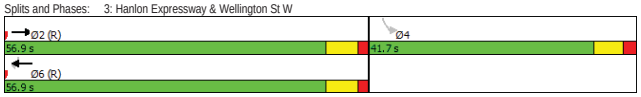
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		16.4			15.3					22.4		2.9
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		16.4			15.3					22.4		2.9
LOS		B			B					C		A
Approach Delay		16.4			15.3						15.0	
Approach LOS		B			B						B	

Intersection Summary

Area Type: Other
Cycle Length: 98.6
Actuated Cycle Length: 98.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Pretimed
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 15.9 — Intersection LOS: B
Intersection Capacity Utilization 43.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1521	942	200	121
v/c Ratio	0.62	0.37	0.17	0.15
Control Delay	16.4	15.3	22.4	2.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.4	15.3	22.4	2.9
Queue Length 50th (m)	67.7	40.2	14.0	0.0
Queue Length 95th (m)	83.0	50.2	22.3	8.6
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2471	2529	1150	797
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	0.37	0.17	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	980	465	0	895	0	0	0	0	190	0	115
Future Volume (vph)	0	980	465	0	895	0	0	0	0	190	0	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4702			4988					3242		1455
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4702			4988					3242		1455
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)	0	1032	489	0	942	0	0	0	0	200	0	121
RTOR Reduction (vph)	0	87	0	0	0	0	0	0	0	0	0	60
Lane Group Flow (vph)	0	1434	0	0	942	0	0	0	0	200	0	61
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	5%	5%	0%	4%	0%	0%	0%	0%	8%	0%	11%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2384			2529					1150		737
v/s Ratio Prot		c0.31			0.19							
v/s Ratio Perm										c0.06		0.04
v/c Ratio		0.60			0.37					0.17		0.08
Uniform Delay, d1		17.2			14.8					21.9		12.5
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		1.1			0.4					0.3		0.2
Delay (s)		18.4			15.2					22.2		12.7
Level of Service		B			B					C		B
Approach Delay (s)		18.4			15.2			0.0			18.6	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	990	725	175	445	75
Future Volume (vph)	65	990	725	175	445	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	1.00			
Frt			0.971			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3397	3318	0	1770	1599
Flt Permitted		0.808			0.950	
Satd. Flow (perm)	0	2753	3318	0	1770	1599
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			51			78
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Adj. Flow (vph)	68	1031	755	182	464	78
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1099	937	0	464	78
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

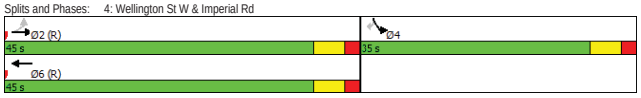
Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	-1.0
Total Lost Time (s)		6.0	6.0		6.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		43.0	43.0		25.0	26.0
Actuated g/C Ratio		0.54	0.54		0.31	0.32
v/c Ratio		0.74	0.52		0.84	0.14
Control Delay		19.4	13.2		39.6	5.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		19.4	13.2		39.6	5.0
LOS		B	B		D	A
Approach Delay		19.4	13.2		34.6	
Approach LOS		B	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 20.3		Intersection LOS: C	
Intersection Capacity Utilization 94.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1099	937	464	78
v/c Ratio	0.74	0.52	0.84	0.14
Control Delay	19.4	13.2	39.6	5.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.4	13.2	39.6	5.0
Queue Length 50th (m)	68.8	45.8	67.0	0.0
Queue Length 95th (m)	103.8	68.2	98.4	8.3
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1479	1806	641	648
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.74	0.52	0.72	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

10-17-2019

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	990	725	175	445	75
Future Volume (vph)	65	990	725	175	445	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	5.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.97		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3397	3318		1770	1599
Flt Permitted		0.81	1.00		0.95	1.00
Satd. Flow (perm)		2754	3318		1770	1599
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	68	1031	755	182	464	78
RTOR Reduction (vph)	0	0	24	0	0	53
Lane Group Flow (vph)	0	1099	913	0	464	25
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	5%	6%	5%	6%	2%	1%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		43.0	43.0		25.0	25.0
Effective Green, g (s)		43.0	43.0		25.0	26.0
Actuated g/C Ratio		0.54	0.54		0.31	0.32
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1480	1783		553	519
v/s Ratio Prot			0.28		c0.26	
v/s Ratio Perm		c0.40				0.02
v/c Ratio		0.74	0.51		0.84	0.05
Uniform Delay, d1		14.2	11.8		25.6	18.5
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		3.4	1.1		10.8	0.0
Delay (s)		17.6	12.9		36.4	18.6
Level of Service		B	B		D	B
Approach Delay (s)		17.6	12.9		33.8	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	345	0	200	220	70	170	1445	0	45	1085	45
Future Volume (vph)	100	345	0	200	220	70	170	1445	0	45	1085	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Frt					0.964							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	3438	0	1787	3396	0	3303	3343	0	1597	3282	1482
Flt Permitted	0.572			0.284			0.194			0.950		
Satd. Flow (perm)	1016	3438	0	534	3396	0	675	3343	0	1597	3282	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					21							102
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Adj. Flow (vph)	102	352	0	204	224	71	173	1474	0	46	1107	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	102	352	0	204	295	0	173	1474	0	46	1107	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

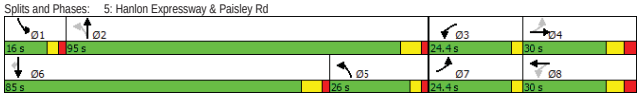
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2					6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	59.4	59.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	37.5	19.8		46.2	25.5		90.7	88.3		9.1	78.1	78.1
Actuated g/C Ratio	0.24	0.13		0.30	0.16		0.58	0.56		0.06	0.50	0.50
v/c Ratio	0.34	0.81		0.67	0.52		0.26	0.78		0.49	0.68	0.06
Control Delay	45.5	82.5		55.9	59.9		23.0	32.3		92.3	33.9	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	45.5	82.5		55.9	59.9		23.0	32.3		92.3	33.9	0.1
LOS	D	F		E	E		C	C		F	C	A
Approach Delay		74.2			58.2			31.4			34.9	
Approach LOS		E			E			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 156.6			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 41.1		Intersection LOS: D	
Intersection Capacity Utilization 85.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	102	352	204	295	173	1474	46	1107	46
v/c Ratio	0.34	0.81	0.67	0.52	0.26	0.78	0.49	0.68	0.06
Control Delay	45.5	82.5	55.9	59.9	23.0	32.3	92.3	33.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	82.5	55.9	59.9	23.0	32.3	92.3	33.9	0.1
Queue Length 50th (m)	25.8	61.9	54.8	44.6	14.0	214.0	15.5	155.1	0.0
Queue Length 95th (m)	43.0	82.3	80.7	63.7	21.1	255.3	30.8	187.3	0.0
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	382	486	330	585	764	1884	113	1636	790
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.72	0.62	0.50	0.23	0.78	0.41	0.68	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	345	0	200	220	70	170	1445	0	45	1085	45
Future Volume (vph)	100	345	0	200	220	70	170	1445	0	45	1085	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frt	1.00	1.00		1.00	0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1687	3438		1787	3395		3303	3343		1597	3282	1482
Flt Permitted	0.57	1.00		0.28	1.00		0.19	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1015	3438		535	3395		676	3343		1597	3282	1482
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	102	352	0	204	224	71	173	1474	0	46	1107	46
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	0	0	0	23
Lane Group Flow (vph)	102	352	0	204	277	0	173	1474	0	46	1107	23
Heavy Vehicles (%)	7%	5%	2%	1%	2%	4%	6%	8%	3%	13%	10%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2					6
Actuated Green, G (s)	32.4	19.8		41.1	25.5		90.7	88.3		7.8	78.1	78.1
Effective Green, g (s)	32.4	19.8		41.1	25.5		90.7	88.3		7.8	78.1	78.1
Actuated g/C Ratio	0.21	0.13		0.26	0.16		0.58	0.56		0.05	0.50	0.50
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	262	431		284	549		689	1873		79	1626	734
v/s Ratio Prot	0.03	c0.10		c0.08	0.08		0.03	c0.44		0.03	c0.34	
v/s Ratio Perm	0.05			0.10			0.12					0.02
v/c Ratio	0.39	0.82		0.72	0.51		0.25	0.79		0.58	0.68	0.03
Uniform Delay, d1	52.9	67.1		49.1	60.3		28.2	27.3		73.3	30.3	20.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	11.4		8.4	0.7		0.2	3.4		10.5	2.3	0.1
Delay (s)	53.9	78.5		57.5	61.0		28.4	30.7		83.8	32.6	20.4
Level of Service	D	E		E	E		C	C		F	C	C
Approach Delay (s)		73.0			59.6			30.4			34.1	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	40.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	157.6	Sum of lost time (s)	23.4
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	250	55	75	135	25	25	580	95	45	495	50
Future Volume (vph)	85	250	55	75	135	25	25	580	95	45	495	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.973			0.977			0.979			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1774	0	1752	1789	0	1805	1820	0	1770	1834	0
Flt Permitted	0.611			0.326			0.355			0.265		
Satd. Flow (perm)	1129	1774	0	596	1789	0	672	1820	0	492	1834	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			16			10			6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	92	272	60	82	147	27	27	630	103	49	538	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	332	0	82	174	0	27	733	0	49	592	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

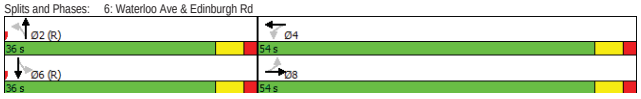
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	22.3	22.3		22.3	22.3		55.7	55.7		55.7	55.7	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.62	0.62		0.62	0.62	
v/c Ratio	0.33	0.73		0.56	0.38		0.07	0.65		0.16	0.52	
Control Delay	28.9	38.2		42.5	26.3		22.2	32.9		11.2	13.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.9	38.2		42.5	26.3		22.2	32.9		11.2	13.0	
LOS	C	D		D	C		C	C		B	B	
Approach Delay		36.2			31.5			32.5			12.9	
Approach LOS		D			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 27.1		Intersection LOS: C	
Intersection Capacity Utilization 73.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	92	332	82	174	27	733	49	592
v/c Ratio	0.33	0.73	0.56	0.38	0.07	0.65	0.16	0.52
Control Delay	28.9	38.2	42.5	26.3	22.2	32.9	11.2	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	38.2	42.5	26.3	22.2	32.9	11.2	13.0
Queue Length 50th (m)	13.8	52.4	13.0	23.8	2.6	100.9	3.4	54.4
Queue Length 95th (m)	24.2	72.2	25.4	36.8	m8.1	160.3	11.6	105.4
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	602	955	317	961	415	1129	304	1136
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.35	0.26	0.18	0.07	0.65	0.16	0.52

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	250	55	75	135	25	25	580	95	45	495	50
Future Volume (vph)	85	250	55	75	135	25	25	580	95	45	495	50
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1756	1773		1739	1789		1794	1820		1763	1834	
Flt Permitted	0.61	1.00		0.33	1.00		0.36	1.00		0.26	1.00	
Satd. Flow (perm)	1130	1773		598	1789		671	1820		491	1834	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	272	60	82	147	27	27	630	103	49	538	54
RTOR Reduction (vph)	0	14	0	0	12	0	0	4	0	0	2	0
Lane Group Flow (vph)	92	318	0	82	162	0	27	729	0	49	590	0
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	22.3	22.3		22.3	22.3		55.7	55.7		55.7	55.7	
Effective Green, g (s)	22.3	22.3		22.3	22.3		55.7	55.7		55.7	55.7	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.62	0.62		0.62	0.62	
Clearance Time (s)	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	
Lane Grp Cap (vph)	279	439		148	443		415	1126		303	1135	
v/s Ratio Prot		c0.18			0.09			c0.40			0.32	
v/s Ratio Perm	0.08			0.14			0.04			0.10		
v/c Ratio	0.33	0.72		0.55	0.37		0.07	0.65		0.16	0.52	
Uniform Delay, d1	27.7	31.0		29.5	28.0		6.8	10.9		7.3	9.6	
Progression Factor	1.00	1.00		1.00	1.00		2.36	2.36		1.00	1.00	
Incremental Delay, d2	0.7	5.8		4.4	0.5		0.3	2.4		1.1	1.7	
Delay (s)	28.4	36.9		33.9	28.5		16.3	28.1		8.4	11.3	
Level of Service	C	D		C	C		B	C		A	B	
Approach Delay (s)		35.0			30.3			27.7			11.1	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	65	80	255	35	50	260
Future Volume (vph)	65	80	255	35	50	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1568
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1568
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		7	7			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	3%
Adj. Flow (vph)	71	87	277	38	54	283
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	87	277	38	54	283
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.1%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	65	80	255	35	50	260
Future Volume (Veh/h)	65	80	255	35	50	260
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	87	277	38	54	283
Pedestrians				1	7	
Lane Width (m)				3.6	3.6	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	1	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			165		670	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			165		670	79
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			80		84	71
cM capacity (veh/h)			1405		339	972

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	71	87	277	38	337
Volume Left	0	0	277	0	54
Volume Right	0	87	0	0	283
cSH	1700	1700	1405	1700	1158
Volume to Capacity	0.04	0.05	0.20	0.02	0.29
Queue Length 95th (m)	0.0	0.0	5.9	0.0	9.7
Control Delay (s)	0.0	0.0	8.2	0.0	11.4
Lane LOS			A		B
Approach Delay (s)	0.0		7.2		11.4
Approach LOS					B

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	360	75	50	255	80	80	495	60	95	420	85
Future Volume (vph)	95	360	75	50	255	80	80	495	60	95	420	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.99		0.99	1.00		1.00	0.99	
Frt		0.974			0.964			0.984			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1758	0	1805	1751	0	1770	1830	0	1656	1796	0
Flt Permitted	0.399			0.259			0.335			0.291		
Satd. Flow (perm)	699	1758	0	489	1751	0	618	1830	0	506	1796	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			23			12			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Adj. Flow (vph)	103	391	82	54	277	87	87	538	65	103	457	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	473	0	54	364	0	87	603	0	103	549	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.44	0.79		0.33	0.61		0.28	0.65		0.40	0.60	
Control Delay	24.0	31.4		25.7	24.7		13.7	17.3		17.5	15.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.0	31.4		25.7	24.7		13.7	17.3		17.5	15.9	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		30.1			24.8			16.9			16.2	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 21.4		Intersection LOS: C	
Intersection Capacity Utilization 82.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd

Queues
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	103	473	54	364	87	603	103	549
v/c Ratio	0.44	0.79	0.33	0.61	0.28	0.65	0.40	0.60
Control Delay	24.0	31.4	25.7	24.7	13.7	17.3	17.5	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	31.4	25.7	24.7	13.7	17.3	17.5	15.9
Queue Length 50th (m)	13.3	68.6	6.0	41.7	7.0	60.6	8.9	52.1
Queue Length 95th (m)	m29.5	#115.3	16.3	69.3	16.7	95.0	22.2	82.8
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	233	596	163	599	313	933	256	919
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.79	0.33	0.61	0.28	0.65	0.40	0.60

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	360	75	50	255	80	80	495	60	95	420	85
Future Volume (vph)	95	360	75	50	255	80	80	495	60	95	420	85
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	
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	1.00		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		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)	1664	1758		1795	1751		1752	1829		1651	1796	
Flt Permitted	0.40	1.00		0.26	1.00		0.34	1.00		0.29	1.00	
Satd. Flow (perm)	699	1758		490	1751		618	1829		506	1796	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	391	82	54	277	87	87	538	65	103	457	92
RTOR Reduction (vph)	0	10	0	0	15	0	0	6	0	0	10	0
Lane Group Flow (vph)	103	463	0	54	349	0	87	597	0	103	539	0
Confl. Peds. (#/hr)	29		9	9		29	20		7	7		20
Heavy Vehicles (%)	6%	5%	3%	0%	4%	0%	2%	1%	9%	9%	2%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	233	586		163	583		313	926		256	909	
v/s Ratio Prot		c0.26			0.20			c0.33			0.30	
v/s Ratio Perm	0.15			0.11			0.14			0.20		
v/c Ratio	0.44	0.79		0.33	0.60		0.28	0.64		0.40	0.59	
Uniform Delay, d1	19.5	22.6		18.7	20.8		10.6	13.6		11.5	13.0	
Progression Factor	0.90	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	9.2		5.4	4.5		2.2	3.5		4.7	2.8	
Delay (s)	22.7	30.6		24.1	25.3		12.8	17.0		16.1	15.9	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		29.2			25.1			16.5			15.9	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	360	60	35	315	155	95	35	55	170	20	130
Future Volume (vph)	210	360	60	35	315	155	95	35	55	170	20	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99		0.98	1.00	0.98		0.99	0.95		0.95	0.98	
Frt			0.850		0.951			0.908			0.870	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1792	1615	1805	1714	0	1805	1640	0	1770	1564	0
Flt Permitted	0.345			0.531			0.618			0.560		
Satd. Flow (perm)	630	1792	1587	1006	1714	0	1163	1640	0	986	1564	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73		35			60			141	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Adj. Flow (vph)	228	391	65	38	342	168	103	38	60	185	22	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	391	65	38	510	0	103	98	0	185	163	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	64.0	61.0	61.0	48.6	48.6		17.2	8.2		17.6	8.2	
Actuated g/C Ratio	0.71	0.68	0.68	0.54	0.54		0.19	0.09		0.20	0.09	
v/c Ratio	0.40	0.32	0.06	0.07	0.54		0.37	0.48		0.70	0.60	
Control Delay	7.6	7.9	1.8	13.5	17.2		30.7	25.3		44.3	19.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.6	7.9	1.8	13.5	17.2		30.7	25.3		44.3	19.2	
LOS	A	A	A	B	B		C	C		D	B	
Approach Delay		7.2			16.9			28.1			32.5	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 14.5 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 17.5		Intersection LOS: B	
Intersection Capacity Utilization 72.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd

Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	228	391	65	38	510	103	98	185	163
v/c Ratio	0.40	0.32	0.06	0.07	0.54	0.37	0.48	0.70	0.60
Control Delay	7.6	7.9	1.8	13.5	17.2	30.7	25.3	44.3	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	7.9	1.8	13.5	17.2	30.7	25.3	44.3	19.2
Queue Length 50th (m)	12.5	27.2	0.0	3.3	55.2	15.2	6.6	28.7	3.8
Queue Length 95th (m)	26.0	51.3	4.2	10.0	102.6	26.6	20.6	44.7	21.5
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	591	1214	1098	543	941	283	288	263	346
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.32	0.06	0.07	0.54	0.36	0.34	0.70	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	360	60	35	315	155	95	35	55	170	20	130
Future Volume (vph)	210	360	60	35	315	155	95	35	55	170	20	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.98		1.00	0.95		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.97	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1746	1792	1587	1799	1713		1794	1640		1721	1565	
Flt Permitted	0.35	1.00	1.00	0.53	1.00		0.62	1.00		0.56	1.00	
Satd. Flow (perm)	634	1792	1587	1005	1713		1168	1640		1014	1565	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	391	65	38	342	168	103	38	60	185	22	141
RTOR Reduction (vph)	0	0	22	0	17	0	0	55	0	0	127	0
Lane Group Flow (vph)	228	391	43	38	493	0	103	43	0	185	36	0
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	59.8	59.8	59.8	47.4	47.4		13.5	7.1		16.9	8.8	
Effective Green, g (s)	59.8	59.8	59.8	47.4	47.4		13.5	7.1		16.9	8.8	
Actuated g/C Ratio	0.66	0.66	0.66	0.53	0.53		0.15	0.08		0.19	0.10	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	537	1190	1054	529	902		219	129		254	153	
v/s Ratio Prot	c0.04	0.22			c0.29		0.03	0.03		c0.07	0.02	
v/s Ratio Perm	0.24		0.03	0.04			0.04			c0.07		
v/c Ratio	0.42	0.33	0.04	0.07	0.55		0.47	0.33		0.73	0.23	
Uniform Delay, d1	7.3	6.5	5.2	10.5	14.2		34.5	39.2		33.4	37.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.7	0.1	0.3	2.4		1.6	1.5		10.0	0.8	
Delay (s)	7.8	7.2	5.3	10.7	16.5		36.1	40.7		43.4	38.3	
Level of Service	A	A	A	B	B		D	D		D	D	
Approach Delay (s)		7.2			16.1			38.3			41.0	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy & North Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	5	40	25	5	30	30	80	10	10	55	50
Future Volume (vph)	55	5	40	25	5	30	30	80	10	10	55	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.946			0.931			0.983			0.929	
Flt Protected		0.973			0.980		0.950			0.950		
Satd. Flow (prot)	0	1715	0	0	1700	0	1770	1831	0	1770	1730	0
Flt Permitted		0.973			0.980		0.950			0.950		
Satd. Flow (perm)	0	1715	0	0	1700	0	1770	1831	0	1770	1730	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	5	43	27	5	33	33	87	11	11	60	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	0	0	65	0	33	98	0	11	114	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.3%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy & North Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	40	25	5	30	30	80	10	10	55	50
Future Volume (Veh/h)	55	5	40	25	5	30	30	80	10	10	55	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	5	43	27	5	33	33	87	11	11	60	54
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	298	273	87	286	294	92	114			98		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	298	273	87	286	294	92	114			98		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	99	96	96	99	97	98			99		
cM capacity (veh/h)	614	615	971	619	598	965	1475			1495		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	108	65	33	98	11	114
Volume Left	60	27	33	0	11	0
Volume Right	43	33	0	11	0	54
cSH	720	754	1475	1700	1495	1700
Volume to Capacity	0.15	0.09	0.02	0.06	0.01	0.07
Queue Length 95th (m)	4.2	2.3	0.5	0.0	0.2	0.0
Control Delay (s)	10.9	10.2	7.5	0.0	7.4	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	10.9	10.2	1.9		0.7	
Approach LOS	B	B				

Intersection Summary

Average Delay	5.1		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy & South Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	5	40	25	5	30	25	40	10	10	65	45
Future Volume (vph)	50	5	40	25	5	30	25	40	10	10	65	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.943			0.931			0.969			0.939	
Flt Protected		0.974			0.980		0.950			0.950		
Satd. Flow (prot)	0	1711	0	0	1700	0	1770	1805	0	1770	1749	0
Flt Permitted		0.974			0.980		0.950			0.950		
Satd. Flow (perm)	0	1711	0	0	1700	0	1770	1805	0	1770	1749	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	5	43	27	5	33	27	43	11	11	71	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	65	0	27	54	0	11	120	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.5%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy & South Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	5	40	25	5	30	25	40	10	10	65	45
Future Volume (Veh/h)	50	5	40	25	5	30	25	40	10	10	65	45
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	5	43	27	5	33	27	43	11	11	71	49
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	250	226	96	241	244	48	120			54		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250	226	96	241	244	48	120			54		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	96	96	99	97	98			99		
cM capacity (veh/h)	664	657	961	664	641	1020	1468			1551		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	102	65	27	54	11	120
Volume Left	54	27	27	0	11	0
Volume Right	43	33	0	11	0	49
cSH	763	804	1468	1700	1551	1700
Volume to Capacity	0.13	0.08	0.02	0.03	0.01	0.07
Queue Length 95th (m)	3.7	2.1	0.4	0.0	0.2	0.0
Control Delay (s)	10.4	9.9	7.5	0.0	7.3	0.0
Lane LOS	B	A	A		A	
Approach Delay (s)	10.4	9.9	2.5		0.6	
Approach LOS	B	A				

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	670	0	240	780	0	200	700	0	60	685	0
Future Volume (vph)	115	670	0	240	780	0	200	700	0	60	685	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			1.00		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.201			0.237			0.211			0.338		
Satd. Flow (perm)	381	3539	0	441	3539	0	400	3610	0	627	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	117	684	0	245	796	0	204	714	0	61	699	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	684	0	245	796	0	204	714	0	61	699	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

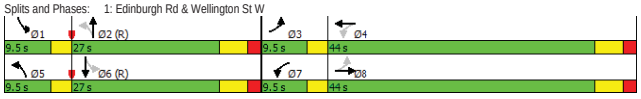
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	35.7	26.2		36.3	28.1		45.1	33.8		37.2	27.0	
Actuated g/C Ratio	0.40	0.29		0.40	0.31		0.50	0.38		0.41	0.30	
v/c Ratio	0.46	0.66		0.90	0.72		0.52	0.53		0.17	0.65	
Control Delay	20.4	30.7		54.1	31.4		19.1	26.0		14.0	27.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.4	30.7		54.1	31.4		19.1	26.0		14.0	27.4	
LOS	C	C		D	C		B	C		B	C	
Approach Delay		29.2			36.8			24.5			26.3	
Approach LOS		C			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 71 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 29.6		Intersection LOS: C	
Intersection Capacity Utilization 78.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	117	684	245	796	204	714	61	699
v/c Ratio	0.46	0.66	0.90	0.72	0.52	0.53	0.17	0.65
Control Delay	20.4	30.7	54.1	31.4	19.1	26.0	14.0	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	30.7	54.1	31.4	19.1	26.0	14.0	27.4
Queue Length 50th (m)	12.4	56.7	28.3	68.7	20.1	54.5	4.2	57.2
Queue Length 95th (m)	20.0	67.6	#53.2	80.8	39.1	84.5	m9.5	#89.5
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	254	1494	273	1494	392	1354	356	1083
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.46	0.90	0.53	0.52	0.53	0.17	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	670	0	240	780	0	200	700	0	60	685	0
Future Volume (vph)	115	670	0	240	780	0	200	700	0	60	685	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3539		1769	3539		1804	3610		1767	3610	
Flt Permitted	0.20	1.00		0.24	1.00		0.21	1.00		0.34	1.00	
Satd. Flow (perm)	381	3539		441	3539		400	3610		628	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	117	684	0	245	796	0	204	714	0	61	699	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	117	684	0	245	796	0	204	714	0	61	699	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	32.0	26.8		34.6	28.1		41.7	32.6		32.5	26.4	
Effective Green, g (s)	32.0	26.8		34.6	28.1		41.7	32.6		32.5	26.4	
Actuated g/C Ratio	0.36	0.30		0.38	0.31		0.46	0.36		0.36	0.29	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	217	1053		265	1104		377	1307		303	1058	
v/s Ratio Prot	0.03	0.19		c0.07	0.22		c0.07	0.20		0.01	c0.19	
v/s Ratio Perm	0.16			c0.29			0.18			0.06		
v/c Ratio	0.54	0.65		0.92	0.72		0.54	0.55		0.20	0.66	
Uniform Delay, d1	20.9	27.5		24.0	27.5		16.0	22.8		19.1	27.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.93	0.83	
Incremental Delay, d2	2.6	1.4		35.5	2.3		1.6	1.6		0.3	2.8	
Delay (s)	23.4	28.9		59.5	29.8		17.6	24.5		18.0	26.0	
Level of Service	C	C		E	C		B	C		B	C	
Approach Delay (s)		28.1			36.8			22.9			25.4	
Approach LOS		C			D			C			C	

Intersection Summary

HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	775	0	0	1015	50	415	160	150	40	0	355
Future Volume (vph)	220	775	0	0	1015	50	415	160	150	40	0	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.993				0.850			0.850
Flt Protected	0.950						0.950	0.978		0.950		
Satd. Flow (prot)	1787	5136	0	0	5097	0	1698	1757	1599	1805	0	1599
Flt Permitted	0.163						0.950	0.978		0.411		
Satd. Flow (perm)	307	5136	0	0	5097	0	1698	1757	1599	781	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					7				155			366
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	227	799	0	0	1046	52	428	165	155	41	0	366
Shared Lane Traffic (%)							32%					
Lane Group Flow (vph)	227	799	0	0	1098	0	291	302	155	41	0	366
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	24.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	3.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

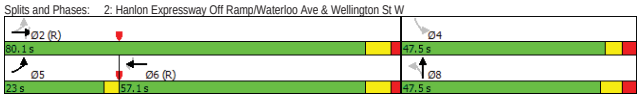
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.32		0.39
v/c Ratio	0.54	0.27			0.55		0.55	0.55	0.16	0.16		0.43
Control Delay	17.5	14.1			31.1		41.0	40.9	2.2	33.3		4.2
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	17.5	14.1			31.1		41.0	40.9	2.2	33.3		4.2
LOS	B	B			C		D	D	A	C		A
Approach Delay		14.9			31.1			32.9			7.1	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 127.6
Actuated Cycle Length: 127.6
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 95
Control Type: Pretimed
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 23.5 — Intersection LOS: C
Intersection Capacity Utilization 78.3% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	227	799	1098	291	302	155	41	366
v/c Ratio	0.54	0.27	0.55	0.55	0.55	0.16	0.16	0.43
Control Delay	17.5	14.1	31.1	41.0	40.9	2.2	33.3	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	14.1	31.1	41.0	40.9	2.2	33.3	4.2
Queue Length 50th (m)	25.7	37.4	81.0	67.0	69.6	0.0	7.8	0.0
Queue Length 95th (m)	41.5	45.6	95.8	98.6	101.7	9.5	17.6	19.6
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	417	2938	2001	532	550	981	250	849
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.27	0.55	0.55	0.55	0.16	0.16	0.43

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	775	0	0	1015	50	415	160	150	40	0	355
Future Volume (vph)	220	775	0	0	1015	50	415	160	150	40	0	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5096		1698	1757	1599	1805		1599
Flt Permitted	0.16	1.00			1.00		0.95	0.98	1.00	0.41		1.00
Satd. Flow (perm)	306	5136			5096		1698	1757	1599	782		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	227	799	0	0	1046	52	428	165	155	41	0	366
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	66	0	0	223
Lane Group Flow (vph)	227	799	0	0	1094	0	291	302	89	41	0	143
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	41.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.32		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	6.5		7.1
Lane Grp Cap (vph)	407	2938			1996		532	550	914	251		626
v/s Ratio Prot	c0.09	0.16			0.21							
v/s Ratio Perm	c0.23						0.17	0.17	0.06	0.05		0.09
v/c Ratio	0.56	0.27			0.55		0.55	0.55	0.10	0.16		0.23
Uniform Delay, d1	15.9	13.8			30.0		36.3	36.3	12.4	31.0		25.9
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	5.4	0.2			1.1		4.0	3.9	0.2	1.4		0.9
Delay (s)	21.3	14.1			31.1		40.3	40.2	12.6	32.4		26.8
Level of Service	C	B			C		D	D	B	C		C
Approach Delay (s)		15.7			31.1			34.5			27.3	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	900	515	0	1330	0	0	0	0	205	0	100
Future Volume (vph)	0	900	515	0	1330	0	0	0	0	205	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.945										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4823	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4823	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		212										105
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	947	542	0	1400	0	0	0	0	216	0	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1489	0	0	1400	0	0	0	0	216	0	105
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					41.7		56.9
Total Split (%)		57.7%			57.7%					42.3%		57.7%
Maximum Green (s)		50.0			50.0					35.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
v/c Ratio		0.58			0.54					0.18		0.13

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

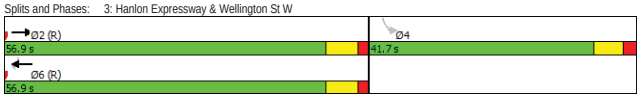
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		15.4			17.4					22.4		3.0
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		15.4			17.4					22.4		3.0
LOS		B			B					C		A
Approach Delay		15.4			17.4						16.0	
Approach LOS		B			B						B	

Intersection Summary

Area Type:	Other		
Cycle Length: 98.6			
Actuated Cycle Length: 98.6			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 16.3		Intersection LOS: B	
Intersection Capacity Utilization 43.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1489	1400	216	105
v/c Ratio	0.58	0.54	0.18	0.13
Control Delay	15.4	17.4	22.4	3.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.4	17.4	22.4	3.0
Queue Length 50th (m)	62.6	66.8	15.2	0.0
Queue Length 95th (m)	77.0	80.1	23.7	8.1
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	2550	2604	1230	824
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.58	0.54	0.18	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	900	515	0	1330	0	0	0	0	205	0	100
Future Volume (vph)	0	900	515	0	1330	0	0	0	0	205	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.95			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4825			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4825			5136					3467		1524
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)	0	947	542	0	1400	0	0	0	0	216	0	105
RTOR Reduction (vph)	0	104	0	0	0	0	0	0	0	0	0	52
Lane Group Flow (vph)	0	1385	0	0	1400	0	0	0	0	216	0	53
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					35.0		50.0
Effective Green, g (s)		50.0			50.0					35.0		50.0
Actuated g/C Ratio		0.51			0.51					0.35		0.51
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2446			2604					1230		772
v/s Ratio Prot		c0.29			0.27							
v/s Ratio Perm										c0.06		0.03
v/c Ratio		0.57			0.54					0.18		0.07
Uniform Delay, d1		16.8			16.5					21.9		12.4
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		1.0			0.8					0.3		0.2
Delay (s)		17.8			17.3					22.2		12.6
Level of Service		B			B					C		B
Approach Delay (s)		17.8			17.3			0.0			19.0	
Approach LOS		B			B			A			B	

Intersection Summary

HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	98.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	985	895	410	370	60
Future Volume (vph)	70	985	895	410	370	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.953			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	3566	3348	0	1787	1615
Flt Permitted		0.688			0.950	
Satd. Flow (perm)	0	2461	3348	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			130			62
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Adj. Flow (vph)	72	1015	923	423	381	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1087	1346	0	381	62
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

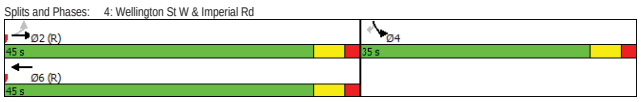
10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		45.8	45.8		22.2	22.2
Actuated g/C Ratio		0.57	0.57		0.28	0.28
v/c Ratio		0.77	0.68		0.77	0.13
Control Delay		19.8	14.0		36.9	5.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		19.8	14.0		36.9	5.9
LOS		B	B		D	A
Approach Delay		19.8	14.0		32.5	
Approach LOS		B	B		C	

Intersection Summary

Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 102.7%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1087	1346	381	62
v/c Ratio	0.77	0.68	0.77	0.13
Control Delay	19.8	14.0	36.9	5.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.8	14.0	36.9	5.9
Queue Length 50th (m)	64.7	66.0	55.6	0.0
Queue Length 95th (m)	#125.6	110.1	76.7	7.5
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1409	1972	647	624
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.77	0.68	0.59	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

10-17-2019

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	985	895	410	370	60
Future Volume (vph)	70	985	895	410	370	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3565	3348		1787	1615
Flt Permitted		0.69	1.00		0.95	1.00
Satd. Flow (perm)		2459	3348		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	1015	923	423	381	62
RTOR Reduction (vph)	0	0	56	0	0	45
Lane Group Flow (vph)	0	1087	1290	0	381	17
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		45.8	45.8		22.2	22.2
Effective Green, g (s)		45.8	45.8		22.2	22.2
Actuated g/C Ratio		0.57	0.57		0.28	0.28
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1407	1916		495	448
v/s Ratio Prot			0.39		c0.21	
v/s Ratio Perm		c0.44				0.01
v/c Ratio		0.77	0.67		0.77	0.04
Uniform Delay, d1		13.1	11.9		26.6	21.1
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		4.2	1.9		7.1	0.0
Delay (s)		17.3	13.8		33.6	21.1
Level of Service		B	B		C	C
Approach Delay (s)		17.3	13.8		31.9	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	400	0	280	475	70	420	1215	0	100	1625	140
Future Volume (vph)	120	400	0	280	475	70	420	1215	0	100	1625	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.981							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3535	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.218			0.209			0.950			0.950		
Satd. Flow (perm)	410	3574	0	397	3535	0	3467	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					8							143
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	122	408	0	286	485	71	429	1240	0	102	1658	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	408	0	286	556	0	429	1240	0	102	1658	143
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

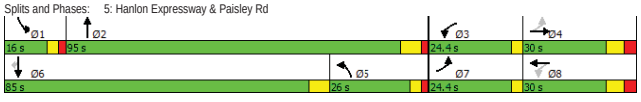
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	28.0		9.5	29.4		10.0	60.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	79.6	79.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	5.4	5.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	40.3	21.4		50.7	28.9		21.0	87.7		10.9	79.6	79.6
Actuated g/C Ratio	0.24	0.13		0.31	0.18		0.13	0.53		0.07	0.48	0.48
v/c Ratio	0.56	0.88		0.94	0.89		0.97	0.69		0.85	0.99	0.17
Control Delay	53.4	90.8		86.0	81.7		106.6	31.2		124.5	61.3	3.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	53.4	90.8		86.0	81.7		106.6	31.2		124.5	61.3	3.7
LOS	D	F		F	F		F	C		F	E	A
Approach Delay		82.2			83.1			50.6			60.3	
Approach LOS		F			F			D			E	

Intersection Summary

Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 164.8			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 63.3		Intersection LOS: E	
Intersection Capacity Utilization 102.3%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	122	408	286	556	429	1240	102	1658	143
v/c Ratio	0.56	0.88	0.94	0.89	0.97	0.69	0.85	0.99	0.17
Control Delay	53.4	90.8	86.0	81.7	106.6	31.2	124.5	61.3	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	90.8	86.0	81.7	106.6	31.2	124.5	61.3	3.7
Queue Length 50th (m)	31.4	74.0	81.6	98.6	77.6	164.8	35.7	296.4	0.0
Queue Length 95th (m)	49.8	#101.7	#133.1	#149.5	#114.2	191.1	#73.2	#354.1	12.8
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	298	477	304	626	442	1794	120	1676	854
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.86	0.94	0.89	0.97	0.69	0.85	0.99	0.17

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	400	0	280	475	70	420	1215	0	100	1625	140
Future Volume (vph)	120	400	0	280	475	70	420	1215	0	100	1625	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	5.4	5.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574		1805	3534		3467	3374		1805	3471	1615
Flt Permitted	0.22	1.00		0.21	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	410	3574		398	3534		3467	3374		1805	3471	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	122	408	0	286	485	71	429	1240	0	102	1658	143
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	0	0	0	74
Lane Group Flow (vph)	122	408	0	286	549	0	429	1240	0	102	1658	69
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)	35.3	21.4		45.8	28.9		21.0	87.7		10.9	79.6	79.6
Effective Green, g (s)	35.3	21.4		45.8	28.9		21.0	87.7		10.9	79.6	79.6
Actuated g/C Ratio	0.21	0.13		0.28	0.18		0.13	0.53		0.07	0.48	0.48
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	5.4	5.4
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)	203	464		293	619		441	1795		119	1676	780
v/s Ratio Prot	0.05	0.11		c0.13	0.16		c0.12	0.37		0.06	c0.48	
v/s Ratio Perm	0.08			c0.14								0.04
v/c Ratio	0.60	0.88		0.98	0.89		0.97	0.69		0.86	0.99	0.09
Uniform Delay, d1	55.0	70.4		52.6	66.4		71.6	28.5		76.2	42.2	23.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.9	17.0		45.6	14.4		35.6	2.2		41.8	19.6	0.2
Delay (s)	60.0	87.5		98.2	80.8		107.2	30.7		118.0	61.8	23.2
Level of Service	E	F		F	F		F	C		F	E	C
Approach Delay (s)		81.1			86.7			50.4			61.9	
Approach LOS		F			F			D			E	

Intersection Summary

HCM 2000 Control Delay	64.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	164.8	Sum of lost time (s)	23.4
Intersection Capacity Utilization	102.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	170	50	90	265	45	50	645	85	50	635	75
Future Volume (vph)	75	170	50	90	265	45	50	645	85	50	635	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.966			0.978			0.982			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1804	0	1805	1836	0	1805	1856	0	1770	1865	0
Flt Permitted	0.331			0.503			0.273			0.260		
Satd. Flow (perm)	612	1804	0	949	1836	0	518	1856	0	483	1865	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			14			8			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	77	175	52	93	273	46	52	665	88	52	655	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	227	0	93	319	0	52	753	0	52	732	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

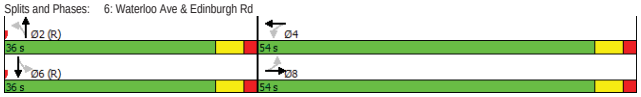
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	21.2	21.2		21.2	21.2		56.8	56.8		56.8	56.8	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.63	0.63		0.63	0.63	
v/c Ratio	0.53	0.51		0.42	0.72		0.16	0.64		0.17	0.62	
Control Delay	42.3	29.4		33.2	38.9		9.8	21.8		10.7	14.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	42.3	29.4		33.2	38.9		9.8	21.8		10.7	14.3	
LOS	D	C		C	D		A	C		B	B	
Approach Delay		32.7			37.6			21.0			14.1	
Approach LOS		C			D			C			B	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 77.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	227	93	319	52	753	52	732
v/c Ratio	0.53	0.51	0.42	0.72	0.16	0.64	0.17	0.62
Control Delay	42.3	29.4	33.2	38.9	9.8	21.8	10.7	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	29.4	33.2	38.9	9.8	21.8	10.7	14.3
Queue Length 50th (m)	12.3	31.9	14.4	51.3	1.9	56.9	3.5	72.0
Queue Length 95th (m)	24.4	47.9	26.0	71.2	m8.5	125.2	11.7	138.5
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	326	973	506	985	326	1173	304	1178
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.23	0.18	0.32	0.16	0.64	0.17	0.62

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	170	50	90	265	45	50	645	85	50	635	75
Future Volume (vph)	75	170	50	90	265	45	50	645	85	50	635	75
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1758	1804		1794	1837		1802	1857		1764	1865	
Flt Permitted	0.33	1.00		0.50	1.00		0.27	1.00		0.26	1.00	
Satd. Flow (perm)	613	1804		949	1837		518	1857		483	1865	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	77	175	52	93	273	46	52	665	88	52	655	77
RTOR Reduction (vph)	0	19	0	0	11	0	0	3	0	0	3	0
Lane Group Flow (vph)	77	208	0	93	308	0	52	750	0	52	729	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	21.2	21.2		21.2	21.2		56.8	56.8		56.8	56.8	
Effective Green, g (s)	21.2	21.2		21.2	21.2		56.8	56.8		56.8	56.8	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.63	0.63		0.63	0.63	
Clearance Time (s)	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	
Lane Grp Cap (vph)	144	424		223	432		326	1171		304	1177	
v/s Ratio Prot		0.12			c0.17			c0.40			0.39	
v/s Ratio Perm	0.13			0.10			0.10			0.11		
v/c Ratio	0.53	0.49		0.42	0.71		0.16	0.64		0.17	0.62	
Uniform Delay, d1	30.1	29.7		29.2	31.6		6.8	10.3		6.9	10.1	
Progression Factor	1.00	1.00		1.00	1.00		0.96	1.60		1.00	1.00	
Incremental Delay, d2	3.8	0.9		1.3	5.5		0.9	2.3		1.2	2.5	
Delay (s)	33.9	30.6		30.4	37.1		7.4	18.8		8.1	12.5	
Level of Service	C	C		C	D		A	B		A	B	
Approach Delay (s)		31.4			35.6			18.1			12.2	
Approach LOS		C			D			B			B	

Intersection Summary

HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	60	130	265	75	155	280
Future Volume (vph)	60	130	265	75	155	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	65	141	288	82	168	304
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	141	288	82	168	304
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.6%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	60	130	265	75	155	280
Future Volume (Veh/h)	60	130	265	75	155	280
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	141	288	82	168	304
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			207		724	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			207		724	66
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			79		46	70
cM capacity (veh/h)			1363		312	1000

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	65	141	288	82	472
Volume Left	0	0	288	0	168
Volume Right	0	141	0	0	304
cSH	1700	1700	1363	1700	876
Volume to Capacity	0.04	0.08	0.21	0.05	0.54
Queue Length 95th (m)	0.0	0.0	6.4	0.0	26.3
Control Delay (s)	0.0	0.0	8.3	0.0	17.0
Lane LOS			A		C
Approach Delay (s)	0.0		6.5		17.0
Approach LOS					C

Intersection Summary

Average Delay	9.9		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	335	125	60	405	45	115	555	55	100	570	110
Future Volume (vph)	90	335	125	60	405	45	115	555	55	100	570	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.959			0.985			0.987			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1793	0	1805	1848	0	1805	1867	0	1736	1842	0
Flt Permitted	0.247			0.233			0.191			0.249		
Satd. Flow (perm)	466	1793	0	440	1848	0	362	1867	0	454	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			8			10			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	97	360	134	65	435	48	124	597	59	108	613	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	494	0	65	483	0	124	656	0	108	731	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

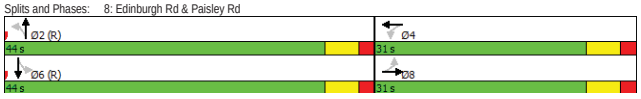
Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.63	0.80		0.45	0.78		0.68	0.69		0.47	0.78	
Control Delay	40.6	32.7		31.3	32.7		36.9	18.5		20.5	21.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.6	32.7		31.3	32.7		36.9	18.5		20.5	21.8	
LOS	D	C		C	C		D	B		C	C	
Approach Delay		34.0			32.5			21.5			21.7	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 26.4		Intersection LOS: C	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd



Queues
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	97	494	65	483	124	656	108	731
v/c Ratio	0.63	0.80	0.45	0.78	0.68	0.69	0.47	0.78
Control Delay	40.6	32.7	31.3	32.7	36.9	18.5	20.5	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	32.7	31.3	32.7	36.9	18.5	20.5	21.8
Queue Length 50th (m)	13.5	70.6	7.5	62.7	13.0	68.5	9.8	81.0
Queue Length 95th (m)	#36.9	#118.5	20.3	#109.8	#42.4	106.8	25.3	127.8
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	155	615	146	621	183	950	230	942
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.80	0.45	0.78	0.68	0.69	0.47	0.78

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	335	125	60	405	45	115	555	55	100	570	110
Future Volume (vph)	90	335	125	60	405	45	115	555	55	100	570	110
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	
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	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.99		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)	1791	1793		1796	1848		1800	1867		1732	1842	
Flt Permitted	0.25	1.00		0.23	1.00		0.19	1.00		0.25	1.00	
Satd. Flow (perm)	466	1793		441	1848		361	1867		454	1842	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	97	360	134	65	435	48	124	597	59	108	613	118
RTOR Reduction (vph)	0	18	0	0	5	0	0	5	0	0	9	0
Lane Group Flow (vph)	97	476	0	65	478	0	124	651	0	108	722	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	155	597		147	616		182	945		230	933	
v/s Ratio Prot		c0.27			0.26			0.35			c0.39	
v/s Ratio Perm	0.21			0.15			0.34			0.24		
v/c Ratio	0.63	0.80		0.44	0.78		0.68	0.69		0.47	0.77	
Uniform Delay, d1	21.1	22.7		19.5	22.5		13.9	14.0		12.0	15.0	
Progression Factor	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.0	9.7		9.4	9.2		18.7	4.1		6.7	6.2	
Delay (s)	36.7	32.4		28.9	31.7		32.6	18.1		18.7	21.2	
Level of Service	D	C		C	C		C	B		B	C	
Approach Delay (s)		33.1			31.4			20.4			20.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	405	120	65	420	195	95	30	50	215	40	295
Future Volume (vph)	290	405	120	65	420	195	95	30	50	215	40	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.99	1.00	0.99		1.00	0.98		0.99	0.99	
Frt			0.850		0.952			0.907			0.868	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	1805	1783	0	1770	1695	0	1787	1629	0
Flt Permitted	0.204			0.507			0.500			0.578		
Satd. Flow (perm)	388	1881	1594	963	1783	0	931	1695	0	1081	1629	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			130		33			54			321	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	315	440	130	71	457	212	103	33	54	234	43	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	315	440	130	71	669	0	103	87	0	234	364	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

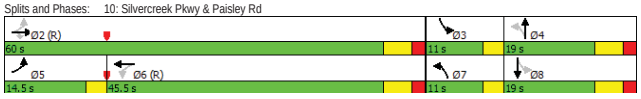
Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		2.5	5.0		4.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		7.5	19.0		9.0	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	63.1	60.1	60.1	45.7	45.7		18.1	9.1		18.5	9.1	
Actuated g/C Ratio	0.70	0.67	0.67	0.51	0.51		0.20	0.10		0.21	0.10	
v/c Ratio	0.70	0.35	0.12	0.15	0.73		0.40	0.40		0.82	0.81	
Control Delay	16.6	8.6	1.7	15.7	24.5		30.7	22.3		53.3	21.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.6	8.6	1.7	15.7	24.5		30.7	22.3		53.3	21.4	
LOS	B	A	A	B	C		C	C		D	C	
Approach Delay		10.4			23.7			26.8			33.9	
Approach LOS		B			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 14.5 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 21.6		Intersection LOS: C	
Intersection Capacity Utilization 92.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	315	440	130	71	669	103	87	234	364
v/c Ratio	0.70	0.35	0.12	0.15	0.73	0.40	0.40	0.82	0.81
Control Delay	16.6	8.6	1.7	15.7	24.5	30.7	22.3	53.3	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	8.6	1.7	15.7	24.5	30.7	22.3	53.3	21.4
Queue Length 50th (m)	19.1	32.6	0.0	7.3	95.7	14.9	5.7	36.8	7.4
Queue Length 95th (m)	#41.2	57.7	6.7	16.6	#166.3	26.6	18.9	#56.6	36.1
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	462	1256	1107	488	921	264	291	285	509
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.35	0.12	0.15	0.73	0.39	0.30	0.82	0.72

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	405	120	65	420	195	95	30	50	215	40	295
Future Volume (vph)	290	405	120	65	420	195	95	30	50	215	40	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1881	1594	1804	1784		1769	1694		1781	1628	
Flt Permitted	0.20	1.00	1.00	0.51	1.00		0.50	1.00		0.58	1.00	
Satd. Flow (perm)	387	1881	1594	964	1784		931	1694		1083	1628	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	440	130	71	457	212	103	33	54	234	43	321
RTOR Reduction (vph)	0	0	45	0	17	0	0	49	0	0	286	0
Lane Group Flow (vph)	315	440	85	71	652	0	103	38	0	234	78	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	58.9	58.9	58.9	44.5	44.5		14.4	8.0		17.8	9.7	
Effective Green, g (s)	58.9	58.9	58.9	44.5	44.5		14.4	8.0		17.8	9.7	
Actuated g/C Ratio	0.65	0.65	0.65	0.49	0.49		0.16	0.09		0.20	0.11	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	432	1231	1043	476	882		208	150		277	175	
v/s Ratio Prot	c0.09	0.23			0.37		0.04	0.02		c0.08	0.05	
v/s Ratio Perm	c0.38		0.05	0.07			0.04			c0.09		
v/c Ratio	0.73	0.36	0.08	0.15	0.74		0.50	0.25		0.84	0.44	
Uniform Delay, d1	11.8	7.0	5.7	12.4	18.1		33.8	38.2		33.9	37.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	0.8	0.2	0.7	5.5		1.9	0.9		20.4	1.8	
Delay (s)	17.9	7.8	5.8	13.1	23.7		35.7	39.1		54.3	39.4	
Level of Service	B	A	A	B	C		D	D		D	D	
Approach Delay (s)		11.1			22.7			37.2			45.2	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy & North Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	3	50	15	3	20	50	85	25	30	100	75
Future Volume (vph)	70	3	50	15	3	20	50	85	25	30	100	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.945			0.928			0.966			0.936	
Flt Protected		0.972			0.981		0.950			0.950		
Satd. Flow (prot)	0	1711	0	0	1696	0	1770	1799	0	1770	1744	0
Flt Permitted		0.972			0.981		0.950			0.950		
Satd. Flow (perm)	0	1711	0	0	1696	0	1770	1799	0	1770	1744	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	3	54	16	3	22	54	92	27	33	109	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	133	0	0	41	0	54	119	0	33	191	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy & North Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	3	50	15	3	20	50	85	25	30	100	75
Future Volume (Veh/h)	70	3	50	15	3	20	50	85	25	30	100	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	3	54	16	3	22	54	92	27	33	109	82
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	440	443	150	444	470	106	191			119		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440	443	150	444	470	106	191			119		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	99	94	97	99	98	96			98		
cM capacity (veh/h)	489	478	896	468	461	949	1383			1469		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	133	41	54	119	33	191
Volume Left	76	16	54	0	33	0
Volume Right	54	22	0	27	0	82
cSH	599	642	1383	1700	1469	1700
Volume to Capacity	0.22	0.06	0.04	0.07	0.02	0.11
Queue Length 95th (m)	6.7	1.6	1.0	0.0	0.6	0.0
Control Delay (s)	12.7	11.0	7.7	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.7	11.0	2.4		1.1	
Approach LOS	B	B				

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy & South Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	3	90	15	3	10	95	80	25	30	60	75
Future Volume (vph)	70	3	90	15	3	10	95	80	25	30	60	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.925			0.950			0.964			0.916	
Flt Protected		0.979			0.974		0.950			0.950		
Satd. Flow (prot)	0	1687	0	0	1724	0	1770	1796	0	1770	1706	0
Flt Permitted		0.979			0.974		0.950			0.950		
Satd. Flow (perm)	0	1687	0	0	1724	0	1770	1796	0	1770	1706	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	3	98	16	3	11	103	87	27	33	65	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	0	0	30	0	103	114	0	33	147	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.0%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy & South Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	3	90	15	3	10	95	80	25	30	60	75
Future Volume (Veh/h)	70	3	90	15	3	10	95	80	25	30	60	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	3	98	16	3	11	103	87	27	33	65	82
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	478	492	106	537	520	100	147			114		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478	492	106	537	520	100	147			114		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	99	90	96	99	99	93			98		
cM capacity (veh/h)	455	433	948	377	418	955	1435			1475		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	177	30	103	114	33	147
Volume Left	76	16	103	0	33	0
Volume Right	98	11	0	27	0	82
cSH	638	491	1435	1700	1475	1700
Volume to Capacity	0.28	0.06	0.07	0.07	0.02	0.09
Queue Length 95th (m)	9.0	1.6	1.9	0.0	0.5	0.0
Control Delay (s)	12.8	12.8	7.7	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.8	12.8	3.7		1.4	
Approach LOS	B	B				

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	580	0	170	545	0	125	465	0	60	490	0
Future Volume (vph)	80	580	0	170	545	0	125	465	0	60	490	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		45.0	50.0		40.0	40.0		20.0	40.0		40.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00			1.00			0.99		
Frt												
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	0	1770	3539	0	1805	3610	0	1770	3610	0
Flt Permitted	0.326			0.248			0.392			0.481		
Satd. Flow (perm)	617	3539	0	462	3539	0	742	3610	0	890	3610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		904.0			320.9			339.0			212.9	
Travel Time (s)		65.1			23.1			24.4			15.3	
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Adj. Flow (vph)	82	592	0	173	556	0	128	474	0	61	500	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	592	0	173	556	0	128	474	0	61	500	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

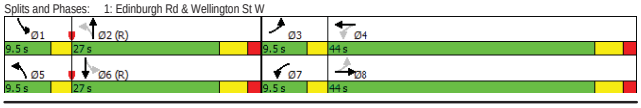
Lanes, Volumes, Timings
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	24.0		9.5	24.0		9.5	24.0	
Total Split (s)	9.5	44.0		9.5	44.0		9.5	27.0		9.5	27.0	
Total Split (%)	10.6%	48.9%		10.6%	48.9%		10.6%	30.0%		10.6%	30.0%	
Maximum Green (s)	6.5	38.0		6.5	38.0		6.5	21.0		6.5	21.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)					7.0			7.0			7.0	
Flash Dont Walk (s)					10.0			10.0			10.0	
Pedestrian Calls (#/hr)					0			0			0	
Act Effct Green (s)	30.4	21.0		31.1	22.9		49.6	39.2		45.8	35.8	
Actuated g/C Ratio	0.34	0.23		0.35	0.25		0.55	0.44		0.51	0.40	
v/c Ratio	0.28	0.72		0.68	0.62		0.25	0.30		0.12	0.35	
Control Delay	19.8	36.5		34.1	32.9		11.8	18.9		8.4	19.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.8	36.5		34.1	32.9		11.8	18.9		8.4	19.2	
LOS	B	D		C	C		B	B		A	B	
Approach Delay		34.5			33.2			17.4			18.0	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80.5 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 26.5		Intersection LOS: C	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Edinburgh Rd & Wellington St W



Queues
1: Edinburgh Rd & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	592	173	556	128	474	61	500
v/c Ratio	0.28	0.72	0.68	0.62	0.25	0.30	0.12	0.35
Control Delay	19.8	36.5	34.1	32.9	11.8	18.9	8.4	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	36.5	34.1	32.9	11.8	18.9	8.4	19.2
Queue Length 50th (m)	9.7	52.6	21.7	48.8	10.2	29.3	3.1	35.6
Queue Length 95th (m)	17.3	65.1	33.1	60.8	21.9	48.1	7.4	56.4
Internal Link Dist (m)		880.0		296.9		315.0		188.9
Turn Bay Length (m)	60.0		50.0		40.0		40.0	
Base Capacity (vph)	295	1494	254	1494	512	1572	526	1436
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.40	0.68	0.37	0.25	0.30	0.12	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Edinburgh Rd & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	580	0	170	545	0	125	465	0	60	490	0
Future Volume (vph)	80	580	0	170	545	0	125	465	0	60	490	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3539		1769	3539		1802	3610		1763	3610	
Flt Permitted	0.33	1.00		0.25	1.00		0.39	1.00		0.48	1.00	
Satd. Flow (perm)	619	3539		463	3539		744	3610		892	3610	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	82	592	0	173	556	0	128	474	0	61	500	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	82	592	0	173	556	0	128	474	0	61	500	0
Confl. Peds. (#/hr)	3		1	1		3	6		10	10		6
Heavy Vehicles (%)	0%	2%	1%	2%	2%	1%	0%	0%	2%	2%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	26.8	21.6		29.4	22.9		46.7	38.0		41.1	35.2	
Effective Green, g (s)	26.8	21.6		29.4	22.9		46.7	38.0		41.1	35.2	
Actuated g/C Ratio	0.30	0.24		0.33	0.25		0.52	0.42		0.46	0.39	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	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)	252	849		245	900		488	1524		464	1411	
v/s Ratio Prot	0.02	0.17		c0.05	0.16		c0.03	0.13		0.01	c0.14	
v/s Ratio Perm	0.08			c0.18			0.11			0.05		
v/c Ratio	0.33	0.70		0.71	0.62		0.26	0.31		0.13	0.35	
Uniform Delay, d1	23.4	31.2		23.4	29.7		11.5	17.3		13.8	19.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.75	0.90	
Incremental Delay, d2	0.8	2.5		8.9	1.3		0.3	0.5		0.1	0.7	
Delay (s)	24.2	33.7		32.3	30.9		11.7	17.8		10.5	18.2	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		32.6			31.3			16.5			17.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	555	0	0	715	50	290	85	160	45	0	255
Future Volume (vph)	150	555	0	0	715	50	290	85	160	45	0	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	150.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt					0.990				0.850			0.850
Flt Protected	0.950						0.950	0.973		0.950		
Satd. Flow (prot)	1787	5136	0	0	5080	0	1698	1747	1599	1805	0	1599
Flt Permitted	0.272						0.950	0.973		0.568		
Satd. Flow (perm)	511	5136	0	0	5080	0	1698	1747	1599	1079	0	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					10				165			263
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		447.0			904.0			367.9			138.7	
Travel Time (s)		32.2			65.1			26.5			10.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Adj. Flow (vph)	155	572	0	0	737	52	299	88	165	46	0	263
Shared Lane Traffic (%)							36%					
Lane Group Flow (vph)	155	572	0	0	789	0	191	196	165	46	0	263
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Minimum Split (s)	9.5	34.1			34.1		47.5	47.5	34.1	25.5		34.1
Total Split (s)	23.0	80.1			57.1		47.5	47.5	80.1	47.5		57.1
Total Split (%)	18.0%	62.8%			44.7%		37.2%	37.2%	62.8%	37.2%		44.7%
Maximum Green (s)	20.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Yellow Time (s)	3.0	5.0			5.0		4.5	4.5	5.0	4.5		5.0
All-Red Time (s)	0.0	2.1			2.1		3.0	3.0	2.1	3.0		2.1
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lead/Lag	Lead				Lag							Lag
Lead-Lag Optimize?	Yes				Yes							Yes
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	0.0		7.0
Flash Dont Walk (s)		20.0			20.0		33.0	33.0	20.0	0.0		20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0		0

Lanes, Volumes, Timings
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

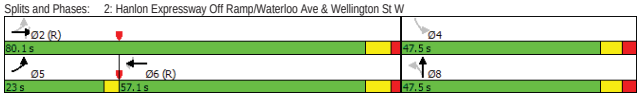
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	77.1	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.60	0.57			0.39		0.31	0.31	0.57	0.31		0.39
v/c Ratio	0.31	0.19			0.40		0.36	0.36	0.17	0.14		0.33
Control Delay	12.6	13.4			28.3		36.3	36.2	2.2	32.9		4.1
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0		0.0
Total Delay	12.6	13.4			28.3		36.3	36.2	2.2	32.9		4.1
LOS	B	B			C		D	D	A	C		A
Approach Delay		13.2			28.3			26.1			8.4	
Approach LOS		B			C			C			A	

Intersection Summary

Area Type:	Other
Cycle Length: 127.6	
Actuated Cycle Length: 127.6	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green	
Natural Cycle: 95	
Control Type: Pretimed	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 20.6	Intersection LOS: C
Intersection Capacity Utilization 66.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W



Queues
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR
Lane Group Flow (vph)	155	572	789	191	196	165	46	263
v/c Ratio	0.31	0.19	0.40	0.36	0.36	0.17	0.14	0.33
Control Delay	12.6	13.4	28.3	36.3	36.2	2.2	32.9	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	13.4	28.3	36.3	36.2	2.2	32.9	4.1
Queue Length 50th (m)	16.8	25.4	53.6	41.0	42.2	0.0	8.7	0.0
Queue Length 95th (m)	27.2	32.2	65.7	64.3	65.2	9.6	18.9	17.4
Internal Link Dist (m)		423.0	880.0		343.9			
Turn Bay Length (m)	150.0							
Base Capacity (vph)	508	2938	1996	532	547	985	338	786
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.19	0.40	0.36	0.36	0.17	0.14	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Hanlon Expressway Off Ramp/Waterloo Ave & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	555	0	0	715	50	290	85	160	45	0	255
Future Volume (vph)	150	555	0	0	715	50	290	85	160	45	0	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1787	5136			5081		1698	1747	1599	1805		1599
Flt Permitted	0.27	1.00			1.00		0.95	0.97	1.00	0.57		1.00
Satd. Flow (perm)	512	5136			5081		1698	1747	1599	1080		1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	155	572	0	0	737	52	299	88	165	46	0	263
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	71	0	0	160
Lane Group Flow (vph)	155	572	0	0	783	0	191	196	94	46	0	103
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	pm+pt	NA			NA		Perm	NA	custom	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases	2						8		2	4		6
Actuated Green, G (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Effective Green, g (s)	73.0	73.0			50.0		40.0	40.0	73.0	40.0		50.0
Actuated g/C Ratio	0.57	0.57			0.39		0.31	0.31	0.57	0.31		0.39
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.1	7.5		7.1
Lane Grp Cap (vph)	492	2938			1990		532	547	914	338		626
v/s Ratio Prot	c0.05	0.11			c0.15							
v/s Ratio Perm	0.13						c0.11	0.11	0.06	0.04		0.06
v/c Ratio	0.32	0.19			0.39		0.36	0.36	0.10	0.14		0.16
Uniform Delay, d1	13.4	13.1			27.9		33.9	33.9	12.4	31.4		25.2
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.7	0.1			0.6		1.9	1.8	0.2	0.8		0.6
Delay (s)	15.1	13.3			28.5		35.8	35.7	12.6	32.2		25.8
Level of Service	B	B			C		D	D	B	C		C
Approach Delay (s)		13.7			28.5			28.8			26.8	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	127.6	Sum of lost time (s)	17.6
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	660	395	0	905	0	0	0	0	175	0	165
Future Volume (vph)	0	660	395	0	905	0	0	0	0	175	0	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor												
Frt		0.944										0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	4818	0	0	5136	0	0	0	0	3467	0	1524
Flt Permitted										0.950		
Satd. Flow (perm)	0	4818	0	0	5136	0	0	0	0	3467	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		341										174
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		635.4			447.0			133.0			1053.0	
Travel Time (s)		45.7			32.2			9.6			75.8	
Confl. Peds. (#/hr)	2					2						
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
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Adj. Flow (vph)	0	695	416	0	953	0	0	0	0	184	0	174
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1111	0	0	953	0	0	0	0	184	0	174
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			14.4			14.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Minimum Split (s)		24.9			24.9					24.7		24.9
Total Split (s)		56.9			56.9					24.7		56.9
Total Split (%)		69.7%			69.7%					30.3%		69.7%
Maximum Green (s)		50.0			50.0					18.0		50.0
Yellow Time (s)		5.0			5.0					4.5		5.0
All-Red Time (s)		1.9			1.9					2.2		1.9
Lost Time Adjust (s)		0.0			0.0					0.0		0.0
Total Lost Time (s)		6.9			6.9					6.7		6.9
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		7.0			7.0					7.0		7.0
Flash Dont Walk (s)		11.0			11.0					11.0		11.0
Pedestrian Calls (#/hr)		0			0					0		0
Act Effct Green (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
v/c Ratio		0.36			0.30					0.24		0.17

Lanes, Volumes, Timings
3: Hanlon Expressway & Wellington St W

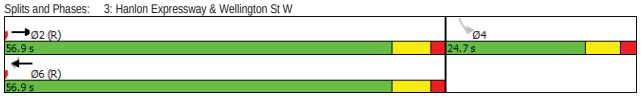
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		5.5			7.8					27.2		1.6
Queue Delay		0.0			0.0					0.0		0.0
Total Delay		5.5			7.8					27.2		1.6
LOS		A			A					C		A
Approach Delay		5.5			7.8						14.7	
Approach LOS		A			A						B	

Intersection Summary

Area Type: Other
Cycle Length: 81.6
Actuated Cycle Length: 81.6
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 0.36
Intersection Signal Delay: 7.8 — Intersection LOS: A
Intersection Capacity Utilization 39.2% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Hanlon Expressway & Wellington St W



Queues
3: Hanlon Expressway & Wellington St W

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1111	953	184	174
v/c Ratio	0.36	0.30	0.24	0.17
Control Delay	5.5	7.8	27.2	1.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.5	7.8	27.2	1.6
Queue Length 50th (m)	19.0	24.3	12.8	0.0
Queue Length 95th (m)	26.1	31.3	21.5	6.9
Internal Link Dist (m)	611.4	423.0		
Turn Bay Length (m)				
Base Capacity (vph)	3084	3147	764	1001
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.36	0.30	0.24	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Hanlon Expressway & Wellington St W

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	660	395	0	905	0	0	0	0	175	0	165
Future Volume (vph)	0	660	395	0	905	0	0	0	0	175	0	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9			6.9					6.7		6.9
Lane Util. Factor		0.91			0.91					0.97		1.00
Frpb, ped/bikes		1.00			1.00					1.00		1.00
Flpb, ped/bikes		1.00			1.00					1.00		1.00
Frt		0.94			1.00					1.00		0.85
Flt Protected		1.00			1.00					0.95		1.00
Satd. Flow (prot)		4817			5136					3467		1524
Flt Permitted		1.00			1.00					0.95		1.00
Satd. Flow (perm)		4817			5136					3467		1524
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)	0	695	416	0	953	0	0	0	0	184	0	174
RTOR Reduction (vph)	0	132	0	0	0	0	0	0	0	0	0	67
Lane Group Flow (vph)	0	979	0	0	953	0	0	0	0	184	0	107
Confl. Peds. (#/hr)	2					2						
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%	0%	0%	0%	1%	0%	6%
Turn Type		NA			NA					Perm		Perm
Protected Phases		2			6							
Permitted Phases										4		6
Actuated Green, G (s)		50.0			50.0					18.0		50.0
Effective Green, g (s)		50.0			50.0					18.0		50.0
Actuated g/C Ratio		0.61			0.61					0.22		0.61
Clearance Time (s)		6.9			6.9					6.7		6.9
Lane Grp Cap (vph)		2951			3147					764		933
v/s Ratio Prot		c0.20			0.19							
v/s Ratio Perm										c0.05		0.07
v/c Ratio		0.33			0.30					0.24		0.11
Uniform Delay, d1		7.7			7.5					26.2		6.6
Progression Factor		1.00			1.00					1.00		1.00
Incremental Delay, d2		0.3			0.2					0.7		0.2
Delay (s)		8.0			7.8					26.9		6.8
Level of Service		A			A					C		A
Approach Delay (s)		8.0			7.8			0.0			17.2	
Approach LOS		A			A			A			B	

Intersection Summary

HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	13.6
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	650	625	310	395	60
Future Volume (vph)	65	650	625	310	395	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor		1.00	0.99			
Frt			0.950			0.850
Flt Protected		0.995			0.950	
Satd. Flow (prot)	0	3528	3338	0	1787	1615
Flt Permitted		0.776			0.950	
Satd. Flow (perm)	0	2751	3338	0	1787	1615
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			150			62
Link Speed (k/h)		50	50		50	
Link Distance (m)		73.9	635.4		730.2	
Travel Time (s)		5.3	45.7		52.6	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Adj. Flow (vph)	67	670	644	320	407	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	737	964	0	407	62
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2		1	1
Detector Template	Left	Thru	Thru		Left	Right
Leading Detector (m)	2.0	10.0	10.0		2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6		2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4

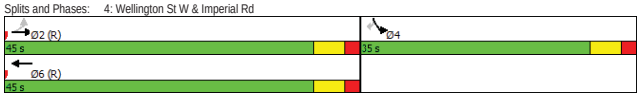
Lanes, Volumes, Timings
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	2	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	36.0	36.0	33.0		24.0	24.0
Total Split (s)	45.0	45.0	45.0		35.0	35.0
Total Split (%)	56.3%	56.3%	56.3%		43.8%	43.8%
Maximum Green (s)	39.0	39.0	39.0		29.0	29.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	17.0	17.0	14.0		7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)		45.0	45.0		23.0	23.0
Actuated g/C Ratio		0.56	0.56		0.29	0.29
v/c Ratio		0.48	0.50		0.79	0.12
Control Delay		12.8	10.6		37.6	5.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		12.8	10.6		37.6	5.8
LOS		B	B		D	A
Approach Delay		12.8	10.6		33.4	
Approach LOS		B	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 10 (13%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 16.3		Intersection LOS: B	
Intersection Capacity Utilization 84.0%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Wellington St W & Imperial Rd



Queues
4: Wellington St W & Imperial Rd

10-17-2019

Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	737	964	407	62
v/c Ratio	0.48	0.50	0.79	0.12
Control Delay	12.8	10.6	37.6	5.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.8	10.6	37.6	5.8
Queue Length 50th (m)	34.6	38.0	59.1	0.0
Queue Length 95th (m)	57.8	63.3	83.1	7.5
Internal Link Dist (m)	49.9	611.4	706.2	
Turn Bay Length (m)				
Base Capacity (vph)	1546	1942	647	624
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.48	0.50	0.63	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Wellington St W & Imperial Rd

10-17-2019

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	65	650	625	310	395	60
Future Volume (vph)	65	650	625	310	395	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	0.95		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3529	3339		1787	1615
Flt Permitted		0.78	1.00		0.95	1.00
Satd. Flow (perm)		2750	3339		1787	1615
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	670	644	320	407	62
RTOR Reduction (vph)	0	0	66	0	0	44
Lane Group Flow (vph)	0	737	898	0	407	18
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	2%	3%	0%	1%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)		45.0	45.0		23.0	23.0
Effective Green, g (s)		45.0	45.0		23.0	23.0
Actuated g/C Ratio		0.56	0.56		0.29	0.29
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1546	1878		513	464
v/s Ratio Prot			c0.27		c0.23	
v/s Ratio Perm		0.27				0.01
v/c Ratio		0.48	0.48		0.79	0.04
Uniform Delay, d1		10.5	10.5		26.3	20.5
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.1	0.9		8.2	0.0
Delay (s)		11.5	11.4		34.5	20.6
Level of Service		B	B		C	C
Approach Delay (s)		11.5	11.4		32.7	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	335	0	235	350	70	370	1200	0	90	1100	135
Future Volume (vph)	130	335	0	235	350	70	370	1200	0	90	1100	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		45.0	65.0		0.0	160.0		180.0	210.0		210.0
Storage Lanes	1		0	1		0	2		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00			1.00	1.00							
Frt					0.975							0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3574	0	1805	3511	0	3467	3374	0	1805	3471	1615
Flt Permitted	0.333			0.283			0.184			0.950		
Satd. Flow (perm)	626	3574	0	537	3511	0	672	3374	0	1805	3471	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					12							139
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		275.1			202.0			1053.0			279.1	
Travel Time (s)		19.8			14.5			54.2			14.4	
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Adj. Flow (vph)	134	345	0	242	361	72	381	1237	0	93	1134	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	345	0	242	433	0	381	1237	0	93	1134	139
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

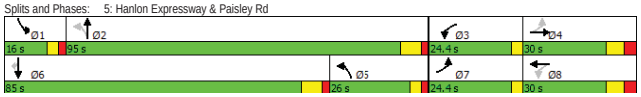
Lanes, Volumes, Timings
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2					6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	1.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	30.0		9.5	30.0		10.0	59.4		10.0	60.4	60.4
Total Split (s)	24.4	30.0		24.4	30.0		26.0	95.0		16.0	85.0	85.0
Total Split (%)	14.8%	18.1%		14.8%	18.1%		15.7%	57.4%		9.7%	51.4%	51.4%
Maximum Green (s)	21.4	22.0		21.4	22.0		21.0	87.6		11.0	77.6	77.6
Yellow Time (s)	3.0	4.5		3.0	4.5		3.0	5.4		3.0	5.4	5.4
All-Red Time (s)	0.0	3.5		0.0	3.5		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		5.0			5.0			42.0			42.0	42.0
Flash Dont Walk (s)		15.0			15.0			10.0			10.0	10.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	39.4	19.7		47.3	24.9		90.1	87.7		10.6	77.7	77.7
Actuated g/C Ratio	0.24	0.12		0.29	0.15		0.56	0.54		0.07	0.48	0.48
v/c Ratio	0.52	0.79		0.77	0.79		0.52	0.67		0.78	0.68	0.16
Control Delay	50.9	82.8		63.8	74.7		39.3	29.5		113.5	35.4	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	50.9	82.8		63.8	74.7		39.3	29.5		113.5	35.4	3.9
LOS	D	F		E	E		D	C		F	D	A
Approach Delay		73.9			70.8			31.8			37.5	
Approach LOS		E			E			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 165.4			
Actuated Cycle Length: 161.4			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 44.9		Intersection LOS: D	
Intersection Capacity Utilization 83.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 5: Hanlon Expressway & Paisley Rd



Queues
5: Hanlon Expressway & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	134	345	242	433	381	1237	93	1134	139
v/c Ratio	0.52	0.79	0.77	0.79	0.52	0.67	0.78	0.68	0.16
Control Delay	50.9	82.8	63.8	74.7	39.3	29.5	113.5	35.4	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	82.8	63.8	74.7	39.3	29.5	113.5	35.4	3.9
Queue Length 50th (m)	34.8	61.4	67.1	73.3	33.5	161.8	32.1	159.2	0.0
Queue Length 95th (m)	54.4	80.4	95.2	#104.4	44.1	190.4	#64.6	187.7	12.7
Internal Link Dist (m)		251.1		178.0		1029.0		255.1	
Turn Bay Length (m)	65.0		65.0		160.0		210.0		210.0
Base Capacity (vph)	330	488	325	556	740	1833	123	1671	849
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.71	0.74	0.78	0.51	0.67	0.76	0.68	0.16

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
5: Hanlon Expressway & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	335	0	235	350	70	370	1200	0	90	1100	135
Future Volume (vph)	130	335	0	235	350	70	370	1200	0	90	1100	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574		1805	3512		3467	3374		1805	3471	1615
Flt Permitted	0.33	1.00		0.28	1.00		0.18	1.00		0.95	1.00	1.00
Satd. Flow (perm)	627	3574		538	3512		672	3374		1805	3471	1615
Peak-hour factor, PHF	0.97	0.97	0.40	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	345	0	242	361	72	381	1237	0	93	1134	139
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	0	72
Lane Group Flow (vph)	134	345	0	242	423	0	381	1237	0	93	1134	67
Confl. Peds. (#/hr)	1		1	1		1						
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%	1%	7%	1%	0%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2					6
Actuated Green, G (s)	34.4	19.7		42.6	24.9		90.1	87.7		10.6	77.7	77.7
Effective Green, g (s)	34.4	19.7		42.6	24.9		90.1	87.7		10.6	77.7	77.7
Actuated g/C Ratio	0.21	0.12		0.26	0.15		0.56	0.54		0.07	0.48	0.48
Clearance Time (s)	3.0	8.0		3.0	8.0		5.0	7.4		5.0	7.4	7.4
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)	239	436		298	542		732	1834		118	1672	777
v/s Ratio Prot	0.05	0.10		c0.10	0.12		0.07	c0.37		0.05	c0.33	
v/s Ratio Perm	0.07			c0.11			0.22					0.04
v/c Ratio	0.56	0.79		0.81	0.78		0.52	0.67		0.79	0.68	0.09
Uniform Delay, d1	54.1	68.8		50.9	65.6		39.4	26.5		74.2	32.2	22.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.0	9.5		15.4	7.2		0.7	2.0		28.5	2.2	0.2
Delay (s)	57.1	78.3		66.3	72.7		40.1	28.5		102.7	34.4	22.8
Level of Service	E	E		E	E		D	C		F	C	C
Approach Delay (s)		72.4			70.4			31.2			37.9	
Approach LOS		E			E			C			D	

Intersection Summary				
HCM 2000 Control Delay	44.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	161.3	Sum of lost time (s)	23.4	
Intersection Capacity Utilization	83.8%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	115	35	55	105	40	45	505	65	35	500	55
Future Volume (vph)	80	115	35	55	105	40	45	505	65	35	500	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	45.0		0.0	60.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.965			0.959			0.983			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1802	0	1805	1797	0	1805	1859	0	1770	1867	0
Flt Permitted	0.606			0.586			0.414			0.404		
Satd. Flow (perm)	1117	1802	0	1105	1797	0	785	1859	0	750	1867	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			33			8			7	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		372.2			272.5			212.9			802.4	
Travel Time (s)		26.8			19.6			15.3			57.8	
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Adj. Flow (vph)	82	119	36	57	108	41	46	521	67	36	515	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	155	0	57	149	0	46	588	0	36	572	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

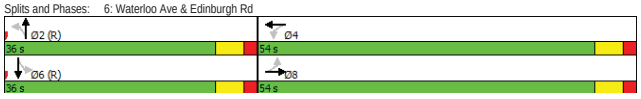
Lanes, Volumes, Timings
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		36.0	36.0		36.0	36.0	
Total Split (s)	54.0	54.0		54.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	48.0	48.0		48.0	48.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		16.0	16.0		16.0	16.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	12.1	12.1		12.1	12.1		65.9	65.9		65.9	65.9	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.73	0.73		0.73	0.73	
v/c Ratio	0.55	0.59		0.39	0.55		0.08	0.43		0.07	0.42	
Control Delay	49.2	38.7		41.7	35.2		4.3	11.2		4.7	6.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.2	38.7		41.7	35.2		4.3	11.2		4.7	6.2	
LOS	D	D		D	D		A	B		A	A	
Approach Delay		42.4			37.0			10.7			6.1	
Approach LOS		D			D			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 69 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 67.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Waterloo Ave & Edinburgh Rd



Queues
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	82	155	57	149	46	588	36	572
v/c Ratio	0.55	0.59	0.39	0.55	0.08	0.43	0.07	0.42
Control Delay	49.2	38.7	41.7	35.2	4.3	11.2	4.7	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	38.7	41.7	35.2	4.3	11.2	4.7	6.2
Queue Length 50th (m)	14.2	22.2	9.6	19.8	1.6	28.5	1.5	32.5
Queue Length 95th (m)	27.2	39.5	20.3	36.4	5.6	89.3	5.2	62.9
Internal Link Dist (m)		348.2		248.5		188.9		778.4
Turn Bay Length (m)	45.0		45.0		60.0		50.0	
Base Capacity (vph)	595	973	589	973	575	1364	549	1369
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.16	0.10	0.15	0.08	0.43	0.07	0.42

Intersection Summary

HCM Signalized Intersection Capacity Analysis
6: Waterloo Ave & Edinburgh Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	115	35	55	105	40	45	505	65	35	500	55
Future Volume (vph)	80	115	35	55	105	40	45	505	65	35	500	55
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		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)	1752	1803		1792	1796		1801	1858		1760	1867	
Flt Permitted	0.61	1.00		0.59	1.00		0.41	1.00		0.40	1.00	
Satd. Flow (perm)	1117	1803		1105	1796		784	1858		749	1867	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	119	36	57	108	41	46	521	67	36	515	57
RTOR Reduction (vph)	0	23	0	0	29	0	0	2	0	0	2	0
Lane Group Flow (vph)	82	132	0	57	120	0	46	586	0	36	570	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	2%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	12.1	12.1		12.1	12.1		65.9	65.9		65.9	65.9	
Effective Green, g (s)	12.1	12.1		12.1	12.1		65.9	65.9		65.9	65.9	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.73	0.73		0.73	0.73	
Clearance Time (s)	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	
Lane Grp Cap (vph)	150	242		148	241		574	1360		548	1367	
v/s Ratio Prot		c0.07			0.07			c0.32			0.31	
v/s Ratio Perm	0.07			0.05			0.06			0.05		
v/c Ratio	0.55	0.55		0.39	0.50		0.08	0.43		0.07	0.42	
Uniform Delay, d1	36.4	36.4		35.6	36.1		3.4	4.7		3.4	4.6	
Progression Factor	1.00	1.00		1.00	1.00		0.90	1.90		1.00	1.00	
Incremental Delay, d2	4.0	2.5		1.7	1.6		0.3	1.0		0.2	0.9	
Delay (s)	40.4	38.9		37.2	37.8		3.3	9.9		3.6	5.6	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		39.4			37.6			9.5			5.5	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	70	140	175	70	140	165
Future Volume (vph)	70	140	175	70	140	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	76	152	190	76	152	179
Shared Lane Traffic (%)						
Lane Group Flow (vph)	76	152	190	76	152	179
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.8%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	70	140	175	70	140	165
Future Volume (Veh/h)	70	140	175	70	140	165
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	152	190	76	152	179
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			229		533	77
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			229		533	77
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		65	82
cM capacity (veh/h)			1338		438	986

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	76	152	190	76	331
Volume Left	0	0	190	0	152
Volume Right	0	152	0	0	179
cSH	1700	1700	1338	1700	954
Volume to Capacity	0.04	0.09	0.14	0.04	0.35
Queue Length 95th (m)	0.0	0.0	4.0	0.0	12.5
Control Delay (s)	0.0	0.0	8.1	0.0	13.2
Lane LOS			A		B
Approach Delay (s)	0.0		5.8		13.2
Approach LOS					B

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	305	100	35	280	60	115	470	30	55	445	85
Future Volume (vph)	105	305	100	35	280	60	115	470	30	55	445	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	120.0		0.0	0.0		0.0	55.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		1.00	1.00		1.00	1.00	
Frt		0.963			0.973			0.991			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1801	0	1805	1821	0	1805	1878	0	1736	1842	0
Flt Permitted	0.396			0.306			0.319			0.345		
Satd. Flow (perm)	745	1801	0	578	1821	0	604	1878	0	629	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			16			6			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		390.9			78.0			802.4			259.2	
Travel Time (s)		28.1			5.6			57.8			18.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Adj. Flow (vph)	113	328	108	38	301	65	124	505	32	59	478	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	436	0	38	366	0	124	537	0	59	569	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Detector Phase	8	8		4	4		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		34.0	34.0		34.0	34.0	
Total Split (s)	31.0	31.0		31.0	31.0		44.0	44.0		44.0	44.0	
Total Split (%)	41.3%	41.3%		41.3%	41.3%		58.7%	58.7%		58.7%	58.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	9.0	9.0		9.0	9.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
v/c Ratio	0.46	0.71		0.20	0.59		0.41	0.56		0.19	0.60	
Control Delay	26.5	27.9		21.2	24.6		16.6	15.5		12.0	16.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.5	27.9		21.2	24.6		16.6	15.5		12.0	16.0	
LOS	C	C		C	C		B	B		B	B	
Approach Delay		27.6			24.3			15.7			15.7	
Approach LOS		C			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 4 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 20.2		Intersection LOS: C	
Intersection Capacity Utilization 81.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 8: Edinburgh Rd & Paisley Rd

Queues
8: Edinburgh Rd & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	113	436	38	366	124	537	59	569
v/c Ratio	0.46	0.71	0.20	0.59	0.41	0.56	0.19	0.60
Control Delay	26.5	27.9	21.2	24.6	16.6	15.5	12.0	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.5	27.9	21.2	24.6	16.6	15.5	12.0	16.0
Queue Length 50th (m)	14.6	59.3	4.0	42.6	10.8	51.1	4.5	54.4
Queue Length 95th (m)	32.1	95.2	11.4	69.8	24.9	79.9	11.5	86.0
Internal Link Dist (m)		366.9		54.0		778.4		235.2
Turn Bay Length (m)	60.0		120.0				55.0	
Base Capacity (vph)	248	616	192	617	306	954	318	942
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.71	0.20	0.59	0.41	0.56	0.19	0.60

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Edinburgh Rd & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	305	100	35	280	60	115	470	30	55	445	85
Future Volume (vph)	105	305	100	35	280	60	115	470	30	55	445	85
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	
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	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		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)	1787	1801		1794	1822		1798	1878		1731	1842	
Flt Permitted	0.40	1.00		0.31	1.00		0.32	1.00		0.35	1.00	
Satd. Flow (perm)	745	1801		578	1822		604	1878		629	1842	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	113	328	108	38	301	65	124	505	32	59	478	91
RTOR Reduction (vph)	0	16	0	0	11	0	0	3	0	0	9	0
Lane Group Flow (vph)	113	420	0	38	355	0	124	534	0	59	560	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	2%	4%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.51	0.51		0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	248	600		192	607		306	951		318	933	
v/s Ratio Prot		c0.23			0.20			0.28			c0.30	
v/s Ratio Perm	0.15			0.07			0.21			0.09		
v/c Ratio	0.46	0.70		0.20	0.59		0.41	0.56		0.19	0.60	
Uniform Delay, d1	19.7	21.7		17.8	20.7		11.5	12.8		10.1	13.1	
Progression Factor	1.00	1.02		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.5	6.2		2.3	4.1		3.9	2.4		1.3	2.8	
Delay (s)	25.1	28.3		20.1	24.8		15.4	15.2		11.4	16.0	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		27.7			24.4			15.2			15.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	330	125	70	325	150	120	40	65	190	45	205
Future Volume (vph)	215	330	125	70	325	150	120	40	65	190	45	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.99	1.00	0.99		1.00	0.98		0.99	0.99	
Frt			0.850		0.953			0.907			0.877	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	1805	1785	0	1770	1695	0	1787	1647	0
Flt Permitted	0.317			0.547			0.494			0.532		
Satd. Flow (perm)	601	1881	1594	1039	1785	0	919	1695	0	995	1647	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136		33			71			213	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	234	359	136	76	353	163	130	43	71	207	49	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	359	136	76	516	0	130	114	0	207	272	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	61.0	58.0	58.0	45.3	45.3		18.3	9.2		20.6	9.2	
Actuated g/C Ratio	0.68	0.64	0.64	0.50	0.50		0.20	0.10		0.23	0.10	
v/c Ratio	0.44	0.30	0.13	0.15	0.56		0.50	0.48		0.65	0.76	
Control Delay	8.6	8.4	1.7	14.9	18.7		33.6	23.3		38.8	24.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.6	8.4	1.7	14.9	18.7		33.6	23.3		38.8	24.2	
LOS	A	A	A	B	B		C	C		D	C	
Approach Delay		7.2			18.2			28.8			30.5	
Approach LOS		A			B			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 14.5 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 18.4		Intersection LOS: B	
Intersection Capacity Utilization 76.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd

Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	234	359	136	76	516	130	114	207	272
v/c Ratio	0.44	0.30	0.13	0.15	0.56	0.50	0.48	0.65	0.76
Control Delay	8.6	8.4	1.7	14.9	18.7	33.6	23.3	38.8	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	8.4	1.7	14.9	18.7	33.6	23.3	38.8	24.2
Queue Length 50th (m)	13.8	25.7	0.0	7.1	58.0	19.0	7.4	31.8	10.2
Queue Length 95th (m)	26.5	45.5	6.7	17.4	102.0	32.5	22.6	49.6	35.2
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	561	1211	1075	523	915	264	305	317	420
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.30	0.13	0.15	0.56	0.49	0.37	0.65	0.65

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	330	125	70	325	150	120	40	65	190	45	205
Future Volume (vph)	215	330	125	70	325	150	120	40	65	190	45	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.91		1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	1881	1594	1804	1784		1769	1694		1782	1647	
Flt Permitted	0.32	1.00	1.00	0.55	1.00		0.49	1.00		0.53	1.00	
Satd. Flow (perm)	602	1881	1594	1038	1784		919	1694		999	1647	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	359	136	76	353	163	130	43	71	207	49	223
RTOR Reduction (vph)	0	0	50	0	17	0	0	65	0	0	188	0
Lane Group Flow (vph)	234	359	86	76	499	0	130	49	0	207	84	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	56.7	56.7	56.7	44.0	44.0		16.0	8.1		20.6	10.4	
Effective Green, g (s)	56.7	56.7	56.7	44.0	44.0		16.0	8.1		20.6	10.4	
Actuated g/C Ratio	0.63	0.63	0.63	0.49	0.49		0.18	0.09		0.23	0.12	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	508	1185	1004	507	872		237	152		317	190	
v/s Ratio Prot	c0.05	0.19			c0.28		0.05	0.03		c0.07	0.05	
v/s Ratio Perm	0.24		0.05	0.07			0.05			c0.08		
v/c Ratio	0.46	0.30	0.09	0.15	0.57		0.55	0.32		0.65	0.44	
Uniform Delay, d1	8.9	7.6	6.5	12.7	16.3		32.9	38.4		30.3	37.1	
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	0.7	0.2	0.6	2.7		2.6	1.2		4.8	1.6	
Delay (s)	9.5	8.3	6.7	13.3	19.0		35.5	39.6		35.1	38.7	
Level of Service	A	A	A	B	B		D	D		D	D	
Approach Delay (s)		8.4			18.3			37.4			37.1	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
11: Silvercreek Pkwy & North Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	4	50	25	4	25	55	105	25	25	110	85
Future Volume (vph)	80	4	50	25	4	25	55	105	25	25	110	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.950			0.937			0.971			0.935	
Flt Protected		0.971			0.977		0.950			0.950		
Satd. Flow (prot)	0	1718	0	0	1705	0	1770	1809	0	1770	1742	0
Flt Permitted		0.971			0.977		0.950			0.950		
Satd. Flow (perm)	0	1718	0	0	1705	0	1770	1809	0	1770	1742	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		48.2			109.9			286.0			209.5	
Travel Time (s)		3.5			7.9			20.6			15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	4	54	27	4	27	60	114	27	27	120	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	145	0	0	58	0	60	141	0	27	212	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.2%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
11: Silvercreek Pkwy & North Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	4	50	25	4	25	55	105	25	25	110	85
Future Volume (Veh/h)	80	4	50	25	4	25	55	105	25	25	110	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	4	54	27	4	27	60	114	27	27	120	92
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											209	
pX, platoon unblocked												
vC, conflicting volume	483	481	166	478	514	128	212			141		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	483	481	166	478	514	128	212			141		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	81	99	94	94	99	97	96			98		
cM capacity (veh/h)	454	454	878	442	436	923	1358			1442		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	145	58	60	141	27	212
Volume Left	87	27	60	0	27	0
Volume Right	54	27	0	27	0	92
cSH	553	583	1358	1700	1442	1700
Volume to Capacity	0.26	0.10	0.04	0.08	0.02	0.12
Queue Length 95th (m)	8.4	2.6	1.1	0.0	0.5	0.0
Control Delay (s)	13.8	11.9	7.8	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.8	11.9	2.3		0.9	
Approach LOS	B	B				

Intersection Summary

Average Delay	5.2		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
12: Silvercreek Pkwy & South Access

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	4	90	25	4	25	95	80	20	25	75	85
Future Volume (vph)	80	4	90	25	4	25	95	80	20	25	75	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.930			0.937			0.970			0.921	
Flt Protected		0.978			0.977		0.950			0.950		
Satd. Flow (prot)	0	1694	0	0	1705	0	1770	1807	0	1770	1716	0
Flt Permitted		0.978			0.977		0.950			0.950		
Satd. Flow (perm)	0	1694	0	0	1705	0	1770	1807	0	1770	1716	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		49.5			98.3			92.6			286.0	
Travel Time (s)		3.6			7.1			6.7			20.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	4	98	27	4	27	103	87	22	27	82	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	189	0	0	58	0	103	109	0	27	174	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.2%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
12: Silvercreek Pkwy & South Access

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	4	90	25	4	25	95	80	20	25	75	85
Future Volume (Veh/h)	80	4	90	25	4	25	95	80	20	25	75	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	4	98	27	4	27	103	87	22	27	82	92
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	504	497	128	540	532	98	174			109		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	504	497	128	540	532	98	174			109		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	99	89	93	99	97	93			98		
cM capacity (veh/h)	430	432	922	374	412	958	1403			1481		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	189	58	103	109	27	174
Volume Left	87	27	103	0	27	0
Volume Right	98	27	0	22	0	92
cSH	594	527	1403	1700	1481	1700
Volume to Capacity	0.32	0.11	0.07	0.06	0.02	0.10
Queue Length 95th (m)	10.9	3.0	1.9	0.0	0.4	0.0
Control Delay (s)	13.9	12.7	7.8	0.0	7.5	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	13.9	12.7	3.8		1.0	
Approach LOS	B	B				

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	255	35	50	260	65	80
Future Volume (vph)	255	35	50	260	65	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		60.0	0.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt		0.850	0.874			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1615	3078	0	1805	3610
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1615	3078	0	1805	3610
Link Speed (k/h)	50		50			50
Link Distance (m)	538.7		138.7			117.5
Travel Time (s)	38.8		10.0			8.5
Confl. Peds. (#/hr)	7			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	3%	0%	0%
Adj. Flow (vph)	277	38	54	283	71	87
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	38	337	0	71	87
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.7%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	255	35	50	260	65	80
Future Volume (Veh/h)	255	35	50	260	65	80
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	277	38	54	283	71	87
Pedestrians	1		7			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	0		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			139			
pX, platoon unblocked						
vC, conflicting volume	389	170			338	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	389	170			338	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	50	96			94	
cM capacity (veh/h)	550	850			1231	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	277	38	36	301	71	44	44
Volume Left	277	0	0	0	71	0	0
Volume Right	0	38	0	283	0	0	0
cSH	550	850	1700	1700	1231	1700	1700
Volume to Capacity	0.50	0.04	0.02	0.18	0.06	0.03	0.03
Queue Length 95th (m)	22.5	1.1	0.0	0.0	1.5	0.0	0.0
Control Delay (s)	18.0	9.4	0.0	0.0	8.1	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	17.0		0.0		3.6		
Approach LOS	C						

Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	265	75	155	280	60	30
Future Volume (vph)	265	75	155	280	60	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		60.0	0.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Ped Bike Factor						
Frt		0.850	0.903			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1615	3239	0	1805	3610
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1615	3239	0	1805	3610
Link Speed (k/h)	50		50			50
Link Distance (m)	538.7		138.7			117.5
Travel Time (s)	38.8		10.0			8.5
Confl. Peds. (#/hr)	1					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	288	82	168	304	65	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	288	82	472	0	65	33
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 41.3%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	265	75	155	280	60	30
Future Volume (Veh/h)	265	75	155	280	60	30
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	288	82	168	304	65	33
Pedestrians			1			
Lane Width (m)			3.6			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			139			
pX, platoon unblocked						
vC, conflicting volume	468	236			472	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	468	236			472	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	42	89			94	
cM capacity (veh/h)	493	772			1100	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	288	82	112	360	65	16	16
Volume Left	288	0	0	0	65	0	0
Volume Right	0	82	0	304	0	0	0
cSH	493	772	1700	1700	1100	1700	1700
Volume to Capacity	0.58	0.11	0.07	0.21	0.06	0.01	0.01
Queue Length 95th (m)	29.5	2.8	0.0	0.0	1.5	0.0	0.0
Control Delay (s)	22.1	10.2	0.0	0.0	8.5	0.0	0.0
Lane LOS	C	B			A		
Approach Delay (s)	19.4		0.0		5.6		
Approach LOS	C						

Intersection Summary			
Average Delay	8.2		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	70	140	175	70	140	165
Future Volume (vph)	70	140	175	70	140	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	60.0
Storage Lanes		1	1		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1900	1615	1770	1900	1805	1599
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1900	1615	1770	1900	1805	1599
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			538.7	138.7	
Travel Time (s)	8.5			38.8	10.0	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	1%
Adj. Flow (vph)	76	152	190	76	152	179
Shared Lane Traffic (%)						
Lane Group Flow (vph)	76	152	190	76	152	179
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.8%		ICU Level of Service A	
Analysis Period (min) 15			

HCM Unsignalized Intersection Capacity Analysis
7: Waterloo Ave & Silvercreek Pkwy

10-17-2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	70	140	175	70	140	165
Future Volume (Veh/h)	70	140	175	70	140	165
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	152	190	76	152	179
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			229		533	77
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			229		533	77
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		65	82
cM capacity (veh/h)			1338		438	986

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	76	152	190	76	331
Volume Left	0	0	190	0	152
Volume Right	0	152	0	0	179
cSH	1700	1700	1338	1700	954
Volume to Capacity	0.04	0.09	0.14	0.04	0.35
Queue Length 95th (m)	0.0	0.0	4.0	0.0	12.5
Control Delay (s)	0.0	0.0	8.1	0.0	13.2
Lane LOS			A		B
Approach Delay (s)	0.0		5.8		13.2
Approach LOS					B

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	360	2	0	315	180	2	2	0	170	1	130
Future Volume (vph)	210	360	2	0	315	180	2	2	0	170	1	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.98			1.00		0.94	0.98	
Frt		0.999			0.951						0.851	
Flt Protected	0.950							0.976		0.950		
Satd. Flow (prot)	1752	1791	0	0	1708	0	0	1854	0	1770	1518	0
Flt Permitted	0.308									0.952		
Satd. Flow (perm)	563	1791	0	0	1708	0	0	1891	0	1663	1518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			41						141	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Adj. Flow (vph)	228	391	2	0	342	196	2	2	0	185	1	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	393	0	0	538	0	0	4	0	185	142	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

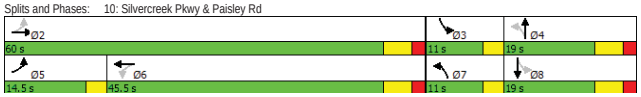
Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0		45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%		50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0		39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		Max	Max	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.1	54.1			42.1			5.8		16.8	13.8	
Actuated g/C Ratio	0.71	0.68			0.53			0.07		0.21	0.17	
v/c Ratio	0.43	0.32			0.58			0.03		0.50	0.37	
Control Delay	6.5	6.4			15.7			35.5		33.0	8.6	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	6.5	6.4			15.7			35.5		33.0	8.6	
LOS	A	A			B			D		C	A	
Approach Delay		6.4			15.7			35.5			22.4	
Approach LOS		A			B			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 79.9			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 13.4		Intersection LOS: B	
Intersection Capacity Utilization 80.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	228	393	538	4	185	142
v/c Ratio	0.43	0.32	0.58	0.03	0.50	0.37
Control Delay	6.5	6.4	15.7	35.5	33.0	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	6.4	15.7	35.5	33.0	8.6
Queue Length 50th (m)	9.3	21.2	48.7	0.6	26.2	0.1
Queue Length 95th (m)	19.9	40.7	95.3	3.7	45.6	14.7
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	573	1211	920	308	369	379
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.32	0.58	0.01	0.50	0.37

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	360	2	0	315	180	2	2	0	170	1	130
Future Volume (vph)	210	360	2	0	315	180	2	2	0	170	1	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.98			1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00			1.00		0.95	1.00	
Frt	1.00	1.00			0.95			1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1748	1791			1708			1845		1683	1519	
Flt Permitted	0.31	1.00			1.00			1.00		0.95	1.00	
Satd. Flow (perm)	566	1791			1708			1891		1687	1519	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	391	2	0	342	196	2	2	0	185	1	141
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	0	0	110	0
Lane Group Flow (vph)	228	393	0	0	517	0	0	4	0	185	32	0
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA			NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.0	54.0			42.1			1.2		18.7	18.7	
Effective Green, g (s)	54.0	54.0			42.1			1.2		18.7	18.7	
Actuated g/C Ratio	0.64	0.64			0.50			0.01		0.22	0.22	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	485	1141			848			26		372	335	
v/s Ratio Prot	c0.05	0.22			c0.30					0.09	0.02	
v/s Ratio Perm	0.25							0.00		c0.02		
v/c Ratio	0.47	0.34			0.61			0.15		0.50	0.10	
Uniform Delay, d1	8.3	7.1			15.4			41.2		28.9	26.3	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.8			3.3			2.7		4.7	0.6	
Delay (s)	9.0	8.0			18.6			44.0		33.6	26.8	
Level of Service	A	A			B			D		C	C	
Approach Delay (s)		8.3			18.6			44.0			30.7	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	84.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	405	10	5	420	235	2	0	0	215	3	195
Future Volume (vph)	290	405	10	5	420	235	2	0	0	215	3	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			0.99			1.00		0.99	0.99	
Frt		0.996			0.952						0.852	
Flt Protected	0.950							0.950		0.950		
Satd. Flow (prot)	1805	1873	0	0	1780	0	0	1770	0	1787	1596	0
Flt Permitted	0.278				0.997					0.930		
Satd. Flow (perm)	528	1873	0	0	1775	0	0	1860	0	1737	1596	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			39						212	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	315	440	11	5	457	255	2	0	0	234	3	212
Shared Lane Traffic (%)												
Lane Group Flow (vph)	315	451	0	0	717	0	0	2	0	234	215	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

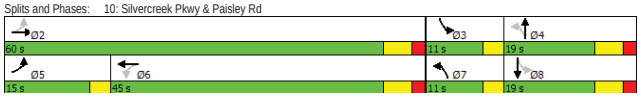
10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		2.5	5.0		4.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		7.5	19.0		9.0	19.0	
Total Split (s)	15.0	60.0		45.0	45.0		11.0	19.0		11.0	19.0	
Total Split (%)	16.7%	66.7%		50.0%	50.0%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	12.0	54.0		39.0	39.0		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		Max	Max	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.1	54.1			41.0			5.9		16.9	13.9	
Actuated g/C Ratio	0.71	0.68			0.51			0.07		0.21	0.17	
v/c Ratio	0.59	0.36			0.77			0.01		0.62	0.48	
Control Delay	8.9	6.7			23.0			35.0		36.6	8.5	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	8.9	6.7			23.0			35.0		36.6	8.5	
LOS	A	A			C			C		D	A	
Approach Delay		7.6			23.0			35.0			23.1	
Approach LOS		A			C			C			C	

Intersection Summary

Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 80			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 86.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	315	451	717	2	234	215
v/c Ratio	0.59	0.36	0.77	0.01	0.62	0.48
Control Delay	8.9	6.7	23.0	35.0	36.6	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.9	6.7	23.0	35.0	36.6	8.5
Queue Length 50th (m)	13.6	24.9	80.3	0.3	34.1	0.4
Queue Length 95th (m)	28.2	48.0	#167.5	2.4	56.9	17.9
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	568	1265	929	302	376	452
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.36	0.77	0.01	0.62	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	405	10	5	420	235	2	0	0	215	3	195
Future Volume (vph)	290	405	10	5	420	235	2	0	0	215	3	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99			1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00		0.99	1.00	
Frt	1.00	1.00			0.95			1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.95		0.95	1.00	
Satd. Flow (prot)	1804	1874			1779			1767		1778	1597	
Flt Permitted	0.28	1.00			1.00			1.00		0.93	1.00	
Satd. Flow (perm)	527	1874			1775			1860		1741	1597	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	440	11	5	457	255	2	0	0	234	3	212
RTOR Reduction (vph)	0	1	0	0	20	0	0	0	0	0	165	0
Lane Group Flow (vph)	315	450	0	0	697	0	0	2	0	234	50	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.0	54.0			41.0			1.3		18.8	18.8	
Effective Green, g (s)	54.0	54.0			41.0			1.3		18.8	18.8	
Actuated g/C Ratio	0.64	0.64			0.48			0.02		0.22	0.22	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	486	1193			858			28		392	354	
v/s Ratio Prot	c0.08	0.24								c0.10	0.03	
v/s Ratio Perm	0.34				c0.39			0.00		c0.03		
v/c Ratio	0.65	0.38			0.81			0.07		0.60	0.14	
Uniform Delay, d1	9.8	7.4			18.6			41.2		29.6	26.5	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.9			8.3			1.1		6.6	0.8	
Delay (s)	12.7	8.3			26.9			42.2		36.1	27.3	
Level of Service	B	A			C			D		D	C	
Approach Delay (s)		10.1			26.9			42.2			31.9	
Approach LOS		B			C			D			C	

Intersection Summary

HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	84.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	330	5	3	325	175	4	3	0	190	5	205
Future Volume (vph)	215	330	5	3	325	175	4	3	0	190	5	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			0.99			1.00		0.99	0.99	
Frt		0.998			0.953						0.853	
Flt Protected	0.950							0.972		0.950		
Satd. Flow (prot)	1805	1877	0	0	1782	0	0	1826	0	1787	1598	0
Flt Permitted	0.365				0.998					0.930		
Satd. Flow (perm)	692	1877	0	0	1779	0	0	1877	0	1738	1598	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			38						223	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	234	359	5	3	353	190	4	3	0	207	5	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	364	0	0	546	0	0	7	0	207	228	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

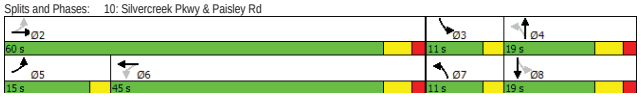
Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0		31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	15.0	60.0		45.0	45.0		11.0	19.0		11.0	19.0	
Total Split (%)	16.7%	66.7%		50.0%	50.0%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	12.0	54.0		39.0	39.0		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None		Max	Max	
Walk Time (s)		11.0		11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0		14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0		0	0			0			0	
Act Effct Green (s)	57.0	54.0			42.1			5.9		16.9	13.9	
Actuated g/C Ratio	0.71	0.68			0.53			0.07		0.21	0.17	
v/c Ratio	0.38	0.29			0.57			0.05		0.55	0.49	
Control Delay	5.8	6.1			15.5			35.8		34.3	8.7	
Queue Delay	0.0	0.0			0.0			0.0		0.0	0.0	
Total Delay	5.8	6.1			15.5			35.8		34.3	8.7	
LOS	A	A			B			D		C	A	
Approach Delay		6.0			15.5			35.8			20.9	
Approach LOS		A			B			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 79.9			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 80.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	234	364	546	7	207	228
v/c Ratio	0.38	0.29	0.57	0.05	0.55	0.49
Control Delay	5.8	6.1	15.5	35.8	34.3	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	6.1	15.5	35.8	34.3	8.7
Queue Length 50th (m)	9.5	19.0	49.4	1.1	29.7	0.7
Queue Length 95th (m)	20.6	37.2	96.9	5.1	50.5	18.7
Internal Link Dist (m)		178.0	665.0	185.5		362.4
Turn Bay Length (m)	80.0					
Base Capacity (vph)	660	1269	954	305	376	462
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.29	0.57	0.02	0.55	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	330	5	3	325	175	4	3	0	190	5	205
Future Volume (vph)	215	330	5	3	325	175	4	3	0	190	5	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			0.99			1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00		0.99	1.00	
Frt	1.00	1.00			0.95			1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.97		0.95	1.00	
Satd. Flow (prot)	1804	1877			1782			1825		1778	1599	
Flt Permitted	0.36	1.00			1.00			1.00		0.93	1.00	
Satd. Flow (perm)	693	1877			1780			1877		1741	1599	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	359	5	3	353	190	4	3	0	207	5	223
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	174	0
Lane Group Flow (vph)	234	364	0	0	527	0	0	7	0	207	54	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.1	54.1			42.1			1.3		18.8	18.8	
Effective Green, g (s)	54.1	54.1			42.1			1.3		18.8	18.8	
Actuated g/C Ratio	0.64	0.64			0.50			0.02		0.22	0.22	
Clearance Time (s)	3.0	6.0			6.0			6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	559	1196			882			28		391	354	
v/s Ratio Prot	c0.04	0.19								c0.09	0.03	
v/s Ratio Perm	0.22				c0.30			0.00		c0.03		
v/c Ratio	0.42	0.30			0.60			0.25		0.53	0.15	
Uniform Delay, d1	7.9	6.9			15.3			41.3		29.1	26.6	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.7			3.0			4.7		5.1	0.9	
Delay (s)	8.4	7.6			18.3			46.0		34.2	27.6	
Level of Service	A	A			B			D		C	C	
Approach Delay (s)		7.9			18.3			46.0			30.7	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	84.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	360	25	35	315	180	30	70	50	170	40	75
Future Volume (vph)	210	360	25	35	315	180	30	70	50	170	40	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99		0.97	0.99	0.98		0.99	0.97		0.95	0.98	
Frt			0.850		0.945			0.937			0.902	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1792	1615	1805	1697	0	1805	1720	0	1770	1644	0
Flt Permitted	0.281			0.526			0.676			0.515		
Satd. Flow (perm)	514	1792	1568	994	1697	0	1271	1720	0	910	1644	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73		41			34			83	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Adj. Flow (vph)	233	400	28	39	350	200	33	78	56	189	44	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	400	28	39	550	0	33	134	0	189	127	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

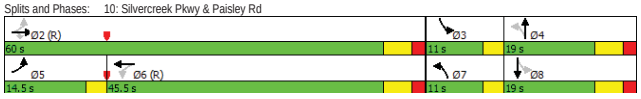
Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	59.9	56.9	56.9	44.0	44.0		19.8	10.1		22.7	14.9	
Actuated g/C Ratio	0.67	0.63	0.63	0.49	0.49		0.22	0.11		0.25	0.17	
v/c Ratio	0.49	0.35	0.03	0.08	0.65		0.10	0.60		0.62	0.37	
Control Delay	9.9	9.4	0.0	14.7	21.4		20.5	33.6		36.5	17.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.9	9.4	0.0	14.7	21.4		20.5	33.6		36.5	17.9	
LOS	A	A	A	B	C		C	C		D	B	
Approach Delay		9.2			20.9			31.0			29.0	
Approach LOS		A			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 14.5 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 18.9		Intersection LOS: B	
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	233	400	28	39	550	33	134	189	127
v/c Ratio	0.49	0.35	0.03	0.08	0.65	0.10	0.60	0.62	0.37
Control Delay	9.9	9.4	0.0	14.7	21.4	20.5	33.6	36.5	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	9.4	0.0	14.7	21.4	20.5	33.6	36.5	17.9
Queue Length 50th (m)	14.7	31.6	0.0	3.7	67.3	4.0	12.2	28.0	7.3
Queue Length 95th (m)	26.6	52.6	0.2	10.3	114.2	9.5	34.9	45.6	23.7
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	500	1132	1017	485	850	345	277	306	345
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.35	0.03	0.08	0.65	0.10	0.48	0.62	0.37

Intersection Summary

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	360	25	35	315	180	30	70	50	170	40	75
Future Volume (vph)	210	360	25	35	315	180	30	70	50	170	40	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.98		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.94		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	1792	1568	1796	1698		1793	1721		1731	1644	
Flt Permitted	0.28	1.00	1.00	0.53	1.00		0.68	1.00		0.51	1.00	
Satd. Flow (perm)	516	1792	1568	995	1698		1275	1721		938	1644	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	233	400	28	39	350	200	33	78	56	189	44	83
RTOR Reduction (vph)	0	0	11	0	22	0	0	30	0	0	69	0
Lane Group Flow (vph)	233	400	17	39	528	0	33	104	0	189	58	0
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	55.7	55.7	55.7	42.8	42.8		15.7	11.3		22.3	14.9	
Effective Green, g (s)	55.7	55.7	55.7	42.8	42.8		15.7	11.3		22.3	14.9	
Actuated g/C Ratio	0.62	0.62	0.62	0.48	0.48		0.17	0.13		0.25	0.17	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	454	1109	970	473	807		247	216		302	272	
v/s Ratio Prot	c0.06	0.22			c0.31		0.01	0.06		c0.06	0.04	
v/s Ratio Perm	0.26		0.01	0.04			0.02			c0.10		
v/c Ratio	0.51	0.36	0.02	0.08	0.65		0.13	0.48		0.63	0.21	
Uniform Delay, d1	10.0	8.4	6.6	12.9	18.0		31.2	36.6		28.8	32.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.84	0.81		1.00	1.00	
Incremental Delay, d2	1.0	0.9	0.0	0.3	4.1		0.2	1.7		4.0	0.4	
Delay (s)	10.9	9.3	6.6	13.2	22.1		26.6	31.2		32.8	32.9	
Level of Service	B	A	A	B	C		C	C		C	C	
Approach Delay (s)		9.8			21.5			30.3			32.8	
Approach LOS		A			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	69.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	405	50	60	420	235	45	65	50	215	85	195
Future Volume (vph)	290	405	50	60	420	235	45	65	50	215	85	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98	1.00	0.99		1.00	0.99		0.99	0.99	
Frt			0.850		0.946			0.935			0.895	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	1805	1768	0	1770	1756	0	1787	1684	0
Flt Permitted	0.125			0.507			0.348			0.537		
Satd. Flow (perm)	238	1881	1580	962	1768	0	648	1756	0	1004	1684	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73		40			36			108	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	315	440	54	65	457	255	49	71	54	234	92	212
Shared Lane Traffic (%)												
Lane Group Flow (vph)	315	440	54	65	712	0	49	125	0	234	304	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

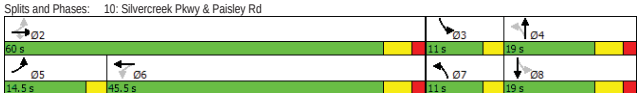
Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		2.5	5.0		4.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		7.5	19.0		9.0	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	Max	Max		None	None		Max	Max	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	57.0	54.0	54.0	39.5	39.5		20.3	10.2		22.6	15.0	
Actuated g/C Ratio	0.65	0.62	0.62	0.45	0.45		0.23	0.12		0.26	0.17	
v/c Ratio	0.87	0.38	0.05	0.15	0.87		0.20	0.53		0.70	0.80	
Control Delay	41.7	9.9	1.3	16.2	34.1		25.2	34.0		40.1	41.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.7	9.9	1.3	16.2	34.1		25.2	34.0		40.1	41.8	
LOS	D	A	A	B	C		C	C		D	D	
Approach Delay		21.7			32.6			31.5			41.0	
Approach LOS		C			C			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 87.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 30.6		Intersection LOS: C	
Intersection Capacity Utilization 89.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	315	440	54	65	712	49	125	234	304
v/c Ratio	0.87	0.38	0.05	0.15	0.87	0.20	0.53	0.70	0.80
Control Delay	41.7	9.9	1.3	16.2	34.1	25.2	34.0	40.1	41.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	9.9	1.3	16.2	34.1	25.2	34.0	40.1	41.8
Queue Length 50th (m)	31.8	37.4	0.0	6.8	108.6	6.4	14.8	34.2	35.6
Queue Length 95th (m)	#81.8	57.7	3.0	15.4	#184.4	14.9	32.1	#59.7	#85.4
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	361	1164	1006	435	822	260	292	332	378
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.38	0.05	0.15	0.87	0.19	0.43	0.70	0.80

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	405	50	60	420	235	45	65	50	215	85	195
Future Volume (vph)	290	405	50	60	420	235	45	65	50	215	85	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.94		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1881	1580	1803	1769		1769	1756		1782	1685	
Flt Permitted	0.13	1.00	1.00	0.51	1.00		0.35	1.00		0.54	1.00	
Satd. Flow (perm)	238	1881	1580	963	1769		648	1756		1007	1685	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	440	54	65	457	255	49	71	54	234	92	212
RTOR Reduction (vph)	0	0	21	0	22	0	0	31	0	0	90	0
Lane Group Flow (vph)	315	440	33	65	690	0	49	94	0	234	214	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	54.1	54.1	54.1	39.6	39.6		16.0	11.5		22.5	15.0	
Effective Green, g (s)	54.1	54.1	54.1	39.6	39.6		16.0	11.5		22.5	15.0	
Actuated g/C Ratio	0.61	0.61	0.61	0.45	0.45		0.18	0.13		0.25	0.17	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	348	1148	964	430	790		173	227		325	285	
v/s Ratio Prot	c0.12	0.23			0.39		0.01	0.05		c0.06	c0.13	
v/s Ratio Perm	c0.43		0.02	0.07			0.04			0.12		
v/c Ratio	0.91	0.38	0.03	0.15	0.87		0.28	0.41		0.72	0.75	
Uniform Delay, d1	21.0	8.8	6.9	14.5	22.2		30.8	35.4		29.1	35.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	25.8	1.0	0.1	0.7	12.8		0.9	1.2		12.9	16.7	
Delay (s)	46.8	9.7	6.9	15.3	35.0		31.7	36.7		42.0	51.7	
Level of Service	D	A	A	B	D		C	D		D	D	
Approach Delay (s)		24.0			33.4			35.3			47.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	88.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	330	55	65	325	120	50	85	60	190	90	130
Future Volume (vph)	215	330	55	65	325	120	50	85	60	190	90	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98	1.00	0.99		1.00	0.99		0.99	0.99	
Frt			0.850		0.960			0.938			0.912	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	1805	1802	0	1770	1762	0	1787	1718	0
Flt Permitted	0.332			0.547			0.421			0.492		
Satd. Flow (perm)	630	1881	1580	1038	1802	0	783	1762	0	921	1718	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73		26			33			67	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		202.0			689.0			209.5			386.4	
Travel Time (s)		14.5			49.6			15.1			27.8	
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	234	359	60	71	353	130	54	92	65	207	98	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	359	60	71	483	0	54	157	0	207	239	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

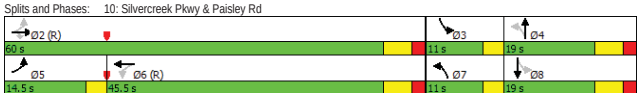
Lanes, Volumes, Timings
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Detector Phase	5	2	2	6	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	31.0	31.0	31.0	31.0		9.5	19.0		9.5	19.0	
Total Split (s)	14.5	60.0	60.0	45.5	45.5		11.0	19.0		11.0	19.0	
Total Split (%)	16.1%	66.7%	66.7%	50.6%	50.6%		12.2%	21.1%		12.2%	21.1%	
Maximum Green (s)	11.5	54.0	54.0	39.5	39.5		8.0	13.0		8.0	13.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)		11.0	11.0	11.0	11.0			2.0			2.0	
Flash Dont Walk (s)		14.0	14.0	14.0	14.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0	0	0			0			0	
Act Effct Green (s)	58.8	55.8	55.8	42.9	42.9		21.4	11.2		23.2	13.8	
Actuated g/C Ratio	0.65	0.62	0.62	0.48	0.48		0.24	0.12		0.26	0.15	
v/c Ratio	0.43	0.31	0.06	0.14	0.55		0.21	0.63		0.66	0.75	
Control Delay	9.3	9.3	1.7	15.8	19.8		21.6	34.5		37.8	42.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.3	9.3	1.7	15.8	19.8		21.6	34.5		37.8	42.5	
LOS	A	A	A	B	B		C	C		D	D	
Approach Delay		8.6			19.2			31.2			40.3	
Approach LOS		A			B			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 14.5 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 72.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 10: Silvercreek Pkwy & Paisley Rd



Queues
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	234	359	60	71	483	54	157	207	239
v/c Ratio	0.43	0.31	0.06	0.14	0.55	0.21	0.63	0.66	0.75
Control Delay	9.3	9.3	1.7	15.8	19.8	21.6	34.5	37.8	42.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	9.3	1.7	15.8	19.8	21.6	34.5	37.8	42.5
Queue Length 50th (m)	16.2	29.6	0.0	7.4	59.8	6.2	14.4	29.7	30.2
Queue Length 95th (m)	26.5	45.5	3.7	16.4	93.9	13.2	26.1	49.6	#68.3
Internal Link Dist (m)		178.0			665.0		185.5		362.4
Turn Bay Length (m)	80.0								
Base Capacity (vph)	561	1165	1006	494	871	281	282	314	324
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.31	0.06	0.14	0.55	0.19	0.56	0.66	0.74

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
10: Silvercreek Pkwy & Paisley Rd

10-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	330	55	65	325	120	50	85	60	190	90	130
Future Volume (vph)	215	330	55	65	325	120	50	85	60	190	90	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.94		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	1881	1580	1803	1801		1769	1762		1783	1718	
Flt Permitted	0.33	1.00	1.00	0.55	1.00		0.42	1.00		0.49	1.00	
Satd. Flow (perm)	630	1881	1580	1038	1801		783	1762		923	1718	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	359	60	71	353	130	54	92	65	207	98	141
RTOR Reduction (vph)	0	0	23	0	14	0	0	29	0	0	57	0
Lane Group Flow (vph)	234	359	37	71	469	0	54	128	0	207	182	0
Confl. Peds. (#/hr)	3		1	1		3	1		2	2		1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	55.2	55.2	55.2	42.3	42.3		17.8	11.8		21.8	13.8	
Effective Green, g (s)	55.2	55.2	55.2	42.3	42.3		17.8	11.8		21.8	13.8	
Actuated g/C Ratio	0.61	0.61	0.61	0.47	0.47		0.20	0.13		0.24	0.15	
Clearance Time (s)	3.0	6.0	6.0	6.0	6.0		3.0	6.0		3.0	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)	515	1153	969	487	846		220	231		300	263	
v/s Ratio Prot	c0.05	0.19			c0.26		0.02	0.07		c0.06	c0.11	
v/s Ratio Perm	0.23		0.02	0.07			0.03			0.11		
v/c Ratio	0.45	0.31	0.04	0.15	0.55		0.25	0.56		0.69	0.69	
Uniform Delay, d1	9.3	8.3	6.9	13.6	17.1		30.0	36.6		29.7	36.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.85	0.79		1.00	1.00	
Incremental Delay, d2	0.6	0.7	0.1	0.6	2.6		0.6	2.8		6.5	7.7	
Delay (s)	9.9	9.0	7.0	14.2	19.7		26.1	31.8		36.2	43.8	
Level of Service	A	A	A	B	B		C	C		D	D	
Approach Delay (s)		9.2			19.0			30.3			40.2	
Approach LOS		A			B			C			D	

Intersection Summary					
HCM 2000 Control Delay		21.9	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.60			
Actuated Cycle Length (s)		90.0	Sum of lost time (s)		18.0
Intersection Capacity Utilization		72.0%	ICU Level of Service		C
Analysis Period (min)		15			

c Critical Lane Group

APPENDIX H:
Signal Justification Warrants

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Silvercreek Parkway at North Access

What is the direction of the Main Road street? North-South

When was the data collected? 2031 Total Traffic

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Urban Population >= 10,000 AND Speed < 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	30	80	10	55	5	40	10	55	50	25	5	30	0
8:00	28	47	14	39	2	28	17	55	41	8	2	11	0
9:00	31	52	15	43	2	31	18	61	46	9	2	12	0
12:30	34	58	17	48	2	34	21	69	51	10	2	14	0
13:30	36	62	18	51	2	36	22	73	54	11	2	15	0
16:00	43	74	22	61	3	43	26	87	65	13	3	17	0
17:00	49	83	24	68	3	49	29	97	73	15	3	19	0
18:00	50	85	25	70	3	50	30	100	75	15	3	20	0
Total	**301**	**541**	**145**	**435**	**22**	**311**	**173**	**597**	**455**	**106**	**22**	**138**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Silvercreek Parkway at North Access

Count Date: 2031 Total Traffic

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
1A	480	720	600	900	395	292	322	360	382	457	512	526		
	COMPLIANCE %				55	41	45	50	53	63	71	73	451	56
1B	120	170	120	170	160	90	99	110	117	140	157	161		
	COMPLIANCE %				94	53	58	65	69	82	92	95	608	76

Restricted Flow Signal Justification 1:			
Both 1A and 1B 100% Fullfilled each of 8 hours	Yes ☐	No ☑
Lesser of 1A or 1B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
2A	480	720	600	900	235	202	223	250	265	317	355	365		
	COMPLIANCE %				33	28	31	35	37	44	49	51	307	38
2B	50	75	50	75	85	49	54	60	64	77	86	88		
	COMPLIANCE %				100	65	72	80	85	100	100	100	703	88

Restricted Flow Signal Justification 2:		
Both 2A and 2B 100% Fullfilled each of 8 hours	Yes ☐	No ☑
Lesser of 2A or 2B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	13:30	265	89	379	24 %	32 %
	16:00	317	107	351	31 %	
	17:00	355	120	331	36 %	
	18:00	365	123	326	38 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Silvercreek Parkway at North Access

Count Date: 2031 Total Traffic

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600	Not Justified				
	2601 - 7000					
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Silvercreek Parkway at North Access

Count Date: 2031 Total Traffic

Summary Results

Justification			Compliance	Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	56 %	☐	☑
	B	Crossing Volume	76 %		
2. Delay to Cross Traffic	A	Main Road	38 %	☐	☑
	B	Crossing Road	88 %		
3. Combination	A	Justificaton 1	56 %	☐	☑
	B	Justification 2	38 %		
4. 4-Hr Volume			32 %	☐	☑
5. Collision Experience			0 %	☐	☑
6. Pedestrians	A	Volume	Justification not met	☐	☑
	B	Delay	Justification not met		

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Silvercreek Parkway at South Access

What is the direction of the Main Road street? North-South

When was the data collected? 2031 Total Traffic

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Urban Population >= 10,000 AND Speed < 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	25	40	10	50	5	40	10	65	45	25	5	30	0
8:00	52	44	14	39	2	50	17	33	41	8	2	6	0
9:00	58	49	15	43	2	55	18	37	46	9	2	6	0
12:30	65	55	17	48	2	62	21	41	51	10	2	7	0
13:30	69	58	18	51	2	65	22	44	54	11	2	7	0
16:00	83	70	22	61	3	78	26	52	65	13	3	9	0
17:00	93	78	24	68	3	88	29	58	73	15	3	10	0
18:00	95	80	25	70	3	90	30	60	75	15	3	10	0
Total	**540**	**474**	**145**	**430**	**22**	**528**	**173**	**390**	**450**	**106**	**22**	**85**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Silvercreek Parkway at South Access

Count Date: 2031 Total Traffic

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
1A	480	720	600	900	350	308	340	381	403	485	542	556		
	COMPLIANCE %				49	43	47	53	56	67	75	77	467	58
1B	120	170	120	170	155	107	117	131	138	167	187	191		
	COMPLIANCE %				91	63	69	77	81	98	100	100	679	85

Restricted Flow Signal Justification 1:			
Both 1A and 1B 100% Fullfilled each of 8 hours	Yes ☐	No ☑
Lesser of 1A or 1B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
2A	480	720	600	900	195	201	223	250	265	318	355	365		
	COMPLIANCE %				27	28	31	35	37	44	49	51	302	38
2B	50	75	50	75	80	49	54	60	64	77	86	88		
	COMPLIANCE %				100	65	72	80	85	100	100	100	703	88

Restricted Flow Signal Justification 2:		
Both 2A and 2B 100% Fullfilled each of 8 hours	Yes ☐	No ☑
Lesser of 2A or 2B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	13:30	265	118	379	31 %	42 %
	16:00	318	142	350	41 %	
	17:00	355	159	331	48 %	
	18:00	365	163	326	50 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Silvercreek Parkway at South Access

Count Date: 2031 Total Traffic

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600	Not Justified				
	2601 - 7000					
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Silvercreek Parkway at South Access

Count Date: 2031 Total Traffic

Summary Results

Justification			Compliance	Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	58 %	☐	☑
	B	Crossing Volume	85 %		
2. Delay to Cross Traffic	A	Main Road	38 %	☐	☑
	B	Crossing Road	88 %		
3. Combination	A	Justificaton 1	58 %	☐	☑
	B	Justification 2	38 %		
4. 4-Hr Volume			42 %	☐	☑
5. Collision Experience			0 %	☐	☑
6. Pedestrians	A	Volume	Justification not met	☐	☑
	B	Delay	Justification not met		