

Ontario Line

Integrated Transit Oriented Communities – Exhibition Station

Draft Transportation Impact Assessment
Issued for Rezoning

Site A: 1-1A ATLANTIC AVENUE
TORONTO, ONTARIO, M6K 3E7

Site B: 2-20 ATLANTIC AVENUE, 1 JEFFERSON AVENUE
TORONTO, ONTARIO

Contract RFS-2019-NAFC-110

PO 214244

HDRProject 10206938



Ontario Line Technical Advisor

TORONTO, ONTARIO

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1 Introduction

HDR Corporation was retained by Metrolinx to undertake a Transportation Impact Assessment (TIA) and Parking Assessment for a proposed mixed-use Transit Oriented Community (TOC) development to be located on the future Ontario Line Exhibition Station site.

The subject properties are located on the north side of the future Liberty New Street, between Jefferson Avenue and Hanna Avenue. The existing uses on the sites are generally comprised of low-rise office and parking lot space.

The proposed redevelopment consists of three separate sites:

- **Site A:** 1-1A Atlantic Avenue
 - Consisting of 265 residential units, 1,078 m² of retail space, and 13,166 m² of office space.
 - The first floor will provide access to the eastern tunnel at Exhibition Station, which provides a through connection between Liberty Village and Exhibition Place, and emergency egress from the station.
- **Site B:** 2-20 Atlantic Avenue and 1 Jefferson Avenue
 - Consisting of 303 residential units, 4,226 m² of retail space, and 10,427 m² of office space.
 - The first floor will provide access to an underground concourse for Exhibition Station, which will connect to the Ontario Line and GO Station platforms.

The development site locations and study area are illustrated in **Figure 1-1**. The sites will be highly transit-oriented given the proximity to Ontario Line, GO, and TTC services, and the mixed-use nature of the area which includes employment use and other commercial-retail and services that will support the residential component of the sites. Vehicular parking is proposed on-site at a reduced rate consistent with recently proposed rates in the area.

The Traffic Impact Assessment report includes documentation of the following components:

- Existing Conditions
- Background Traffic Conditions
- Proposed TOC Trip Generation
- Future Total Traffic Conditions with the TOC
- Parking Assessment
- Loading Assessment
- Transportation Demand Management
- Preliminary Findings and Next Steps



Figure 1-1: Study Area and Site Context

1.1 Scope of Work

The scope of work has been prepared in accordance with the **City of Toronto Guidelines for the Preparation of Transportation Impact Studies** (2013), and is as follows:

Study Area	<ul style="list-style-type: none"> Bounded by King Street West to the north, Strachan Avenue to the east, Lake Shore Boulevard to the south, and British Columbia Road/Dufferin Street to the west.
Analysis Scenarios	<ul style="list-style-type: none"> Existing 2020 Traffic Conditions Future 2030 Background Traffic Conditions (10-year Horizon) <i>Includes general background traffic growth, and growth associated with the Exhibition GO Station and Ontario Line Station</i> Future 2030 Total Traffic Conditions (10-year Horizon) <i>Includes future background traffic volumes plus traffic resulting from the proposed development</i>
Analysis Time Periods	<p>The following time periods were analyzed as they represent peak trip generation times for residential developments:</p> <ul style="list-style-type: none"> Weekday AM peak hour between 7:00am and 9:00am Weekday PM peak hour between 3:00pm and 6:00pm
Study Area Intersections for Analysis	<p>The following intersections were analyzed for capacity, level of service, and delays:</p> <ul style="list-style-type: none"> Dufferin Street and King Street West King Street West and Joe Shuster Way King Street West and Atlantic Avenue

-
- King Street West and Sudbury Street
 - King Street West and Shaw Street
 - King Street West and Strachan Avenue
 - Strachan Avenue and Fleet Street
 - Strachan Avenue and Lakeshore Boulevard
 - Lakeshore Boulevard and British Columbia Road
 - Dufferin Street/British Columbia Road and Saskatchewan Road
 - Dufferin Street and Liberty Street
 - Liberty New Street and Dufferin Street (Future Intersection)
 - Liberty New Street and Atlantic Avenue (Future Intersection)
 - TOC Site Driveway Intersections (Future Intersections)
-

Parking and Loading Review A parking and loading assessment was undertaken for the proposed development using the City of Toronto Zoning By-law 569-2013 as the basis of the assessment, and in the context of the site as a transit-oriented community.

Multi-Modal Level of Service (MMLOS) Multi-modal Level of Service (MMLOS) for the Exhibition TOC development has been reviewed under a separate cover, in the report Ontario Line Exhibition Station Site Plan Review Transportation Impact Assessment (Ontario Line Technical Advisor, May 2021), which was submitted as part of a Site Plan Review Package for the proposed station – referred to herein as the “Station SPR”. The Station SPR study assessed the 2041 horizon year, which is 11 years beyond the horizon year assessed in this report. While the station related pedestrian traffic may continue to grow, the TOC related pedestrian traffic will remain relatively constant based on ultimate development of the site, and the presence of the proposed station.

A MMLOS analysis for the 2041 horizon year is included in that assessment and incorporates projected pedestrian demand related to background, TOC, and Station trips to identify pedestrian levels of service at sidewalks, intersection corners and crosswalks, and bus bays. This TOC report does not duplicate the SPR analysis findings but includes a MMLOS analysis of existing pedestrian, bicycle, and transit conditions for the key segments and intersections near TOC sites.

Please refer to the Station SPR report for detailed 2041 horizon year Fruin level of service analysis of the study area, which includes the Exhibition TOC development trip generation.

1.2 Analysis Methodology

1.1.1 Pedestrian Level of Service

The pedestrian analysis within the study area is based on the City of Ottawa Multi-Modal Level of Service (MMLOS) Guidelines, which evaluates the pedestrian LOS based on pedestrian comfort, safety, and convenience. A detailed evaluation of pedestrian density levels of service and intersection HCM analysis can be found in the Ontario Line Exhibition Station Site Plan Review Transportation Impact Assessment (Ontario Line Technical Advisor, May 2021).

1.1.2 Bicycle Level of Service

The bicycle level of service for existing conditions was determined through the City of Ottawa multi-modal level of service methodology, which analyzes the segments and intersections primarily based on qualitative parameters, such as street width, presence / type of dedicated cycling facilities, and vehicular operating speeds.

1.1.3 Transit Analysis

The transit level of service for existing conditions was determined through the City of Ottawa multi-modal level of service methodology, which analyzes the segments and intersections based on the transit facility type, driveway friction, and intersection signal delay.

1.1.4 Automobile Level of Service

Intersection operations were assessed for the study area intersections using the Synchro Traffic Signal Coordination Software Version 10, which employs methodology from the **Highway Capacity Manual (HCM 2000)** published by the Transportation Research Board National Research Council. Synchro can analyze both signalized and unsignalized intersections in a road corridor or network taking into account the spacing, interaction, queues and operations between intersections.

The signalized and unsignalized intersection analysis considers three separate measures of performance:

- The capacity of all intersection movements, represented by the volume to capacity (v/c) ratio;
- The level of service (LOS) for all intersection turning movements as well as for the overall intersection. The overall intersection LOS is based on the average control delay per vehicle (weighted) for the various movements through the intersection; and,
- The forecasted queue lengths (95th percentile queue length) and storage requirements.

LOS is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between ‘A’ and ‘F’, with ‘F’ being the longest delay. The volume to capacity (v/c) ratio is a measure of the degree of capacity utilized at an intersection. HCM definitions are summarized in **Table 1-1**.

Table 1-1: Highway Capacity Manual Level of Service Definitions

Level of Service (LOS)	Signalized Control Delay per Vehicle (s)	Unsignalized Control Delay per Vehicle (s)	Description
A	≤ 10	≤ 10	Ideal
B	> 10 and ≤ 20	> 10 and ≤ 15	Acceptable
C	> 20 and ≤ 35	> 15 and ≤ 25	Acceptable
D	> 35 and ≤ 55	> 25 and ≤ 35	Somewhat undesirable
E	> 55 and ≤ 80	> 35 and ≤ 50	Undesirable
F	> 80	> 50	Poor

The analysis undertaken in this study also follows the **City of Toronto Guidelines for Using Synchro 9 (Including SimTraffic 9¹)** (March 18, 2016), City of Toronto **‘Guidelines for the Preparation of Transportation Impact Studies²’**, and City of Toronto **‘Traffic Signal Operations Policies and Strategies³’** (May 2015)³.

¹ https://www.toronto.ca/wp-content/uploads/2017/11/99bc-0_2016-04-28_Guidelines-for-Using-Synchro-9-Including-SimTraffic-9_Final-a.pdf

² <http://amis.ca/~arris2/ARCHIVE/traffic-impact-study-guidelines.pdf>

³ https://www.toronto.ca/wp-content/uploads/2017/11/91d6-0_2015-11-13_Traffic-Signal-Operations-Policies-and-Strategies_Final-a.pdf

2 Existing Conditions

2.1 Community Context

Liberty Village is a dense urban community in the City of Toronto and has experienced significant growth in recent years with the construction of several new developments, doubling its population between 2011 and 2016. This population growth has largely been on the eastern end of Liberty Village. The community was historically a heavy industrial area and has retained much of the factory architecture throughout its redevelopment.

As shown in **Figure 2-1**, the majority of Liberty Village is currently designated as a Core Employment Area generally to the west of Hanna Ave or a Mixed Use Area generally to the east of Hanna Ave, with a Park area being designated where Allan A. Lamport Stadium is located. South of the railway corridor below Liberty Village, the lands covering Exhibition Place are designated as either Other Open Space Areas or Regeneration Areas.

Land Use Designations

- Neighbourhoods
- Apartment Neighbourhoods
- Mixed Use Areas
- Natural Areas
- Parks
- Other Open Space Areas (Including Golf Courses, Cemeteries, Public Utilities)
- Institutional Areas
- Regeneration Areas
- General Employment Areas
- Core Employment Areas
- Utility Corridors



Figure 2-1: Land Use Designations (City of Toronto Official Plan)

2.2 Site Context

The Exhibition TOC sites are located just north of the future Liberty New Street connection between Jefferson Avenue and Hanna Avenue. The sites will be situated in an area with excellent surface transit service, accommodating short- and long-distance travel through various routes and services, as described in Section 2.4 Existing Transit Services. The nearby Exhibition GO Station and TTC Exhibition Loop will be accessible from Liberty Village via the existing underground tunnel, as well as via the new proposed station headhouse for the Ontario Line station between Jefferson and Atlantic Avenues.

The area is generally mixed-use and there are many amenities in the area that will support both residential and employment uses within this mixed-use downtown urbanized environment.

2.3 Existing Road Network

The community of Liberty Village does not have the same fine-grid network connectivity characteristic of downtown Toronto due to the barriers imposed by the railway corridors to the north and to the south. There are currently no north-south roadway links across the railway corridors between Dufferin Street and Strachan Avenue; however, the community is still well served for automobile trips due to the connections to King Street, Dufferin Street, Strachan Avenue, and the nearby interchange with the Gardiner Expressway.

The existing network and the future Liberty New Street traffic controls and lane configurations in the vicinity of the study area are shown in **Figure 2-2**. All study roadways are under the jurisdiction of the City of Toronto.

The existing arterial and collector road network is described below:

King Street W	King Street is a two-way east-west major arterial street with a posted speed limit of 40 km/h. It has a four-lane cross section, with sidewalks on both sides of the street. There are westbound streetcar stops at Strachan Avenue, Shaw Street, Sudbury Street, Jefferson Avenue, Joe Shuster Way, and Dufferin Street. Eastbound streetcar stops are available at Dufferin Street, Joe Shuster Way, Atlantic Avenue, Sudbury Street, Shaw Street, and Strachan Avenue.
Dufferin Street	Dufferin Street is a two-way north-south minor arterial street with a speed limit of 50 km/h. It has a four-lane cross section north of Springhurst Avenue, and a two-lane cross section to the south. Streetcars operate in mixed traffic north of Springhurst Avenue where the Dufferin Loop is located; stops are located northbound at Liberty Street and King Street, and southbound at King Street, Liberty Street, and Springhurst Avenue. Dufferin Street connects to British Columbia Road within Exhibition Place, which in turn provides access to Lake Shore Boulevard and Gardiner Expressway.
Liberty Street	Liberty Street is a two-way east-west collector road with a posted speed limit of 40 km/h. It has a two-lane cross-section within the study area and has no centerline on midblock sections of roadway. Liberty Street is currently the only roadway in Liberty Village that connects Dufferin Street and Strachan Avenue, until the Liberty New Street connection is constructed to the south.
Strachan Avenue	Strachan Avenue is a two-way north-south major arterial street with a speed limit of 40 km/h. It has a four-lane cross section, with sidewalks on both sides of the street. Bulwer Street also provides primary access to some buildings on the north side of the street, such as Ogden Jr Public School.
Lake Shore Boulevard	Lake Shore Boulevard is a two-way east-west major arterial street with a speed limit of 60 km/h. Through the study area, it has a 6-lane cross-section, with three through-lanes per direction, and auxiliary left-turn lanes at major intersections.

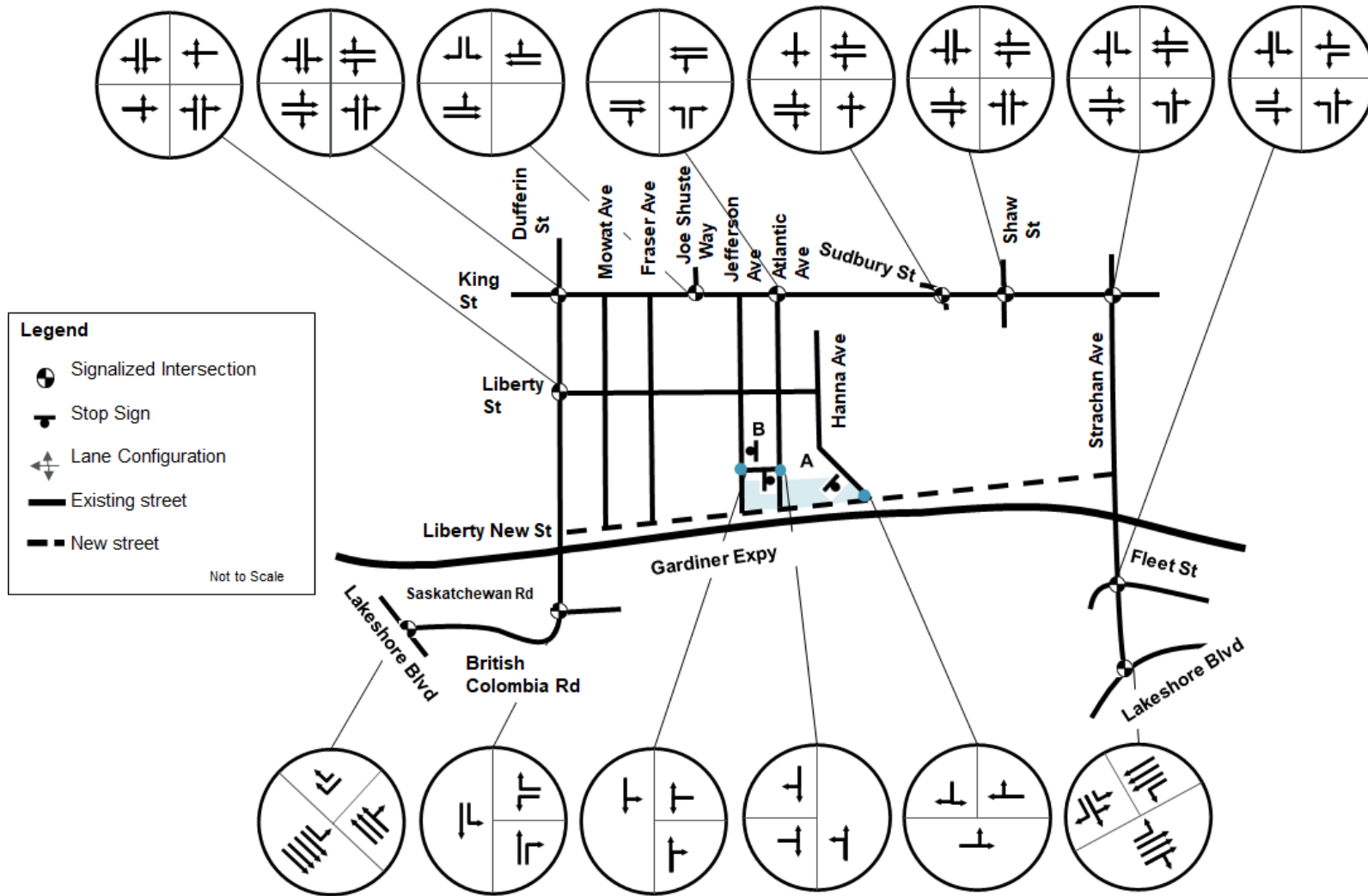


Figure 2-2: Existing Network and Future Liberty New Street Lane Configuration and Traffic Control

2.4 Existing Transit Services

The TTC operates streetcar services along King Street, Dufferin Street (south of King), and Fleet Street. All surface transit routes provide direct access to the Toronto Subway System via Line 1 (Yonge-University-Spadina) at St Andrew Station and Union Station, or Line 2 (Bloor-Danforth) at Dufferin Station, and Bathurst Station. Regional rail service is provided by GO Transit and can be accessed from the existing Exhibition GO Station which will be integrated with the Exhibition Ontario Line Station.

Existing transit services in the vicinity of Exhibition Station are summarized below and an excerpt from the TTC system map is shown in **Figure 2-3**.

- 504/509/511 Streetcar. The 511 and 509 streetcar routes directly serve Exhibition Place with a stop on the south side of the Gardiner Expressway at Manitoba Drive and Nova Scotia Drive at the Exhibition Loop. The 504 streetcar route runs east-west along King Street. The 504 streetcar operates on a 3-minute headway and has a nearby stop at Dufferin Street / Atlantic Avenue. The 509 and 511 streetcar routes operate on approximately 6 to 8 minute headways with a nearby stop at the Exhibition GO Station.
- 29A and 29C Bus. The 29A bus runs north-south along Dufferin Street terminating at the Dufferin Gate Loop. The 29C bus directly serves Exhibition Place with limited service stopping at the Exhibition Loop and Princes' Gate Loop. The 29C (Wilson Station-Exhibition/Princes' Gate) branch operates during the peak periods from Monday to Friday, and during the daytime on Saturdays, Sundays, and holidays during the fall and winter. Route 29 operates on an 8-minute headway and the nearest available stop is located at Dufferin Gate / Liberty Street.
- 121A and 121D Bus. The 121 Fort York-Esplanade bus route operates between Exhibition Place, the Fort York neighbourhood and the Distillery neighbourhood. Two services are operated. The 121A (Exhibition (Princes' Gates)-Distillery via Union Station) branch operates all day, every day, outside the summer months. The 121D (Ontario Place-Cherry Beach via Union Station and Distillery) seasonal branch operates from mid-May to mid-October.
- 63 Ossington Bus. The 63 Ossington bus route operates between Eglinton West Station on Line 1 Yonge-University and King Street West and the Liberty Village, generally in a north-south direction. The route does not directly serve the Exhibition Place or Ontario Place sites. Service between Liberty Village and St Clair Avenue is part of the 10 Minute Network, and operates 10 minutes or better, all day, every day. Two services are operated. The 63A (Eglinton West Station-Liberty Village) branch operates between 5 AM and 2 AM, seven days a week, with the 636 Ossington Blue Night bus (Ossington to Eglinton) operating between 2 AM and 5 AM. The 63B (St Clair-Liberty Village) short-turn branch operates during the peak periods, from Monday to Friday only. Route 63 operates on a headway of 3 to 5 minutes and has a nearby stop located at Liberty Street / Atlantic Avenue.
- Lakeshore West GO Line. The Lakeshore West line delivers two-way, all-day service seven days a week, from Toronto to Aldershot. It delivers rush-hour service from Hamilton to Toronto in the morning and back again in the afternoon. On weekdays,

trains run on the Lakeshore West line every 30 minutes, with 15 minute frequencies in the peak flow direction (EB in AM peak period and WB in PM peak period).

- Overall, the study area has excellent transit coverage for both short-distance and long-distance trips and provides excellent headways for passengers. Transit priority measures such as those currently along King Street also help improve the speed, reliability, and attractiveness of transit for transportation across the City.



Figure 2-3: Existing Transit Services

2.5 Existing Cycling and Pedestrian Facilities

The surrounding areas of Liberty Village and Exhibition Place have significant gaps in the existing sidewalk network and sidewalks that are partially obstructed by utility poles, fire hydrants, bicycle posts, and garbage bins, which constrain effective sidewalk widths. Gaps in the sidewalk network require pedestrians to walk across commercial boulevard parking spaces or on the roadways which can present unsafe conditions, especially as the population of Liberty Village continues to grow, and that a significant supply of public and private parking in the community accommodates automobile trips in the area. Examples of missing links in the pedestrian network are illustrated below in **Figure 2-4** and **Figure 2-5**.

An excerpt of The Toronto Cycling Map from the City of Toronto website is highlighted in **Figure 2-6**. Existing connections that were not included in the City's cycling map include Douro Street (both directions), Saskatchewan Road between Dufferin Street and Manitoba Drive (north side), Princes' Boulevard between Manitoba Drive and Canada Boulevard (both directions), and New Brunswick Way (both directions).

The existing cycling network within the study area is rather limited, particularly throughout Liberty Village and the surrounding neighbourhoods which would be most likely to travel to and from Exhibition Station via bicycle due to the proximity. The only significant bicycle facilities in the area are located on Strachan Avenue, and the Martin Goodman Trail south of Lake Shore Boulevard. Richmond Street and Adelaide Street, and King Street (from the Transit Priority Corridor) east of Bathurst provide for excellent connections into the downtown core of the City. The Liberty Village New Street EA Study prepared by LEA in October 2015 identifies a new multi-use trail as an additional cycling facility that will connect Dufferin Street to Strachan Avenue once completed.



Figure 2-4: Liberty Street / Fraser Avenue Pedestrian Facilities (Facing East)



Figure 2-5: Liberty Street Pedestrian Facilities (Facing East Towards Mowat Avenue)

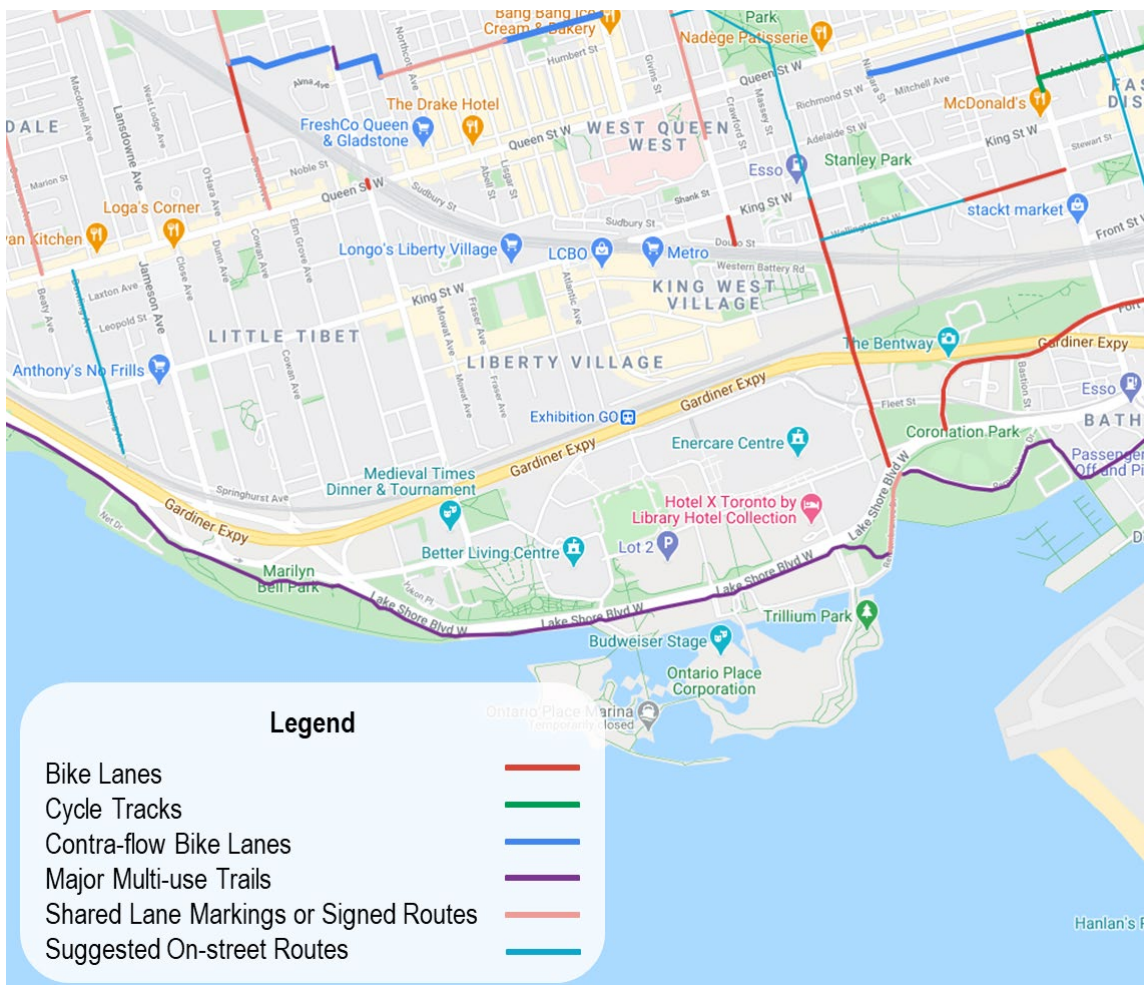


Figure 2-6: Existing Cycling Facilities

2.6 Walkshed Analysis

A multi-modal level of service analysis was undertaken for the key links around the TOC sites. The assessment was completed using the City of Ottawa's Multi-Modal Level of Service (MMLOS) Methodology⁴. Due to the scope of this study and data availability, the following items are noted:

- Existing facility widths were estimated based on aerial photography (Google);
- Daily curb lanes volumes were estimated based on available traffic data and street classification; and
- Intersection delays for pedestrians were estimated based on estimated cycle lengths and walk times.

2.6.1 Existing Pedestrian Level of Service

The pedestrian level of service (PLOS) on roadway segments in the study area were analyzed using the methodology detailed in the City of Ottawa MMLOS Guidelines. The detailed inputs used for the analysis can be found in **Appendix A**.

The PLOS for the existing network is illustrated below in **Figure 2-7**.

Based on the PLOS analysis, the following observations were made on the pedestrian network:

- **No Sidewalks:** Several of the north-south connections in Liberty Village do not currently have sidewalks available and instead accommodate parking for vehicles along these stretches. As Liberty Village continues to develop, it will be important that these pedestrian connectivity gaps be filled to ensure that pedestrians can move safely around the area, especially as demand grows to and from the future Liberty New Street and Ontario Line station. Pedestrian gaps are also noted throughout the Exhibition Place area.
- **Narrow Effective Sidewalk Width:** The north side of Liberty Street between Mowat Avenue and Atlantic Avenue has several locations with constrained sidewalks due to utility poles, fire hydrants, and garbage bins being placed on the sidewalk, resulting in effective sidewalk widths of less than or equal to 1.5 metres. These narrow effective sidewalk widths are substandard pedestrian clearway by current standards for accessibility. These locations make it difficult for pedestrians to pass by each other and do not easily accommodate mobility impaired users on the sidewalk. Similarly, obstructed sections of sidewalk were observed on the east side of Fraser Avenue (south of Liberty Street), south side of King Street (between Dufferin Street and Joe Shuster Way, and the east side of Hanna Avenue (north of Liberty Street). A narrow sidewalk width of 1.5 metres is observed on Liberty Street on the north side between Hanna Avenue and Pirandello Street, and the south side between Lynn Williams Street and Pirandello Street.

⁴ Multi-Modal Level of Service (MMLOS) Guidelines, City of Ottawa,
<https://app05.ottawa.ca/sirepub/cache/2/csqliwq23jjanozog31sq3r1/31504601272021034735933.PDF>

- Dufferin Street / Saskatchewan Road:** The intersection operates at a LOS of F for pedestrians due to the poor crossing conditions on the east leg of the intersection. The east leg has a wide crossing distance of approximately 22 metres and conflicts with a slightly channelized right turn lane which results in an increased approaching speed of vehicles. Pedestrian comfort and safety at the intersection would improve by reducing the sidewalk corner curb radii on the east side of the intersection and bringing the westbound right turn lane to a 90-degree intercept angle.

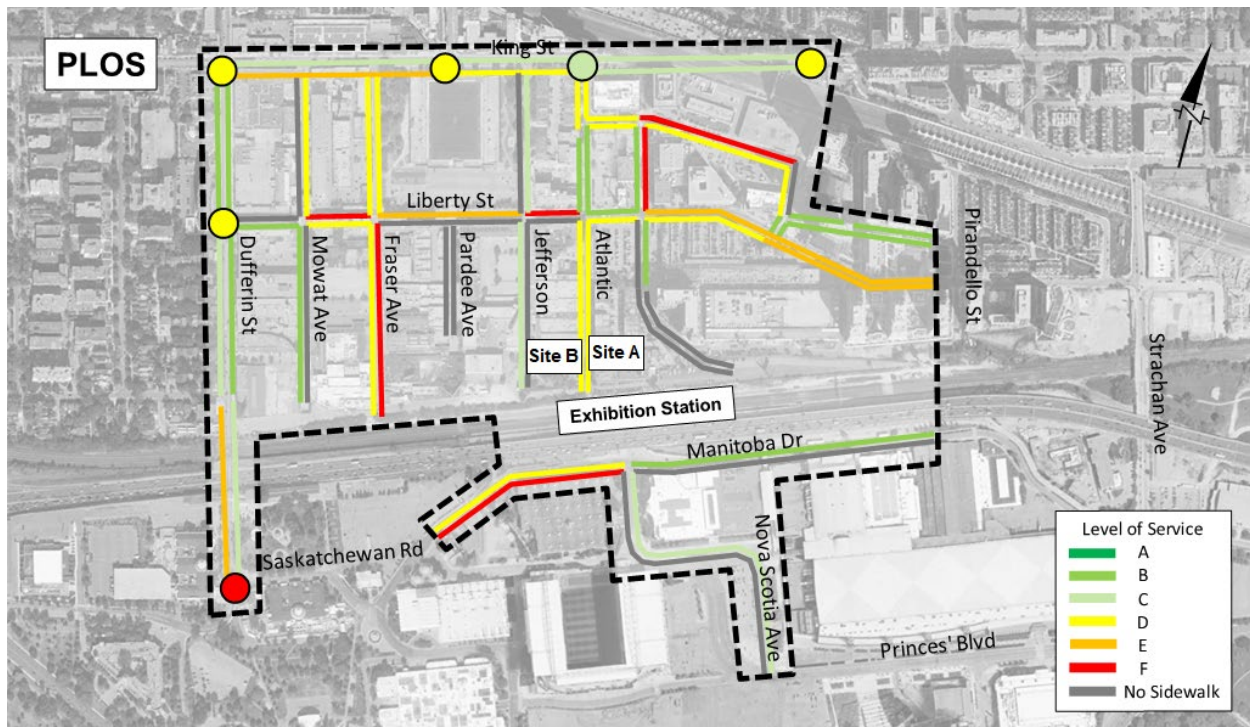


Figure 2-7: Existing Pedestrian Level of Service

2.6.2 Bicycle Level of Service

The bicycle level of service (BLOS) on roadway segments in the walkshed area were analyzed using the methodology detailed in the City of Ottawa MMLoS Guidelines. The detailed inputs used for the analysis can be found in **Appendix A**.

The following observations are made for bicycle levels of service in the network:

- Using the Ottawa MMLoS methodology, many of the smaller roadways within the Liberty Village community operate at a BLOS of A, despite the absence of separated bicycle facilities. Bicycles would be expected to experience higher degrees of safety and comfort on the slow and narrow roadways, however, it is a limitation of the methodology that on-street parking obstructions and traffic demand are not considered for mixed traffic facilities, as these would also affect the cycling experience by increasing friction and conflict with automobiles.

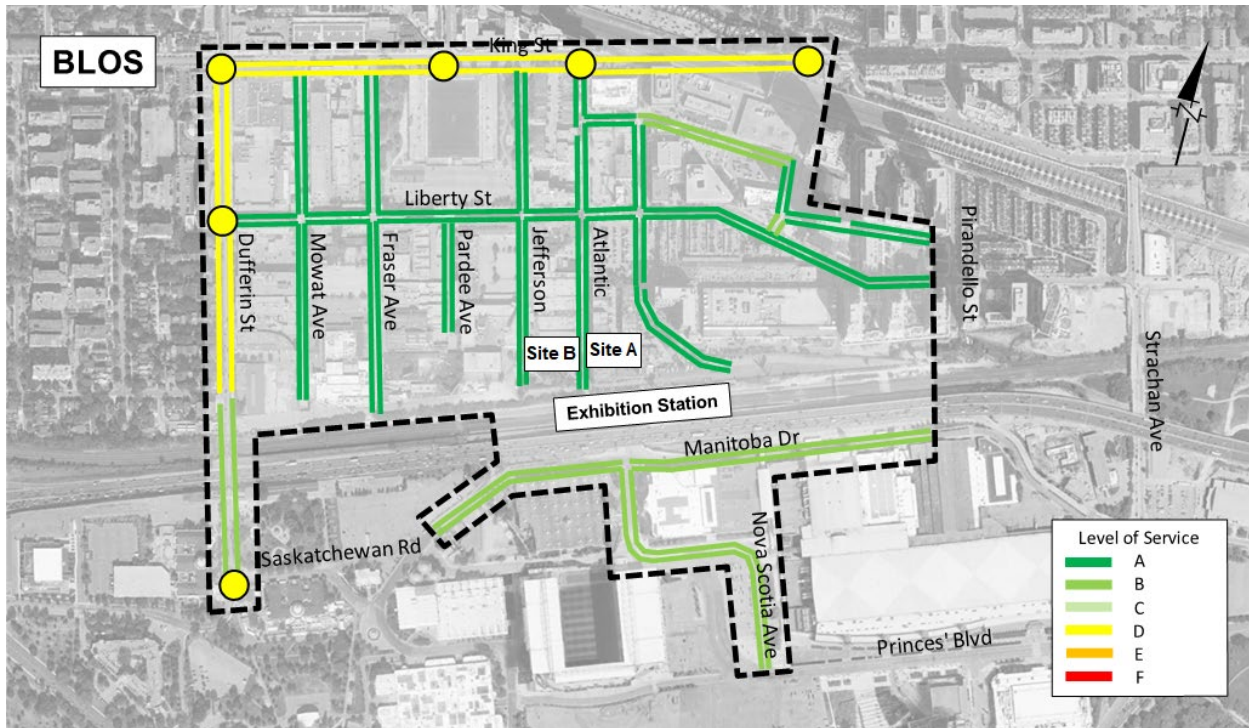


Figure 2-8: Existing Bicycle Level of Service

2.6.3 Transit Level of Service

The transit level of service (TLOS) on roadway segments in the study area were analyzed using the methodology detailed in the City of Ottawa MMLoS Guidelines. Specifically, the factor of transit speed vs. posted speed was estimated based on the driveway and parking friction thresholds for mixed traffic, i.e. segments that experience limited parking/driveway friction result in an LOS of “D”, and segments with moderate friction result in an LOS of “E”. The detailed inputs used for the analysis can be found in **Appendix A**.

As shown in the transit LOS figure, the segments with transit routes generally operate at a LOS of “D” in the walkshed area with the exception of the segment of Liberty Street between Atlantic Avenue and Hanna Avenue, and along Dufferin Street between King Street and Springhurst Avenue. The LOS E segment along Liberty Street experiences a higher level of friction than others in the area due to a large parking lot on the southern side of Liberty Street. The parking lot is expected to primarily accommodate commuter trips which will increase friction and lower the speed of transit vehicles on the segment during the peak hours. A higher transit friction is experienced along Dufferin Street due to a relatively high number of driveways and on-street parking along the segments.

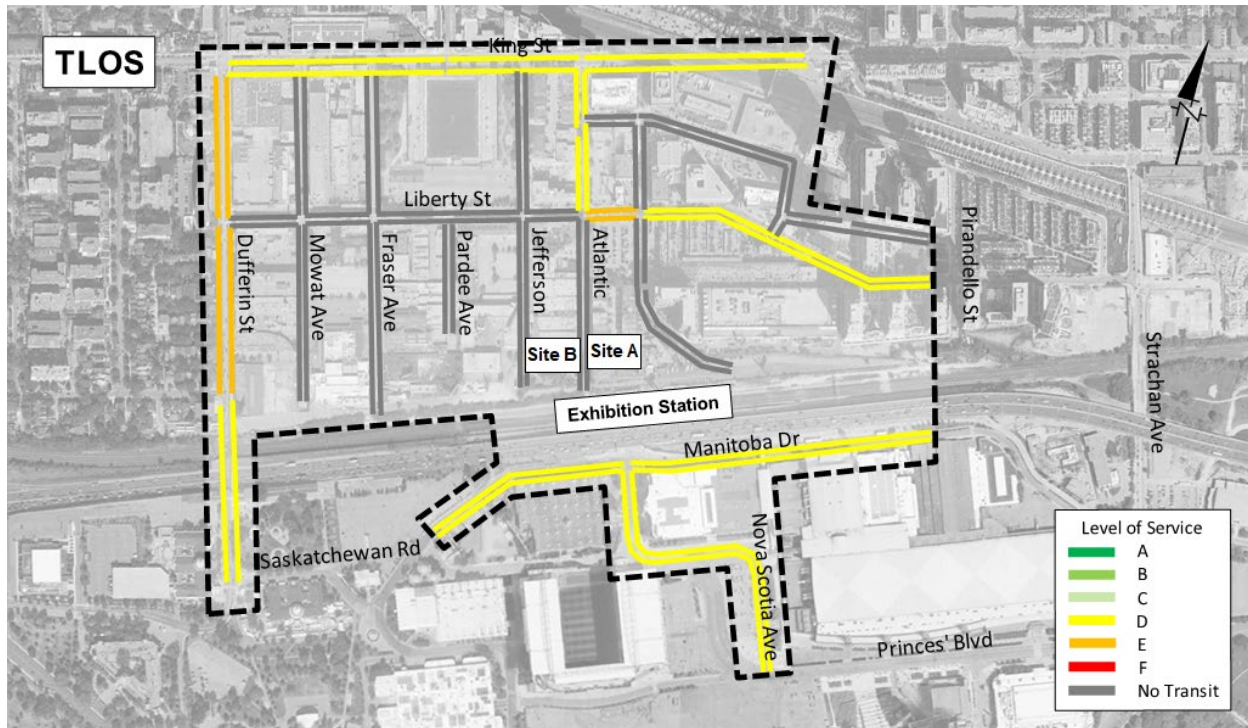


Figure 2-9: Existing Transit Level of Service

2.7 Existing Traffic Volumes

A summary of the intersections and count sources for traffic volumes are provided in **Table 2-1**. HDR used counts from the 2020 Ontario Line Environmental Assessment prepared by AECOM and HDR to maintain consistency with the study where possible and supplemented the counts with additional counts from the City’s database or Synchro models. The existing volumes are described as representing 2020 conditions in order to relate them to the 2030 future horizon year, however, they represent typical pre-pandemic traffic volumes and conditions as they were developed using pre-pandemic volumes that were adjusted with a 1% annual growth factor to represent a ‘typical’ 2020 demand. The annual growth rate is considered to be conservative relative to growth assumptions used in traffic impact studies undertaken for nearby developments but is consistent with the Existing Transportation Conditions Report prepared by AECOM for the Ontario Line Environmental Assessment.

Appendix C shows the existing traffic and active transportation volumes at the study area intersections. Individual intersection peak hour traffic volumes are shown and were used in the study analysis, which is more conservative than calculating a global peak hour set of volumes. Volume balancing between intersections was also reviewed.



Table 2-1: Traffic Count Sources

Synchro / TIS ID	Intersection	Source used
539	King/Dufferin	2017 King Street Synchro Model
2081	King/Joe Shuster Way	2017 King Street Synchro Model
1912	King/Atlantic	2017 King Street Synchro Model
1851	King/Sudbury	2017 King Street Synchro Model
1628	King/Shaw	2017 King Street Synchro Model
538	King/Strachan	2017 King Street Synchro Model
1449	Dufferin/Liberty	2020 Ontario Line Existing EA
2134	Dufferin/Saskatchewan	2016 Dufferin Street Synchro Model
571	Strachan/Fleet	2014 Pan Am Park Synchro Model
1344	Lake Shore/British Columbia	2014 Pan Am Park Synchro Model
222	Lake Shore/Strachan	2014 Pan Am Park Synchro Model

To be conservative, counts were grown by an annual growth factor of 1% to reach existing 2020 volumes, which is consistent with the 2020 Ontario Line EA Existing Transportation Conditions Report prepared by AECOM, and conservative relative to Traffic Impact Studies undertaken for proposed developments nearby.

2.8 Existing Traffic Operations

Based on the existing traffic volumes shown in **Appendix C** and the existing road network illustrated in **Figure 2-2**, intersection operations were assessed using the Synchro 10 traffic analysis software. Existing signal timings are provided in **Appendix B**.

As discussed previously, frequent streetcar service runs in mixed traffic along King Street, as well as along Dufferin Street south of King Street. An adjusted ideal saturation flow rate was derived along King Street to estimate the impact of the streetcars running in mixed traffic based on the operational conditions during the AM and PM peak hours. Assuming that a movement would be operating at-capacity during either the AM or PM peak hour in the existing conditions between Dufferin Street and Strachan Avenue, an ideal saturation flow rate of 1250 was identified and applied along King Street east-west.

Table 2-2 summarizes the level-of-service (LOS), volume/capacity ratio (v/c ratio), and 95th percentile queue for each movement under existing conditions using the HCM 2000 methodology. Detailed Synchro results and reports for all study area intersections are provided in **Appendix D**.

Under existing traffic conditions, the majority of movements are well within capacity. However, the following critical movements exist:

- Eastbound approach to King/Dufferin during the AM peak hour operates at capacity, and the southbound approach is approaching capacity during the AM and PM peak hours. The eastbound approach experiences high delays as a result of the mixed streetcar traffic.
- Northbound approach to Dufferin/Liberty during the AM peak hour operates near capacity due to the heavy right turning flows into Liberty Village, causing the lane to operate as a

dedicated right turn lane. The westbound approach to the intersection operates at capacity during the PM peak hour due to the heavy outbound flow in the evenings. Alternative routing options for traffic to and from the south are limited without the construction of Liberty New Street.

- Westbound at King/Strachan during the AM peak hour.
- Northbound left and southbound-through at Strachan/Fleet during the PM peak hour. The northbound left movement is at capacity.
- Eastbound through-right at Lake Shore/Strachan operates near capacity during the AM peak hour. During the PM peak hour, the eastbound left and westbound-through movements are near or at capacity.
- Eastbound-through movement at Lake Shore/British Columbia operates at capacity during the PM peak hour.

Table 2-2: Existing Conditions – Summary of Traffic Analysis Results

Intersection	Movement	Storage length	AM Peak Hour			PM Peak Hour		
			LOS	v/c Ratio	95th %ile Q (m)	LOS	v/c Ratio	95th %ile Q (m)
King/Dufferin (Signalized)	Overall	-	D	0.92	-	C	0.76	-
	EBLTR	267	D	1.00	90.7	B	0.57	45.8
	WBLTR	292	C	0.80	22.4	B	0.66	67.7
	NBLTR	188	B	0.43	13.0	C	0.62	50.4
	SBLTR	361	D	0.93	71.2	E	0.98	70.0
King/Joe Shuster Way (Signalized)	Overall	-	B	0.62	-	A	0.46	-
	EBLT	292	B	0.63	38.8	A	0.29	26.0
	WBTR	167	A	0.53	35.0	A	0.47	44.7
	SBLR	76	C	0.56	45.2	C	0.42	29.1
King/Atlantic (Signalized)	Overall	-	C	0.74	-	B	0.53	-
	EBTR	167	B	0.78	54.3	B	0.50	27.8
	WBLT	294	B	0.78	56.2	B	0.50	40.8
	NBL	30	C	0.64	50.9	C	0.55	43.7
	NBR	174	C	0.41	27.5	C	0.53	36.4
King/Sudbury (Signalized)	Overall	-	B	0.75	-	B	0.45	-
	EBLTR	294	B	0.72	56.8	A	0.36	31.8
	WBLTR	175	B	0.67	49.8	A	0.45	39.5
	NBLTR	134	C	0.02	3.2	0	0	0
	SBLTR	172	D	0.81	72.4	C	0.44	32.3
King/Shaw (Signalized)	Overall	-	B	0.63	-	B	0.57	-
	EBLTR	175	B	0.72	47.9	A	0.39	27.3
	WBLTR	231	B	0.57	35.5	B	0.57	49.4
	NBLTR	103	C	0.47	29.1	C	0.58	33.0
	SBLTR	356	B	0.32	16.1	C	0.49	26.4
Dufferin/Liberty (Signalized)	Overall	-	C	0.82	-	C	0.74	-
	EBLTR	82	C	0.01	0.4	B	0.02	3.7
	WBLTR	82	D	0.80	66.3	E	1.00	146.8
	NBLTR	225	B	0.98	82.4	B	0.46	m46.0
	SBLTR	188	C	0.61	42.7	B	0.41	35.0
Dufferin/Saskatchewan (Signalized)	Overall	-	A	0.40	-	A	0.53	-
	WBL	30	D	0.15	5.6	C	0.20	14.9
	WBR	124	C	0.07	5.6	C	0.09	8.3
	NBT	241	A	0.28	53.1	B	0.52	96.7



Intersection	Movement	Storage length	AM Peak Hour			PM Peak Hour		
			LOS	v/c Ratio	95th %ile Q (m)	LOS	v/c Ratio	95th %ile Q (m)
	NBR	15	A	0.03	5.5	A	0.02	4.9
	SBL	30	A	0.14	9.1	A	0.20	0.5
	SBT	167	A	0.39	59.8	A	0.57	73.7
King/Strachan (Signalized)	Overall	-	C	0.86	-	B	0.59	-
	EBLTR	231	C	0.75	55.2	B	0.36	29.8
	WBLTR	334	D	0.94	70.4	A	0.56	16.3
	NBL	25	C	0.32	26.6	C	0.48	24.6
	NBTR	400	D	0.75	91.3	C	0.63	62.8
	SBL	25	C	0.17	7.4	C	0.14	7.8
	SBTR	355	C	0.31	41.3	C	0.35	47.9
Strachan/Fleet (Signalized)	Overall	-	C	0.57	-	D	0.80	-
	EBL	25	D	0.40	39.5	D	0.58	57.6
	EBTR	119	D	0.29	46.2	C	0.18	21.0
	WBLT	205	D	0.60	71.9	D	0.62	67.0
	WBR	50	C	0.07	2.9	C	0.05	0.0
	NBL	30	C	0.23	28.4	F	0.99	77.7
	NBTR	181	C	0.59	124.5	C	0.60	128.4
	SBTR	217	C	0.34	68.6	D	0.85	228.9
Lake Shore/Strachan (Signalized)	Overall	-	D	0.83	-	D	0.95	-
	EBL	60	E	0.95	145.8	F	1.01	165.7
	EBTR	286	C	0.98	295.3	B	0.53	98.6
	WBL	60	C	0.16	6.3	C	0.08	3.9
	WBT	172	D	0.64	94.6	D	0.95	211.7
	NBLTR	92	0	0	0	0	0	0
	SBL	140	C	0.22	35.1	D	0.46	68.5
	SBLT	181	C	0.20	34.9	D	0.44	68.8
Lake Shore/British Columbia (Signalized)	Overall	-	C	0.65	-	D	0.92	-
	EBL	15	B	0.04	3.2	D	0.03	7.6
	EBT	387	C	0.76	119.0	F	1.11	201.0
	WBR	80	C	0.14	0.0	E	0.79	72.9
	NBTR	776	C	0.67	77.3	C	0.89	252.0
British Columbia/Yukon (Signalized)	Overall	-	A	0.31	-	A	0.31	-
	EBL	30	A	0.00	0.3	A	0.00	0.3
	EBTR	140	A	0.32	26.3	A	0.32	26.3
	WBL	20	A	0.00	0.3	A	0.00	0.3
	WBT	241	A	0.24	18.3	A	0.24	18.3
	WBR	20	A	0.00	0.0	A	0.00	0.0
	NBLTR	68	C	0.09	4.6	C	0.09	4.6
SBLTR	97	C	0.02	0.0	C	0.02	0.0	

Note: LOS = level of service; v/c = volume to capacity ratio; Critical movements are highlighted in red as defined by the City's TIS Guidelines.

3 Background Traffic Conditions

3.1 Planned Roadway Improvements

A new street along the southern boundary of Liberty Street is proposed, named “Liberty New Street”. The new street will have a two-lane cross-section and will extend between Dufferin Street and Strachan Avenue, immediately north of the railway corridor, intersecting with Mowat Avenue, Fraser Avenue, Jefferson Avenue, Atlantic Avenue, Hanna Avenue, and Pirandello Street. Sidewalks will be provided along the north side of Liberty New Street, and a multi-use path will be provided along the south side to accommodate pedestrians and cyclists. Since the control type at each intersection was not specified in the EA, the intersection control measures recommended in the Ontario Line Exhibition Station Site Plan Review Transportation Impact Assessment (Ontario Line Technical Advisor, May 2021) were carried forward, with the intersection of Jefferson Avenue and Liberty New Street being all-way stop-controlled, Atlantic Avenue and Liberty New Street being signalized, Dufferin Street and Liberty New Street being signalized, and Strachan Avenue and Liberty New Street being a right-in/right-out configuration.

Liberty New Street was assumed to be completed by the 2030 analysis horizon year.

3.2 Planned Transit Improvements

The following future transit improvements are expected in the study area as part of the planned and committed improvements from Metrolinx and the TTC:

- Ontario Line: Exhibition Station will be a terminal station for the proposed Ontario Line subway, which will operate at 90-second headways, connecting Liberty Village and Exhibition Place with the neighbourhoods along the Ontario Line alignment to the east. Exhibition Station will also provide convenient access to the Lakeshore West GO rail and TTC streetcar services nearby.
- Lakeshore West GO Train: GO train frequencies are expected to increase over time following electrification of the corridor, resulting in 15-minute peak service, and 30-minute off peak services in both directions. New eastbound and westbound express GO platforms will be added to Exhibition Station, to be located in the middle of the station just north of the eastbound local GO platform at the southern end.
- Streetcar Extension: The TTC has plans to extend the existing streetcar services from the Exhibition Loop to the Dufferin Gates Loop as part of the Waterfront LRT, providing enhanced streetcar connections within the network west of Exhibition Place. Changes resulting from the extension project will include:
 - New westbound streetcar platform at Manitoba Drive / Nova Scotia Avenue;
 - Possible grade-separated north-south crossings for pedestrians at Manitoba Drive / Nova Scotia Avenue to be used during special event peak hours;
 - New streetcar stop at Centennial Park for both directions, located north of Centennial Park east of Dufferin Street. The west side of the intersection to be protected for a future westerly extension; and
 - Signalization of Dufferin Street at the Dufferin Loop.

- **Bus Transit Services:** Bus bays will be located on Liberty New Street to accommodate redirection of bus routes through Liberty Village. The westbound bus bay will be located between Jefferson Avenue and Atlantic Avenue, and the eastbound bus bay will be located just east of Atlantic Avenue (based on current assumptions and subject to change based on City of Toronto and TTC future plans). The new bus bays will accommodate Route 29A (Dufferin) with a 3.3-minute headway, 63 (Ossington) with a 3.5-minute headway, and 929 (Dufferin Express). The planned future routes in the vicinity of Exhibition Station are illustrated in **Figure 3-1**.

Based on the above planned service improvements, the future growth around Exhibition Station will be serviced with multiple modes of public transit, providing connecting options in all directions.



Figure 3-1: Future Transit Routes

3.3 Background Traffic Volumes

Background traffic volumes are comprised of existing traffic volumes plus general background traffic growth, trip reassignment due to the future Liberty New Street connection, and demand growth associated with Exhibition GO and Ontario Line Station.

Future Background traffic volumes were derived in the following manner:

1. The existing trips associated with the Exhibition GO Station were removed from the network (since new forecasts for the integrated station will be added).
2. A compound annual growth rate of 2% per year was applied between 2020 and 2030 to reflect background traffic growth, including growth associated with nearby developments.
3. Traffic volumes within the study area were reassigned to reflect new patterns expected following the completion of Liberty New Street, between Dufferin Street and Strachan Avenue.

4. The future Exhibition GO Station trips were added to the network, which include a small number of vehicle trips associated with passenger pick-up/drop-off, as well as walking, cycling, and transit trips to and from the GO station.
5. Trips associated with Exhibition Ontario Line Station were assigned to the network, which also include a small number of vehicle trips associated with passenger pick-up/drop-off, as well as walking, cycling, and transit trips to and from the Ontario Line Station.
6. Trips to and from the proposed future bus bays that don't use either the GO station or the OL station were also added to the network in order to assess traffic operations at the intersections along Liberty New Street.

It is noted that future growth from Exhibition Place has been solely estimated based on the forecasted demand growth from the Metrolinx EMME model for the Greater Golden Horseshoe, and additional trips have not been assigned to account for any potential redevelopment plans within Exhibition Place or Ontario Place.

3.3.1 Existing Exhibition GO Station Trips

The existing trips generated by the Exhibition GO Station within the study area was estimated to be removed before the application of the compound annual background growth rate. The future trips were then added on top of the grown traffic volumes.

This process relied on TTS data, which is collected by a survey of households within the Greater Golden Horseshoe including the Greater Toronto Area. The TTS data summarizes travel patterns and other related transportation information that can be used to aid in planning, such as mode splits. The 2016 TTS divides geographical areas into 'zones' for the purposes of determining trip patterns from one zone to another.

The following methodology was applied in the calculation of the existing Exhibition GO Station trip layers:

1. The daily boarding and alighting trips and existing mode splits were taken from Metrolinx's 2016 GO Rail Station Access Plan to determine the daily trips per mode at Exhibition GO Station.
2. The 2016 Transportation Tomorrow Survey (TTS) dataset was queried for transit boarding and alighting trips at Exhibition GO Station in 15-minute time intervals to determine the conversion of daily trips to AM and PM peak hour trips. The conversion factors were applied to the daily trips by mode calculated with the GO Rail Station Access Plan data.
3. The 2016 TTS dataset was queried to identify the origin-destination trip travel patterns by mode to and from the existing Exhibition GO Station, and the distribution patterns were applied to the AM and PM peak hour trips by mode.
4. The existing Exhibition GO Station trips by mode were subtracted from the study area network.

To identify the AM and PM peak hour of total station usage (boardings plus alightings), the following assumptions were made for the 2016 TTS data to estimate the time of day a trip would use the station:

- Boardings: It was assumed that the time of arrival to the station to board a train was equal to the start time of the trip.
- Alightings: It was assumed that alightings from the station represent a point near the end of a trip. Since alightings at a station generally occur well after the start time of a commute, it was assumed that all commute trips using the station are one hour in duration. Therefore, the alighting time of a trip was assumed to be one hour after the start time of the trip indicated by the TTS data.

The total hourly demand at Exhibition GO Station based on the 2016 TTS data queries was used to identify the AM and PM peak hour and the corresponding peak hour demand relative to the daily demand. The ratio of AM and PM peak hour demand to daily demand (summarized in **Table 3-1**) was applied to the daily demand from the GO Rail Station Access plan to identify the boarding and alighting demand by mode during the AM and PM peak hours (summarized in **Table 3-2** and **Table 3-3** for boardings and alightings, respectively).

Table 3-1: 2016 TTS Data on Exhibition GO Station Usage

Direction	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips	AM Pk Hr: Daily Ratio	PM Pk Hr: Daily Ratio
Boardings	2,158	155	759	7%	35%
Alightings	2,198	585	280	27%	13%

Table 3-2: Estimated 2016 Peak Hour Boardings

Mode	Mode Split*	Daily Boardings	AM Pk Hr: Daily Ratio	AM Peak Hour	PM Pk Hr: Daily Ratio	PM Peak Hour
Total Boardings	100%	1,650*	7%	119	35%	580
Walk	76%	1,262		91		444
Local Transit	17%	275		20		97
Cycling	1%	16		1		6
Pickup Dropoff	6%	97		7		34

*Source: 2016 GO Rail Station Access Plan

Table 3-3: Estimated 2016 Peak Hour Alightings

Mode	Mode Split*	Daily Alightings	AM Pk Hr: Daily Ratio	AM Peak Hour	PM Pk Hr: Daily Ratio	PM Peak Hour
Total Alightings	100%	1,650	27%	439	13%	210
Walk	76%	1,262		336		161
Local Transit	17%	275		73		35
Cycling	1%	16		4		2
Pickup Dropoff	6%	97		26		12

*Source: 2016 GO Rail Station Access Plan

The 2016 TTS data that contained trips using Exhibition GO Station, in conjunction with knowledge of the local transportation network, were also used to estimate trip distribution and assignment of these existing station trips for each mode as described below:

- For PUDO trips, the TTS dataset contained trips destined to and from the traffic zones containing the existing GO station whose trip purpose was to “facilitate passenger”.
- For all other modes, including walking trips transferring to and from other transit routes, pure-walking trips, and bike trips, the TTS dataset contained all trips whose boarding or alighting station was the existing Exhibition GO Station.

The directional distributions of existing GO station PUDO and active transportation trips are shown in **Table 3-4** and **Table 3-5**. TTS data is shown in **Appendix E**.

Table 3-4: Directional Distribution for Existing GO Station for PUDO Trips

Time Periods		AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
Local Short-Distance Trips	NW	0%	17%	0%	0%
	N	9%	0%	0%	9%
	NE	8%	5%	0%	62%
	E	27%	0%	0%	29%
	SE	0%	0%	0%	0%
	S	0%	0%	0%	0%
	SW	0%	0%	0%	0%
	W	0%	0%	0%	0%
Regional Long-Distance Trips	NW	0%	0%	0%	0%
	N	0%	0%	0%	0%
	NE	0%	34%	24%	0%
	E	12%	0%	0%	0%
	SE	0%	0%	0%	0%
	S	0%	0%	0%	0%
	SW	0%	0%	0%	0%
	W	44%	44%	76%	0%
Total		100%	100%	100%	100%

Table 3-5: Directional Distribution for Existing GO Station for Walk and Bike Trips

Time Periods		AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
Local Short-Distance Trips	NW	6%	1%	1%	4%
	N	33%	2%	4%	13%
	NE	9%	17%	19%	21%
	E	52%	79%	73%	41%
	SE	0%	0%	0%	21%
	S	0%	0%	0%	0%
	SW	0%	0%	1%	0%
	W	0%	0%	0%	0%
Regional Long-Distance Trips	NW	0%	0%	0%	0%
	N	0%	0%	0%	0%
	NE	0%	0%	1%	0%
	E	0%	0%	0%	0%

Time Periods		AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
	SE	0%	0%	0%	0%
	S	0%	0%	0%	0%
	SW	0%	0%	0%	0%
	W	0%	0%	1%	0%
Total		100%	100%	100%	100%

The multi-modal assignment for the existing GO station trips is shown in **Appendix C**.

3.3.2 General Background Automobile Growth

The background traffic growth per year was estimated based on automobile travel demand data from Metrolinx’s 2041 macroscopic travel demand forecasting model for the study area zones, relative to the 2016 TTS demand for the same area coverage. All automobile trips that began or ended in these zones were aggregated for the 2041 and 2016 years. A compound annual background growth rate of 2% per year was determined from the Metrolinx model outputs. The 2% per year growth rate was applied between 2020 and 2030. As the Metrolinx model includes assumptions for nearby developments, it was assumed that the increase in trips generated by nearby planned developments has been incorporated through the annual growth. These growth rates were applied to:

- All through-movements along major and minor arterial streets, which include Dufferin Street, King Street West, Strachan Avenue, and Lakeshore Boulevard; and
- All left and right-turning movements at minor intersections along King Street West and Dufferin Street. This growth component was assumed to represent all future background developments within Liberty Village until the year 2030.

Existing trips associated with Exhibition GO station were removed from the network before the above growth rate was applied.

A compound annual background growth of 1.0% was assumed for all pedestrian and bicycle demand in the study area. The general grown traffic is shown in **Appendix C**.

3.3.3 Liberty New Street Traffic Reassignment

The Liberty New Street connection that will be constructed just north of the railway corridor below Liberty Village between Dufferin Street and Strachan Avenue will provide additional routing options to traffic in the vicinity and will help support the development of lands above the railway corridor. The forecasted trip change shown in Figure 6-6 and Figure 6-7 of the Transportation Report of the Liberty Village New Street EA Study prepared by LEA in October 2015 was used to estimate proportional changes in the future traffic patterns following the completion of Liberty New Street.

The change in volumes as a result of Liberty New Street is shown in **Appendix C** and the total future background traffic volumes are shown in **Appendix C**. Traffic volumes along Liberty New Street in the future total conditions are forecasted to be approximately 100 trips eastbound and westbound during the AM and PM peak hours respectively, between Strachan Avenue and

Atlantic Avenue. The other volumes east-west along Liberty New Street are generally between 200 trips and 300 trips per direction.

3.3.4 Exhibition GO Station Future Trip Generation

The net change in trips generated by Exhibition GO Station by the 2030 analysis horizon year was estimated by removing the existing GO Station trips and adding the forecast gross 2030 trips for walking, cycling, and automobile passenger pick-up/drop-off trips. The methodology for calculating the existing Exhibition GO Station trip generation layer was outlined in Section 3.3.1.

The future 2030 Exhibition GO Station trips were estimated based on the ingress and egress trips from the scaled-back 2080 trip transfer matrix derived from the Metrolinx EMME model, which is shown in **Appendix F**. A 1% compound annual growth rate was assumed between 2030 and 2080 for Exhibition Station related trips. Since only the AM peak hour trip transfer matrix was available, an opposite trend was assumed for the PM peak hour and the trip matrix was transposed. The analysis was conducted using the most recent iteration of the station trip forecasts provided by Metrolinx at the time of the preparation of this report.

Ingress and egress mode splits for 2030 conditions were based on:

- The trip transfer matrix for all trips transferring from other transit routes; and
- Projected 2031 mode splits for Exhibition GO Station from Metrolinx’s 2016 GO Rail Station Access Plan for trips accessing and egressing the station by walking, biking and driving/carpooling.

The 2030 gross trip generation for the GO Station is summarized in **Table 3-6**.

Table 3-6: 2030 GO Station Gross Trip Generation By Access and Egress Mode

Trip Type	AM Peak		PM Peak	
	Mode share*	Trips	Mode share*	Trips
Total to GO ingress trips		760		6,762
From OL to GO transfer trips	-	362	-	5,251
Total Local transit to GO transfers		118		1,041
Total walk/bike/PUDO to GO access trips	100%	281	100%	471
Walk to GO	70%	198	70%	332
TOC to GO trips		15		38
Walk to GO (excludes TOC trips)	-	183	-	294
Cycle to GO	7%	19	7%	32
PUDO to GO	23%	64	23%	107
Total GO egress trips		6,762		760
From GO to OL transfer trips	-	5,251	-	362
Total GO to Local transit transfers		1,041		118
Total GO to walk/bike/PUDO egress trips	100%	471	100%	281
Walk from GO	70%	332	70%	198
GO to TOC		29		13
Walk from GO (excludes TOC trips)	-	302	-	184
Cycle from GO	7%	32	7%	19

Trip Type	AM Peak		PM Peak	
	Mode share*	Trips	Mode share*	Trips
PUDO from GO	23%	107	23%	64

*Mode share represents access and egress mode shares other than transfers from local transit.

The future directional distribution and route choice for gross future GO station trips were derived in the following manner:

- For future PUDO trips to and from the GO station, the same directional distribution was assumed for existing PUDO trips shown in **Table 3-4**, since growth in station usage will largely be accounted for by non-auto access and egress modes.
- For biking trips, a directional distribution similar to the existing GO station (**Table 3-5**) was assumed. To account for additional development potential to the south of the railway tracks, the south directional share was increased by 15%, and the other directions were decreased proportionally. The final directional distribution is shown in **Table 3-7**.
- For all walking trips transferring from other local transit routes, as well as pure walking trips, the directional distribution was obtained directly from the 2041 Station Transfer Matrices. The directional distributions are summarized in **Table 3-8** and **Table 3-9** for local transit transfer trips and pure walking trips, respectively. The regions from which these walking trips start and end are depicted in **Figure 3-2**.

Table 3-7: Directional Distribution for Future Bike-GO Station Trips

Time Period		AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
Local Short-Distance Trips	NW	4.9%	1.1%	0.9%	3.6%
	N	28.1%	1.9%	3.7%	11.2%
	NE	7.4%	14.6%	16.3%	18.0%
	E	44.5%	67.1%	61.9%	34.7%
	SE	0.0%	0.0%	0.0%	17.5%
	S	15.0%	15.0%	15.0%	15.0%
	SW	0.0%	0.4%	0.7%	0.0%
Regional Long-Distance Trips	NE	0.0%	0.0%	0.9%	0.0%
	W	0.0%	0.0%	0.4%	0.0%
Total		100%	100%	100%	100%

*Directions omitted have 0% directional share at all times of day and all directions

Table 3-8: 2041 Route Choice Distribution To and From GO Station for Local Transit Transfer Trips

Location	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
North via 29	0.0%	3.0%	3.0%	0.0%
North via 63	0.0%	5.4%	5.4%	0.0%
East via 509	14.3%	2.3%	2.3%	14.3%
East via 511	14.3%	4.1%	4.1%	14.3%
South via 29	0.0%	0.2%	0.2%	0.0%



South via 929	0.0%	0.2%	0.2%	0.0%
East via OL	71.4%	80.4%	80.4%	71.4%
West via 509	0.0%	1.3%	1.3%	0.0%
North via 929	0.0%	3.0%	3.0%	0.0%
TOTAL	100%	100%	100%	100%

**Derived from 2041 Station Transfer Matrix*

Table 3-9 2041 Directional Distribution for Walking Trips to and from GO Station

Location	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
North	27.7%	39.3%	39.3%	27.7%
Liberty Village	36.9%	60.7%	60.7%	36.9%
Exhibition Place	3.1%	0.0%	0.0%	3.1%
South West	22.6%	0.0%	0.0%	22.6%
South East	9.7%	0.0%	0.0%	9.7%



Figure 3-2: Regions for Station Walking Trips

3.3.5 Exhibition Ontario Line Station Trip Generation

Similar to the future GO station ridership, the Ontario Line Exhibition Station (OL Station) trips were estimated based on the ingress and egress trips from the scaled-back 2080 trip transfer matrix derived from the Metrolinx EMM model, which is shown in **Appendix F**. A 1% compound annual growth rate was assumed between 2030 and 2080. Since only the AM peak hour trip transfer matrix was available, an opposite trend was assumed for the PM peak hour

and the trip matrix was transposed. Ingress and egress mode splits for 2030 conditions were based on:

- The trip transfer matrix for all trips transferring from other transit routes; and
- Existing 2016 TTS data for trips boarding and alighting Exhibition GO Station for trips accessing and egressing the station by walking, biking and driving/carpooling.

The 2030 trip generation for the OL station is summarized in **Table 3-10**.

Table 3-10: 2030 OL Station Gross Trip Generation By Access and Egress Mode and by Analysis Period

Trip Type	AM		PM	
	Mode share*	Trips	Mode share*	Trips
Total to OL ingress trips		7,306		2,499
From GO to OL transfer trips	-	5,251	-	362
Total Local transit to OL transfers		733		380
Total walk/bike/PUDO trips to OL access trips	100%	1,322	100%	1,756
Walk to OL	67%	883	70%	1,689
TOC to OL trips		33		33
walk to OL (excludes TOC trips)	-	851	-	1,656
Cycle to OL	26%	349	7%	14
PUDO to OL	7%	89	23%	53
Total OL egress trips		2,499		7,306
From OL to GO transfer trips	-	362	-	5,251
Total OL to Local transit transfers		380		733
Total OL to walk/bike/PUDO egress trips	100%	1,756	100%	1,322
Walk from OL	96%	1,689	70%	883
OL to TOC		26		29
Walk from OL (excludes TOC trips)	-	1,663	-	854
Cycle from OL	1%	14	7%	349
PUDO from OL	3%	53	23%	89

*Mode share represents access and egress mode shares other than transfers from local transit.

The directional distribution for OL station trips were derived in the following manner:

- For PUDO trips to and from the OL station, the directional distribution was based on 2016 TTS data of all trips beginning within a 3km radius of the station and ending in East York or the east side of North York (represented by Planning Districts 5 and 6), since these regions generally follow the proposed OL alignment. Trips starting beyond 3km to the east of the OL station were discounted to minimize backtracking, since it was assumed that these trips would use other stations along OL. The resulting directional distribution is shown in **Table 3-11**.
- For biking trips, a directional distribution similar to that of PUDO trips to the OL station (**Table 3-11**) was assumed. To account for additional development potential to the south of the railway tracks, the south directional share was increased by 15%, and the other directions were decreased proportionally. The final directional distribution is shown in **Table 3-12**.
- For all walking trips transferring from other local transit routes, as well as pure walking trips, the directional distribution was obtained directly from the 2041 Station Transfer Matrices. The directional distributions are summarized in **Table 3-13** and **Table 3-14** for

local transit transfer trips and pure walking trips, respectively. The regions from which these walking trips start, and end are depicted in **Figure 3-2**.

Table 3-11: PUDO OL Trip Distribution

Direction		AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
Local Trips	NW	48.1%	30.0%	29.9%	48.6%
	N	28.7%	33.9%	40.7%	29.8%
	NE	0.0%	0.0%	0.0%	0.0%
	E	23.2%	35.4%	28.8%	19.9%
	SE	0.0%	0.7%	0.0%	0.7%
	S	0.0%	0.0%	0.0%	0.0%
	SW	0.0%	0.0%	0.6%	1.1%
	W	0.0%	0.0%	0.0%	0.0%
Total		100%	100%	100%	100%

Table 3-12: Directional Distribution for Bike-OL Station Trips

Direction		AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
Local Trips	NW	40.9%	25.5%	25.4%	41.3%
	N	24.4%	28.8%	34.6%	25.3%
	NE	0.0%	0.0%	0.0%	0.0%
	E	19.7%	30.1%	24.5%	16.9%
	SE	0.0%	0.6%	0.0%	0.6%
	S	15.0%	15.0%	15.0%	15.0%
	SW	0.0%	0.0%	0.5%	0.9%
	W	0.0%	0.0%	0.0%	0.0%
Total		100%	100%	100%	100%

Table 3-13: 2041 Route Choice Distribution To and From OL Station for Local Transit Transfer Trips

Location	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
North via 29	0.2%	14.9%	14.9%	0.2%
North via 63	1.0%	26.9%	26.9%	1.0%
East via 509	0.0%	0.0%	0.0%	0.0%
East via 511	4.7%	20.9%	20.9%	4.7%
South via 29	0.1%	0.7%	0.7%	0.1%
South via 929	0.1%	0.7%	0.7%	0.1%
West via GO local	53.5%	14.9%	14.9%	53.5%
West via GO express	39.9%	0.0%	0.0%	39.9%
West via 509	0.3%	6.0%	6.0%	0.3%
North via 929	0.2%	14.9%	14.9%	0.2%
TOTAL	100%	100%	100%	100%

**Derived from 2041 Station Transfer Matrix*

Table 3-14 2041 Directional Distribution for Walking Trips To and From GO Station

Location	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
North	13.6%	9.1%	9.1%	13.6%
LV	34.5%	89.7%	89.7%	34.5%
EP	3.6%	1.2%	1.2%	3.6%
SouthW	33.7%	0.0%	0.0%	33.7%
SouthE	14.5%	0.0%	0.0%	14.5%

3.3.6 Local Bus and Streetcar Platform Trips

Aside from transfer trips to and from the OL and GO stations, it was assumed that other local trips would originate from Liberty Village and Exhibition Place. The trip generation and route choice distribution from these three areas were estimated separately as explained below.

3.3.6.1 BUS AND STREETCAR TRIPS TO/FROM LIBERTY VILLAGE

The volume of trips between Liberty Village and the bus and streetcar platforms around the OL station was estimated using the 2041 AM Transit OD matrix from the Metrolinx 2041 Greater Golden Horseshoe model. The following forecasts are estimated after scaling down the model transit-based trips to represent the 2030 AM peak hour:

- AM inbound to Liberty Village: 3,098 transit-based trips; and
- AM outbound from Liberty Village: 1,697 transit-based trips.

It was assumed that the PM inbound and outbound transit trips were the opposite of the AM inbound and outbound transit trips to and from Liberty Village, with 1697 and 3098 inbound and outbound trips, respectively.

The transit route choice was based on a directional distribution that was itself derived from the 2041 GGH AM Transit OD matrix, in conjunction with knowledge of each transit route’s future convenience, such as speed and accessibility. The directional distribution is shown in **Table 3-15**, and the resulting route choice distribution to and from Liberty Village is shown in **Table 3-16**. It was assumed that the directional distribution would remain the same in the 2030 horizon.

Table 3-15: 2041 GGH Transit Trips Directional Distribution

Direction		AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
Local Short-Distance Trips	NW	6.9%	11.1%	11.1%	6.9%
	N	6.0%	8.0%	8.0%	6.0%
	NE	11.8%	20.2%	20.2%	11.8%
	E	11.5%	37.3%	37.3%	11.5%
	SE	0.1%	0.1%	0.1%	0.1%
	SW	0.0%	0.1%	0.1%	0.0%
	W	2.8%	0.8%	0.8%	2.8%
Regional Long-Distance Trips	NW	8.6%	4.5%	4.5%	8.6%
	N	14.8%	5.6%	5.6%	14.8%
	NE	16.9%	4.4%	4.4%	16.9%

Direction	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
E	7.9%	1.9%	1.9%	7.9%
SW	2.1%	0.7%	0.7%	2.1%
W	10.6%	5.3%	5.3%	10.6%
Total	100%	100%	100%	100%

Local S, Regional S and Regional SE were 0%.

Table 3-16: 2041 Transit Route Choice To and From Liberty Village

Direction	AM(IN)	AM(OUT)	PM(IN)	PM(OUT)
North via 29	17%	17%	17%	17%
North via 63	5%	6%	6%	5%
East via 504	11%	24%	24%	11%
East via 509	5%	4%	4%	5%
East via 511	6%	5%	5%	6%
South via 29	5%	1%	1%	5%
East via GO local	2%	1%	1%	2%
East via GO express	6%	2%	2%	6%
West via GO local	5%	2%	2%	5%
West via GO express	8%	4%	4%	8%
West via 504	6%	6%	6%	6%
East via OL	21%	26%	26%	21%
West via 509	1%	0%	0%	1%
North via 929	1%	1%	1%	1%
Total	100%	100%	100%	100%

Since passengers from Liberty Village can access each route from more than one stop, it was necessary to assume a proportion of transit trips opting to use the OL station’s bus and streetcar platforms, as opposed to other stops elsewhere around Liberty Village. These percentage shares of passengers choosing to use the bus and streetcar platforms, in conjunction with the total transit trips from Liberty Village, were used to derive the final number of peak hour trips between Liberty Village and the bus and streetcar platforms, and are shown in Table 3-17.

Table 3-17: 2030 Future Total Transit Trips by Platform to/from Liberty Village

Route Gateway*	Percentage of trips using station bus and streetcar platforms for each route	Inbound Platform	Outbound Platform	AM(IN)	AM(OUT)	PM(IN)	PM(OUT)
North via 29	50%	Eastbound bus bays	Westbound bus bays	263	143	143	263
North via 63	50%	Westbound bus bays	Eastbound bus bays	78	55	55	78
East via 504	0%	Elsewhere	Elsewhere	0	0	0	0
East via 509	100%	Westbound LRT platform	Eastbound LRT platform	161	68	68	161
East via 511	100%	Eastbound LRT platform	Eastbound LRT platform	194	77	77	194
South via 29/929	50%	Westbound bus bays	Eastbound bus bays	76	10	10	76

Route Gateway*	Percentage of trips using station bus and streetcar platforms for each route	Inbound Platform	Outbound Platform	AM(IN)	AM(OUT)	PM(IN)	PM(OUT)
East via GO local	100%	Within Station		53	15	15	53
East via GO express	100%			184	38	38	184
West via GO local	100%			145	35	35	145
West via GO express	100%			257	71	71	257
East via OL	100%			663	449	449	663
West via 504	0%	Elsewhere	Elsewhere	0	0	0	0
West via 509	100%	Eastbound LRT platform	Westbound LRT platform	39	7	7	39
North via 929	50%	Eastbound bus bays	Westbound bus bays	23	5	5	23

*For the northbound and southbound travel directions, the inbound directions are represented by south and north, respectively. For eastbound and westbound travel directions, the inbound directions are represented by west and east, respectively.

3.3.6.2 BUS/STREETCAR TRIPS TO/FROM EXHIBITION PLACE

The volume of trips between Exhibition Place (EP) and the bus and streetcar platforms around the OL station was also estimated using the 2041 AM Transit OD matrix from the Metrolinx 2041 Greater Golden Horseshoe model for the AM and PM peak hours. The following transit-based trips are forecasted after scaling to represent 2030 conditions, and include only the transit trips that opt for the westbound bus bays, eastbound bus bays, and Exhibition LRT stop:

- AM inbound to Exhibition Place: 102 transit-based trips.
- AM outbound from Exhibition Place: 6 transit-based trips.

It was assumed that the PM inbound and outbound transit trips were the opposite of the AM inbound and outbound transit trips to and from Exhibition Place, with 6 and 102 inbound and outbound trips, respectively.

The final combined 2030 future background traffic volumes can be found in **Appendix C**.

Table 3-18: 2030 Future Total Transit Trips by Route to/from Exhibition Place

Route*	Inbound Platform	Outbound Platform	AM(IN)	AM(OUT)	PM(IN)	PM(OUT)
North via 29/929	Eastbound bus bay	Westbound bus bay	32	3	3	32
North via 63	Westbound bus bay	Eastbound bus bay	9	1	1	9
East via 504	Elsewhere	Elsewhere	0	0	0	0
East via 509	Westbound LRT platform	Eastbound LRT platform	20	1	1	20
East via 511	Eastbound LRT platform	N/A	24	1	1	24
South via 29	Westbound bus bay	Eastbound bus bay	9	0	0	9
West via 509	Eastbound LRT platform	Westbound LRT Platform	5	0	0	5

**For the northbound and southbound travel directions, the inbound directions are represented by south and north, respectively. For eastbound and westbound travel directions, the inbound directions are represented by west and east, respectively.*

3.4 Background Traffic Operations

Table 3-19 summarizes the LOS, v/c ratio, and 95th percentile queue for movements under future background conditions based on the forecast traffic volumes shown in **Appendix C**. Signal timing splits were optimized whilst maintaining the cycle length and phasing structure. Detailed Synchro results and reports for the study area intersection are provided in **Appendix D**.

Under 2030 background traffic conditions, the addition of background traffic from general background traffic growth, GO Station growth, and new trips associated with Ontario Line has resulted in at-capacity conditions throughout the study area. These locations include new critical movements at all study intersections along King Street with the exception of King/Joe Shuster, at the intersection of Dufferin/Liberty Street, Lake Shore/Strachan, and King/Strachan. Although the Ontario Line Exhibition Station does not generate a significant number of vehicle trips, the station is expected to add a substantial number of conflicting pedestrians and bicycle volumes, with the majority of these volumes being directed to capacity-constrained locations along King Street.

The westbound approach to Dufferin/Liberty improves due to the newly available routing option for outbound traffic travelling to the southwest which is provided by Liberty New Street.

Further improvements were assessed at the intersections of Strachan/Fleet and Dufferin/Liberty New Street during the PM peak hour to identify mitigation opportunities, as summarized in **Table 3-20**. The improvements applied included:

- **Strachan/Fleet:** Add northbound left turn advanced phase and increase cycle length by 10 seconds.
- **Dufferin/Liberty New Street:** Increase cycle length to 80 seconds.

With the additional improvements, the intersection of Dufferin/Liberty New will operate without critical movements, and the overall intersection of Strachan/Fleet will operate within capacity. Despite the improvements at Strachan/Fleet, high delays are still expected on the eastbound left, westbound left/through, northbound left, and southbound through/right movements, with the southbound through/right operating at capacity. Mitigation measures to alleviate the remaining overcapacity movements are limited due to right-of-way constraints. Additionally, further road widening at locations such as Lakeshore/Strachan, and Strachan/Fleet may have a detrimental impact on experience for pedestrians and cyclists.

Table 3-19: 2030 Background Conditions – Summary of Traffic Analysis Results

Intersection	Movement	Storage length	AM Peak Hour			PM Peak Hour		
			LOS	v/c Ratio	95th %ile Q (m)	LOS	v/c Ratio	95th %ile Q (m)
King/Dufferin (Signalized)	Overall	-	F	1.28	-	D	0.95	-
	EBLTR	267	F	1.36	137.4	D	0.90	85.1
	WBLTR	292	E	1.09	87.6	D	0.93	124.4
	NBLTR	188	B	0.64	18.5	C	0.81	73.3
	SBLTR	361	F	1.29	117.2	E	1.00	81.6
King/Joe Shuster Way (Signalized)	Overall	-	B	0.74	-	A	0.55	-
	EBLT	292	B	0.79	34.1	A	0.36	32.3
	WBTR	167	B	0.67	49.9	A	0.58	62.3
	SBLR	76	C	0.58	46.3	C	0.42	29.1
King/Atlantic (Signalized)	Overall	-	D	0.94	-	B	0.70	-
	EBTR	167	D	0.96	88.5	B	0.65	47.0
	WBLT	294	D	0.97	91.1	B	0.54	47.0
	NBL	30	D	0.83	76.6	C	0.64	50.6
	NBR	174	C	0.59	39.3	C	0.74	55.3
King/Sudbury (Signalized)	Overall	-	C	0.88	-	B	0.54	-
	EBLTR	294	C	0.88	98.0	A	0.44	43.7
	WBLTR	175	C	0.84	83.3	B	0.57	59.0
	NBLTR	134	C	0.01	3.2	0	0	0
	SBLTR	172	D	0.86	77.7	C	0.48	33.7
King/Shaw (Signalized)	Overall	-	C	0.75	-	B	0.74	-
	EBLTR	175	C	0.88	79.1	B	0.47	32.7
	WBLTR	231	B	0.76	54.7	B	0.80	78.1
	NBLTR	103	C	0.48	29.5	C	0.60	34.0
	SBLTR	356	C	0.53	24.2	C	0.65	33.7
Dufferin/Liberty (Signalized)	Overall	-	D	0.97	-	C	0.77	-
	EBLTR	82.6	C	0.01	0.5	B	0.02	3.7
	WBLTR	82.9	D	0.75	59.7	C	0.86	104.6
	NBLTR	225	D	1.19	112.4	B	0.66	73.2
	SBLTR	188	E	1.06	48.0	B	0.60	51.0
Dufferin/Saskatchewan (Signalized)	Overall	-	A	0.55	-	B	0.71	-
	WBL	30	D	0.17	5.9	C	0.22	16.0
	WBR	124	C	0.07	5.6	C	0.40	23.4
	NBT	241	A	0.43	86.8	B	0.78	184.8
	NBR	15	A	0.03	6.3	A	0.03	4.9
	SBL	30	A	0.34	11.0	A	0.32	10.2
Dufferin/Liberty New (Signalized)	Overall	-	B	0.59	-	C	0.87	-
	WBL	15	C	0.60	43.9	B	0.51	24.6
	WBR	83	C	0.06	9.0	B	0.27	12.1
	NBTR	167	B	0.46	121.2	C	0.97	176.6
	SBL	50	A	0.05	0.9	A	0.09	3.0
	SBT	50	A	0.58	56.6	B	0.77	132.6
King/Strachan (Signalized)	Overall	-	D	1.06	-	C	0.81	-
	EBLTR	231	D	0.95	94.8	B	0.50	45.3
	WBLTR	334	E	1.05	93.3	B	0.81	59.5
	NBL	25	D	0.64	37.8	D	0.80	75.4
	NBTR	400	F	1.10	136.6	C	0.77	109.0
	SBL	25	D	0.41	9.1	C	0.16	8.0

Intersection	Movement	Storage length	AM Peak Hour			PM Peak Hour		
			LOS	v/c Ratio	95th %ile Q (m)	LOS	v/c Ratio	95th %ile Q (m)
Strachan/Fleet (Signalized)	SBTR	355	C	0.50	54.4	C	0.38	56.6
	Overall	-	C	0.65	-	F	1.62	-
	EBL	25	D	0.45	41.2	D	0.66	67.5
	EBTR	119	D	0.30	47.6	D	0.18	22.1
	WBLT	205	D	0.64	74.4	D	0.66	73.1
	WBR	50	C	0.08	2.9	C	0.06	0.0
	NBL	30	C	0.31	30.3	F	2.36	84.5
	NBTR	181	C	0.72	166.2	C	0.76	182.0
	SBL	25	C	0.29	21.2	D	0.53	38.9
Lake Shore/Strachan (Signalized)	SBTR	217	C	0.53	112.9	E	1.04	316.4
	Overall	-	F	1.16	-	F	1.39	-
	EBL	60	F	1.31	267.9	F	1.55	298.7
	EBTR	286	F	1.26	557.7	C	0.71	178.4
	WBL	60	D	0.16	7.4	C	0.13	5.5
	WBT	172	D	0.84	160.6	F	1.16	361.5
	NBLTR	92	E	0.28	23.4	E	0.18	10.5
	SBL	140	E	0.72	66.1	F	0.94	141.4
	SBLT	181	E	0.74	70.2	E	0.90	140.1
Lake Shore/British Columbia (Signalized)	SBR	50	C	0.18	13.9	C	0.49	66.7
	Overall	-	C	0.77	-	F	1.10	-
	EBL	15	B	0.04	3.0	D	0.03	7.2
	EBT	387	D	0.83	139.0	F	1.16	260.1
	WBR	80	D	0.18	0.0	E	0.72	54.4
British Columbia/Yukon (Signalized)	NBTR	776	C	0.83	111.7	F	1.15	409.5
	Overall	-	A	0.31	-	A	0.31	-
	EBL	30	A	0.00	0.3	A	0.00	0.3
	EBTR	140	A	0.32	26.4	A	0.32	26.4
	WBL	20	A	0.00	0.3	A	0.00	0.3
	WBT	241	A	0.24	18.3	A	0.24	18.3
	WBR	20	A	0.00	0.0	A	0.00	0.0
	NBLTR	68	C	0.09	4.5	C	0.09	4.5
Atlantic/Liberty New (Signalized)	SBLTR	97	C	0.02	0.0	C	0.02	0.0
	Overall	-	C	0.44	-	B	0.39	-
	EBLT	63	A	0.09	8.9	A	0.22	20.8
	WBTR	174	A	0.17	17.6	A	0.07	7.6
	SBLR	30	D	0.83	37.8	C	0.67	27.5

Note: LOS = level of service; v/c = volume to capacity ratio; Critical movements are highlighted in red as defined by the City's TIS Guidelines.



Table 3-20: Future Background with Improvements (PM Only)

Intersection	Movement	Storage length	PM Peak Hour		
			LOS	v/c Ratio	95th %ile Q (m)
Dufferin/Liberty New (Signalized)	Overall	-	B	0.81	-
	WBL	15	D	0.61	47.3
	WBR	83	C	0.06	9.7
	NBTR	167	B	0.85	249.9
	SBL	50	A	0.08	2.8
	SBT	50	A	0.64	116.4
Strachan/Fleet (Signalized)	Overall	-	F	0.98	-
	EBL	25	E	0.76	77.1
	EBTR	119	D	0.19	23.7
	WBLT	205	E	0.77	86.9
	WBR	50	D	0.06	0.0
	NBL	30	E	0.86	62.7
	NBTR	181	C	0.70	178.5
	SBL	25	D	0.44	38.3
SBTR	217	F	1.21	366.8	

Note: LOS = level of service; v/c = volume to capacity ratio; Critical movements are highlighted in red as defined by the City's TIS Guidelines.

4 Proposed TOC Development

4.1 Conceptual Site Plan

The proposed development is comprised of three separate sites, as shown in **Figure 1-1**. The site statistics for both sites are reported in **Table 4-1**. The conceptual site plan as of September 2021 for Site A and Site B are shown in **Figure 4-1** to **Figure 4-2**.

Table 4-1: Site Plan Statistics (May 17, 2021)

Site	Residential Units	Retail GFA	Office GFA	Transit GFA
Site A	265	1,078 m ² (11,603 ft ²)	13,166 m ² (141,717 ft ²)	340 m ² (3,659 ft ²)
Site B	303	4,226 m ² (45,488 ft ²)	10,427 m ² (112,235 ft ²)	428 m ² (4,606 ft ²)
Total	568	5,304 m ² (57,091 ft ²)	23,593 m ² (253,952 ft ²)	768 m ² (8,266 ft ²)

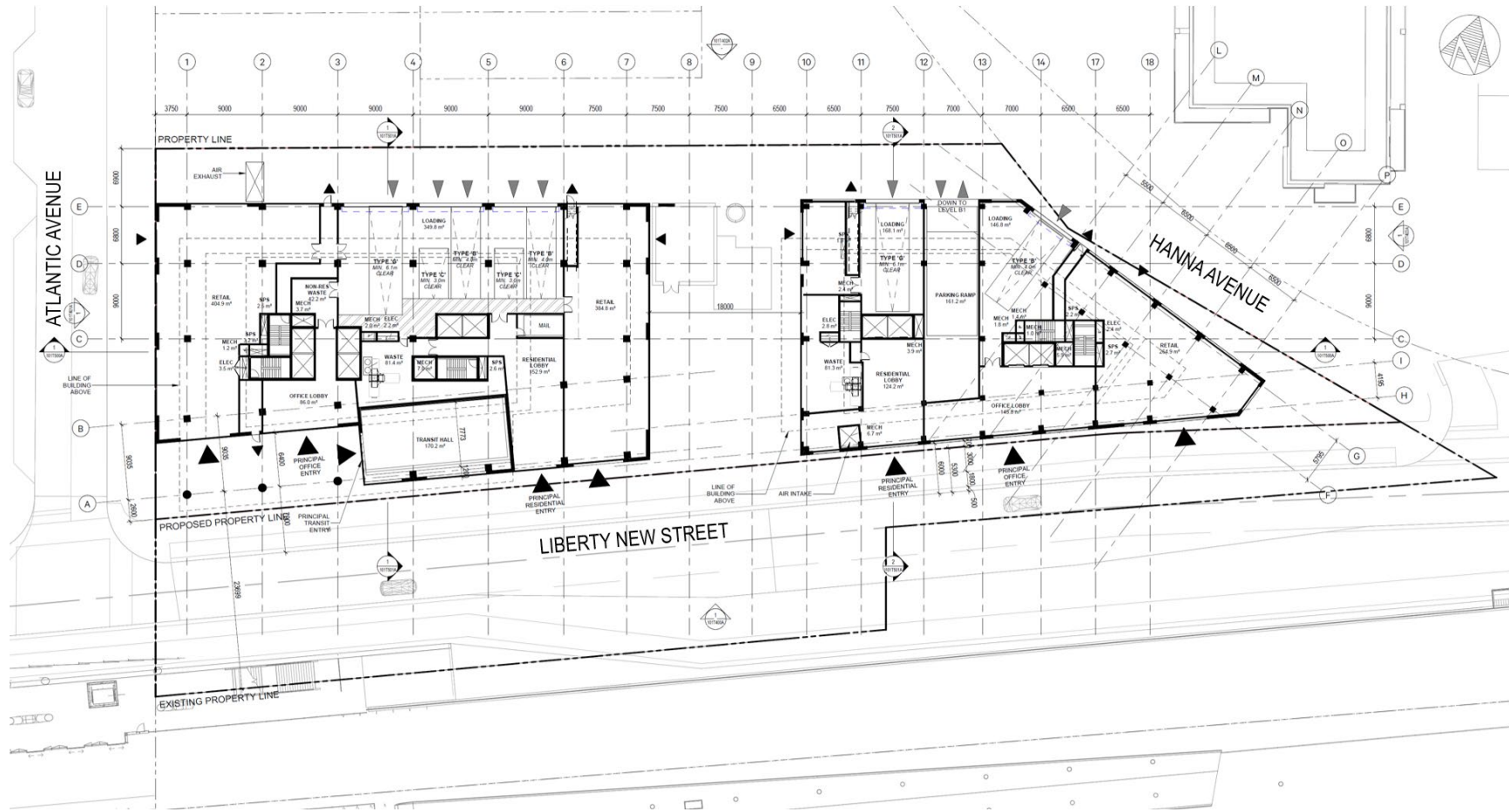


Figure 4-1: Site A (1-1A Atlantic Avenue) Site Plan

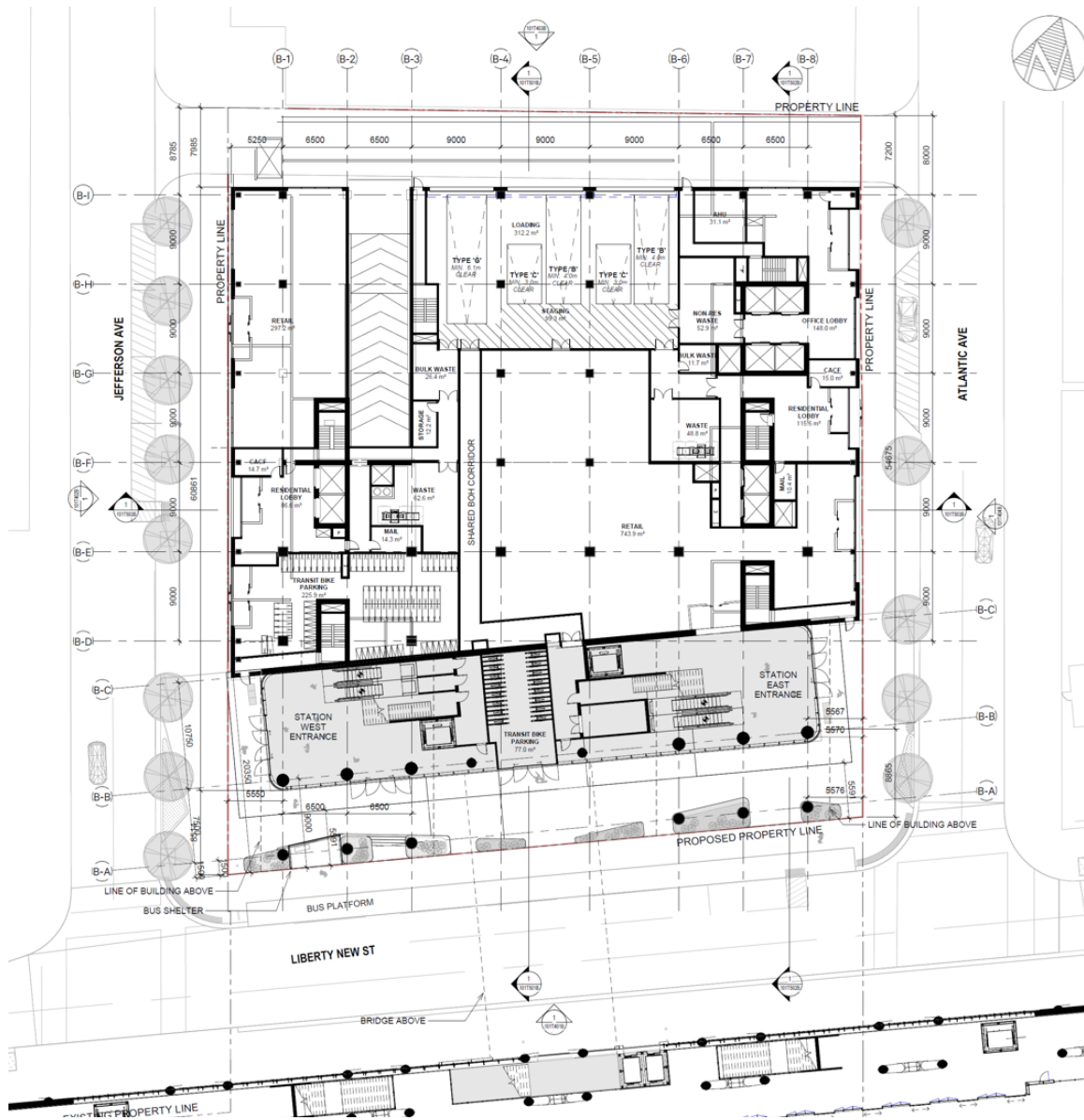


Figure 4-2: Site B (2-20 Atlantic Avenue, 1 Jefferson Avenue) Site Plan

4.2 Total Traffic Volumes

The 2030 future total traffic volumes are comprised of 2030 future background traffic volumes and TOC site trips.

4.2.1 TOC Site Trip Generation

4.2.1.1 MODE SPLITS

The 2016 TTS was used to inform the mode split assumptions for the development using existing information for nearby uses. The mode split for the area was obtained through review of TTS (2006) Zones 85, and 88-90, which are the zones surrounding the subject site. A proposed mode split was applied to each land use to account for improved transit service and modal shifts in the future. The TTS data and the proposed mode splits are summarized in **Table 4-2**.

Table 4-2: Existing and Proposed Mode Splits (2016 Transportation Tomorrow Survey)

Mode	Existing (TTS)				Proposed			
	AM (In)	AM (Out)	PM (In)	PM (Out)	AM (In)	AM (Out)	PM (In)	PM (Out)
Transit	36%	34%	31%	33%	40%	40%	40%	40%
Cycle	5%	8%	8%	6%	5%	8%	8%	6%
Auto driver	41%	30%	30%	40%	37%	24%	21%	33%
Auto Passenger	4%	3%	5%	5%	4%	3%	5%	5%
Taxi/Ride Hail	1%	3%	3%	3%	1%	3%	3%	3%
Walk	13%	22%	24%	14%	13%	22%	24%	14%
Total	100%	100%	100%	100%	100%	100%	100%	100%

4.2.1.2 PERSON-TRIP GENERATION

Trips were generated for the proposed development using the information provided in the Institute of Transportation Engineers (ITE) Trip Generation Informational Report (10th edition). Trip generation rates for Land Use 222 (Multifamily Housing – High-Rise), Land Use 820 (Shopping Centre), and Land Use 710 (General Office Building) were used.

The land use assumes dense multi-use conditions for Land Use 222, and general urban/suburban conditions were used for the other land uses as a dense multi-use category was not available.

Table 4-3 shows the ITE trip generation rates used for each site’s land use, and it includes estimated person trips per vehicle trip. The purpose of generating person trips rather than vehicle trips was to be able to assign pedestrian, cycling and transit trips to the study network. **Table 4-4** shows the resulting trip generation by mode for all four sites.



Table 4-3: ITE Trip Generation Rates and Total Person Trip Generation

Total	Land Use	Multifamily Housing (High Rise)	Shopping Centre	General Office Building	Total
	LUC#	222	820	710	-
	Total Size Proposed	830	79,415 ft ²	451,233 ft ²	-
	Setting/Location	Dense Multi-Use Urban	General Urban/Suburban	Dense Multi-Use Urban	-
AM	Average Rate	0.21	0.94	0.83	-
	Equation	$\ln(T) = 0.84 \ln(X) - 0.65$	$T = 0.50(X) + 151.78$	$T = 0.72(X) + 21.64$	-
	Entering%	12%	62%	86%	-
	Exiting%	88%	38%	14%	-
	Person Trips per Vehicle	2.81	NA	1.47	-
	Total Person Trips (gross)*	302	54	301	656
	Total Person Trips (multi-use interaction)*	257	46	256	558
	Total Inbound Person Trips	31	28	220	279
	Total Outbound Person Trips	226	17	36	279
PM	Average Rate	0.19	3.81	0.87	-
	Equation	$\ln(T) = 0.81 \ln(X) - 0.60$	$\ln(T) = 0.74 \ln(X) + 2.89$	$T = 0.83(X) + 7.99$	-
	Entering%	70%	48%	17%	-
	Exiting%	30%	52%	83%	-
	Person Trips per Vehicle	2.17	1.43	1.46	-
	Total Person Trips (gross)*	203	218	319	740
	Total Person Trips (multi-use interaction)*	173	186	273	632
	Total Inbound Person Trips	121	89	46	257
	Total Outbound Person Trips	52	97	227	375

Note: The trip generation equation was used for residential and office land use, for retail land use, the total person trips were calculated using the average vehicular trip generation rate. For retail AM, it assumed there would be 1 person per vehicle. *Assumed 15% reduction in trip generation to account for internal trips between land uses.

*Gross trip generation for all TOC sites is the summation of trip generation of each site calculated using the equation or average rate.



Table 4-4: Trip Generation by Mode

Peak Hour	Direction	Mode	Mode Shares	Total Person Trips
AM	Inbound	Total	100%	279
		Transit	40%	111
		Cycle	5%	15
		Auto driver	37%	103
		Auto passenger	4%	10
		Taxi	1%	4
		Walk	13%	36
	Outbound	Total	100%	279
		Transit	40%	112
		Cycle	8%	22
		Auto driver	24%	67
		Auto passenger	3%	10
		Taxi	3%	7
		Walk	22%	61
PM	Inbound	Total	100%	257
		Transit	40%	102
		Cycle	8%	20
		Auto driver	21%	54
		Auto passenger	5%	12
		Taxi	3%	8
		Walk	24%	61
	Outbound	Total	100%	375
		Transit	40%	152
		Cycle	6%	22
		Auto driver	33%	123
		Auto passenger	5%	18
		Taxi	3%	10
		Walk	14%	51

Table 4-5: Assumed Trip Distribution for Auto Mode

Location	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
North via Dufferin	11%	7%	7%	11%
North via Shaw	12%	13%	14%	15%
North via Strachan	6%	5%	6%	6%
East via King	4%	8%	8%	7%
East via Wellington	4%	10%	7%	4%
East via Lakeshore	25%	27%	25%	22%
West via Lakeshore	31%	26%	29%	26%
West via Springhurst	2%	1%	2%	3%
West via King	3%	1%	1%	3%
North via Sudbury	1%	1%	1%	2%
TOTAL	100%	100%	100%	100%

Table 4-6: Assumed Trip Distribution for Transit Mode

Location	AM(IN)	AM(OUT)	PM(IN)	PM(OUT)
North via 29	20%	9%	12%	18%
North via 63	5%	5%	6%	4%
East via 504	10%	32%	28%	11%
East via 509	6%	5%	5%	5%
East via 511	6%	5%	5%	6%
East via GO	12%	4%	5%	10%
West via GO	13%	2%	5%	15%
West via 504	7%	1%	3%	6%
East via Ontario Line	22%	36%	33%	23%
TOTAL	100%	100%	100%	100%

Table 4-7: Assumed Trip Distribution for Walk-only Mode

Location	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
North via Dufferin West	3%	0%	1%	2%
North via Dufferin East	3%	0%	1%	2%
North via Joe Shuster West	2%	0%	1%	1%
North via Joe Shuster East	2%	0%	1%	1%
North via Shaw West	2%	0%	1%	1%
North via Shaw East	2%	0%	1%	1%
North via Strachan West	8%	8%	7%	6%
North via Strachan East	8%	8%	7%	6%
East via King North	14%	21%	20%	15%
East via King South	14%	21%	20%	15%
East via Wellington North	4%	7%	7%	5%
East via Wellington South	4%	7%	7%	5%
East via Fleet North	6%	10%	10%	9%
East via Fleet South	6%	10%	10%	9%
South via Martin Goodman West side	4%	7%	7%	6%
West via Lakeshore EB South	1%	0%	0%	1%
West via Springhurst South	1%	0%	0%	1%
West via Springhurst North	1%	0%	0%	1%
West via King South	5%	1%	1%	4%
West via King North	5%	1%	1%	4%
South of Liberty between Jefferson & Atlantic	3%	0%	1%	2%
Southeast of King/Atlantic	2%	0%	1%	1%
TOTAL	100%	100%	100%	100%

Table 4-8: Assumed Trip Distribution for Bicycle Mode

Location	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
North via Dufferin	29%	2%	2%	28%
North via Joe Shuster	0%	0%	0%	0%
North via Shaw	26%	13%	20%	26%
North via Strachan	7%	0%	1%	6%



Location	AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
East via King	7%	18%	18%	8%
East via Wellington	10%	27%	27%	12%
South via Martin Goodman	12%	34%	27%	12%
West via Lakeshore	0%	5%	5%	0%
West via King	10%	0%	2%	8%
TOTAL	100%	100%	100%	100%

Trips between the TOC and the combined GO and Ontario Line Exhibition Station were estimated by applying the resulting transit gateway percentages for Ontario and GO Lines, which is listed in **Table 4-10**.

Table 4-9: Trips Between OL and GO Exhibition Station and TOC Site

Time and Direction	All modes	Transit mode%	Transit trips	Choosing OL	TOC-OL Trips	Choosing GO	TOC-GO Trips
AM(IN)	274	40%	109	21%	23	24%	26
AM(OUT)	279	40%	112	26%	29	12%	14
PM(IN)	243	40%	97	26%	25	12%	12
PM(OUT)	347	40%	140	21%	30	24%	34

The total traffic volumes are shown in **Appendix C**, comprised of future background traffic and TOC site trips. Due to limited data, a conservative approach was taken in the analysis and site traffic associated with land uses within the footprint of the proposed TOC's and OL station facilities was not subtracted before adding in the new site traffic.

5 Total Traffic Conditions

5.1 Future Total Traffic Operations

5.1.1 Pedestrian Operations

The future pedestrian density level of service operations for the 2041 horizon year were analyzed in the Ontario Line Exhibition Station Site Plan Review Transportation Impact Assessment (Ontario Line Technical Advisor, May 2021) report and found that there are no critical conditions on the sidewalks, bus bays, and intersection crosswalks during the AM and PM peak hours. Deficiencies were found on the north intersection corners at the future intersection of Liberty New Street and Atlantic Avenue; however, adjacent plaza space may be used to spread intersection queues. Detailed analysis and discussion can be found in the Ontario Line Exhibition Station Site Plan Review Transportation Impact Assessment (Ontario Line Technical Advisor, May 2021) report.

5.1.2 Automobile Operations

Total traffic operations were assessed based on the future total traffic volumes shown in **Appendix C. Table 5-1** summarizes the future total traffic operations. Signal timing split optimization was performed to ensure realistic operations. There was no activation or deactivation of left turns, and no further geometric improvements outside of those described in **Section 3.1** and **Section 3.4**. Detailed results and reports for all study area intersections are provided in **Appendix D**.

Under future total conditions, site traffic associated with the TOC generally results in marginal increases in v/c ratios and delay. Movements that experience capacity issues under future total conditions were critical or experienced capacity issues under future background conditions. However, the Site B driveway onto Jefferson Avenue is expected to operate with high delays, primarily due to the high conflicting pedestrian volumes walking to the station headhouse. However, the driveways are expected to be well within capacity. Other movements that emerge as critical or at capacity include:

- King/Dufferin will experience exacerbated conditions during the PM peak hour, with both the eastbound and westbound approaches reaching capacity.
- Dufferin/Liberty will experience exacerbated conditions during the AM peak hour, increasing the overall intersection delay from an LOS of “D” to an LOS of “E”, with the overall intersection reaching a volume to capacity ratio of 0.99.
- King/Strachan will experience exacerbated conditions during the AM peak hour, increasing the overall intersection delay from an LOS of “D” to an LOS of “E”, with the eastbound approach reaching capacity.

All other critical movements highlighted in the results summary table were carried forward from the existing or future background conditions.



Table 5-1: 2030 Future Total Conditions – Summary of Synchro Results

Intersection	Movement	AM Peak Hour			PM Peak Hour		
		LOS	v/c Ratio	95th %ile Q (m)	LOS	v/c Ratio	95th %ile Q (m)
King/Dufferin (Signalized)	Overall	F	1.31	-	D	0.97	-
	EBLTR	F	1.38	139.3	D	1.04	92.2
	WBLTR	F	1.12	89.5	D	1.00	133.0
	NBLTR	B	0.68	19.4	C	0.79	73.1
	SBLTR	F	1.33	121.5	E	0.97	81.3
King/Joe Shuster Way (Signalized)	Overall	B	0.75	-	A	0.56	-
	EBLT	B	0.80	34.1	A	0.36	32.7
	WBTR	B	0.68	50.9	A	0.59	63.8
	SBLR	C	0.58	46.3	C	0.42	29.1
King/Atlantic (Signalized)	Overall	D	0.94	-	B	0.70	-
	EBTR	D	0.98	90.6	B	0.65	47.0
	WBLT	D	0.97	91.1	B	0.54	47.0
	NBL	D	0.84	78.3	C	0.66	52.0
	NBR	C	0.59	39.5	C	0.75	57.1
King/Sudbury (Signalized)	Overall	C	0.88	-	B	0.55	-
	EBLTR	C	0.90	99.8	A	0.44	44.1
	WBLTR	C	0.86	94.7	B	0.58	60.3
	NBLTR	C	0.01	3.1	A	0.00	0.0
	SBLTR	D	0.85	76.9	C	0.49	34.0
King/Shaw (Signalized)	Overall	C	0.78	-	B	0.78	-
	EBLTR	C	0.88	79.6	B	0.47	33.0
	WBLTR	B	0.78	57.2	B	0.82	82.3
	NBLTR	C	0.48	29.5	C	0.60	34.2
	SBLTR	C	0.59	26.9	C	0.69	35.7
Dufferin/Liberty (Signalized)	Overall	E	0.99	-	C	0.78	-
	EBLTR	C	0.01	0.5	B	0.02	3.8
	WBLTR	D	0.76	59.7	D	0.88	107.1
	NBLTR	D	1.18	115.0	B	0.68	74.6
	SBLTR	E	1.08	47.5	B	0.60	51.2
Dufferin/ Saskatchewan (Signalized)	Overall	A	0.56	-	B	0.77	-
	WBL	D	0.17	5.9	C	0.22	16.0
	WBR	C	0.07	5.7	C	0.59	34.5
	NBT	A	0.46	90.6	C	0.81	188.3
	NBR	A	0.03	6.2	A	0.03	4.9
	SBL	A	0.35	11.5	A	0.33	10.2
Dufferin/Liberty New (Signalized)	Overall	B	0.60	-	B	0.84	-
	WBL	C	0.62	46.8	D	0.66	54.2
	WBR	C	0.09	10.6	C	0.10	12.2
	NBTR	B	0.49	125.8	B	0.87	254.4
	SBL	A	0.11	1.9	A	0.20	6.0
	SBT	A	0.59	54.0	A	0.65	116.4
King/Strachan (Signalized)	Overall	E	1.09	-	C	0.86	-
	EBLTR	D	1.00	101.0	B	0.55	49.3
	WBLTR	E	1.06	93.8	B	0.86	71.0
	NBL	D	0.78	48.6	D	0.85	84.2
	NBTR	F	1.14	142.5	C	0.76	106.4
	SBL	D	0.41	9.4	C	0.15	7.6
	SBTR	C	0.53	57.5	C	0.37	57.3



Intersection	Movement	AM Peak Hour			PM Peak Hour		
		LOS	v/c Ratio	95th %ile Q (m)	LOS	v/c Ratio	95th %ile Q (m)
Strachan/Fleet (Signalized)	Overall	C	0.67	-	F	1.00	-
	EBL	D	0.46	41.4	E	0.77	#78.0
	EBTR	D	0.30	47.6	D	0.19	23.7
	WBLT	D	0.64	74.4	E	0.77	86.9
	WBR	C	0.09	3.1	D	0.06	0.0
	NBL	C	0.32	30.8	E	0.86	62.7
	NBTR	C	0.75	176.3	C	0.71	184.5
	SBL	C	0.31	22.0	D	0.46	39.6
	SBTR	C	0.55	118.4	F	1.24	379.1
Lake Shore/ Strachan (Signalized)	Overall	F	1.17	-	F	1.40	-
	EBL	F	1.32	272.2	F	1.57	298.7
	EBTR	F	1.27	566.5	C	0.71	178.4
	WBL	D	0.16	7.5	C	0.13	5.5
	WBT	D	0.84	163.6	F	1.18	361.5
	NBLTR	E	0.30	24.0	E	0.24	12.5
	SBL	E	0.72	67.8	F	0.94	149.2
	SBLT	E	0.76	73.8	E	0.91	146.7
	SBR	C	0.18	13.9	C	0.49	66.7
Lake Shore/British Columbia (Signalized)	Overall	C	0.79	-	F	1.11	-
	EBL	B	0.04	2.9	D	0.03	7.1
	EBT	D	0.83	145.1	F	1.15	262.6
	WBR	D	0.18	0.0	E	0.73	56.7
	NBTR	C	0.86	113.8	F	1.17	413.3
British Columbia/ Yukon (Signalized)	Overall	A	0.31	-	A	0.31	-
	EBL	A	0.00	0.3	A	0.00	0.3
	EBTR	A	0.32	26.4	A	0.32	26.4
	WBL	A	0.00	0.3	A	0.00	0.3
	WBT	A	0.24	18.3	A	0.24	18.3
	WBR	A	0.00	0.0	A	0.00	0.0
	NBLTR	C	0.09	4.5	C	0.09	4.5
	SBLTR	C	0.02	0.0	C	0.02	0.0
Atlantic/Liberty New (Signalized)	Overall	B	0.51	-	B	0.45	-
	EBLT	A	0.19	12.5	A	0.27	24.2
	WBTR	A	0.24	19.2	A	0.12	9.4
	SBLR	C	0.79	44.1	B	0.68	32.0
Jefferson/Liberty New (Unsignalized)	Overall	B	-	-	A	-	-
	EBLT	B	0.38	0	A	0.44	8.1
	WBTR	A	0.31	0	A	0.21	0.0
	SBLR	A	0.06	0	A	0.29	86.9
Atlantic/Site A Driveway (Unsignalized)	Overall	C	-	-	B	-	-
	WBLR	C	0.06	1.4	B	0.07	1.8
	NBTR	A	0.05	0.0	A	0.03	0.0
	SBLT	A	0.01	0.2	A	0.00	0.1
Hanna/Liberty New (Unsignalized)	Overall	F	-	-	F	-	-
	EBLT	B	0.22	6.2	A	0.21	6.0
	WBTR	A	0.15	0.0	A	0.06	0.0
	SBLR	F	0.18	4.7	F	0.53	16.8
Jefferson/Site B Driveway (Unsignalized)	Overall	F	-	-	F	-	-
	WBLR	F	0.35	9.4	F	0.61	19.1
	NBTR	A	0.10	0.0	A	0.12	0.0
	SBLT	A	0.00	0.0	A	0.00	0.0



Intersection	Movement	AM Peak Hour			PM Peak Hour		
		LOS	v/c Ratio	95th %ile Q (m)	LOS	v/c Ratio	95th %ile Q (m)
Atlantic/Site B Driveway (Unsignalized)	Overall	C	-	-	C	-	-
	EBLR	D	0.23	6.6	D	0.30	9.2
	NBLT	A	0.03	0.7	A	0.02	0.5
	SBTR	A	0.12	0.0	A	0.11	0.0

Note: LOS = level of service; v/c = volume to capacity ratio; Critical movements are highlighted in red.



6 Parking and Loading Assessment

This section of the report reviews the proposed parking supply and the requirements of the new City-wide Zoning By-law 569-2013, as amended (Office Consolidation) Version Date: May 1, 2020. The by-law includes specific requirements for parking (bicycle and vehicle) as well as loading.

6.1 Policy Area Designations and Parking Requirements

The current city-wide Zoning By-law 569-2013 is typically applied to new developments throughout the City. The By-law includes multiple sets of vehicle parking rates with diminishing requirements for certain areas that have better transit accessibility. The Exhibition TOC area does not fall under any Policy Area designation and would typically use the general “in all other areas of the City” requirements in the regulations; however, due to the excellent transit available along King Street and the future Ontario Line subway which will be located directly adjacent to the sites, it is assumed that in the future this area will be designated as Policy Area 1. The policy areas in the City of Toronto are illustrated in **Figure 6-1**.

For comparison, the Policy Area 1 rates and Policy Area 3 rates are summarized below. Policy Area 3 rates are generally applied adjacent to subway lines beyond Downtown Toronto; however, the proposed Exhibition site will have better accessibility to the Downtown core than areas typically classified as Policy Area 3.

Table 6-1: Policy Area 1 and Policy Area 3 Minimum Parking Requirements

Use	Policy Area 1	Policy Area 3
Dwelling Unit in an Apartment Building (Resident Requirement)	<ul style="list-style-type: none"> 0.3 for each bachelor dwelling unit up to 45 square metres and 1.0 for each bachelor dwelling unit greater than 45 square metres; 0.5 for each one-bedroom dwelling unit; 0.8 for each two-bedroom dwelling unit; and 1.0 for each three or more bedroom dwelling unit 	<ul style="list-style-type: none"> 0.6 for each bachelor dwelling unit up to 45 square metres and 1.0 for each bachelor dwelling unit greater than 45 square metres; 0.7 for each one-bedroom dwelling unit; 0.9 for each two-bedroom dwelling unit; and 1.0 for each three or more bedroom dwelling unit
Dwelling Unit in an Apartment Building (Visitor Requirement)	<ul style="list-style-type: none"> a minimum rate of 0.1 for each dwelling unit 	<ul style="list-style-type: none"> a minimum rate of 0.1 for each dwelling unit
Retail Store	<ul style="list-style-type: none"> minimum of 1.0 for each 100 square metres of GFA 	<ul style="list-style-type: none"> minimum of 1.0 for each 100 square metres of GFA
Office	<ul style="list-style-type: none"> a minimum rate of 0.35 for each 100 square metres of GFA 	<ul style="list-style-type: none"> a minimum rate of 1.0 for each 100 square metres of GFA

According to By-law No. 569-2013, within Bicycle Zone 1, if bicycle parking is provided in excess of the required minimums, then the minimum vehicle parking requirements can be reduced by 1 vehicle space for every 5 bicycle parking spaces provided beyond the minimum, to a maximum of 20% of the required minimum vehicle parking. The subject site is located in Bicycle Zone 1, which is defined as the area of the City bounded by the Humber River on the



west, Lawrence Avenue on the north, Victoria Park Avenue on the east and Lake Ontario on the south.

6.2 Vehicular Parking Supply

6.2.1 Site A (1-1A Atlantic Avenue)

The total proposed vehicular parking supply for Site A is 102 spaces, comprised of a mix of residential tenant parking, car-share spaces, and shared parking spaces. Two levels of below-grade parking garage will serve residents and commercial patrons; no surface parking is proposed.

6.2.2 Site B (2-20 Atlantic Avenue, 1 Jefferson Avenue)

The total proposed vehicular parking supply for Site B is 112 spaces, comprised of resident tenant parking, residential visitor parking, car-share spaces, shared parking spaces, and transit staff parking spaces. Three levels of below-grade parking garage will serve residents and commercial patrons; no surface parking is proposed.

The parking supply for all sites is summarized in **Table 6-2**.

Table 6-2: Vehicle Parking Supply

Site	Vehicle Parking Space Type					TOTAL
	Tenant	Car-Share	Visitor	Shared Parking	Transit Staff	
Site A	50	4	0	48	0	102
Site B	55	5	7	39	6	112
TOTAL	105	9	7	87	6	214

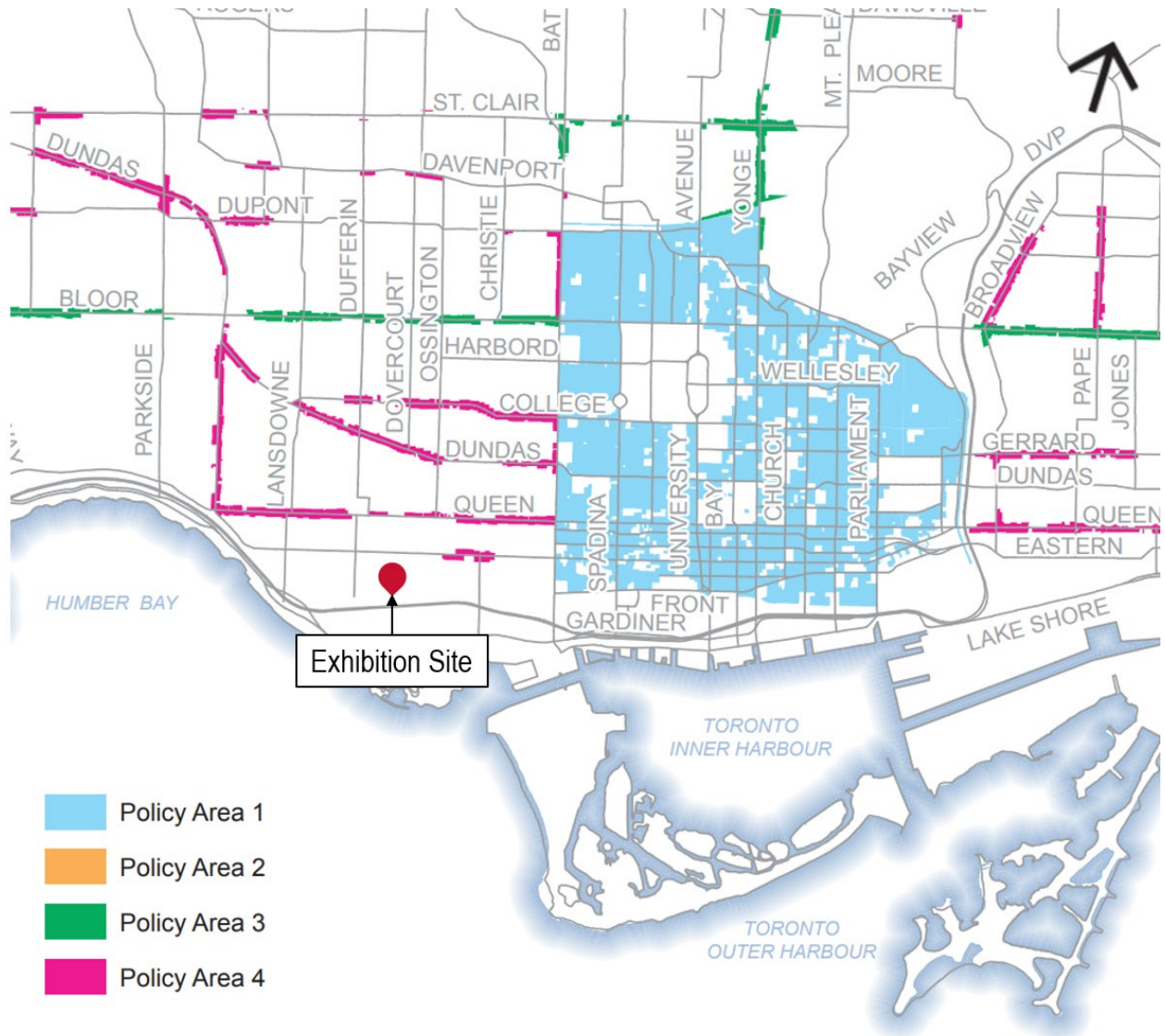


Figure 6-1: City of Toronto Policy Areas

6.3 Vehicle Parking Requirements

Vehicle parking requirements were reviewed using By-law 569-2013 with Policy Area 1 rates; the requirements are shown in **Table 6-3**.

Table 6-3: Vehicle Parking Zoning By-law Requirements

Site	Land Use	Size (Unit or m2)	By-law No. 569-2013 (PA1)	
			Rate	# Spaces Req.
A	Bachelor	4	0.3 / Unit	1
	1-Bed	154	0.5 / Unit	77
	2-Bed	72	0.8 / Unit	57
	3-Bed	35	1.0 / Unit	35
	Visitors	265	0.1 / Unit	26
	Retail	1,078 m ²	1.0 / 100 m ²	10
	Office	13,166 m ²	0.35 / 100 m ²	46
	Subtotal			252
B	Bachelor	22	0.3 / Unit	6
	1-Bed	172	0.5 / Unit	86
	2-Bed	52	0.8 / Unit	41
	3-Bed	57	1.0 / Unit	57
	Visitors	303	0.1 / Unit	30
	Retail	4,226 m ²	1.0 / 100 m ²	42
	Office	10,427 m ²	0.35 / 100 m ²	36
	Subtotal			299
Total Required			551	

Based on the Policy Area 1 minimum parking requirements, a total of 551 parking spaces would be required; for comparison, a total of 790 parking spaces would be required if Policy Area 3 was used. However, considering the urban trends, downtown location and access to transit, it is neither practical nor reasonable to provide the number of parking spaces required by the prevailing Zoning By-law for the proposed development. In recent years, City Council has acknowledged this and has adopted lower standards for approval for new developments in Downtown Toronto. These actions have been bolstered by Ontario's New Five-Year Climate Change Action Plan and numerous other initiatives by the City of Toronto. There has also been a steep decline in residential parking demand and vehicle ownership in the Downtown Toronto area. There have been developments with 'zero' parking across North America, including Downtown Toronto, where transit accessibility is reasonable. The area is well served by transit, Site B will have direct internal access to the Exhibition Ontario Line station, and all sites are very close to the King and Dufferin streetcars, Exhibition GO Station, and a number of bus routes. Also, a very high transit-dependency is the fundamental characteristic of Transit Oriented Developments / Communities, as they promote reduced automobile dependency.

Recently approved parking supply ratios for condominium buildings in the downtown area included rates as low as 0.03 spaces per unit. After reviewing a few similar developments in the nearby area, it was determined that an effective parking supply rate of 0.25 spaces per unit for

resident parking and 0.10 spaces per unit for visitor parking would be a conservative estimate for a TOC development at Exhibition Station. Nearby proxy sites are summarized below in **Table 6-4** which shows several developments near the Exhibition TOC sites providing proposed parking in the range of 28% to 40% of the required parking at the sites. By comparison, the TOC sites are proposing to provide 42% of the overall parking requirement, prior to reductions.

The by-law minimum rate of 0.35 spaces per 100 m² of office space was maintained for the TOC sites as sufficient samples in the nearby area were not observed to support office space parking reductions. The developments at 25 Liberty Street and 950 King Street both proposed zero retail parking spaces due to the small sizes of the retail uses and the expectation that the businesses will primarily serve local foot traffic. Visitor parking rates of 0.1 spaces per unit were generally maintained, except at 2 Tecumseth Street which proposed a visitor parking rate of 0.06 spaces per unit. The development at 2 Tecumseth Street had also proposed adjusted resident parking rates for each unit type. The introduction of Ontario Line, the new Liberty New Street bus bays, and the proximity of the TOC sites will reduce resident, visitor, staff, and customer reliance on single occupant vehicles to reach the site and support the provision of reduced parking at the sites.

The non-residential parking requirements have been estimated through a shared-use parking scheme that is summarized in **Table 6-5**. Shared use parking enables the efficient use of parking spaces, as different uses have higher demands for parking at different times of the day. The percentage of parking demand (as a portion of the overall rate) were from the City of Toronto's Table 200.5.10.1 as recommended in the By-law 569-2013.

It is noted that ancillary retail units will be constructed on the ground-level of the sites to which destination vehicular trips are not expected, as the businesses will primarily serve local foot traffic; therefore, the number of required retail spaces has been omitted. As per the shared parking calculations, and omitting the retail spaces, it is recommended that 48 spaces are allocated to non-residential use on Site A and 39 spaces on Site B.



Table 6-4: Parking Proxy Sites

Site	Study Date	Req. Parking	Prop. Parking	% of Req. Proposed	Site Characteristics			Proposed Rates			
					Res. (DU)	Retail (m ²)	Office (m ²)	Tenant	Visitor	Retail (per 100 m ²)	Office (per 100 m ²)
25 Liberty Street	Apr. 2017	302	108	36%	-	2,699	22,677	-	-	NA	NA
950 King Street	Mar. 2018	185	74	40%	217	588	-	0.24	0.1	0	-
1071 King Street	Dec. 2019	238	66	28%	230	489	-	0.187	0.1	0	-
2 Tecumseth	May 2019	1335	379	28%	680	6,269	31,206	By Unit*	0.06	1	0.35

*Proposed by unit:

- Bachelor: 0.1 per unit
- 1 Bedroom: 0.3 per unit
- 2 Bedroom: 0.5 per unit
- 3 Bedroom: 1.0 per unit

Table 6-5: Shared Parking Calculations

Site	Land Use	Size (Unit or m ²)	By-law No. 569-2013 (PA1)				
			Rate	# Spaces Req.	AM	PM	Eve
Site A	Visitors	265	0.1 / Unit	26	2 (10%)	9 (35%)	26 (100%)
	Retail	1,078	1.0 / 100m ²	10	2 (20%)	10 (100%)	10 (100%)
	Office	13,166	0.35 / 100 m ²	46	46 (100%)	27 (60%)	0 (0%)
	Subtotal			82	50	46	36
	Maximum Required			50			
Site B	Visitors	303	0.1 / Unit	30	3 (10%)	10 (35%)	30 (100%)
	Retail	4,226	1.0 / 100m ²	42	8 (20%)	42 (100%)	42 (100%)
	Office	10,427	0.35 / 100m ²	36	36 (100%)	21 (60%)	0 (0%)
	Subtotal			108	47	74	72
	Maximum Required			74			

The number of shared parking spaces that can be realized with the currently proposed parking supply is summarized in **Table 6-6**, assuming that a rate of 0.25 spaces per residential unit will be provided to residential unit tenants, that the shared parking spaces will be provided for the tenants, and that no parking will be required for retail uses. As shown, the final proposed spaces will satisfy requirements for all sites. Accounting for a further reduction based on the surplus bicycle parking on each site (calculation detailed below in Section 6.5), a surplus of 15 to 19 parking spaces is provided at the sites. The surplus parking has been assigned to visitor parking to help separate the uses and provide a more reliable source of parking for residential visitors to the sites

Table 6-6: Proposed Parking Reassignment

Parking Assignment	Site A	Site B
Total Parking Proposed	102	112
Residential Units	265	303
Base Tenant Spaces Required (based on proposed 0.25 spaces/unit)	66	75
Car-Share Spaces	4	5
Total Tenant Spaces Required	54	60
Proposed Parking Remaining	48	52
Required Shared Parking (Excluding Retail)	48	39
Difference:	0	+13
Vehicle Parking Reduction from Providing Surplus Bicycle Parking	+15	+4
Final Parking Difference:	+15	+19

6.4 Accessible Parking Spaces

Accessible parking requirements were reviewed using By-law 569-2013, Chapter 200.15.10, which stipulates the following:

(1) Parking Rates - Accessible Parking Spaces

If the total **parking space** requirement is 5 or more, clearly identified off-**street** accessible **parking spaces** must be provided on the same **lot** as every **building** or **structure** erected or enlarged, as follows:

- (A) if the number of required **parking spaces** is less than 13, a minimum of 1 **parking space** must comply with all regulations for an accessible **parking space** in Section 200.15;
- (B) if the number of required **parking spaces** is 13 to 100, a minimum of 1 **parking space** for every 25 **parking spaces** or part thereof must comply with all regulations for an accessible **parking space** in Section 200.15; and
- (C) if the number of required **parking spaces** is more than 100, a minimum of 5 **parking spaces** plus 1 **parking space** for every 50 **parking spaces** or part thereof in excess of 100 **parking spaces**, must comply with all regulations for an accessible **parking space** in Section 200.15. [By-law: 579-2017]

With the parking requirements summarized in **Table 6-6**, all site requirements fall within 100 to 150 parking spaces, which will result in a requirement of 5 accessible parking spaces per site. At a minimum, 5 accessible parking spaces will be provided per site.

6.5 Bicycle Parking Supply

Bicycle parking for the site will be provided in the form of short-term and long-term bicycle parking spaces. Short-term bicycle parking will be provided at-grade (internally or weather protected if outdoors) as well as underground, and will serve residential visitors, commercial patrons, and potentially residents who are making short stops at home. Long-term bicycle parking will be located on the underground parking levels under each building. The bicycle parking supply is summarized in **Table 6-7**.

Table 6-7: Bicycle Parking Supply

Area	Bicycle Parking Space Type					Total
	Residential Long Term	Residential Short Term	Non-Residential Long Term	Non-Residential Short Term	Transit	
Site A	289	48	34	38	0	409
Site B	285	34	30	49	82	480

6.6 Bicycle Parking Requirements

Bicycle parking requirements were reviewed for By-law 569-2013. Based on the requirements summarized in **Table 6-8**, overall, there will be a surplus in bicycle parking indicating the opportunity to off-set the vehicular parking demand.

Site A will have a total surplus of 76 bicycle parking spaces, while Site B will have 24 surplus bicycle parking spaces. With the bicycle surplus offset in By-law 569-2013 which stipulates that vehicular parking can be reduced by surplus bicycle parking at a rate of 1 vehicle spaces per 5 bicycle spaces, up to a limit of 20% parking reduction, Site A could be reduced by 15 vehicle parking spaces and Site B by 4 spaces, which would result in all sites satisfying the required parking supply following the reassignment of spaces.

Table 6-8: Bicycle Parking Zoning By-law Requirements

Land Use	Unit or per 100 m ²	By-law No. 569-2013				
		Long-Term		Short-Term		
		Rate	# Required	Rate	# Required	
Site A	Residential	265	0.9	239	0.1	27
	Retail	1,078	0.2	3	3+0.3(x)	7

Land Use	Unit or per 100 m ²	By-law No. 569-2013				
		Long-Term		Short-Term		
		Rate	# Required	Rate	# Required	
Office	13,166	0.2	27	3+0.2(x)	30	
Total Required		-	269	-	64	
Proposed		-	323	-	86	
Surplus / Deficit		-	+54	-	+22	
Site B	Residential	303	0.9	273	0.1	31
	Retail	4,226	0.2	9	3+0.3(x)	16
	Office	10,427	0.2	21	3+0.2(x)	24
	Total Required		-	303	-	71
	Proposed		-	315	-	83
	Surplus / Deficit		-	+12	-	+12

6.7 Loading Space Requirements

Loading space requirements of Zoning By-law 569-2013 were also reviewed for the proposed sites. The loading space requirements as per the By-law, and loading spaces provided, are shown in **Table 6-9** below. It is noted that the shared loading space calculations are used from Zoning By-law 569-2013, which stipulates that the Type “B” and Type “C” loading spaces can be shared between retail and office uses and that the highest requirement for each use is used as the overall requirement for the shared loading.

Table 6-9: Loading Spaces Required Based on By-Law Rates

Site	Land Use Type	Units or m ²	Loading Space Required and Provided
A	Residential	265	1 Type “G”
	Retail	1,078	1 Type “B”
	Office	13,166	2 Type “B” and 2 Type “C”
	Total Req. (Shared Loading)		2 Type “B”, 2 Type “C”, and 1 Type “G”
	Total Proposed		3 Type “B”, 2 Type “C”, and 2 Type “G”
B	Residential	303	1 Type “G”
	Retail	4,226	2 Type “B”
	Office	10,427	2 Type “B” and 2 Type “C”
	Total Req. (Shared Loading)		2 Type “B”, 2 Type “C”, and 1 Type “G”
	Total Proposed		2 Type “B”, 2 Type “C”, and 1 Type “G”

The dimensions of the proposed loadings spaces meet the By-law requirements, with the dimensions of each type listed below.

Type “G”

- Minimum Length: 13.0 metres
- Minimum Width: 4.0 metres
- Minimum Clearance: 6.1 metres

Type “B”

- Minimum Length: 11.0 metres
- Minimum Width: 3.5 metres
- Minimum Clearance: 4.0 metres

Type “C”

- Minimum Length: 6.0 metres
- Minimum Width: 3.5 metres
- Minimum Clearance: 3.0 metres

6.8 Loading Swept Path Analysis

The loading areas were tested throughout the development process of the TOC site designs using AutoTURN software (within AutoCAD) to check the loading space accessibility for anticipated design vehicles entering the sites. The largest commercial vehicle anticipated to enter the site is a Medium Single-Unit Truck (‘MSU’) style delivery or moving vehicle. For garbage trucks, a City of Toronto front-loading garbage truck was tested. The swept path analysis for all sites is shown in **Appendix G**. As shown, all sites have sufficient space to accommodate movements inbound/outbound for all design vehicles. Some movements at Site A will have slightly constrained widths, at which garbage trucks and medium sized trucks entering and exiting the Type “G” and Type “B” loading spaces may need to make a three-point turn to complete the movement. It is also noted that staging areas are not provided at the Type “G” and Type “B” loading docks in the east building on Site A; staging areas should be provided to avoid having the trucks extend beyond the building envelope and obstruct traffic on the site driveway.

7 Transportation Demand Management

Transportation Demand Management (TDM) measures are methods employed to reduce the traffic impacts of a development through the reduction of Single-Occupant Vehicle (SOV) trips as well as the encouragement of more sustainable forms of travel and more efficient use of the transportation network for all modes of travel.

TDM measures can be ‘hard measures’, such as infrastructure like bicycle parking, or can be ‘soft measures’ such as policies that allow for working-from-home or flex hours. TDM measures must also be tied to the surrounding transportation network context of the development. For example, bicycle parking will be ineffective if there is no surrounding bicycle infrastructure like bicycle lanes, multi-use paths, or a lack of bicycle parking at the ultimate destination. For this reason, successful TDM implementation requires a united effort and coordination between the City and developers.

Hard measures are physically infrastructure improvements that encourage alternative modes of travel and mode shifts away from single-occupant vehicles. This can include the provision of bicycle parking or enhanced pedestrian and cyclist facilities on-site including shower and change facilities for employment uses.

Soft measures are programs or policies, such as unbundling or condo units to parking spaces, work-from-home policies, transit subsidies, etc. In many cases, hard and soft measures work together and provide mutual benefit. For instance, transit pass subsidies are soft measures, but when paired with hard measures like improved waiting areas, can have a greater impact on mode choice.

The Toronto Green Standard (Version 3) requires measures that will support a 15% or greater reduction in single occupancy vehicle (SOV) trips.

For the subject site, the general context of the area as a downtown city centre-core, mixed-use environment with excellent transit access and future direct transit access to the Ontario Line, will have an impact on the potential TDM measures. In fact, the inherent nature of the area and the presence of the Ontario Line, GO Transit, and streetcar surface transit routes throughout the study area will make this location an excellent candidate to benefit from TDM initiatives.

The mixed-use nature of downtown allows for synergy and mixed-use interactions between the proposed residential towers, as well as the ancillary retail at the ground floor, and the surrounding retail-commercial and services that are in the area. Additionally, due to the location near the City’s central business district, there is an expectation that many of the residents will work within the general area and will not rely on transit to make their daily trips. Rather, these residents will walk or cycle. The mixed-use, and walkable nature of the area will in itself help to reduce vehicle trips by encouraging walking and linked trips.

Since the ancillary retail will primarily serve the surrounding area and the residential condos above, the TDM plan will be geared towards adapting the residential component.

7.1 Local and Regional Transit Accessibility

As already discussed, there is excellent transit coverage within the vicinity of the site even without the construction of Ontario Line. TTC surface transit is provided in the form of streetcars along Fleet Street (in separated right-of-way and dedicated signals at intersections) and King Street (in mixed traffic). Additionally, these streetcar routes provide direct access to the Toronto subway system along Line 1 (easterly to Union Station or St Andrew Station).

The study area already has a fairly high non-vehicle modal split at over 60% non-auto drive and this is expected to increase in general due to the increase in transit availability. The site itself will further benefit and leverage this proximity and access.

7.2 Transit Pass Subsidies

Residents and tenants of the buildings will be given transit pass subsidies that will further encourage the use of transit as a primary mode and will attract those who wish to rely on transit and will utilize the transit passes. The subsidies can be provided in the form of reduced cost passes or can be provided in the form of subsidies to residents.

7.3 Real-Time Transit Information

Real-time transit service updates will be provided in the lobby area of each residential tower. The real-time displays will include arrival time for the nearest transit stops for each of the primary transit services expected to serve the development (as outlined in **Section 2.4** and **Section 3.2**). The real-time displays will allow residents to time leaving their buildings to reduce the amount of time standing at each transit stop, thus making transit more attractive.

7.4 Pedestrian and Cycling Connections

All four buildings will be directly fronting Liberty New Street. Internally, the residential component of one of the condo towers will have access to the transit station lobby area, and there will be no need for residents of Site B to leave the building if they are destined to Ontario Line or GO routes.

There will be a multi-use path along the south side of Liberty New Street.

Bicycles are also allowed on the TTC streetcars and subways outside of peak periods, and at all times on TTC buses. Residents will be able to bring their bicycles on streetcars and use them to complete the last leg of their trips, if it is conducive to their needs.

7.5 Bicycle Parking

The building will be equipped with long-term bicycle parking that will be available to all residents. Long-term bicycle parking ensures that residents are encouraged to own bicycles in the first place by providing them with easily accessible, secure and sheltered bicycle parking. Short-term bicycle parking will be provided for visitors. Long-term bicycle parking is typically provided on P1 parking and only provided on lower parking levels if the bicycle parking takes up more than 50% of the P1 parking level.

The short-term bicycle parking will be placed in safe, well lit, accessible areas at ground level. This will encourage visitors to feel cycling is a viable option. It is noted that only excess bicycle parking beyond the by-law required bicycle parking spaces are considered to be on-site TDM measures.

Bikeshare is also available within the general area. There are 5 bikeshare stations within 400 metres walking distance. These will also be available for use by residents and visitors if they use the bikeshare services. Bikeshare spaces are considered usable if they are occupied or empty, as they can be used by residents or visitors when leaving the site (bicycle is available) or when returning (there is a free “dock”).

7.6 Car-Share Services

Car-share services are an effective way to reduce auto dependency and parking needs for both residential and non-residential developments, by providing vehicles that can be used by residents and tenants on an as-needed basis. The result is that the development will attract those who do not own vehicles and typically rely on alternative forms of transportation, thus reducing the number of parking spaces required on site and attracting residents and tenants that will generally produce fewer vehicle trips, but will still occasionally require a vehicle.

For some development proposals, the City of Toronto has accepted proposals that suggest that for each car-share parking space provided on site, the development will be able to reduce the parking supply by 3 parking spaces. This is another example of the City accepting TDM measures to reduce the parking supply.

7.7 Summary of Transportation Demand Management

The following summarizes the measures that will support a reduction in single occupancy vehicle (SOV) trips:

- Direct access to Ontario Line and GO from within one of the buildings;
- Transit passes or subsidies provided to all residents of the buildings, including the commercial-retail components
- Proximity to surface transit routes along Liberty New Street, Dufferin Street, King Street, Manitoba Drive, Fleet Street, and others;
- Real-time transit information;
- Location near a mixed-use city centre core environment to promote walking trips; and
- Proximity to carshare services.

8 Preliminary Findings and Next Steps

8.1 Existing Network

A multi-modal network analysis was completed along key routes near the TOC sites for walking, cycling, and transit modes based on the City of Ottawa's Multi-Modal Level of Service methodology. Automobile operational conditions were analyzed using Synchro based on the requirements from the *City of Toronto Guidelines for the Preparation of Transportation Impact Studies (2013)*. Identified opportunities and constraints included:

Pedestrian Level of Service

- **No Sidewalks:** Several of the north-south connections in Liberty Village do not currently have sidewalks available and instead accommodate parking for vehicles along these stretches. As Liberty Village continues to develop, it will be important that these pedestrian connectivity gaps be filled to ensure that pedestrians can move safely around the area, especially as demand grows to and from the future Liberty New Street and Ontario Line station. Pedestrian gaps are also noted throughout the Exhibition Place area.
- **Narrow Effective Sidewalk Width:** The north side of Liberty Street between Mowat Avenue and Atlantic Avenue has several locations with constrained sidewalks due to utility poles, fire hydrants, and garbage bins being placed on the sidewalk, resulting in effective sidewalk widths of less than or equal to 1.5 metres. These locations make it difficult for pedestrians to pass by each other and do not easily accommodate mobility impaired users on the sidewalk. Similarly, obstructed sections of sidewalk were observed on the east side of Fraser Avenue (south of Liberty Street), south side of King Street (between Dufferin Street and Joe Shuster Way, and the east side of Hanna Avenue (north of Liberty Street). A narrow sidewalk width of 1.5 metres is observed on Liberty Street on the north side between Hanna Avenue and Pirandello Street, and the south side between Lynn Williams Street and Pirandello Street.
- **Dufferin Street / Saskatchewan Road:** The intersection operates at a LOS of F for pedestrians due to the poor crossing conditions on the east leg of the intersection. The east leg has a wide crossing distance of approximately 22 metres and conflicts with a slightly channelized right turn lane which results in an increased approaching speed of vehicles. Pedestrian comfort and safety at the intersection would improve by reducing the sidewalk corner curb radii on the east side of the intersection and bringing the westbound right turn lane to a 90-degree intercept angle.

Bicycle Level of Service

- Using the Ottawa MMLOS methodology, many of the smaller roadways within the Liberty Village community operate at a BLOS of A, despite the absence of separated bicycle facilities. Bicycles would be expected to experience higher degrees of safety and comfort on the slow and narrow roadways, however, it is a limitation of the methodology that on-street parking obstructions and traffic demand are not considered for mixed traffic

facilities, as these would also affect the cycling experience by increasing friction and conflict with automobiles.

Transit Level of Service

- As shown in the transit LOS figure (**Figure 2-9**), the segments with transit routes generally operate at a LOS of “D” in the walkshed area with the exception of the segment of Liberty Street between Atlantic Avenue and Hanna Avenue, and along Dufferin Street between King Street and Springhurst Avenue. The LOS E segment along Liberty Street experiences a higher level of friction than others in the area due to a large parking lot on the southern side of Liberty Street. The parking lot is expected to primarily accommodate commuter trips which will increase friction and lower the speed of transit vehicles on the segment during the peak hours. A higher transit friction is experienced along Dufferin Street due to a relatively high number of driveways and on-street parking along the segments.

Automobile Level of Service

- Capacity issues currently exist at King and Dufferin, as well as at Dufferin and Liberty. Capacity issues at Dufferin and Liberty are caused by high traffic demand to and from the south turning into and out of Liberty Village from Dufferin Street.
- The northbound left movement at Strachan and Fleet operates at capacity during the PM peak hour.
- The eastbound through/right movement at Lake Shore and Strachan operates near capacity during the AM peak hour. During the PM peak hour, the eastbound left and westbound through movements will operate at capacity.
- The northbound approach to Lake Shore and British Columbia operates near capacity during the AM peak hour, and the eastbound approach operates at capacity during the PM peak hour.

8.2 Proposed Development

The proposed Transit Oriented Community developments around Exhibition Station will comprise of two separate sites:

- **Site A:** 1-1A Atlantic Avenue
 - Consisting of 265 residential units, 1,078 m² of retail space, and 13,166 m² of office space.
 - The first floor will provide access to the eastern tunnel at Exhibition Station, which provides a through connection between Liberty Village and Exhibition Place, and emergency egress from the station.
- **Site B:** 2-20 Atlantic Avenue and 1 Jefferson Avenue
 - Consisting of 303 residential units, 4,226 m² of retail space, and 10,427 m² of office space.
 - The first floor will provide access to an underground concourse for Exhibition Station, which will connect to the Ontario Line and GO Station platforms.



Transit Oriented Community Traffic Forecasts

The Ontario Line Exhibition Station is forecasted to add 9,661 walking, cycling, and transit trips to the surrounding area during the AM and PM peak hours. The proposed developments, Site A and Site B, will add a combined total of 656 and 740 total trips for all modes during the AM and PM peak hours, respectively, with a significant portion of these trips being pedestrian and surface transit trips destined to / from the Station. The TOC’s contribution to total traffic volumes for pedestrian and automobile trips at the study area intersections is presented in **Table 8-1**.

The TOC will contribute less than 5% to total vehicle traffic volumes at the study area intersections under 2030 total traffic conditions. Comparatively, the TOC will generate many more active transportation trips as a proportion of the total intersection volume which includes pedestrians on the crosswalks and cyclists riding within the curb lane. Up to 4.1% of total pedestrian traffic will be TOC related.

Table 8-1: Exhibition TOC Transportation Contribution to Study Area Intersections

Period	Pedestrian Volumes	Traffic Volume
AM Peak Hour	3.3%	2.7%
PM Peak Hour	4.1%	2.5%

8.3 Future Capacity and Operations

2030 Future Background Conditions

Under 2030 background traffic conditions, the addition of background traffic from general background traffic growth, GO Station growth, and new trips associated with Ontario Line has resulted in at-capacity conditions throughout the study area. These locations include new critical movements at all study intersections along King Street with the exception of King/Joe Shuster, at the intersection of Dufferin/Liberty Street, Lake Shore/Strachan, and King/Strachan. Although the Ontario Line Exhibition Station will not generate a significant number of vehicle trips, the station is expected to add a substantial number of conflicting pedestrians and bicycle volumes, with the majority of these volumes being directed to capacity-constrained locations along King Street.

Further improvements were assessed at the intersections of Strachan/Fleet and Dufferin/Liberty during the PM peak hour to identify mitigation opportunities, as summarized in **Table 3-20**. The improvements applied included:

- **Strachan/Fleet:** Add northbound left turn advanced phase and increase cycle length by 10 seconds.
- **Dufferin/Liberty New Street:** Increase cycle length to 80 seconds.

With the additional improvements, the intersection of Dufferin/Liberty New will operate without critical movements, and the overall intersection of Strachan/Fleet will operate within capacity. Despite the improvements at Strachan/Fleet, high delays are still expected on the eastbound

left, westbound left/through, northbound left, and southbound through/right movements, with the southbound through/right operating at capacity.

2030 Future Total Conditions

The addition of TOC and Station traffic triggers a small number of turning movements at Dufferin/King, Dufferin/Liberty, King/Strachan, and the new intersection at Jefferson Avenue/Site B Driveway to operate with capacity issues. Signal timing optimizations have been applied to the future total scenario, and limited options are available to further mitigate the constraints at these locations due to right-of-way constraints.

8.4 Parking

The vehicular parking requirements based on By-law 569-2013 Policy Area 1 rates are 252 (Site A) and 299 (Site B) without any reductions applied. However, due to the location and nature of the site, a total of 102 (Site A) and 112 (Site B) parking spaces are provided, consistent with reductions applied to nearby developments. The proposed parking on all sites will satisfy the targeted residential tenant parking rate of 0.25 spaces per unit, and the City of Toronto by-law requirement for shared spaces between residential visitor and office uses. Including a reduction for surplus bicycle parking on site, a surplus vehicular parking of 15 to 19 spaces will be provided to the TOC sites. The minimum accessible parking space requirement of 5 spaces per site will be satisfied.

8.5 Loading

Application of Zoning By-laws 569-2013 requires various Type ‘G’, Type ‘B’, and Type ‘C’ loading spaces on all sites. Loading sites provided satisfy all of the requirements.

All sites will have sufficient space to accommodate movements inbound/outbound for all design vehicles. Some movements inbound/outbound from the Type “G” and Type “B” spaces at Site A will have slightly constrained widths, which garbage trucks and medium sized trucks may need to make a three-point turn to complete the movement.

It is noted that staging areas are not provided at the Type “G” and Type “B” loading docks in the east building on Site A; staging areas should be provided to avoid having the trucks extend beyond the building envelope and obstruct traffic on the site driveway.

8.6 Mitigation Measures

The following mitigation measures are recommended to help support the future Exhibition Station Transit Oriented Community sites into the 2030 future horizon:

- Improvements within Liberty Village to fill sidewalk gaps, increase effective sidewalk widths at constrained locations, and enhance the visibility of faded crosswalks should be considered by the City for implementation.
- Optimize intersection cycle lengths and splits in the future to ensure that changes in travel patterns are accounted for.



- **Strachan/Fleet:** Add northbound left turn advanced phase and increase cycle length by 10 seconds to mitigate future background deficiencies.
- **Dufferin/Liberty New Street:** Increase cycle length to 80 seconds to mitigate future background deficiencies.
- Provide staging areas at the east building loading docks at Site A to prevent parked trucks from extending beyond the building envelope and obstructing driveway traffic.



Appendix A: Multi-Modal Level of Service Analysis

INTERSECTIONS														
		Dufferin / King				King / Joe Shuster				King / Atlantic				
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	
Pedestrian	Lanes	4	4	4	4	3		4	4			3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m			No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Protected/ Permissive	No left turn / Prohib.		Permissive	No left turn / Prohib.			No left turn / Prohib.	No left turn / Prohib.	Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control		No right turn	Permissive or yield control			Permissive or yield control	Permissive or yield control	No right turn
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed			RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No		No	No			No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel		No Channel	No Channel			No Channel	No Channel	No Channel
	Corner Radius	3-5m	3-5m	5-10m	0-3m	5-10m		0-3m	5-10m			5-10m	5-10m	0-3m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Std transverse markings		Std transverse markings	Std transverse markings			Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	58	58	57	59	79		61	62			79	62	61
	Ped. Exposure to Traffic LoS	D	D	D	D	B	-	C	C	-		B	C	C
	Cycle Length	90	90	90	90	80		80	80			70	70	70
	Effective Walk Time	34	34	19	8	37		8	8			22	8	8
	Average Pedestrian Delay	17	17	28	37	12		32	32			16	27	27
Pedestrian Delay LoS	B	B	C	D	B	-	D	D	-		B	C	C	
Level of Service	D	D	D	D	B	-	D	D	-		B	C	C	
	D				D				C					
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic			Mixed Traffic	Mixed Traffic	Mixed Traffic
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>													
	Dedicated Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h			≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist Through Movement					-				-				
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	-		Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	One lane crossed		No lane crossed	≥ 2 lanes crossed			≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		≤ 40 km/h	≤ 40 km/h			≤ 40 km/h	≤ 40 km/h	≤ 40 km/h
Left Turning Cyclist	D	D	D	D	B	-	B	D	-		D	D	B	
Level of Service	D	D	D	D	B	-	B	D	-		D	D	B	
	D				D				D					
Transit	Average Signal Delay													
	Level of Service	-	-	-	-	-	-	-	-	-		-	-	-
Truck	Effective Corner Radius													
	Number of Receiving Lanes on Departure from Intersection													
Level of Service	-	-	-	-	-	-	-	-	-	-		-	-	
	-				-				-					

Figure A-1: MMLOS Parameters – Intersections

INTERSECTIONS		King / Sudbury				Dufferin / Saskatchewan				Dufferin / Liberty			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	4	0-2	4	4	4	5	7		4	4	3	
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	
	Conflicting Left Turns	No left turn / Prohib.	No left turn / Prohib.	Permissive	Permissive	No left turn / Prohib.	Permissive	Protected/ Permissive		No left turn / Prohib.	Permissive	Permissive	
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Protected/ Permissive	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	
	Ped Signal Leading Interval?	No	No	No	No	No	No	No		No	No	No	
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	Conv'tl without Receiving Lane		No Channel	No Channel	No Channel	
	Corner Radius	5-10m	5-10m	3-5m	5-10m	10-15m	0-3m	10-15m		5-10m	0-3m	5-10m	
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings		Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	
	PETSI Score	62	94	55	54	64	48	11		65	59	74	
	Ped. Exposure to Traffic LoS	C	A	D	D	C	D	F	-	C	D	C	-
	Cycle Length	80	80	80	80	80	80	80		80	80	80	
	Effective Walk Time	30	30	8	8	10	10	13		24	24	23	
	Average Pedestrian Delay	16	16	32	32	31	31	28		20	20	20	
Pedestrian Delay LoS	B	B	D	D	D	D	C	-	C	C	C	-	
Level of Service	C	B	D	D	D	D	F	-	C	D	C	-	
Level of Service		D				F				D			
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>					Not Applicable	≤ 50 m	≤ 50 m					
	Dedicated Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	
	Cyclist Through Movement					Not Applicable	D	D	-				-
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Separated	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	-
	Left Turn Approach	One lane crossed	One lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	1 lane crossed		≥ 2 lanes crossed		≥ 2 lanes crossed		One lane crossed	
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		≤ 40 km/h		≤ 40 km/h		≤ 40 km/h	
Left Turning Cyclist	B	B	D	D	B	-	D	-	D	-	B	-	
Level of Service	B	B	D	D	B	-	D	-	D	-	B	-	
Level of Service	D				D				D				
Transit	Average Signal Delay												
	Level of Service	-	-	-	-	-	-	-	-	-	-	-	-
Truck	Effective Corner Radius												
	Number of Receiving Lanes on Departure from Intersection												
Level of Service	-	-	-	-	-	-	-	-	-	-	-	-	
Level of Service	-				-				-				

Figure A-2: MMLOS Parameters - Intersections

SEGMENTS	Street A	King	King	King	Liberty	Liberty	Liberty	Liberty	Liberty	Liberty	Liberty	Liberty	Dufferin	Dufferin	Dufferin	Mowat	Mowat	Fraser	Fraser	Jefferson	Jefferson
		Dufferin-Joe Shuster	Joe Shuster-Atlantic	Atlantic-Sudbury	Dufferin-Mowat	Mowat-Fraser	Fraser-Jefferson	Jefferson-Atlantic	Atlantic-Hanna	Hanna-Lynn Williams	Lynn Williams-Piranello	King-Liberty	Liberty-Springhurst	Springhurst-Saskatchewan	King-Liberty	Liberty-South	King-Liberty	Liberty-South	King-Liberty	Liberty-South	King-Liberty
Pedestrian	Sidewalk Width	≥ 2 m < 0.5	≥ 2 m < 0.5	≥ 2 m < 0.5	no sidewalk n/a	< 1.5 m n/a	1.5 m < 0.5 m	< 1.5 m n/a	≥ 2 m < 0.5	1.5 m 0.5-2 m	1.5 m 0.5-2 m	≥ 2 m < 0.5	≥ 2 m < 0.5	≥ 2 m < 0.5	1.5 m < 0.5 m	no sidewalk n/a	1.5 m < 0.5 m	< 1.5 m n/a	1.5 m < 0.5-2 m	no sidewalk n/a	
	Boulevard Width	> 3000	> 3000	≤ 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000
	Avg Daily Curb Lane Traffic Volume	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no
	Operating Speed	C	C	C	F	F	E	F	C	E	E	B	B	C	D	C	D	F	C	C	
	On-Street Parking	2.0 m	2.0 m	2.0 m	1.2 m	1.2 m	1.5 m	1.2 m	1.2 m	1.5 m	1.5 m	2.0 m	2.0 m	2.0 m	2.0 m	1.5 m	1.5 m	1.2 m	1.5 m	1.2 m	
	Exposure to Traffic PLoS	500 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	500 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr
Effective Sidewalk Width	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
Level of Service	C	C	C	-	F	E	F	C	E	E	B	B	C	D	-	D	F	C	-		
Bicycle	Type of Cycling Facility	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	
	Number of Travel Lanes	4-5 lanes total	4-5 lanes total	4-5 lanes total	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	4-5 lanes total	4-5 lanes total	2-3 lanes total	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	
	# of Lanes & Operating Speed LoS	D	D	D	A	A	A	A	A	A	D	D	B	A	A	A	A	A	A	A	
	Bike Lane (+ Parking Lane) Width	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bike Lane Width LoS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bike Lane Blockages	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Blockage LoS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Median Refuge Width (no median = < 1.8 m)	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing	4-5 lanes	4-5 lanes	4-5 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	4-5 lanes	4-5 lanes	4-5 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	
Sidestreet Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		
Level of Service	D	D	D	A	A	A	A	A	A	D	D	B	A	A	A	A	A	A	A		
Transit	Facility Type	Mixed Traffic	Mixed Traffic	Mixed Traffic					Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic						
	Friction or Ratio Transit/Posted Speed	WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.8					WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.8						
	Level of Service	D	D	D	-	-	-	-	E	D	D	E	E	D	-	-	-	-	-		
Truck	Truck Lane Width																				
	Level of Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Figure A-3: MMLOS Parameters - North & East Sides

SEGMENTS	Street A	Atlantic	Atlantic	Atlantic	Hanna	Hanna	Hanna	Quebec-Nova Scotia	Manitoba	Manitoba	Nova Scotia	Lynn Williams	Lynn Williams	Metro Diwayway	Metro Diwayway	Metro Diwayway	Metro Diwayway
		King-Snooker	Snooker-Liberty	Liberty-South	Snooker-Liberty	Liberty-Alley	Alley-South	Quebec-Nova Scotia	Nova Scotia-Canada	Manitoba-Princes	Lynn Williams-Western Battery	Western Battery-Pirandello	Atlantic-Hanna	Hanna-Metro E Alley	Metro E Alley-Lynn Williams	Lynn Williams-Liberty	
Pedestrian	Sidewalk Width	1.5 m < 0.5 m	1.8 m < 0.5 m	1.5 m < 0.5 m	< 1.5 m n/a	1.8 m < 0.5 m	no sidewalk n/a	1.5 m < 0.5 m	1.8 m > 2 m	1.5 m 0.5-2 m	≥ 2 m < 0.5	≥ 2 m < 0.5	1.5 m < 0.5 m	< 1.5 m n/a	no sidewalk n/a	≥ 2 m < 0.5	
	Boulevard Width	> 3000	> 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000
	Avg Daily Curb Lane Traffic Volume	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h yes	≤ 30 km/h yes	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h yes	≤ 30 km/h yes	≤ 30 km/h yes	≤ 30 km/h no	≤ 30 km/h no
	Operating Speed	D	C	D	F	A	C	D	A	C	A	A	D	F	C	A	
	On-Street Parking	1.5 m	2.0 m	1.5 m	1.2 m	2.0 m	250 ped/hr	1.5 m	2.0 m	1.5 m	2.0 m	2.0 m	2.0 m	1.5 m	1.2 m	2.0 m	
	Exposure to Traffic PLoS	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Level of Service	D	C	D	F	B	-	D	B	C	B	B	D	F	-	B		
Bicycle	Type of Cycling Facility	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	
	Number of Travel Lanes	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	2-3 lanes total	2-3 lanes total	2-3 lanes total	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	2-3 lanes total	≤ 2 (no centreline)	2-3 lanes total	
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	
	# of Lanes & Operating Speed LoS	A	A	A	A	A	A	B	B	B	A	A	A	B	A	B	
	Bike Lane (+ Parking Lane) Width	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bike Lane Width LoS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bike Lane Blockages	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Blockage LoS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Median Refuge Width (no median = < 1.8 m)	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	
Sidestreet Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h		
Level of Service	A	A	A	A	A	A	B	B	B	A	A	A	B	A	B		
Transit	Facility Type	Mixed Traffic	Mixed Traffic					Mixed Traffic	Mixed Traffic	Mixed Traffic							
	Friction or Ratio Transit/Posted Speed	WVp ≥ 0.8	WVp ≥ 0.8					WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.8							
	Level of Service	D	D	-	-	-	-	D	D	D	-	-	-	-	-	-	
Truck	Truck Lane Width																
	Level of Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Figure A-4: MMLOS Parameters - North & East Sides

SEGMENTS	Street A	King	King	King	Liberty	Liberty	Liberty	Liberty	Liberty	Liberty	Liberty	Dufferin	Dufferin	Dufferin	Mowat	Mowat	Fraser	Fraser	Jefferson	Jefferson	
		Dufferin-Joe Shuster	Joe Shuster-Atlantic	Atlantic-Sudbury	Dufferin-Mowat	Mowat-Fraser	Fraser-Jefferson	Jefferson-Atlantic	Atlantic-Hanna	Hanna-Lynn Williams	Lynn Williams-Piranello	King-Liberty	Liberty-Springhurst	Springhurst-Saskatchewan	King-Liberty	Liberty-South	King-Liberty	Liberty-South	King-Liberty	Liberty-South	
Pedestrian	Sidewalk Width	1.5 m < 0.5 m	1.8 m < 0.5 m	≥ 2 m < 0.5	≥ 2 m < 0.5	1.8 m < 0.5 m	no sidewalk n/a	no sidewalk n/a	1.8 m < 0.5 m	1.5 m > 2 m	1.5 m 0.5-2 m	≥ 2 m 0.5-2 m	1.5 m 0.5-2 m	1.5 m 0.5-2 m	no sidewalk n/a	1.8 m < 0.5 m	1.5 m < 0.5 m	1.5 m < 0.5 m	no sidewalk n/a	1.5 m 0.5-2 m	
	Boulevard Width	> 3000	> 3000	≤ 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	> 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000
	Avg Daily Curb Lane Traffic Volume	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h yes	> 30 to 50 km/h yes	> 30 to 50 km/h yes	> 30 to 50 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h yes	≤ 30 km/h yes	≤ 30 km/h yes	≤ 30 km/h yes
	Operating Speed On-Street Parking	E	D	C	C	D	F	F	D	D	E	B	C	E	C	A	D	D	C	C	C
	Exposure to Traffic PLoS	1.5 m	2.0 m	2.0 m	2.0 m	2.0 m	2.0 m	2.0 m	2.0 m	1.5 m	1.5 m	2.0 m	1.5 m	1.5 m	1.5 m	1.5 m	1.5 m	1.5 m	1.5 m	1.5 m	1.5 m
	Effective Sidewalk Width	500 ped/hr	500 ped/hr	500 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr
Pedestrian Volume	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
Crowding PLoS																					
Level of Service		E	D	C	C	D	F	F	D	D	E	B	C	E	C	A	D	D	C	C	
Bicycle	Type of Cycling Facility	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	
	Number of Travel Lanes	4-5 lanes total	4-5 lanes total	4-5 lanes total	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	4-5 lanes total	4-5 lanes total	2-3 lanes total	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h
	# of Lanes & Operating Speed LoS	D	D	D	A	A	A	A	A	A	A	D	D	B	A	A	A	A	A	A	A
	Bike Lane (+ Parking Lane) Width																				
	Bike Lane Width LoS																				
	Bike Lane Blockages																				
	Blockage LoS																				
	Median Refuge Width (no median ≤ 1.8 m)	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing	4-5 lanes	4-5 lanes	4-5 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	4-5 lanes	4-5 lanes	4-5 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	
Unsignalized Crossing - Lowest LoS	B	B	B	A	A	A	A	A	A	A	B	B	B	A	A	A	A	A	A	A	
Level of Service		D	D	D	A	A	A	A	A	A	D	D	B	A	A	A	A	A	A	A	
Transit	Facility Type	Mixed Traffic	Mixed Traffic	Mixed Traffic					Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic						
	Friction or Ratio Transit/Posted Speed	WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.8					WVp ≥ 0.6	WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.6	WVp ≥ 0.6	WVp ≥ 0.6	WVp ≥ 0.8						
Level of Service		D	D	D	-	-	-	-	E	D	D	E	E	D	-	-	-	-	-	-	
Truck	Truck Lane Width																				
	Travel Lanes per Direction																				
Level of Service		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Figure A-5: MMLOS Parameters - South & West Sides

SEGMENTS	Street A	Atlantic	Atlantic	Atlantic	Hanna	Hanna	Hanna	Manitoba	Manitoba	Nova Scotia	Lynn Williams	Lynn Williams	Metro Diwayway	Metro Diwayway	Metro Diwayway	Metro Diwayway
		King-Snooper	Snooper-Liberty	Liberty-South	Snooper-Liberty	Liberty-Alley	Alley-South	Quebec-Nova Scotia	Nova Scotia-Canada	Manitoba-Princes	Lynn Williams-Western Battery	Western Battery-Piranello	Atlantic-Hanna	Hanna-Metro Alley	Metro E Alley-Lynn Williams	Lynn Williams-Liberty
Pedestrian	Sidewalk Width	1.5 m < 0.5 m	1.8 m < 0.5 m	1.5 m < 0.5 m	≥ 2 m < 0.5 m	no sidewalk n/a	no sidewalk n/a	< 1.5 m < 2 m	no sidewalk n/a	no sidewalk n/a	≥ 2 m < 0.5	≥ 2 m < 0.5	1.5 m < 0.5 m	1.5 m < 0.5 m	1.5 m < 0.5 m	≥ 2 m < 0.5
	Boulevard Width	> 3000	> 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000
	Avg Daily Curb Lane Traffic Volume	> 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h yes	≤ 30 km/h yes	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no	≤ 30 km/h no
	Operating Speed On-Street Parking	D	C	D	A	C	C	F	C	C	A	A	D	D	D	A
	Exposure to Traffic PLoS	1.5 m	2.0 m	1.5 m	2.0 m	2.0 m	2.0 m	1.2 m	2.0 m	2.0 m	2.0 m	1.5 m	1.5 m	1.5 m	2.0 m	
	Effective Sidewalk Width	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr	
Pedestrian Volume	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
Crowding PLoS																
Level of Service		D	C	D	B	-	-	F	-	-	B	B	D	D	B	
Bicycle	Type of Cycling Facility	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Number of Travel Lanes	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	2-3 lanes total	2-3 lanes total	2-3 lanes total	≥ 2 (no centreline)	≥ 2 (no centreline)	≥ 2 (no centreline)	2-3 lanes total	≥ 2 (no centreline)	2-3 lanes total
	Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h
	# of Lanes & Operating Speed LoS	A	A	A	A	A	A	B	B	B	A	A	A	B	A	B
	Bike Lane (+ Parking Lane) Width															
	Bike Lane Width LoS															
	Bike Lane Blockages															
	Blockage LoS															
	Median Refuge Width (no median ≤ 1.8 m)	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes
Sidestreet Operating Speed	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	
Unsignalized Crossing - Lowest LoS	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Level of Service		A	A	A	A	A	B	B	B	A	A	A	B	A	B	
Transit	Facility Type	Mixed Traffic	Mixed Traffic					Mixed Traffic	Mixed Traffic	Mixed Traffic						
	Friction or Ratio Transit/Posted Speed	WVp ≥ 0.8	WVp ≥ 0.8					WVp ≥ 0.8	WVp ≥ 0.8	WVp ≥ 0.8						
Level of Service		D	D	-	-	-	D	D	D	-	-	-	-	-		
Truck	Truck Lane Width															
	Travel Lanes per Direction															
Level of Service		-	-	-	-	-	-	-	-	-	-	-	-	-		

Figure A-6: MMLOS Parameters - South & West Sides



Appendix B: Signal Timing Plans

LOCATION: King St & Atlantic Ave		DISTRICT: Toronto & East York					
MODE/COMMENT: SAP with PR, TSP & 2 Wire- Polara APS*		COMPUTER SYSTEM: TransSuite					
TCS: 1912		CONTROLLER/CABINET TYPE: PEEK ATC-1000 / TS2 T1					
PREPARED BY / DATE: Ranajamil Iftikhar / November 19, 2018		CONFLICT FLASH: Red & Red					
CHECKED BY / DATE: Carmen Lam / November 21, 2018		DESIGN WALK SPEED: 1.0 m/s (FDW based on full crossing at 1.2 m/s)					
IMPLEMENTATION DATE: November 29, 2018		CHANNEL/DROP: 4026/12					
		FIRMWARE VERSION: 3.018.1.2976					
NEMA Phase	Local Plan Split Table	OFF	AM	PM	Caribana	Phase Mode (Fixed/Demanded or Callable)	Remarks
		All Other Times	07:00-09:30 M-F	16:00-18:30 M-F	To be determined		
		Pattern 1 Split 1	Pattern 2 Split 2	Pattern 3 Split 3	Pattern 4 Split 4		
1	NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT					Pedestrian Minimums: EWWK = 7 sec. EWFD = 14 sec. NSWK = 7 sec. NSFD = 13 sec. NB phase is callable by vehicle or pedestrian actuation. If a vehicle and/or pedestrian call is received, the maximum NBG is served. The NSWK & NSFD are displayed on the pedestrian signal heads if a vehicle and/or pedestrian call is received.
2	King St	WLK 7 FDW 14 MIN 21 MAX1 27 AMB 4 ALR 3 SPLIT				Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	See back for TSP Instructions. APS is on during 7 secs of EWWK and NSWK when activated by pushbuttons Extended Push Activation = 3 secs TSP EB & WB disabled on November 29, 2018.
3	NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT					Phase 8 can only be activated by pushbutton to avoid being constantly actuated if a construction vehicle sits on or close to the stopbar loop for construction. Script 4 blocks TSP requests from streetcars less than 90 seconds behind the previous streetcar in the same direction. Additional 1 second above the pedestrian minimum provided to the Phase 4/8 SPLIT is to be served in Phase 4/8.
4	Atlantic Ave	WLK 7 FDW 13 MIN 20 MAX1 20 AMB 4 ALR 2 SPLIT				Callable by Leddar O/H Detection and/or Pushbutton; (truncations allowable to pedestrian minimum)	
5	NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT					
6	King St	WLK 7 FDW 14 MIN 21 MAX1 27 AMB 4 ALR 3 SPLIT				Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
7	NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT					
8	Atlantic Ave	WLK 7 FDW 13 MIN 20 MAX1 20 AMB 4 ALR 2 SPLIT				Callable by Pushbutton (truncations allowable to pedestrian minimum)	
	CL		60	70	70	80	
	OF		6	6	6	29	

Notes: APS ready but not activated*

LOC: King St & Atlantic Ave
MODE: SAP with PR, TSP & 2 Wire- Polara APS*
TCS: 1912
PREPARATION DATE (TIMING CARD): November 19, 2018

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce (Max. time added & subtracted in sec.)

	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
OFF								
Split 1	Ext. -- 21 --	-- --	-- --	-- 21 --	-- --	-- --	-- --	-- --
Rdc.	-- 5 --	-- 1 --	-- 5 --	-- 1 --				
AM, PM								
Split 2,3,4	Ext. -- 26 --	-- --	-- --	-- 26 --	-- --	-- --	-- --	-- --
Rdc.	-- 15 --	-- 1 --	-- 15 --	-- 1 --				
Caribana								
Split 2,3,4	Ext. -- 30 --	-- --	-- --	-- 30 --	-- --	-- --	-- --	-- --
Rdc.	-- 25 --	-- 1 --	-- 25 --	-- 1 --				

Pattern 1 OC Threshold set to 3x OC Rdc due to limited slop. Controller could take up to three cycles to get back in sync from -TSP Recovery.

2.1.9.2 Advanced I/O Scripts
 Input Script 4 "TSP26Timer"
 Blocks TSP 2 and TSP 6 calls from vehicles with a headway less than 90 sec
 To view current status of TSP inputs, go to screen 2.1.9.2 page 01 and press [C].

T.S.P. PARAMETERS

PREPARED:	RI	TSP RUN # 2	EB Thru	TSP RUN # 6	WB Thru
-----------	----	-------------	---------	-------------	---------

2.3.2.x O.C.

ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 A	Mode 2 A
2.8.2 Transit Run Parameters		
2.8.3 Transit Action Plan 1 (Used for Patterns 1 & 4)		
Run Enable (X = Yes)	X	X
Run Config = 1	Recovery = 2 (O.C.)	
2.8.3 Transit Action Plan 2 (Used for Pattern 2)		
Run Enable (X = Yes)	X	X
Run Config = 2	Recovery = 2 (O.C.)	
2.8.3 Transit Action Plan 3 (Used for Pattern 3)		
Run Enable (X = Yes)	X	X
Run Config = 3	Recovery = 2 (O.C.)	
2.8.4 Transit Run Configuration 1		
Delay / Extend / Fail	-- / -- / 235	7 / -- / 235
CALLS (and Extends)	Ø 2/6	Ø 2/6
Skips	--	--
Reduces (Truncates)	Ø 4/8	Ø 4/8
2.8.4 Transit Run Configuration 2		
Delay / Extend / Fail	13 / -- / 235	7 / -- / 235
CALLS (and Extends)	Ø 2/6	Ø 2/6
Skips	--	--
Reduces (Truncates)	Ø 4/8	Ø 4/8
2.8.4 Transit Run Configuration 3		
Delay / Extend / Fail	5 / -- / 235	7 / -- / 235
CALLS (and Extends)	Ø 2/6	Ø 2/6
Skips	--	--
Reduces (Truncates)	Ø 4/8	Ø 4/8

2.8.6 TSP Split Tables: 1, 2, 3 & 4

	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-1	--	--	--	-1
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--

TSP RUN # 6
WB Thru
SRM #1 Ch #2
TSP Input 6
BIU #3 PIN #12a

TSP RUN # 2
EB Thru
SRM #1 Ch #1
TSP Input 2
BIU #3 PIN #10a

TSP Loop Legend
 Request (Thru)
 Cancel (Thru)

Notes:
 ATC Mode 0 2 3 4
 TTC Algor/m B-2 A C D
 Extensions SDW Walk W/SDW W/SDW
TSP SUMMARY
 Maximum Green Extensions:
 EWG: 30 s Green/Walk
 NSG Truncation to ped minimum

LOCATION: King St & Shaw St		DISTRICT: Toronto & East York	
MODE/COMMENT: SAP with PR, 2-Wire Polara APS & TSP		COMPUTER SYSTEM: TransSuite	
TCS: 1628		CONTROLLER/CABINET TYPE: Peek ATC 1000 / TS2 T1	
PREPARED BY / DATE: Ranajamil Iftikhar / November 19, 2018		CONFLICT FLASH: Red & Red	
CHECKED BY / DATE: Carmen Lam / November 21, 2018		DESIGN WALK SPEED: 1.0 m/s (FDW based on full crossing at 1.2 m/s)	
IMPLEMENTATION DATE: November 29, 2018		CHANNEL/DROP: 4026/14	
		FIRMWARE VERSION: 3.018.1.2976	

NEMA Phase	OFF	AM	PM	Gardiner Closure	Phase Mode (Fixed/Demanded/Callable)	Remarks
Local Plan Split Table	Pattern 1 Split 1	Pattern 2 Split 2	Pattern 3 Split 3	Pattern 4 Split 4		
1 NOT USED						Pedestrian Minimums: EWWK = 7 secs; EWFD = 15 secs NSWK = 7 secs; NSFD = 13 secs NS phase is callable by vehicle or pedestrian actuation. If a vehicle and/or pedestrian call is received, the maximum NSG is served. The NSWK & NSFD are displayed on the pedestrian signal heads if a pedestrian or vehicle call is received.
2 King St 	WLK 7 FDW 15 MIN 22 MAX1 33 AMB 4 ALR 2 SPLIT				Fixed POZ activated by Request Loop <i>(max extension of 30 secs in Green/Walk)</i>	APS on for 7 secs of EWWK and NSWK when activated by the push buttons. Extended Push Activation = 3 secs See back for TSP instructions. TSP re-enabled for both directions on February 2, 2018 Script 5 blocks TSP requests from streetcars less than 90 seconds behind the previous streetcar in the same direction.
3 NOT USED						Additional 1 second above the pedestrian minimum provided to the Phase 4/8 SPLIT is to be served in Phase 4/8.
4 Shaw St 	WLK 7 FDW 13 MIN 20 MAX1 21 AMB 4 ALR 2 SPLIT				Callable by Wavetronix detector and/or Push Button	
5 NOT USED						
6 King St 	WLK 7 FDW 15 MIN 22 MAX1 33 AMB 4 ALR 2 SPLIT				Fixed POZ activated by Request Loop <i>(max extension of 30 secs in Green/Walk)</i>	
7 NOT USED						
8 Shaw St 	WLK 7 FDW 13 MIN 20 MAX1 21 AMB 4 ALR 2 SPLIT				Callable/Extendable by Wavetronix Detector	
CL	65	70	70	80		
OF	1	1	1	42		

NOTES: No EWLT from 7:00AM-10:00AM, M-F; 3:00PM-7:00PM, M-F; public holidays excepted; bicycles excepted; TTC vehicles excepted on EB.

LOC: King St & Shaw St		MODE: SAP with PR, 2-Wire Polara APS & TSP	
TCS: 1628		PREPARATION DATE (TIMING CARD): November 20, 2018	

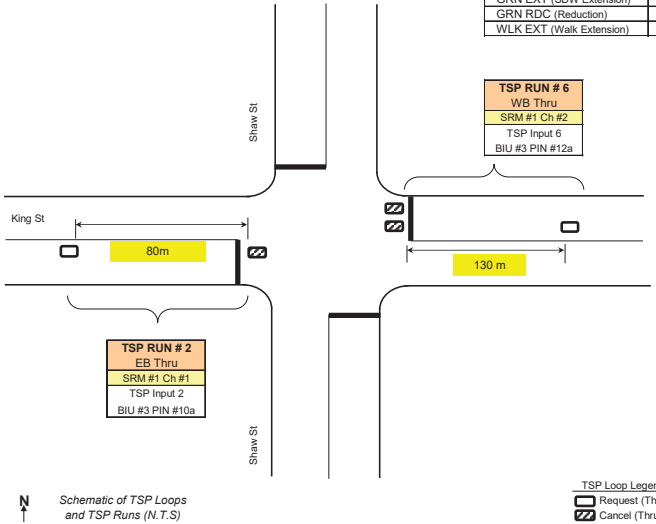
2.3.4 O.C. Extend / Reduce (Max. time added & subtracted in sec.)		From page 1	2.3.2 x O.C.
Split	Ext. / Rdc.	[Cycle] [Stop]	Thres.
OFF	Ext. -- 24 -- -- -- 24 -- -- Rdc. -- 10 -- 1 -- -- 10 -- 1	65 11	Pattern 1 17 s [26 %]
AM	Split 2 Ext. -- 26 -- -- -- 26 -- -- Rdc. -- 15 -- 1 -- -- 15 -- 1	70 16	Pattern 2 18 s [25 %]
PM	Split 3 Ext. -- 26 -- -- -- 26 -- -- Rdc. -- 15 -- 1 -- -- 15 -- 1	70 16	Pattern 3 18 s [25 %]
CARIBANA	Split 4 Ext. -- 30 -- -- -- 30 -- -- Rdc. -- 25 -- 1 -- -- 25 -- 1	80 26	Pattern 3 20 s [25 %]

2.1.9.2 Advanced I/O Scripts
 Input Script 5 'TSP26Timer'
 Blocks TSP 2 and TSP 6 calls from vehicles with a headway less than 90 sec
 To view current status of TSP inputs, go to screen 2.1.9.2 page 01 and press [C]

T.S.P. PARAMETERS			
PREPARED: RI	TSP RUN #2 EB Thru	TSP RUN #6 WB Thru	

2.8.2 Transit Run Parameters			
ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 A (walk)	Mode 2 A (walk)	Mode 2 A (walk)
Run Enable (x = Yes)	X	X	X
Run Config = 1	Recovery = 2 (O.C. with delay)		
2.8.3 Transit Action Plan 1 (Used for Pattern 1 & 4)			
Run Enable (x = Yes)	X	X	X
Run Config = 2	Recovery = 2 (O.C. with delay)		
2.8.3 Transit Action Plan 2 (Used for Pattern 2)			
Run Enable (x = Yes)	X	X	X
Run Config = 3	Recovery = 2 (O.C. with delay)		
2.8.3 Transit Action Plan 3 (Used for Pattern 3)			
Run Enable (x = Yes)	X	X	X
Run Config = 3	Recovery = 2 (O.C. with delay)		
2.8.4 Transit Run Configuration 1			
Delay / Extend / Fail	-- / -- / 235	5 / -- / 235	
CALLS (and Extends)	Ø 2/6	Ø 2/6	
Skips	--	--	
Reduces (Truncates)	Ø 4/8	Ø 4/8	
2.8.4 Transit Run Configuration 2			
Delay / Extend / Fail	14 / -- / 235	5 / -- / 235	
CALLS (and Extends)	Ø 2/6	Ø 2/6	
Skips	--	--	
Reduces (Truncates)	Ø 4/8	Ø 4/8	
2.8.4 Transit Run Configuration 3			
Delay / Extend / Fail	-- / -- / 235	13 / -- / 235	
CALLS (and Extends)	Ø 2/6	Ø 2/6	
Skips	--	--	
Reduces (Truncates)	Ø 4/8	Ø 4/8	

2.8.6 TSP Split Tables: 1, 2, 3 & 4									
	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-1	--	--	--	--	-1
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--	--



Notes:

ATC Mode	0	2	3	4
TTC Algor'm	B-2	A	C	D
Extensions	SDW	Walk	W/SDW	W/SDW

TSP SUMMARY	
Maximum Green Extensions:	EWG: 30 s Green/WLK
	NS truncation to ped min

LOCATION: King St W & Strachan Ave MODE/COMMENT: FXT with TSP* TCS: 538 PREPARED BY/ DATE: Ranajamil Ifrikhar / November 19, 2018 CHECKED BY/ DATE: Carmen Lam / November 21, 2108 IMPLEMENTATION DATE: November 29, 2018		DISTRICT: Toronto & East York COMPUTER SYSTEM: TransSuite CONTROLLER/CABINET TYPE: Peek ATC-1000 / TS2 T1 CONFLICT FLASH: Red & Red DESIGN WALK SPEED: 1.0 m/s (FDW based on full crossing at 1.2 m/s) CHANNEL/DROP: 4026/11 CONTROLLER FIRMWARE: 3.018.1.2976							
NEMA Phase	Phase Mode							Remarks	
	(Fixed/Demanded or Callable)								
	OFF	AM	PM	NGHT	WKND	SPEIC EVENT			
	All Other Times	06:45-09:30 M-F	15:45-18:15 M-F	22:00-06:45 Daily	09:00-19:00 Sat & Sun	Times to be determined			
	Local Plan Split Table	Pattern 1 Split 1	Pattern 2 Split 2	Pattern 3 Split 3	Pattern 4 Split 4	Pattern 5 Split 5	Pattern 16 Split 16		
1		WLK 6 FDW 6 MIN 7 MAX1 7 AMB 3 ALR 1 SPLIT						Demanded (Phase not currently in use - only implemented for during Dufferin St bridge rehab) Pedestrian Minimums: EWWK = 7 sec, EWFD = 13 sec NSWK = 7 sec, NSFD = 14 sec *See back for TSP Instructions WB & EB TSP enabled on Feb 3, 2014. Script 1 blocks TSP requests from streetcars less than 90 seconds behind the previous streetcar in the same direction.	
2		WLK 7 FDW 13 MIN 20 MAX1 32 AMB 3 ALR 3 SPLIT						Fixed POZ activated by Request Loop (max extension of 30 secs in EBG/Walk)	
3		WLK FDW MIN MAX1 AMB ALR SPLIT							
4		WLK 7 FDW 14 MIN 21 MAX1 22 AMB 4 ALR 2 SPLIT	38	46	46	38	41	42	Fixed (truncations allowable to pedestrian minimum)
5		WLK FDW MIN MAX1 AMB ALR SPLIT							
6		WLK 7 FDW 13 MIN 20 MAX1 32 AMB 3 ALR 3 SPLIT	38	46	46	38	41	42	Fixed POZ activated by Request Loop (max extension of 30 secs in WBG/Walk)
7		WLK FDW MIN MAX1 AMB ALR SPLIT							
8		WLK 7 FDW 14 MIN 21 MAX1 22 AMB 4 ALR 2 SPLIT	32	34	34	32	34	28	Fixed (truncations allowable to pedestrian minimum)
	CL	70	80	80	70	75	70		
	OF	14	42	50	59	47	14		

Notes:

LOC: King St & Strachan Av
MODE: FXT with TSP
TCS: 538
PREPARATION DATE (TIMING CARD): November 20, 2018

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce	(Max. time added & subtracted in sec.)	From page 1	(Cycle)	(Stop)
OFF	01 02 03 04 05 06 07 08			
Split 1	Ext. -- 13 -- 13 -- 13 -- 13	70	9	9
Rdc.	-- 5 -- 4 -- 5 -- 4			
AM				
Split 2	Ext. -- 15 -- 15 -- 15 -- 15	80	10	10
Rdc.	-- 6 -- 4 -- 6 -- 4			
PM				
Split 3	Ext. -- 15 -- 15 -- 15 -- 15	80	10	10
Rdc.	-- 6 -- 4 -- 6 -- 4			
NIGHT				
Split 4	Ext. -- 13 -- 13 -- 13 -- 13	70	9	9
Rdc.	-- 5 -- 4 -- 5 -- 4			
WKND				
Split 5	Ext. -- 14 -- 14 -- 14 -- 14	75	10	10
Rdc.	-- 6 -- 4 -- 6 -- 4			
SPECIAL EVENT				
Split 16	Ext. -- 13 -- 13 -- 13 -- 13	70	9	9
Rdc.	-- 8 -- 1 -- 8 -- 1			

2.1.9.2 Advanced I/O Scripts
 Input Script 1 'TSP26Timer'.
 Blocks TSP 2 and TSP 6 calls from vehicles with a headway less than 90 sec
 To view current status of TSP inputs, go to screen 2.1.9.2 page 01 and press [C].

T.S.P. PARAMETERS

PREPARED: RI

	TSP RUN #2	TSP RUN #6
EB Thru		
WB Thru		

2.8.2 Transit Run Parameters

ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 A	Mode 2 A
Run Enable (x = Yes)	X	X
Run Config = 1		
Recovery = 2 (O.C. with delay)		

2.8.3 Transit Action Plan 1 (Used for Patterns 1, 4, 5, 16)

Run Config = 2	Recovery = 2 (O.C. with delay)
X	X

2.8.3 Transit Action Plan 2 (Used for Pattern 2)

Run Config = 2	Recovery = 2 (O.C. with delay)
X	X

2.8.3 Transit Action Plan 3 (Used for Pattern 3)

Run Config = 3	Recovery = 2 (O.C. with delay)
X	X

2.8.4 Transit Run Configuration 1

Delay / Extend / Fall	2 / -- / 235	-- / -- / 235
CALLS (and Extends)	0 2/6	0 2/6
Skips	--	--
Reduces (Truncates)	0 4/8	0 4/8

2.8.4 Transit Run Configuration 2

Delay / Extend / Fall	15 / -- / 235	4 / -- / 235
CALLS (and Extends)	0 2/6	0 2/6
Skips	--	--
Reduces (Truncates)	0 4/8	0 4/8

2.8.4 Transit Run Configuration 3

Delay / Extend / Fall	4 / -- / 235	9 / -- / 235
CALLS (and Extends)	0 2/6	0 2/6
Skips	--	--
Reduces (Truncates)	0 4/8	0 4/8

2.8.6 TSP Split Tables: 1 & 4

	01	02	03	04	05	06	07	08
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	-5	--	--	--	-5	--
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--

2.8.6 TSP Split Tables: 2, 3 & 5

	01	02	03	04	05	06	07	08
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	-7	--	--	--	-7	--
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--

2.8.6 TSP Split Table: 16

	01	02	03	04	05	06	07	08
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	+1	--	--	--	-1	--
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--

TSP RUN #6
 WB Thru
 SRM #1 Ch #2
 TSP Input 6
 BIU #3 PIN #12a

TSP Loop Legend
 Request (Thru)
 Cancel (Thru)

ATC Mode 0 2 3 4
TTC Algor'm B-2 A C D
Extensions SDW Walk W/SDW W/SDW

TSP SUMMARY
 Maximum Green Extensions:
 EWG: 30 s Green/Walk
 Truncation of phases 4 and 8 to ped min

LOCATION: King St & Sudbury St / Private Access MODE/COMMENT: SAP with PR & TSP TCS: 1851 PREPARED BY/DATE: Ranajamil Iftikhar / November 19, 2018 CHECKED BY/DATE: Carmen Lam / November 21, 2108 IMPLEMENTATION DATE: November 29, 2018		DISTRICT: Toronto & East York COMPUTER SYSTEM: TransSuite CONTROLLER/CABINET TYPE: Peek ATC 1000 / TS2 T1 CONFLICT FLASH: Red & Red DESIGN WALK SPEED: 1.0 m/s (FDW based on full crossing at 1.2 m/s) CHANNEL/DROP: 4026/15 CONTROLLER FIRMWARE: 3.018.1.2976				
NEMA Phase	Local Plan Split Table	Phase Mode (Fixed/Demanded or Callable)				Remarks
		OFF All Other Times	AM 06:45-09:30 M-F	PM 15:45-18:15 M-F	CARIBANA Times to be Determined	
1	NOT USED					Pedestrian Minimums: NSWK = 7 sec, NSFD = 14 sec EWWWK = 7 sec, EWFD = 17 sec NS phase is callable by vehicle or pedestrian actuation. If a vehicle call and/or a pedestrian call is received, the pedestrian minimums will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a vehicle and/or pedestrian call is received.
2	King St					Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk) EB & WB TSP enabled on Feb 3, 2014 Additional 1 second above the pedestrian minimum provided to the Phase 4/8 SPLIT is to be served in Phase 4/8. Script 1 blocks TSP requests from streetcars less than 90 seconds behind the previous streetcar in the same direction.
3	NOT USED					
4	Private Access					Callable by Stopbar loop and/or Pushbutton. Truncations allowable to pedestrian minimum
5	NOT USED					
6	King St					Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)
7	NOT USED					
8	Sudbury St					Callable by Trafficam detector and/or Pushbutton; Truncations allowable to pedestrian minimum
	CL	75	80	80	80	
	OF	1	1	1	52	

Notes:

LOC: King St & Sudbury St / Private Access
MODE: SAP with PR & TSP
TCS: 1851
PREPARATION DATE: November 19, 2018

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce (Max. time added & subtracted in sec.)

OFF	Ext.	--	28	--	--	--	28	--	--
	Rdc.	--	18	--	1	--	18	--	1
AM	Ext.	--	30	--	--	--	30	--	--
	Rdc.	--	23	--	1	--	23	--	1
PM	Ext.	--	30	--	--	--	30	--	--
	Rdc.	--	23	--	1	--	23	--	1
CARIBANA	Ext.	--	30	--	--	--	30	--	--
	Rdc.	--	23	--	1	--	23	--	1

T.S.P. PARAMETERS

PREPARED: RI

TSP RUN # 2	TSP RUN # 6
EB Thru	WB Thru

2.8.2 Transit Run Parameters

ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 A (walk)	Mode 2 A (walk)
Run Enable (x = Yes)	X	X
Run Config = 1	Recovery = 2 (O.C. with delay)	

2.8.3 Transit Action Plan 1 (Used for Patterns 1, 3 & 4)

Run Enable (x = Yes)	X	X
Run Config = 2	Recovery = 2 (O.C. with delay)	

2.8.3 Transit Action Plan 2 (Used for Pattern 2)

Run Enable (x = Yes)	X	X
Run Config = 2	Recovery = 2 (O.C. with delay)	

2.8.4 Transit Run Configuration 1

Delay / Extend / Fail	5 / -- / 235	-- / -- / 235
CALLS (and Extends)	Ø 2/6	Ø 2/6
Skips	--	--
Reduces (Truncates)	Ø 4/8	Ø 4/8

2.8.4 Transit Run Configuration 2

Delay / Extend / Fail	13 / -- / 235	-- / -- / 235
CALLS (and Extends)	Ø 2/6	Ø 2/6
Skips	--	--
Reduces (Truncates)	Ø 4/8	Ø 4/8

2.8.6 TSP Split Tables: 1, 2, 3 & 4

GRN EXT (SDW Extension)	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-1	--	--	-1
WLK EXT (Walk Extension)	--	30	--	--	--	30	--

2.1.9.2 Advanced IO Scripts

Input_Script 1 'TSP26Timer'
 Blocks TSP 2 and TSP 6 calls from vehicles with a headway less than 90 sec
 To view current status of TSP inputs, go to screen 2.1.9.2 page 01 and press [C].

TSP Loop Legend









- Request (Thru)
- Cancel (Thru)

TSP SUMMARY

ATC Mode	0	2	3	4
TTC Algorhm	B-2	A	C	D
Extensions	SDW	Wak	W/SDW	W/SDW

Maximum Green Extensions:
 EWG: 30 s Green/Walk
 NS truncation to ped min

LOCATION: Strachan Ave & Wellington St W/ Douro St
DISTRICT: Toronto & East York
MODE/COMMENT: FXT with 2-wire Polara APS
COMPUTER SYSTEM: TransSuite
TCS: 2403
CONTROLLER/CABINET TYPE: PEEK ATC-1000 / TS2T1
PREPARED/CHECKED BY: RVIDS
CONFLICT FLASH: Red & Red
PREPARATION DATE: May 16, 2017
DESIGN WALK SPEED: 1.0m/s (FDW based on full crossing @ 1.2m/s)
IMPLEMENTATION DATE: July 19, 2018
CHANNEL/DROP: 4026/30
FIRMWARE VERSION: 3.018.2976

NEMA Phase	Local Plan Split Table	OFF	AM	PM	SPEC EVENT	Phase Mode (Fixed/Demanded or Callable)	Remarks
		All Other Times	06:45-09:30 M-F	15:45-18:15 M-F	Times to be determined		
		Pattern 1 Split 1	Pattern 2 Split 2	Pattern 3 Split 3	Pattern 4 Split 4		
1 	WLK FDW MIN MAX 1 AMB ALR SPLIT						Pedestrian Minimums: NSWK = 7 sec, NSFD = 16 sec EWWK = 7 sec, EWFD = 13 sec Left-Turn Passage Time = 2 secs Extended APS Push Activation = 3 secs When activated, actuated APS on during EW & NS walk periods when no arrows are displayed.
2 Strachan Ave 	WLK 7 FDW 16 MIN 23 MAX 1 37 AMB 4 ALR 2 SPLIT					Fixed	
3 	WLK FDW MIN 6 MAX 1 6 AMB 3 ALR 1 SPLIT				11	Callable and extendable by 9m setback loop	
4 Douro St 	WLK 7 FDW 13 MIN 20 MAX 1 21 AMB 3 ALR 3 SPLIT					Fixed	
5 	WLK FDW MIN 6 MAX 1 6 AMB 3 ALR 1 SPLIT					NBLA Fixed	
6 Strachan Ave 	WLK 7 FDW 16 MIN 23 MAX 1 37 AMB 4 ALR 2 SPLIT					Fixed	
7 	WLK FDW MIN MAX 1 AMB ALR SPLIT						
8 Wellington St W 	WLK 7 FDW 13 MIN 20 MAX 1 21 AMB 3 ALR 3 SPLIT					Fixed	
	CL OF	70 27	80 48	80 46	80 27		

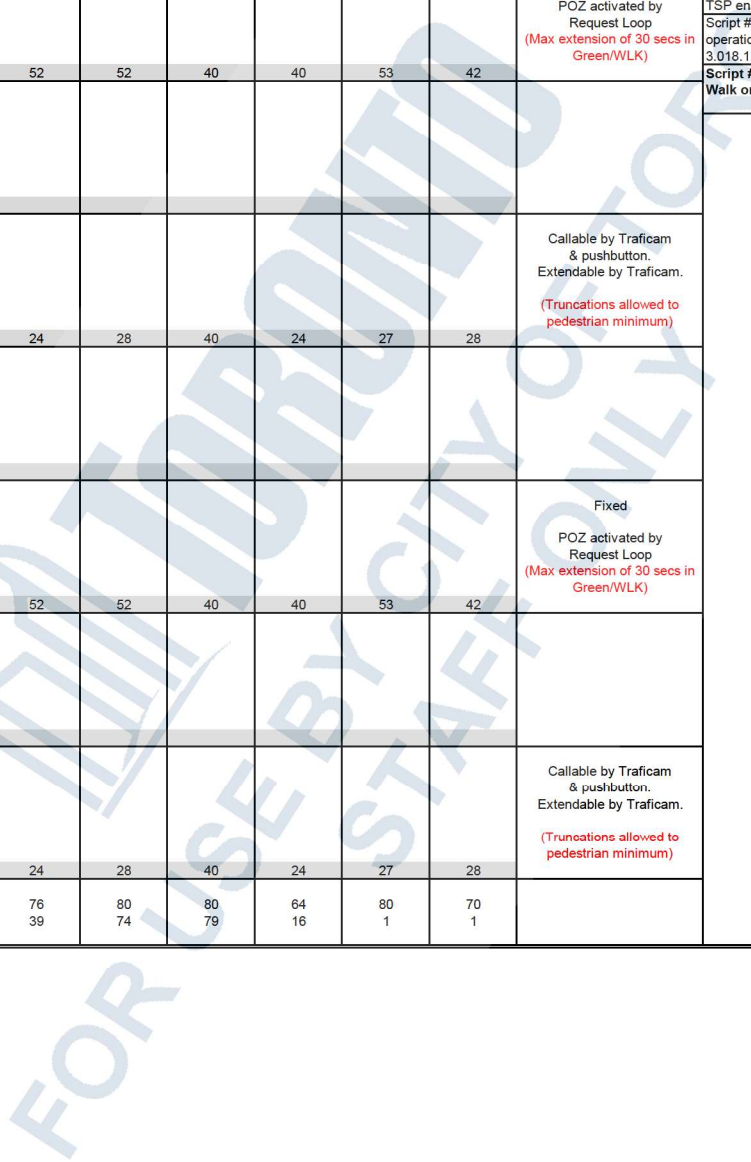
NOTES:

LOCATION:	Dufferin St & Liberty St / Private Access	DISTRICT:	Toronto & East York
MODE/COMMENT:	SAP with PR & TSP	COMPUTER SYSTEM:	TransSuite
TCS:	1449	CONTROLLER/CABINET TYPE:	Peek ATC-1000 / TS2T1
PREPARED/CHECKED BY:	BF	CONFLICT FLASH:	Red & Red
PREPARATION DATE:	August 6, 2019	DESIGN WALK SPEED:	1.0 m/s (FDW based on full crossing at 1.2 m/s)
IMPLEMENTATION DATE:	August 6, 2019	CHANNEL/DROP:	4007/19
		CONTROLLER/FIRMWARE:	3.018.1.2976



NEMA Phase	Local Plan Split Table	OFF	AM	PM	NGHT	WKND	Event	Phase Mode (Fixed/Demanded or Callable)	Remarks
		All Other Times	06:30-09:30 M-F	15:00-19:00 M-F	23:00-06:30 Daily	10:00-19:00 Sat/Sun	TBD		
		Pattern 1 Split 1	Pattern 2 Split 2	Pattern 3 Split 3	Pattern 4 Split 4	Pattern 5 Split 5	Pattern 6 Split 6		
1 Dufferin St	WLK FDW MIN MAX1 AMB ALR SPLIT								Pedestrian Minimums. NSWK = 7 sec, NSFD = 11 sec EWWK = 7 sec, EWFD = 11 sec EW phase is callable by vehicle and/or pedestrian actuation. If a vehicle and/or pedestrian call is received, the maximum EWG is served. The EWWK & EWFD are displayed on the pedestrian signal heads if a vehicle and/or pedestrian call is received.
2 Dufferin St	WLK 7 FDW 11 MIN 18 MAX1 47 AMB 4 ALR 2 SPLIT	52	52	40	40	53	42	Fixed POZ activated by Request Loop (Max extension of 30 secs in Green/WLK)	Side Street Passage Time = 3 sec See back for TSP instructions TSP enabled on May 22, 2015 Script #2 is used to mitigate issues with TSP operation in ATC-1000 firmware version 3.018.1.2976 Script #1 is revised to eliminate the extended Walk on Phase 4 and 8 for all times.
3 Private Access	WLK FDW MIN MAX1 AMB ALR SPLIT								
4 Private Access	WLK 7 FDW 11 MIN 18 MAX1 18 AMB 3 ALR 2 SPLIT	24	28	40	24	27	28	Callable by Traficam & pushbutton. Extendable by Traficam. (Truncations allowed to pedestrian minimum)	
5 Dufferin St	WLK FDW MIN MAX1 AMB ALR SPLIT								
6 Dufferin St	WLK 7 FDW 11 MIN 18 MAX1 47 AMB 4 ALR 2 SPLIT	52	52	40	40	53	42	Fixed POZ activated by Request Loop (Max extension of 30 secs in Green/WLK)	
7 Liberty St	WLK FDW MIN MAX1 AMB ALR SPLIT								
8 Liberty St	WLK 7 FDW 11 MIN 18 MAX1 18 AMB 3 ALR 2 SPLIT	24	28	40	24	27	28	Callable by Traficam & pushbutton. Extendable by Traficam. (Truncations allowed to pedestrian minimum)	
	CL OF	76 39	80 74	80 79	64 16	80 1	70 1		

Notes:



LOC: Dufferin St & Liberty St
 MODE: SAP with WRM & TSP
 TCS: 1449 PREPARATION DATE (TIMING CARD): March 28, 2018

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce		(Max. time added & subtracted in sec.)								From page 1		2.3.2.x O.C. Thres.	
		Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	(Cycle)	(Stop)	Pattern	Thres.
OFF													
Split 1	Ext.	--	23	--	--	--	23	--	--	76	28	Pattern 1	30 s
	Rdc.	--	28	--	--	--	28	--	--				[39 %]
AM													
Split 2	Ext.	--	25	--	--	--	25	--	--	80	28	Pattern 2	30 s
	Rdc.	--	28	--	--	--	28	--	--				[38 %]
PM													
Split 3	Ext.	--	5	--	25	--	5	--	25	80	18	Pattern 3	20 s
	Rdc.	--	18	--	--	--	18	--	--				[25 %]
NGT													
Split 4	Ext.	--	17	--	--	--	17	--	--	64	16	Pattern 4	30 s
	Rdc.	--	16	--	--	--	16	--	--				[47 %]
WKND													
Split 5	Ext.	--	25	--	--	--	25	--	--	80	29	Pattern 5	30 s
	Rdc.	--	29	--	--	--	29	--	--				[38 %]
Event													
Split 6	Ext.	--	20	--	--	--	20	--	--	70	18	Pattern 6	30 s
	Rdc.	--	18	--	--	--	18	--	--				[43 %]

Per TTC's request, extension times for PM plan are changed.
 Note: In response to observation, Phase 4/8 OC Rdc. not permitted and OC Ext added to phase 4/8 during pattern 3.
 OC Thresholds have been increased to mitigated side street impacts. OC Ext values have been adjusted accordingly.

2.1.9.2 Advanced I/O Scripts
 Input Script 2 "TCS1449TSPFilter"

Blocks TSP inputs 2 & 6 during phase 4/8 Amb & AllR, and during unused time served in phase 2/6 late in the cycle, to mitigate firmware issues with ATC-1000 Build 3.018.1.2976. The script also aoolies a 40 seconds delay to TSP input 2 during Pattern 3 (PM).

T.S.P. PARAMETERS

PREPARED: BF

TSP RUN	TSP RUN
# 2	# 6
NB Thru	SB Thru

2.8.2 Transit Run Parameters

ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2	Mode 2
	A	A

2.8.3 Transit Action Plan 1 (Used for Patterns 1, 4, 5 & 6)

Run Enable (X=Yes)	X	X
Run Config = 1	Recovery = 2 (O.C. with delay)	

2.8.3 Transit Action Plan 2 (Used for Pattern 2)

Run Enable (X=Yes)	X	X
Run Config = 2	Recovery = 2 (O.C. with delay)	

2.8.3 Transit Action Plan 3 (Used for Pattern 3)

Run Enable (X=Yes)	X	X
Run Config = 3	Recovery = 2 (O.C. with delay)	

2.8.4 Transit Run Configuration 1

Delay / Extend / Fail	3 / - / 235	1 / - / 235
CALLS (and Extends)	Ø 2/6	Ø 2/6
Skips	--	--
Reduces (Truncates)	Ø 4/8	Ø 4/8

2.8.4 Transit Run Configuration 2

Delay / Extend / Fail	5 / - / 235	2 / - / 235
CALLS (and Extends)	Ø 2/6	Ø 2/6
Skips	--	--
Reduces (Truncates)	Ø 4/8	Ø 4/8

2.8.4 Transit Run Configuration 3

Delay / Extend / Fail	* / - / 235	1 / - / 235
CALLS (and Extends)	Ø 2/6	Ø 2/6
Skips	--	--
Reduces (Truncates)	Ø 4/8	Ø 4/8

*40 seconds NB delay provided by script 2 Elapsed time

Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
-----	-----	-----	-----	-----	-----	-----	-----

2.8.6 TSP Split Tables: 1 & 4

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-1	--	--	--	-1
WLK EXT (Walk Extension)	--	+30	--	--	--	+30	--	--

2.8.6 TSP Split Tables: 2 & 6

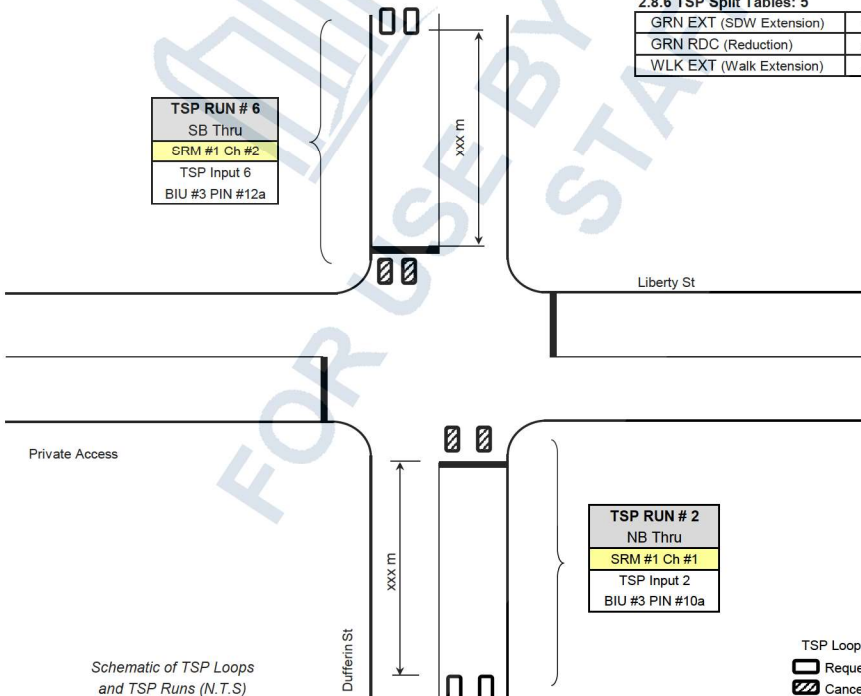
	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-5	--	--	--	-5
WLK EXT (Walk Extension)	--	+30	--	--	--	+30	--	--

2.8.6 TSP Split Tables: 3

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-15	--	--	--	-15
WLK EXT (Walk Extension)	--	+30	--	--	--	+30	--	--

2.8.6 TSP Split Tables: 5

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-4	--	--	--	-4
WLK EXT (Walk Extension)	--	+30	--	--	--	+30	--	--



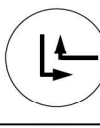
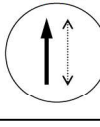
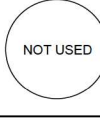
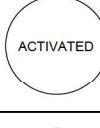
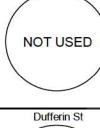
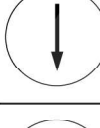

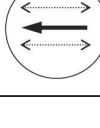
Notes:
 Script #2 blocks TSP inputs 2 and 6 late in the cycle, to mitigate firmware issues with ATC-1000 Build 3.018.1.2976.

TSP inputs can be checked on screen 1.2.4 at all times.

ATC Mo	0	2	3	4
TTC Alg	B-2	A	C	D
Extensio	SDW	Walk	W/SDW	W/SDW

TSP SUMMARY
 Maximum Green Extensions:
 NSG: 30s Green/WLK
 Phase 4 & 8 truncation to ped min

LOCATION:	Dufferin St & Saskatchewan Rd	DISTRICT:	Toronto & East York
MODE/COMMENT:	SAP with PR, 2-wire Polara APS, & TSP	COMPUTER SYSTEM:	TransSuite
TCS:	2134	CONTROLLER/CABINET TYPE:	Peek ATC-1000 / TS2T1
PREPARED/CHECKED BY:	Parsons / MR / DS	CONFLICT FLASH:	Red & Red
PREPARATION DATE:	March 31, 2017	DESIGN WALK SPEED:	1.0 m/s (FDW based on full crossing at 1.2 m/s)
IMPLEMENTATION DATE:	June 22, 2017	CHANNEL/DROP:	4007/21
		CONTROLLER/FIRMWARE:	3.018.1.2976

NEMA Phase	Local Plan Split Table	OFF	AM	PM	NGHT	WKND	PRE-BMO	POST-BMO	Phase Mode (Fixed/Demanded or Callable)	Remarks
		All Other Times	06:30-09:30 M-F	15:00-19:00 M-F	23:00-06:30 Daily	10:00-19:00 Sat/Sun	TBD	TBD		
		Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6	Pattern 7		
		Split 1	Split 2	Split 3	Split 4	Split 5	Split 6	Split 7		
1 	WLK 6 FDW 7 MIN 7 MAX1 3 AMB 3 ALR 1 SPLIT 1	11	11	11	0	11	20	11	Callable/Extendable by 9m long setback loop. All times except NGHT plan. Callable at all times by transit POZ activated by Request Loop (Max extension of 16 secs in Green)	Pedestrian Minimums: NSWK = 7 sec, NSFD = 20 sec EWWK = 7 sec, EWFD = 14 sec Left Turn Passage Time = 2 sec SBLA and WBRA are displayed simultaneously.
2 Dufferin St 	WLK 7 FDW 20 MIN 27 MAX1 30 AMB 4 ALR 3 SPLIT 3	38	39	40	35	42	41	35	Fixed.	WB phase is callable by vehicle and/or pedestrian actuation. If a vehicle and/or pedestrian call is received, the maximum WBG is served. The EWWK & EWFD are displayed on the pedestrian signal heads if a vehicle and/or pedestrian call is received. Side Street Passage Time = 3 sec ATP on during 7 sec of NSWK & 7 sec of EWWK when activated by pushbutton. Extended Push Activation = 3 sec See back for TSP instructions. TSP enabled on May 22, 2015
3 	WLK FDW MIN MAX1 AMB ALR SPLIT									
4 	WLK 7 FDW 14 MIN 21 MAX1 21 AMB 3 ALR 2 SPLIT 2	27	29	29	29	27	29	44	Served concurrently with Phase 8.	
5 	WLK FDW MIN MAX1 AMB ALR SPLIT									
6 Dufferin St 	WLK 7 FDW 20 MIN 27 MAX1 41 AMB 4 ALR 3 SPLIT 3	49	51	51	35	53	61	46	Fixed.	
7 	WLK FDW MIN MAX1 AMB ALR SPLIT									
8 Saskatchewan Rd 	WLK 7 FDW 14 MIN 21 MAX1 21 AMB 3 ALR 2 SPLIT 2	27	29	29	29	27	29	44	Callable by stopbar loop and/or pushbutton. Extendable by stopbar loop.	
	CL OF	76 68	80 15	80 31	64 1	80 33	90 1	90 1		

Note: T- intersection - no west leg.

LOC: Dufferin St & Saskatchewan Rd
MODE: SAP with PR, 2-wire Polara APS, & TSP*
TCS: 2134 **PREPARATION DATE (TIMING CARD):** March 31, 2017

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce		(Max. time added & subtracted in sec.)								From page 1	
		Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	(Cycle)	(Slop)
OFF											
Split 1	Ext.	--	32	--	--	--	32	--	--	76	6
	Rdc.	1	4	--	1	--	5	--	1		
AM											
Split 2	Ext.	--	31	--	--	--	31	--	--	80	9
	Rdc.	1	5	--	3	--	6	--	3		
PM											
Split 3	Ext.	--	30	--	--	--	30	--	--	80	10
	Rdc.	1	6	--	3	--	7	--	3		
NGT											
Split 4	Ext.	--	18	--	--	--	18	--	--	64	4
	Rdc.	--	1	--	3	--	1	--	3		
WKND											
Split 5	Ext.	--	30	--	--	--	30	--	--	80	10
	Rdc.	1	8	--	1	--	9	--	1		
PRE-BMO											
Split 6	Ext.	--	35	--	--	--	35	--	--	90	10
	Rdc.	--	7	--	3	--	7	--	3		
POST-BMO											
Split 7	Ext.	4	13	--	17	--	17	--	17	90	12
	Rdc.	1	1	--	10	--	2	--	10		

2.3.2.x O.C. Thres.

Pattern 1	12 s [16 %]
Pattern 2	18 s [23 %]
Pattern 3	20 s [25 %]
Pattern 4	12 s [19 %]
Pattern 5	20 s [25 %]
Pattern 6	20 s [22 %]
Pattern 7	23 s [25 %]

O.C. Thres. set to 2 x Slop for Patterns 1, 2, and 6 to allow the signal to recover in 2 cycles.
O.C. Thres. Set to 3x slop for Pattern 4 to allow signal to recover in 3 cycles.
Ext values in Patterns 1, 2, 4, and 6 adjusted accordingly.
Phase 1 O.C. Rdc. not allowed during Pre-BMO plan (Pattern 6).
Phase 4/8 Rdc. in Post-BMO plan (Pattern 7) capped at minimum which allows recovery in 2 cycles.
O.C. Ext. split between Phase 2/6 and 4/8 during Post-BMO plan (Pattern 7).

T.S.P. PARAMETERS

PREPARED: Parsons / MR / DS

TSP RUN # 1
SB Left

2.8.2 Transit Run Parameters

ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 0 B-2
--	------------

2.8.3 Transit Action Plan 1 (Used for all Patterns)

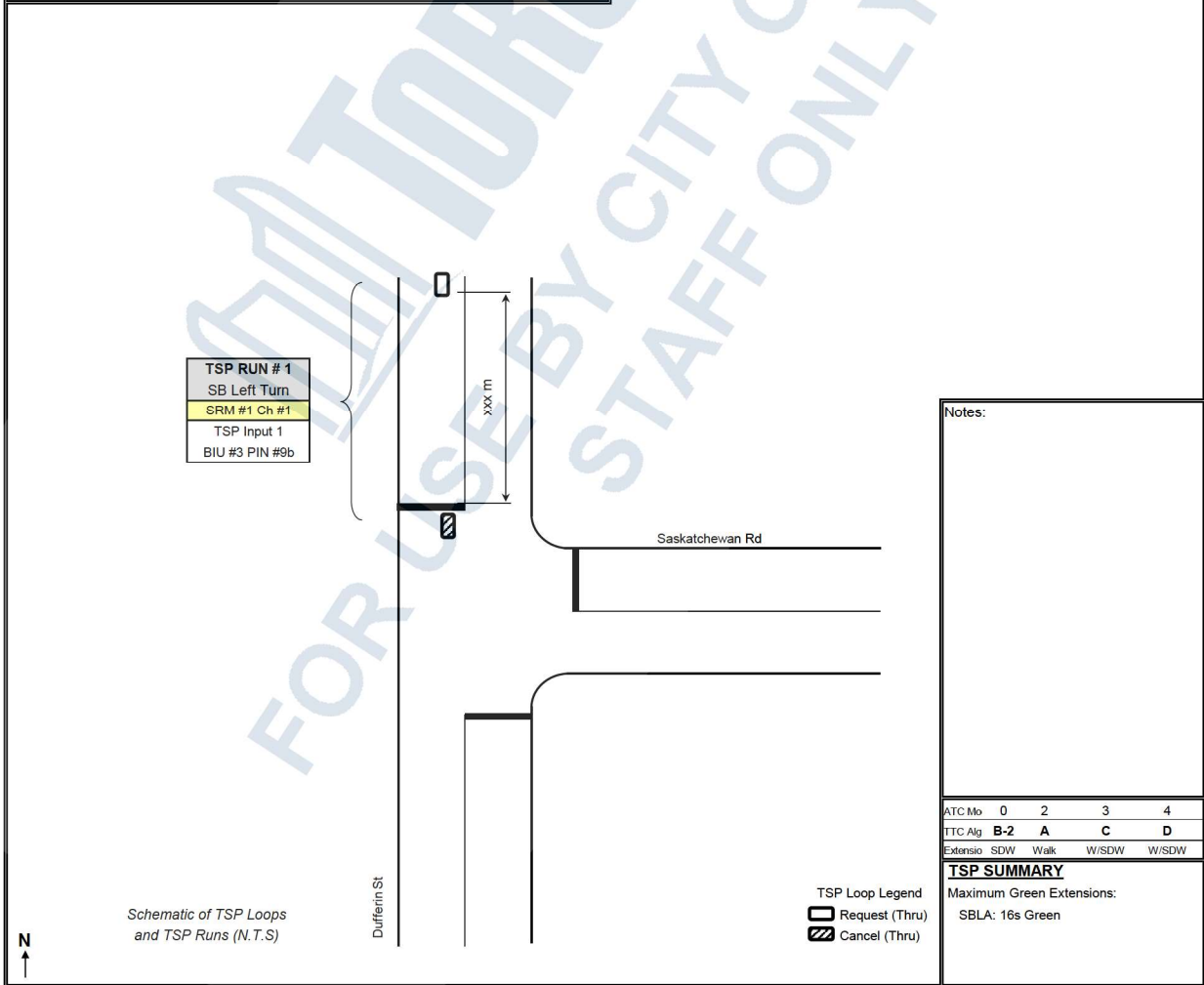
Run Enable (X=Yes)	X
Run Config = 1	Recovery = 2 (O.C. with delay)

2.8.4 Transit Run Configuration 1

Delay / Extend / Fail	-- / -- / 235
CALLS (and Extends)	Ø 1
Skips	--
Reduces (Truncates)	--

2.8.6 TSP Split Tables: 1, 2, 3, 4, 5, 6 & 7

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	+16	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	--	--	--	--	--
WLK EXT (Walk Extension)	--	--	--	--	--	--	--	--



LOCATION:	King St & Dufferin St	DISTRICT:	Toronto & East York
MODE/COMMENT:	FXT with TSP	COMPUTER SYSTEM:	TransSuite
TCS:	539	CONTROLLER/CABINET TYPE:	Peek ATC-1000 / TS2T1
PREPARED BY / DATE:	Kelly Hannah \ September 16, 2020	CONFLICT FLASH:	Red & Red
CHECKED BY / DATE:	Ameneh Dialameh \ September 30, 2020	DESIGN WALK SPEED:	0.9 m/s (FDW based on full crossing at 1.1 m/s)
IMPLEMENTATION DATE:	January 21, 2021	CHANNEL/DROP:	4026/18
		CONTROLLER/FIRMWARE:	3.018.1.2976



NEMA Phase	Local Plan Split Table	OFF	AM	PM	NGHT	WKND	Caribana	Phase Mode (Fixed/Demanded or Callable)	Remarks	
		All Other Times	06:30-09:30 M-F	15:00-19:00 M-F	23:00-06:30 Daily	10:00-19:00 Sat/Sun	TBD			
		Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6			
1	 King St	WLK FDW MIN 10 MAX1 10 AMB 3 ALR 6 SPLIT						Protected/Permissive WBLTGA Callable by WBLT streetcars via interrogator (Max extension of 10 secs in WBLA)	Pedestrian Minimums: EWWK = 8 sec, EWFD = 15 sec NSWK = 8 sec, NSFD = 15 sec Left Turn Passage Time = 2 sec See back for TSP instructions.	
2	 King St	WLK 8 FDW 15 MIN 23 MAX1 26 AMB 3.3 ALR 2.2 SPLIT	0	0	0	0	0	Fixed POZ activated by Request Loop (Max extension of 16 secs in Green/SDW)	Due to restrictions in ATC-1000 firmware version 3.18.2976, phase 2 & 6 splits must be programmed as at least 30 during all patterns at this intersection. TSP re-enabled on January 15, 2021	
3	 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT								
4	 Dufferin St	WLK 8 FDW 15 MIN 23 MAX1 40 AMB 3.3 ALR 2.2 SPLIT						Fixed POZ activated by Request Loop (Max extension of 16 secs in Green/SDW)		
5	 Dufferin St	WLK FDW 6 MIN 6 MAX1 6 AMB 3.3 ALR 4.0 SPLIT						Demanded (In Shared Thru-Left Lane) Reserved for Future Use Times to be Determined		
6	 King St	WLK 8 FDW 15 MIN 23 MAX1 26 AMB 3.3 ALR 2.2 SPLIT	32	41	35	33	33	35	Fixed POZ activated by Request Loop (Max extension of 16 secs in Green/SDW)	
7	 Dufferin St	WLK FDW 6 MIN 6 MAX1 6 AMB 3.3 ALR 3.9 SPLIT	14		14		14	14	Demanded (In Shared Thru-Left Lane)	
8	 Dufferin St	WLK 8 FDW 15 MIN 23 MAX1 26 AMB 3.3 ALR 2.2 SPLIT	32	39	31	31	33	31	Fixed POZ activated by Request Loop (Max extension of 16 secs in Green/SDW)	
	CL	78	80	80	64	80	80			
	OF	53	24	29	29	45	46			

Note:

LOC: King St & Dufferin St
 MODE: FXT with TSP
 TCS: 539

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce (Max. time added & subtracted in sec.) From page 1

		Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	(Cycle)	(Slop)	2.3.2.x O.C. Thres.
OFF												
Split 1	Ext.	--	18	--	19	--	18	--	19	78	5	Pattern 1 5 s [6 %]
	Rdc.	--	3	--	2	--	3	1	1			
AM												
Split 2	Ext.	--	15	--	15	--	15	--	15	80	10	Pattern 2 20 s [25 %]
	Rdc.	--	5	--	5	--	5	--	5			
PM												
Split 3	Ext.	--	17	--	18	--	17	--	18	80	8	Pattern 3 11 s [14 %]
	Rdc.	--	7	--	1	--	7	1	--			
NGT												
Split 4	Ext.	--	15	--	15	--	15	--	15	64	6	Pattern 4 5 s [8 %]
	Rdc.	--	4	--	2	--	4	--	2			
WKND												
Split 5	Ext.	--	17	--	18	--	17	--	18	80	8	Pattern 5 11 s [14 %]
	Rdc.	--	5	--	3	--	5	1	2			
Caribana												
Split 6	Ext.	--	17	--	18	--	17	--	18	80	8	Pattern 6 11 s [14 %]
	Rdc.	--	7	--	1	--	7	1	--			

OC Rdc for Phase 8 is set assuming the reductions need to be limited based on longer Phase 7 clearances applied to the through phases due to a firmware issue.
 Pattern 1, 3, 4, 5 & 6 OC Thres set to 3x available slop (adjusted for long LT clearance).
 Controller could take up to 3 cycles to get back in sync from -TSP Recovery.

2.1.9.2 Advanced I/O Scripts
 Input Script 1: "TSPFilter539"

Blocks TSP 2/6 calls during phase 2/6 Amb/AIR and blocks TSP 4/8 calls during phase 4/8 Amb/AIR to mitigate firmware issues with ATC-1000 version 3.018.2976

T.S.P. PARAMETERS

TSP RUN # 1	TSP RUN # 2	TSP RUN # 4	TSP RUN # 6	TSP RUN # 8
WBLT	EB Thru	NB Thru	WB Thru	SB Thru

2.8.2 Transit Run Parameters

ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 0 D-2	Mode 0 D-2	Mode 0 D-2	Mode 0 D-2	Mode 0 D-2
Run Enable (X = Yes)	X	X	X	X	X
Run Config = 1	Recovery = 1 (o.c.)				

2.8.3 Transit Action Plan 1 (Used for Patterns 1, 4, 5 & 6)

Run Enable (X = Yes)	X	X	X	X	X
Run Config = 2	Recovery = 1 (o.c.)				

2.8.3 Transit Action Plan 2 (Used for Pattern 2)

Run Enable (X = Yes)	X	X	X	X	X
Run Config = 2	Recovery = 1 (o.c.)				

2.8.3 Transit Action Plan 3 (Used for Pattern 3)

Run Enable (X = Yes)	X	X	X	X	X
Run Config = 3	Recovery = 1 (o.c.)				

2.8.4 Transit Run Configuration 1

Delay / Extend / Fail	-- / -- / 235	23 / 4 / 235	28 / -- / 235	22 / 4 / 235	21 / -- / 235
Max Req During Offset Corr	1	1	1	1	1
CALLS (and Extends)	Ø 1	Ø 2/6	Ø 4/8	Ø 2/6	Ø 4/8
Skips	--	--	--	--	--
Reduces (Truncates)	--	--	--	--	--

2.8.4 Transit Run Configuration 2

Delay / Extend / Fail	-- / -- / 235	26 / 4 / 235	38 / -- / 235	21 / 4 / 235	17 / -- / 235
Max Req During Offset Corr	1	1	1	1	1
CALLS (and Extends)	Ø 1	Ø 2/6	Ø 4/8	Ø 2/6	Ø 4/8
Skips	--	--	--	--	--
Reduces (Truncates)	--	--	--	--	--

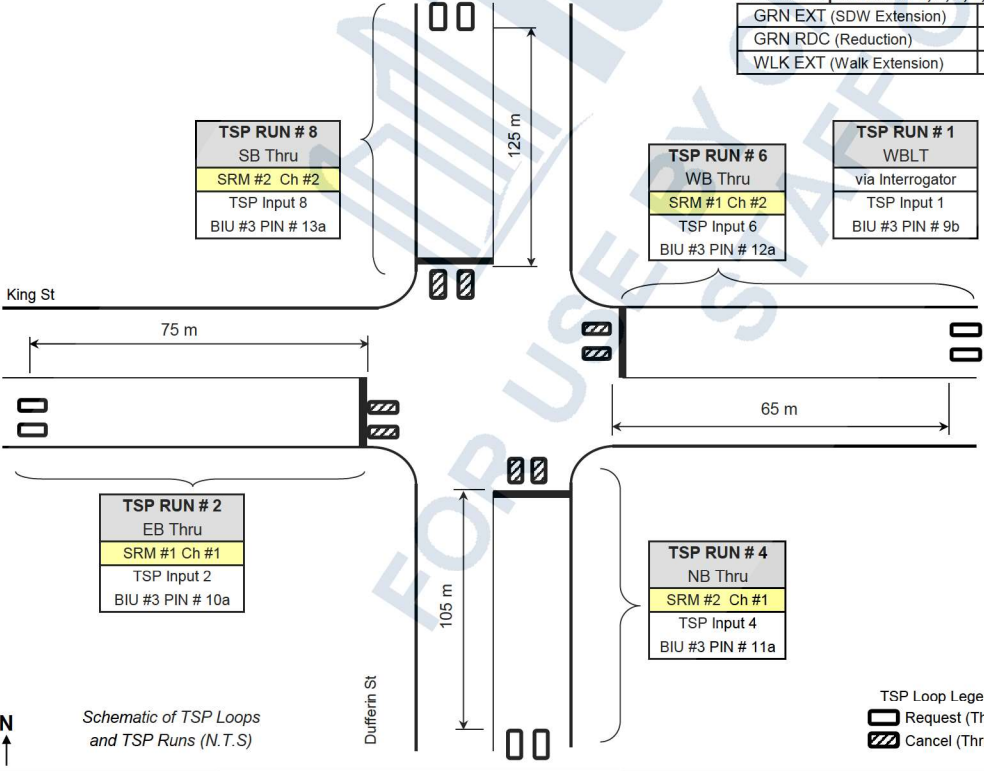
2.8.4 Transit Run Configuration 3

Delay / Extend / Fail	-- / -- / 235	23 / 4 / 235	42 / -- / 235	31 / 4 / 235	18 / -- / 235
Max Req During Offset Corr	1	1	1	1	1
CALLS (and Extends)	Ø 1	Ø 2/6	Ø 4/8	Ø 2/6	Ø 4/8
Skips	--	--	--	--	--
Reduces (Truncates)	--	--	--	--	--

Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
-----	-----	-----	-----	-----	-----	-----	-----

2.8.6 TSP Split Tables: 1, 2, 3, 4, 5 & 6

GRN EXT (SDW Extension)	+10	+16	--	+16	--	+16	--	+16
GRN RDC (Reduction)	--	--	--	--	--	--	--	--
WLK EXT (Walk Extension)	--	--	--	--	--	--	--	--



Notes:

ATC Mode	0	2	3	4
TTC Algor'm	B-2	A	C	D
Extensions	SDW	Walk	W/SDW	W/SDW

TSP SUMMARY

Maximum Green Extensions:
 EWG: 16s Green/SDW
 NSG: 16s Green/SDW
 WBLTA: 10s Green

LOCATION:		Lake Shore Blvd & British Columbia Dr										UTC Stages		Green Returns				
MODE/COMMENT:		SA2-VMG with WRM										B		2 & 6				
TCS/SCN:		1344/30221										C		3 & 7				
CODER/CHECKED BY:		TY										F		4 & 8				
DATE CREATED		July 19, 2018																
DISTRICT:		Toronto and East York																
COMPUTER SYSTEM:		UTC/SCOOT																
CONTROLLER/CABINET:		Econolite Cobalt /TS2T1																
CONTROLLER FIRMWARE:		32.63.10																
CONFLICT:		Red & Red																
DESIGN WALK SPEED:		1.0 m/s (FDW based on full crossing at 1.2 m/s)																
TCC/CHANNEL/DROP:		B/15/2																
IMPLEMENTATION DATE:		July 14, 2019																
Dual Ring NEMA Phase (Green Return)	Local Plan Split Table	TP1	TP2	TP3	TP4	OFF	AM	PM	NGHT	Indy	Phase Mode (Fixed, Demanded or Callable)	Remarks						
		UTC/SCOOT Control	Split 1 & 2	Split 3 & 4	Split 5	All Other Times	6:30 - 10:00 M - F	15:00 - 19:00 M - F	23:00-06:30 Daily	Time to be determined								
		Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Split 1	Split 2	Split 3	Split 4	Split 5							
1	NOT USED											Pedestrian Minimums: EWVK = 7 secs. EWFd = 15 secs. NSWK = 7 secs. NSFd = 17 secs. Phases are skippable, callable & extendable by vehicle and/or pedestrian actuation depending on current operation i.e. under UTC/SCOOT control or TransSuite control. If a vehicle call is received, the minimum time is served. If ongoing vehicle demand exists, the vehicle phase is capable of providing vehicle extensions up to the maximum. Extension time is based on vehicle demand. NB phase is callable & extendable by vehicle actuation only. If a pedestrian call is received, the pedestrian minimum will be served. Vehicle Passage Time = 3 sec. SF #4 enables MAX2 (time to be determined) All plans operate as free. TP1 is used for UTC/SCOOT control. TP2 is used for Pattern 1 & 2 using MAX1 & MAX2 values respectively for green times for all phases. TP3 is used for Pattern 3 & 4 using MAX1 & MAX2 values respectively for green times for all phases. TP4 is used for Pattern 5 using MAX1 value for green time for all phases.						
2	ACTIVATED	7 15 22 38 47 4 3	7 15 22 38 47 4 3	7 15 22 38 47 4 3	7 15 22 38 47 4 3							Dummy Phase activated with Phase 6 Ring Structure: <table border="1"> <tr><td>2</td><td>3</td><td>4</td></tr> <tr><td>6</td><td>7</td><td>8</td></tr> </table>	2	3	4	6	7	8
2	3	4																
6	7	8																
3	ACTIVATED	7 29 53 4 2	7 29 53 4 2	7 29 53 4 2	7 29 53 4 2							Dummy Phase activated with Phase 7 Ring Structure: <table border="1"> <tr><td>2</td><td>3</td><td>4</td></tr> <tr><td>6</td><td>7</td><td>8</td></tr> </table>	2	3	4	6	7	8
2	3	4																
6	7	8																
4	ACTIVATED	7 17 7 24 34 4 2	7 17 7 24 34 4 2	7 17 7 24 34 4 2	7 17 7 24 34 4 2							Signal operates free all times when on local control. Signal is on pedestrian recall and rests in Phases 2 & 6 waiting for calls. When called from rest, signal serves callable phase(s) following phase sequence. If vehicle demand exists for both the NB & SB (veh and/or ped.) at the end of the WB phase, the NB phase is served first followed by the SB phase. In any given cycle, the signal may serve the NB phase, the SB phase, both in that order, or neither depending on demand. The decision point for the NB phase is at the end of the WBG. The decision point for the SB phase is at the end of the NBG phase or at the end of the WBG in the absence of the NB phase being served. Any calls received after the respective decision points will be served after the dwell phase.						
5	NOT USED											Phasing Sequence: Phases 2 & 6 (Dwell Phase) Phases 3 & 7 Phases 4 & 8 Indy Operations						
6	Lake Shore Blvd W	7 15 22 38 47 4 3	7 15 22 38 47 4 3	7 15 22 38 47 4 3	7 15 22 38 47 4 3							Callable by Traficam Detector and/or Pushbuttons; Extendable by Traficam Detector Phasing Sequence: Phases 2 & 6 (Dwell Phase) Phases 3 & 7 Phases 4 & 8 Indy Operations						
7	British Columbia Dr	7 29 53 4 2	7 29 53 4 2	7 29 53 4 2	7 29 53 4 2							Signal drops from SCOOT control and operates free all times under TransSuite control. TP4 used for Pattern 5 using MAX1 values as green time for all phases. Signal is on min recall and rests in Phases 3 & 7 waiting for calls. When called from rest, signal serves callable phase(s) following phase sequence. If vehicle demand exists for both the SB & WB (veh and/or ped.) at the end of the NB phase, the SB phase is served first followed by the WB phase. In any given cycle, the signal may serve the SB phase, the WB phase, both in that order, or neither depending on demand. The decision point for the SB phase is at the end of the NBG. The decision point for the WB phase is at the end of the SBG phase or at the end of the NBG in the absence of the SB phase being served. Any calls received after the respective decision points will be served after the dwell phase.						
8	British Columbia Dr	7 17 7 24 34 4 2	7 17 7 24 34 4 2	7 17 7 24 34 4 2	7 17 7 24 34 4 2							Callable by Stopbar Loop and/or pushbuttons; Extendable by Stopbar Loop Phasing Sequence: Phases 2 & 6 (Dwell Phase) Phases 3 & 7 Phases 4 & 8 Indy Operations						
	CL OFF					0	0	0	0	0	0	During Indy event, WB phase is callable by Traficam and/or Pushbuttons, and Extendable by Traficam. Phasing Sequence: Phases 2 & 6 (Dwell Phase) Phases 3 & 7 Phases 4 & 8 Indy Operations						

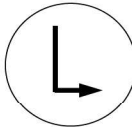
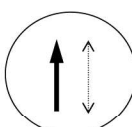
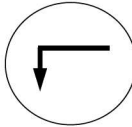
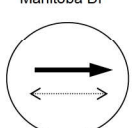

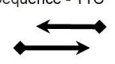
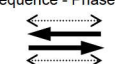
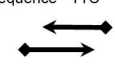
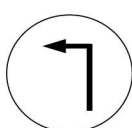

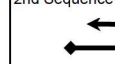
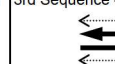
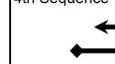
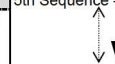


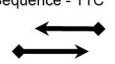


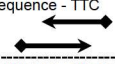

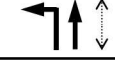
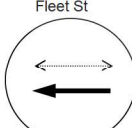
Notes: Signal timings were reverted from the temp. changes for the 2019 Honda Indy on July 14, 2019.

LOCATION:	Lake Shore Blvd W & Strachan Av/ Remembrance Dr	UTC Stages	Green Returns
MODE/COMMENT:	SA2-VMG with UPS, PR & RLC (WB)	A	2 & 5
TCS#/SCN#	222 / 30311	B	2 & 6
CODER / DATE:	RanaJamil Iftikhar / August 15, 2019	C	4 & 8
CHECKED BY / DATE :	Masoud Ramezani /	F	3 & 7
DISTRICT:	Toronto & East York	G	1 & 5
COMPUTER SYSTEM:	UTC / SCOOT	H	1 & 6
CONTROLLER/CABINET:	PEEK ATC-1000 / TS2 T1		
CONFLICT:	Red & Red		
DESIGN WALK SPEED:	1.0 m/s (FDW based on full crossing @ 1.2 m/s)		
IMPLEMENTATION DATE:	January 16, 2020		

NEMA Phase (Green Return)	Local Plan Split Table	OFF	AM	PM	Phase Mode (Fixed/Demanded or Callable)	Remarks
		All Other Times	06:45-9:30 M-F	15:00-19:00 M-F		
		Pattern 1 Split 1	Pattern 2 Split 2	Pattern 3 Split 3		
1 	WLK FDW MIN 6 MAX1 15 MAX2 25 AMB 3 ALR 3 SPLIT	15		16	Protected/Permissive. Callable/ Extendable by Stopbar Loop	Pedestrian Minimums: EWWK = 7 sec, EWFD = 22 sec NSWK = 7 sec, NSFD = 30 sec NS ped crossing on West leg only. NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum SBG is 10 seconds. If ongoing vehicle demand exists on the stopbar loop, the SBG is capable of providing vehicle extensions up to the maximum. If a pedestrian call is received, the pedestrian minimums will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the FWG
2 Lake Shore Blvd W 	WLK 7 FDW 22 MIN 29 MAX1 41 MAX2 41 AMB 4 ALR 2 SPLIT	47	78	62	Fixed	Side Street Passage Time = 3 sec Left Turn Passage Time = 2 sec EBLT demand, in absence of street demand (from Phase 3 or 4), will cause the signal to serve the min SBG (Phase 3) before serving the EBLA. SF#1 Disables WBLA 6:45-09:30, M-F SF#4 Enables Max2 values (times to be determined).
3 Strachan Av/Remembrance Dr 	WLK 7 FDW 30 MIN 10 MAX1 37 MAX2 37 AMB 3 ALR 5 SPLIT	45	45	45	Callable by Stopbar Loop &/or Push Button. Extendable by Stopbar Loop. Remembrance Dr is one-way SB.	ISM used to re-sync in EWG/EWVK only. Ring Structure: 1 2 3 4 5 6 7 8 Phasing Sequence: First Sequence - Phases 2 & 6
4 	WLK FDW MIN 12 MAX1 12 MAX2 12 AMB 3 ALR 6 SPLIT	21	21	21	NB Bike crossing on east leg, callable by ped pushbutton and/or bicycle detector on south leg only	Second Sequence - Phase 3
5 	WLK FDW MIN 6 MAX1 35 MAX2 40 AMB 3 ALR 3 SPLIT	24	31	31	Fully Protected. Callable/ Extendable by Stopbar Loop	Third Sequence - Phase 4
6 Lake Shore Blvd W 	WLK 7 FDW 22 MIN 29 MAX1 32 MAX2 32 AMB 4 ALR 2 SPLIT	38	47	47	Fixed	Fourth Sequence - Phases 1 & 5
7 	WLK 7 FDW 30 MIN 10 MAX1 37 MAX2 37 AMB 3 ALR 5 SPLIT	45	45	45		See back of timing card for operation during Honda Indy File name on USB stick is 222 On field operation, phase 3 is monitored on load switch 8.
8 	WLK FDW MIN 12 MAX1 12 MAX2 12 AMB 3 ALR 6 SPLIT	21	21	21		
	CL	128	144	144		

Notes:

LOCATION:	Strachan Ave & Fleet St / Manitoba Dr	UTC Stages	Green Returns
MODE/COMMENT:	FXT	A	2 & 5
TCS#/SCN#	571 / 30341	B	2 & 6
CODER/CHECKED BY:	TY	C	TTC
DATE CREATED	September 4, 2018	D	3 & 8
DISTRICT:	Toronto and East York	F	4 & 8
COMPUTER SYSTEM:	UTC/SCOOT	G	TTC
CONTROLLER/CABINET:	Peek ATC-1000 / TS2T1	H	1 & 6
CONTROLLER FIRMWARE:	03.018.2976		
CONFLICT:	Red & Red		
DESIGN WALK SPEED:	1.0 m/s (FDW based on full crossing at 1.2 m/s)		
TCC/CHANNEL/DROP:	B/1/3		
IMPLEMENTATION DATE:	July 14, 2019		

Dual Ring NEMA Phase (Green Return)	Timing Information (Seconds)						Phase Mode (Fixed, Demanded or Callable)	Remarks
	Local Plan UTC Plan	OFF	AM	PM	CNE	Indy		
		All Other Times	6:30 - 10:00 M - F Pattern 1	15:00 - 20:00 M - F Pattern 2	Time to be determined Pattern 3	Time to be determined Pattern 4		
1 	WLK 7 FDW 6 MIN 6 MAX1 7 MAX2 10 AMB 3 ALLR 1 SPLIT					12	Demanded by SF #3	Pedestrian Minimums: NSWK = 7 secs. NSFD = 22 secs. EWWK = 7 secs. EWFD = 25 secs. Left-Turn Passage Time = 2 sec Pedestrian slot signal on Manitoba Dr operates concurrently with phase 6.
2 Strachan Ave 	WLK 7 FDW 22 MIN 29 MAX1 36 MAX2 39 AMB 3 ALLR 4 SPLIT	44	60	60	64	48	Fixed	Exclusive EW Transit Phase callable twice per cycle (at the end of NS/EW vehicle phases). Unused time is given to the NS phase green. SF #1 enables NBLA for CNE (time to be determined) SF #2 demands WBLA for CNE (time to be determined) SF #3 demands SBLA for Indy (time to be determined)
3 	WLK 7 FDW 6 MIN 6 MAX1 7 MAX2 7 AMB 3 ALLR 1 SPLIT				12		Demanded by SF #2	SF #4 enables MAX2 (time to be determined) Overlap A overlaps Ø9 & Ø11 which are TTC phases and use times entered for Overlap A.
4 Manitoba Dr 	WLK 7 FDW 25 MIN 32 MAX1 32 MAX2 32 AMB 4 ALLR 3 SPLIT	40	40	40	40	40	Fixed	Normal Phasing Sequence: 1st Sequence - Phases 2 & 6  2nd Sequence - TTC  3rd Sequence - Phases 4 & 8  4th Sequence - TTC 
5 	WLK 7 FDW 18 MIN 6 MAX1 7 MAX2 18 AMB 3 ALLR 1 SPLIT				23		Callable/Extendable by 9 m setback loop SF#1 enables NBLA	Indy Phasing Sequence: 1st Sequence - Phases 2 & 6  2nd Sequence - TTC  3rd Sequence - Phases 4 & 8  4th Sequence - TTC  5th Sequence - Phases 1 & 6 
6 Strachan Ave 	WLK 7 FDW 22 MIN 29 MAX1 36 MAX2 39 AMB 3 ALLR 4 SPLIT	44	60	60	41	60	Fixed Ped slot signal located on Manitoba Dr for NS ped crossing TTC track operates simultaneously with NS ped crossing Manitoba Dr.	CNE Phasing Sequence: 1st Sequence - Phases 2 & 6  2nd Sequence - TTC  3rd Sequence - Phases 3 & 8  4th Sequence - Phases 4 & 8  5th Sequence - TTC 
7 Fleet St/ Manitoba Dr 	WLK 7 FDW 14 MIN 14 MAX1 14 MAX2 14 AMB 4 ALLR 4 SPLIT	22	22	22	22	22	Callable by TTC loops Exclusive EW Transit Phase callable twice per cycle (at the end of NS/EW vehicle phases). Unused time is given to the subsequent phase green.	6th Sequence - Phases 2 & 5 
8 Fleet St 	WLK 7 FDW 25 MIN 32 MAX1 32 MAX2 32 AMB 4 ALLR 3 SPLIT	40	40	40	52	40	Fixed	
	CYCLE OFFSET	128	144	144	160	144		

Notes: If the WBLA & NBLA are activated, SCOOT stages 3 & 6 must be increased to 15 secs (as there are commands in CAST 26 to run the stages at 10 secs to allow region LG to run at a lower cycle length). Signal timings were reverted from the temp. changes for the 2018 CNE Event at approx. 9:45 am on September 4, 2018.

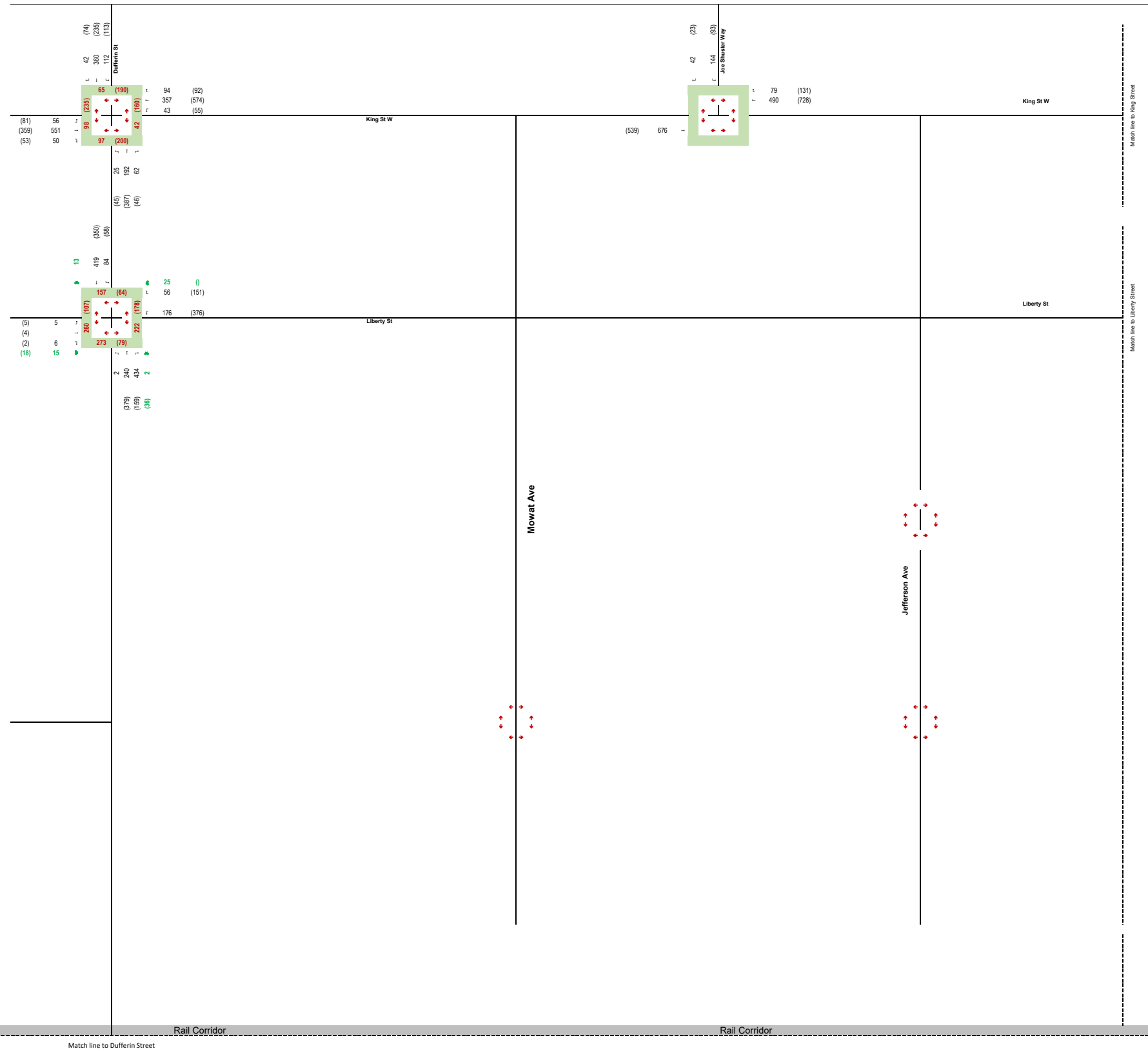


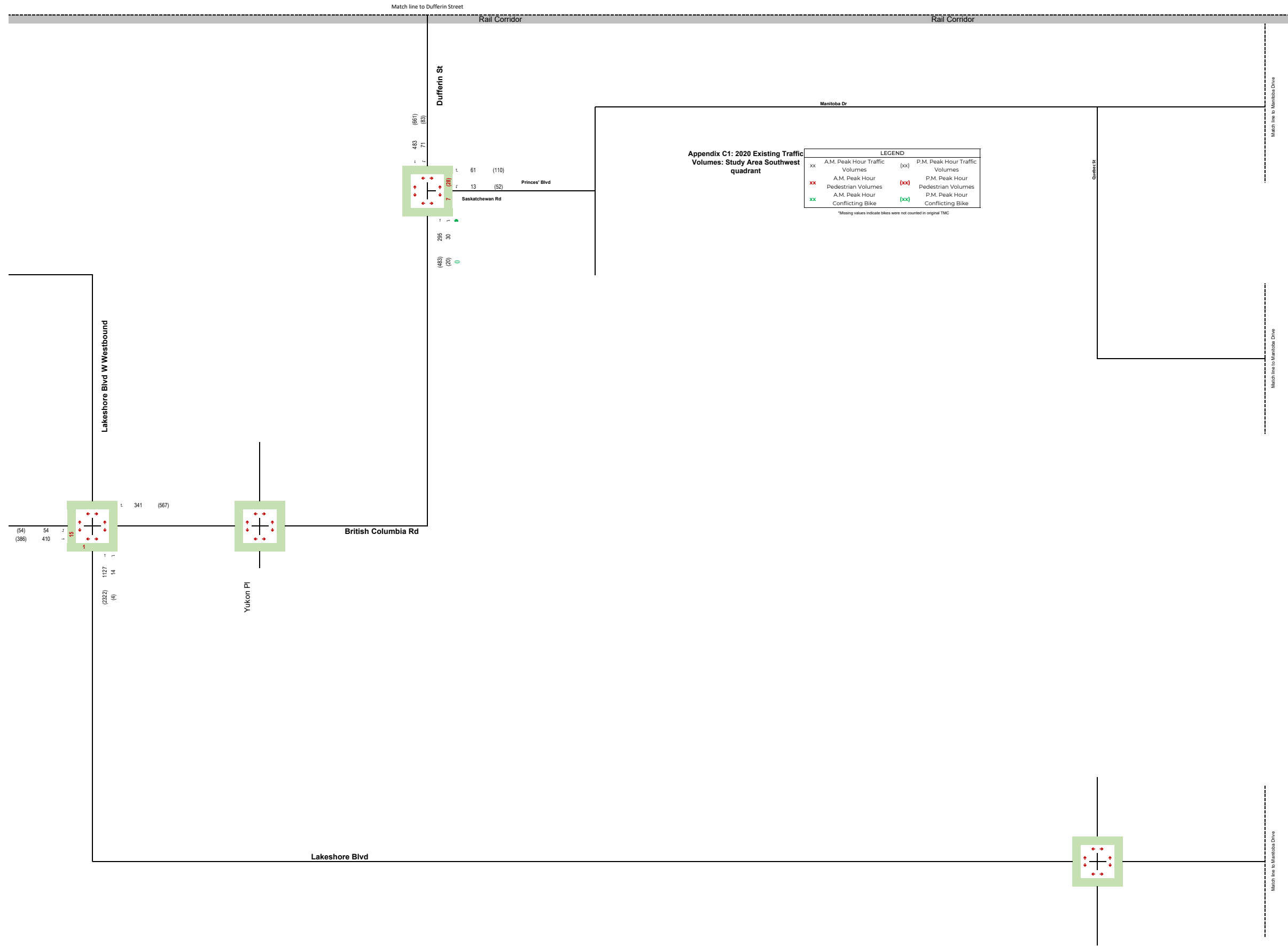
Appendix C: Existing, Exhibition Station, 2030 Future Background, TOC Site and 2030 Total Future Traffic Volumes

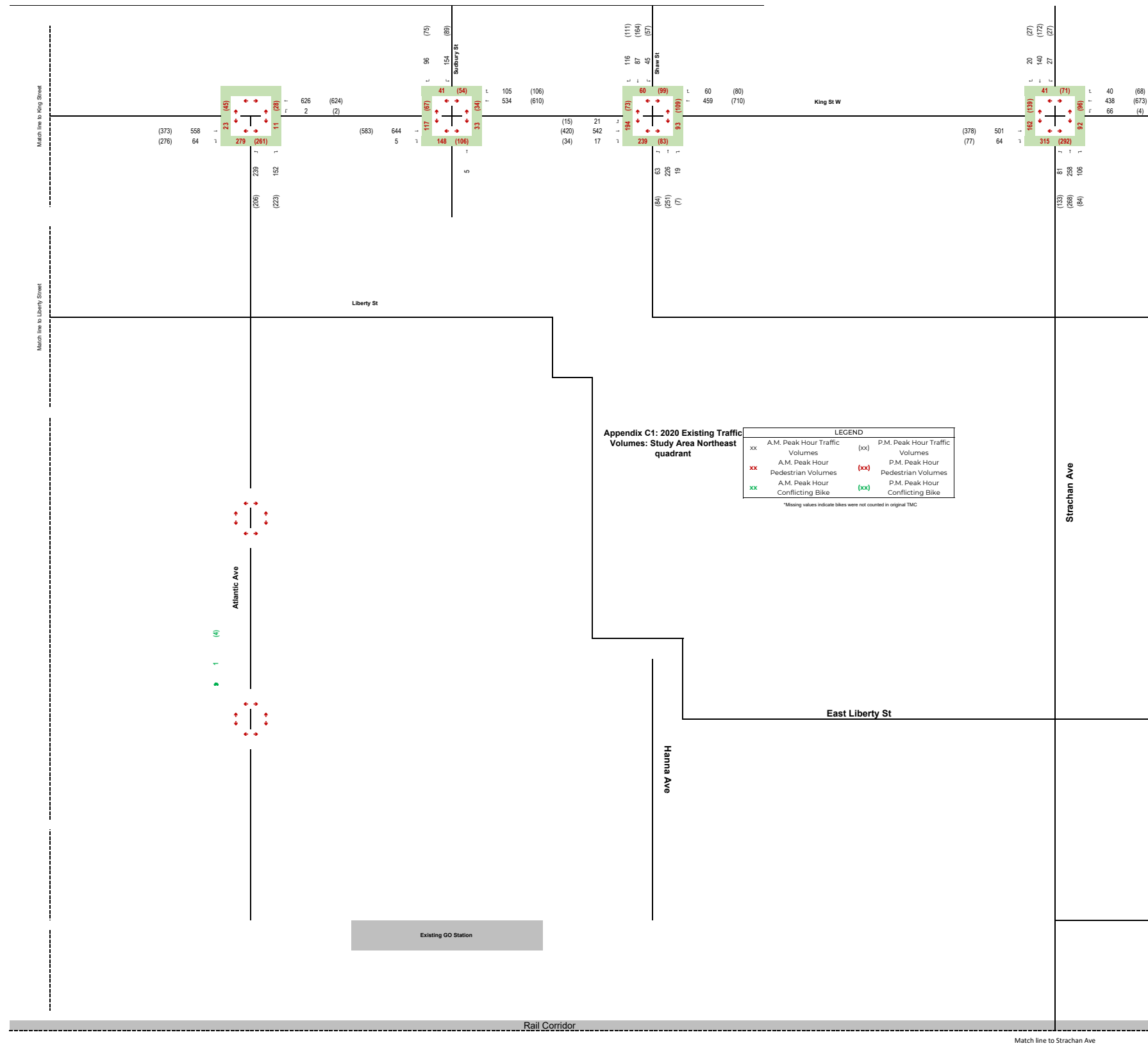
Appendix C1: 2020 Existing Traffic Volumes: Study Area Northwest quadrant

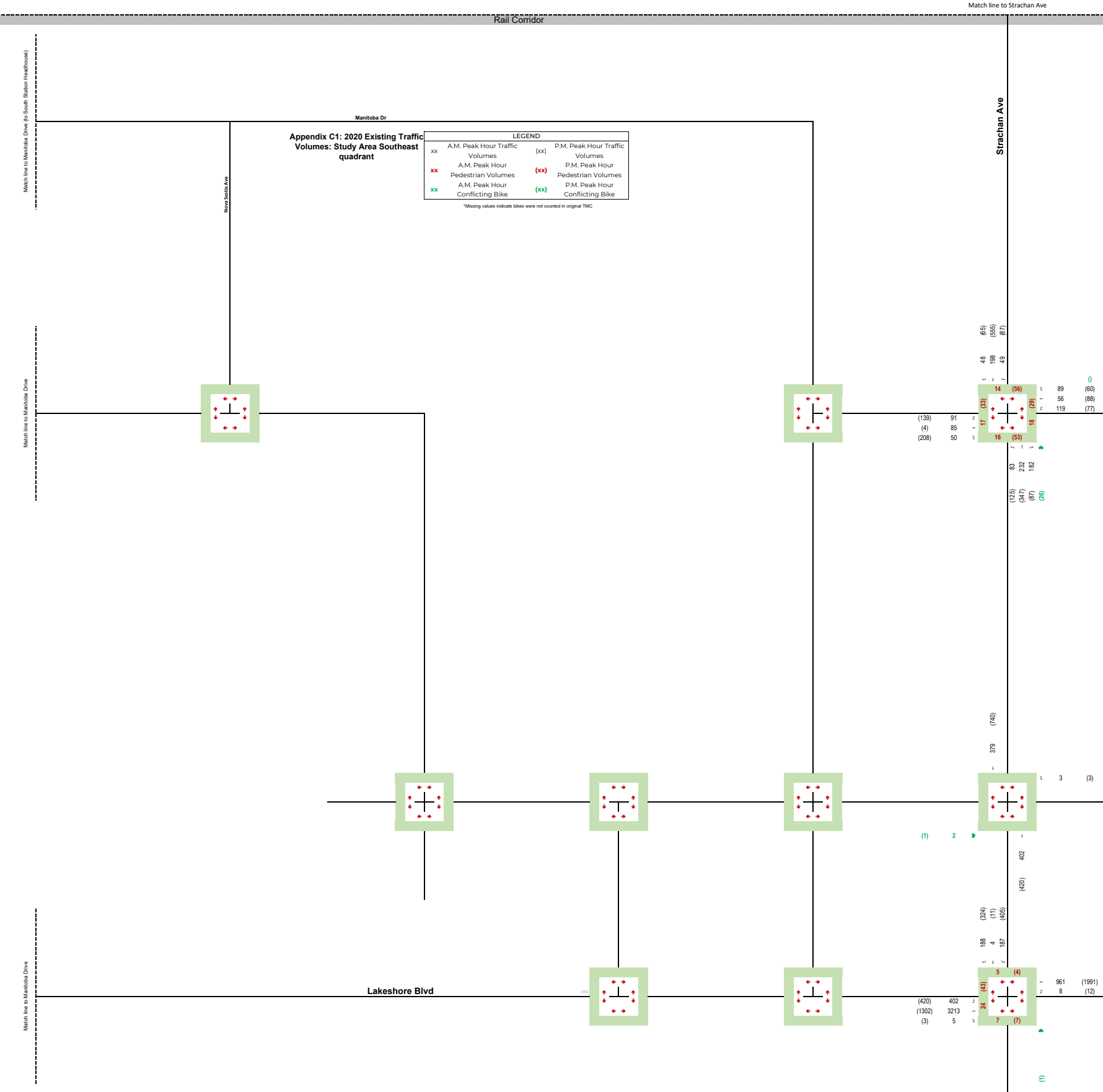
LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC





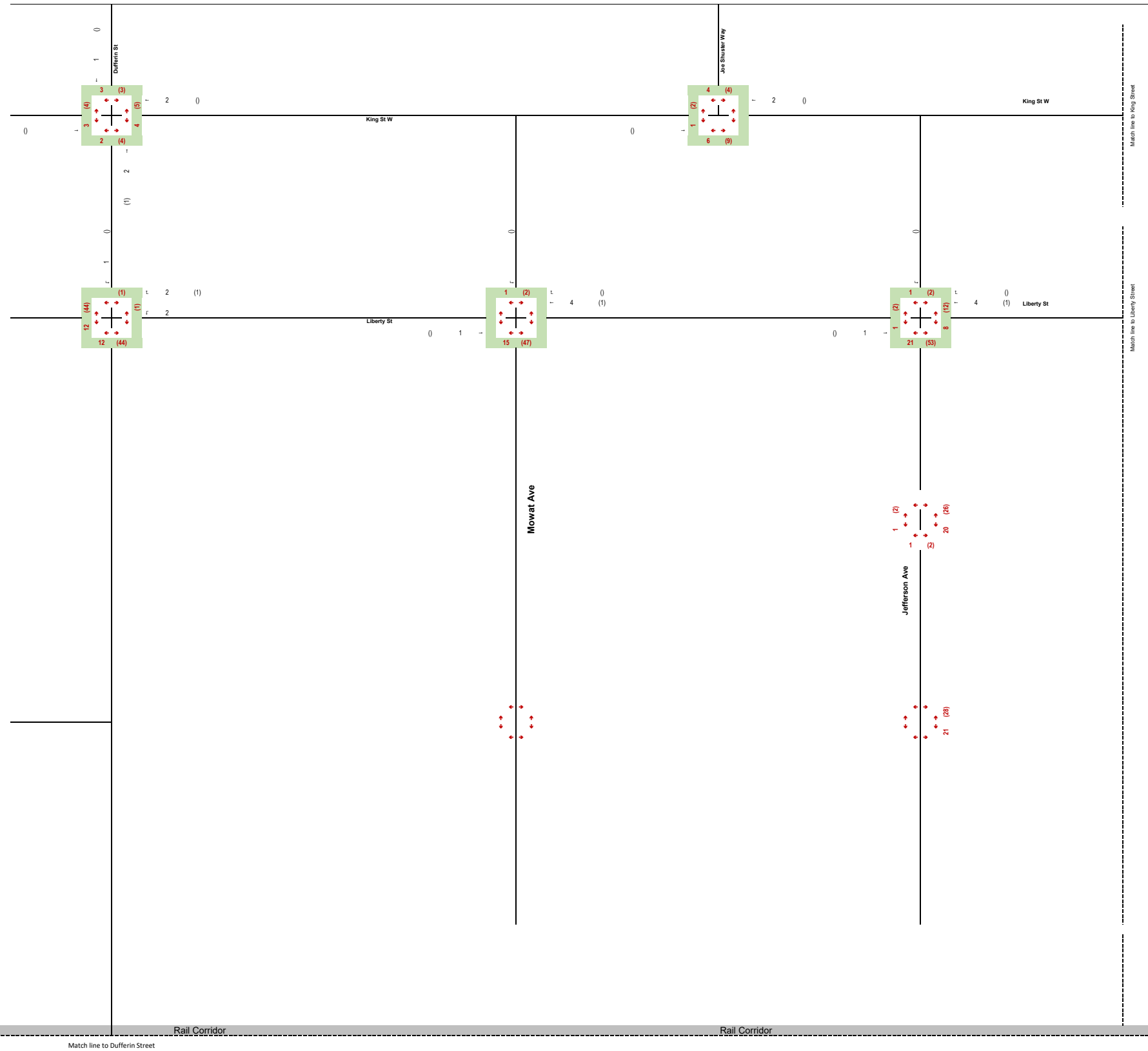


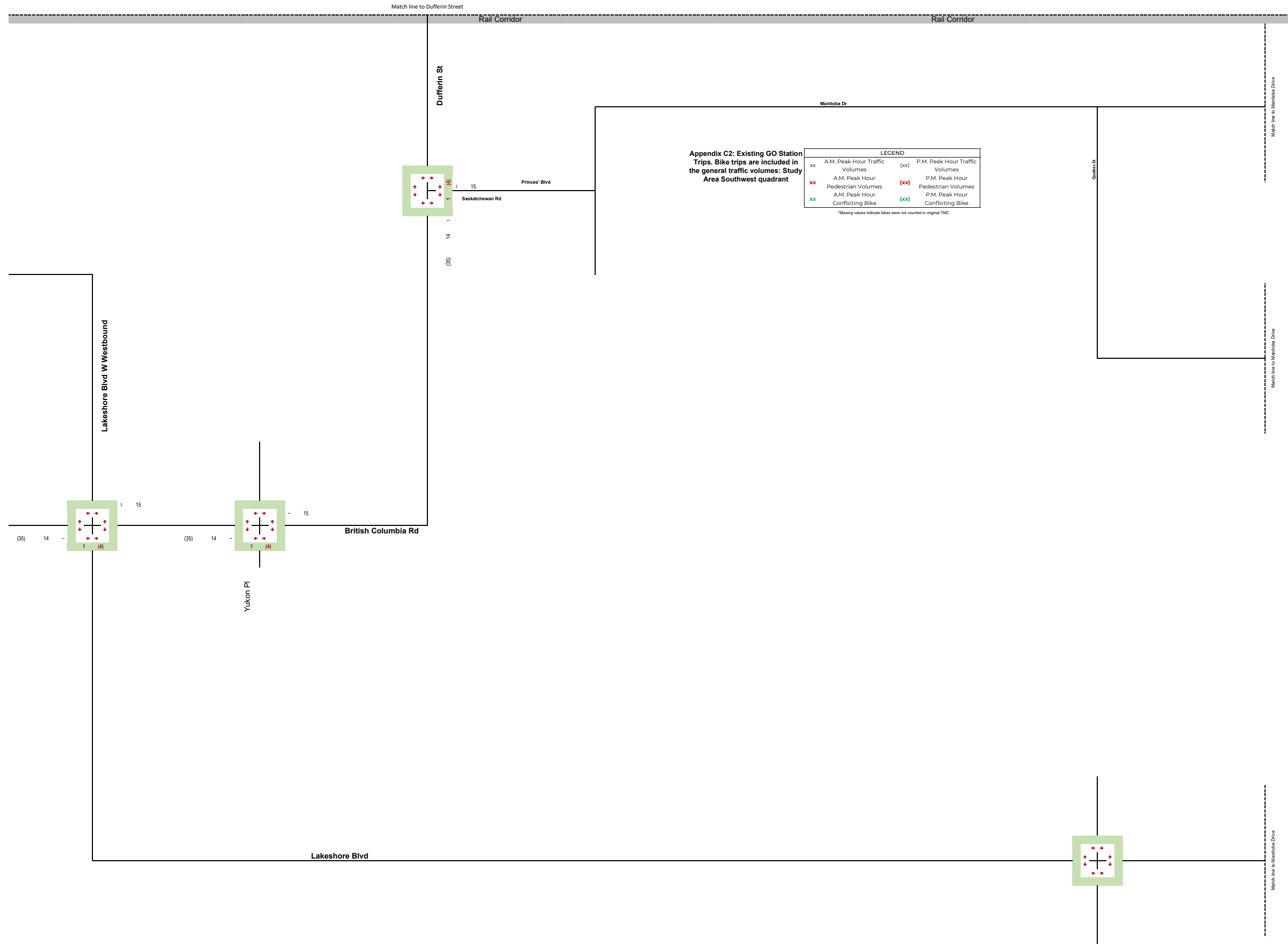


Appendix C2: Existing GO Station Trips. Bike trips are included in the general traffic volumes: Study Area Northwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC

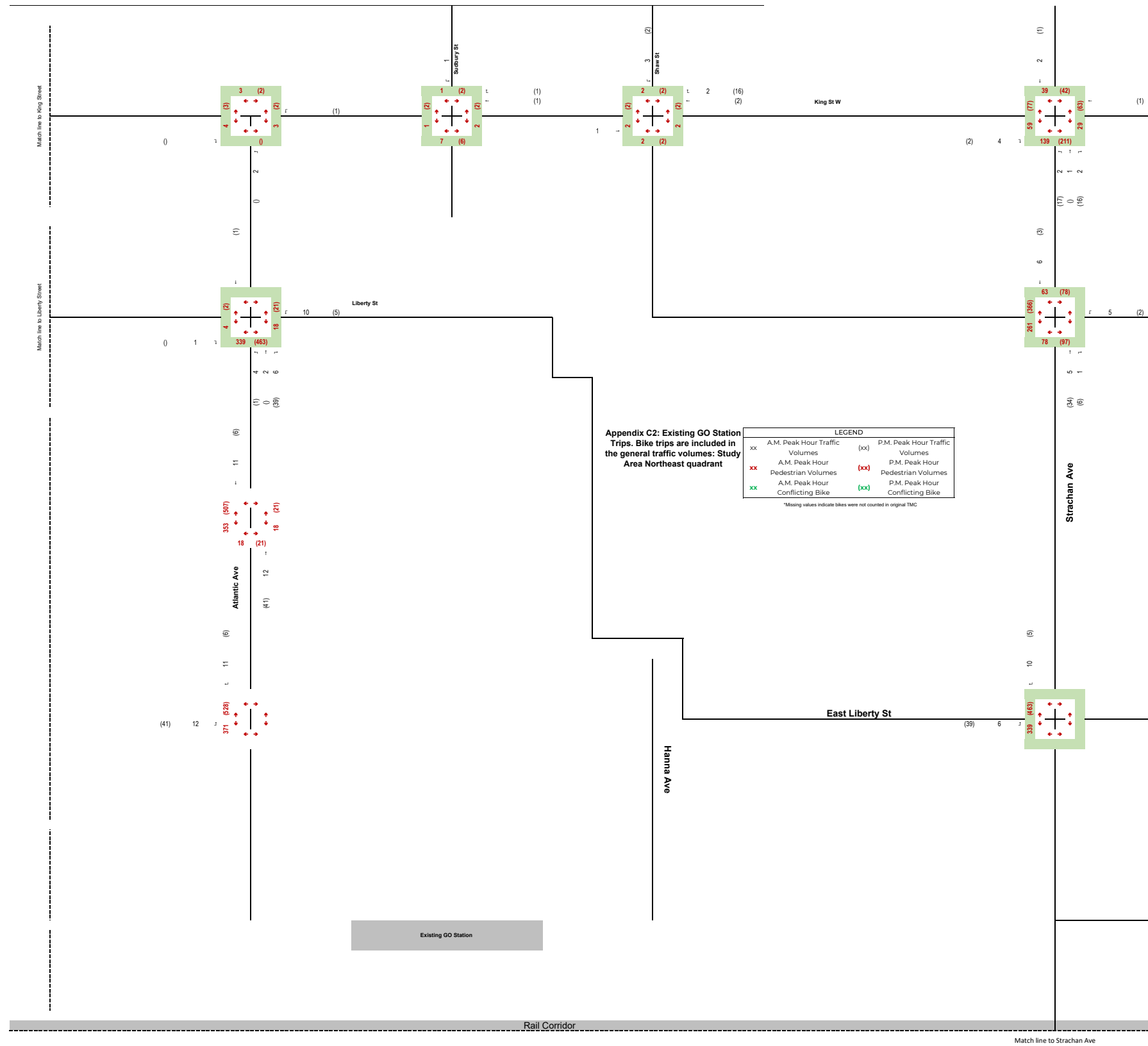


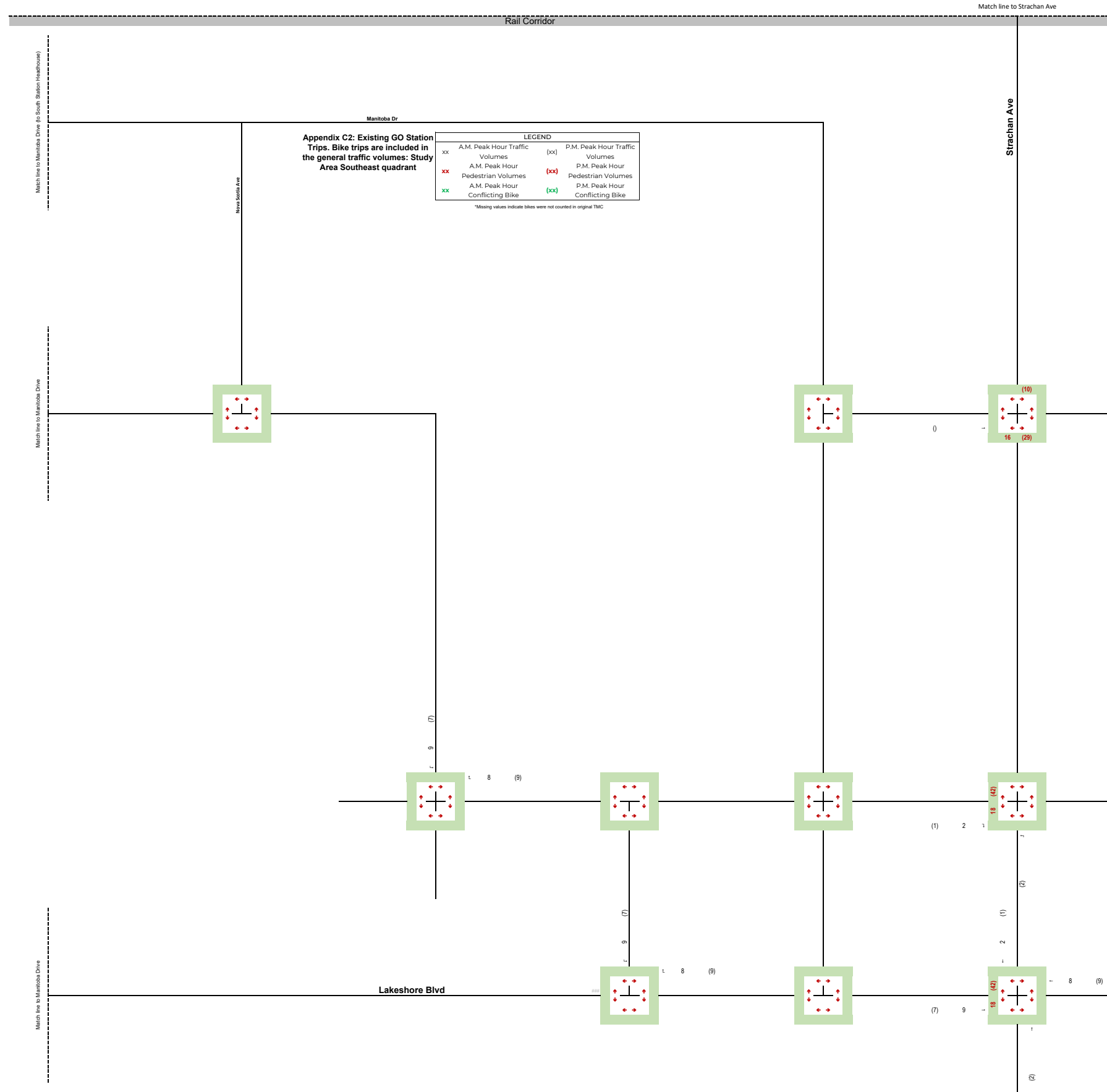


Appendix C2: Existing GO Station Trips. Bike trips are included in the general traffic volumes: Study Area Southwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC

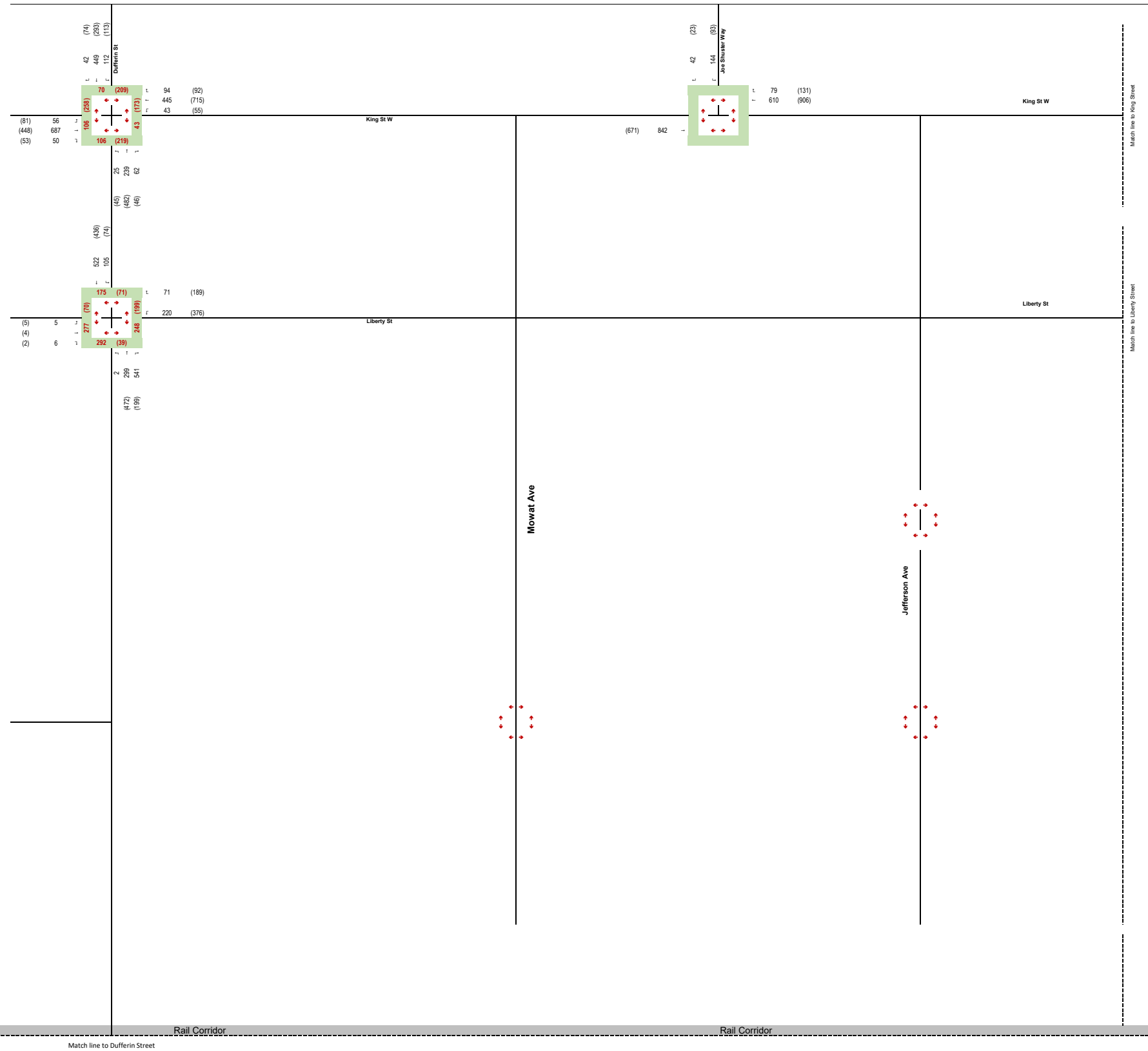


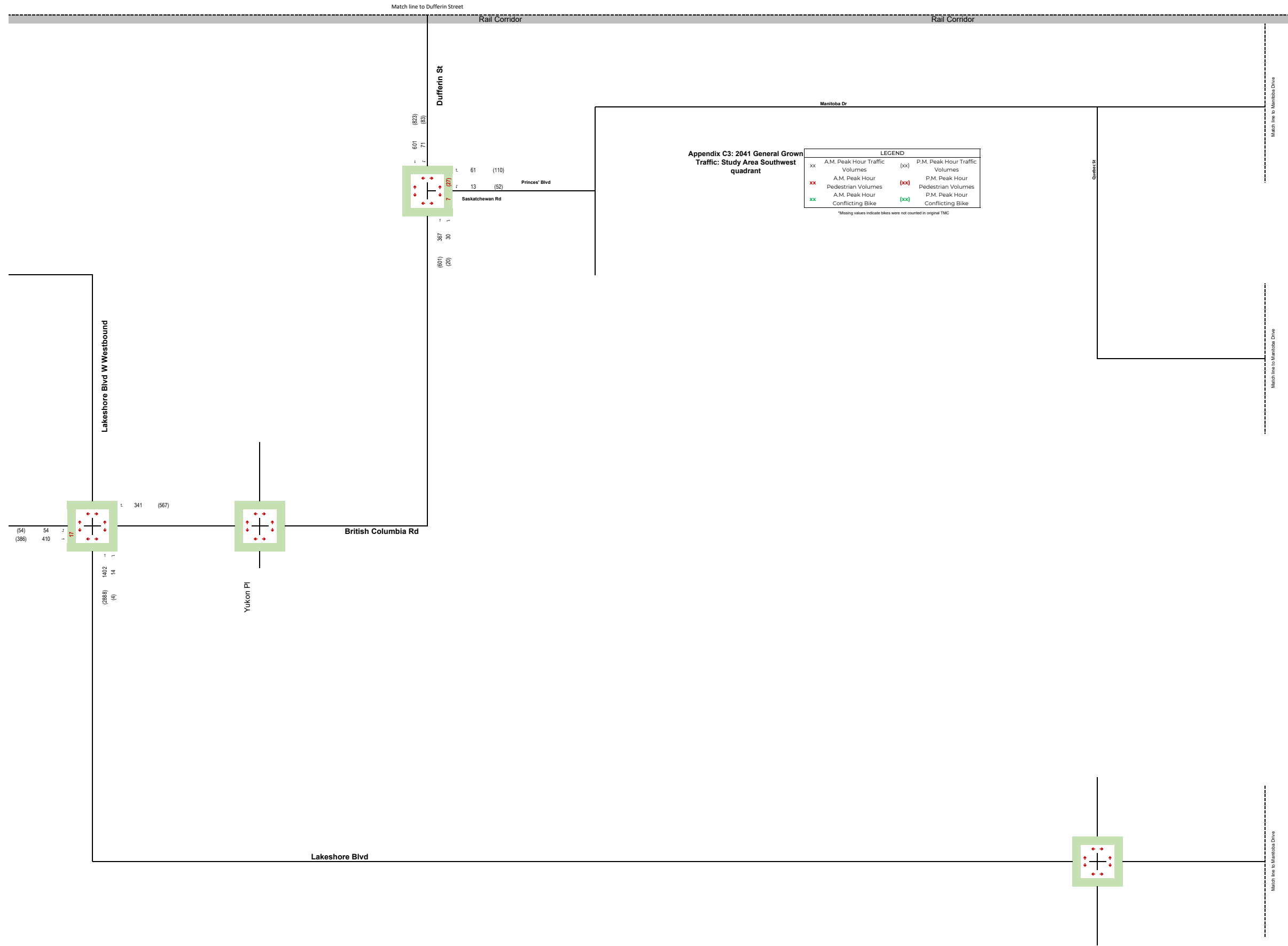


Appendix C3: 2041 General Growth Traffic: Study Area Northwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC





Appendix C3: 2041 General Growth Traffic: Study Area Southwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC

(54)
(386)

54
410

(288)
(4)

1402
14

341
(567)

601
71
(823)
(83)

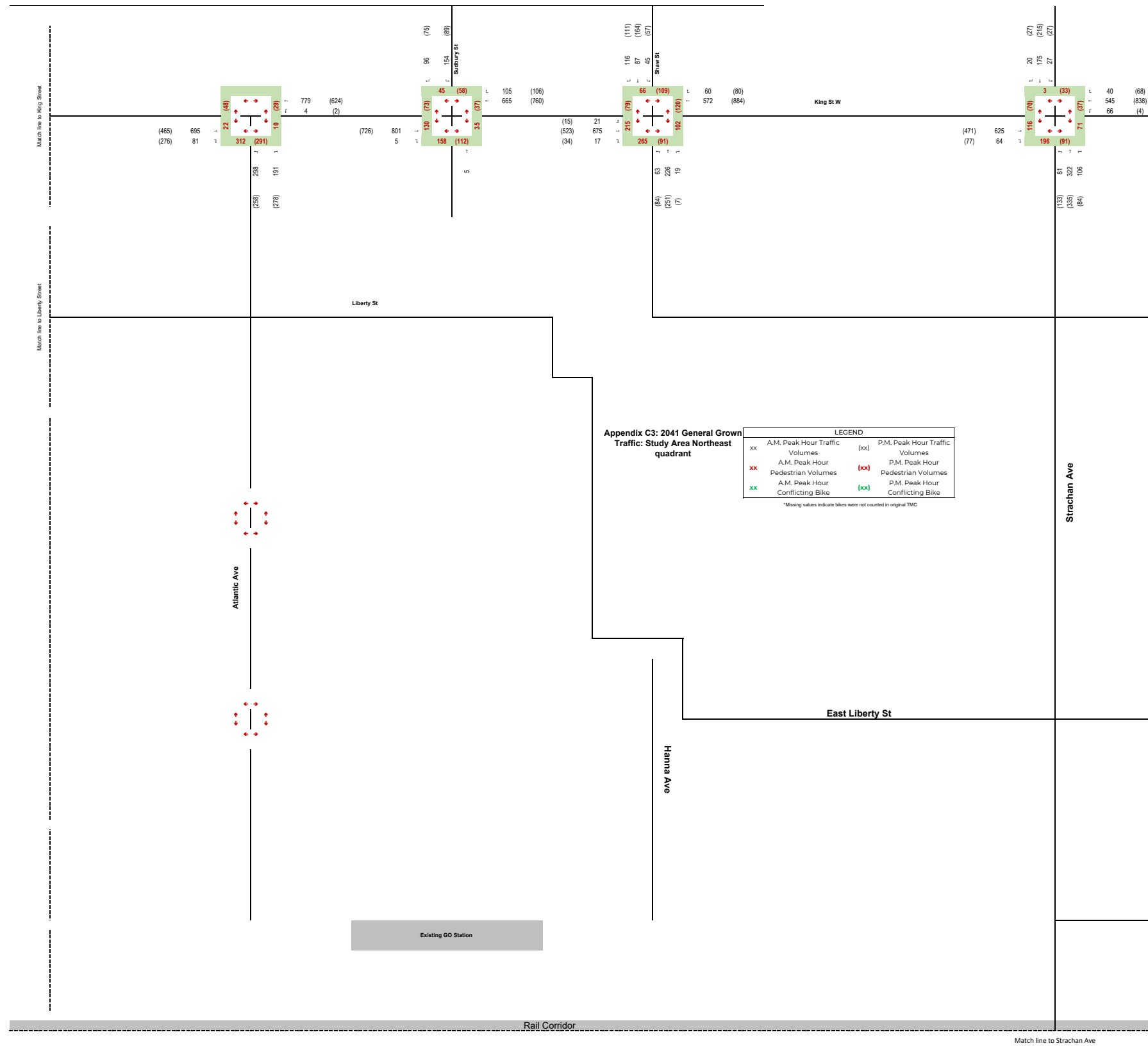
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13
(110)
(52)

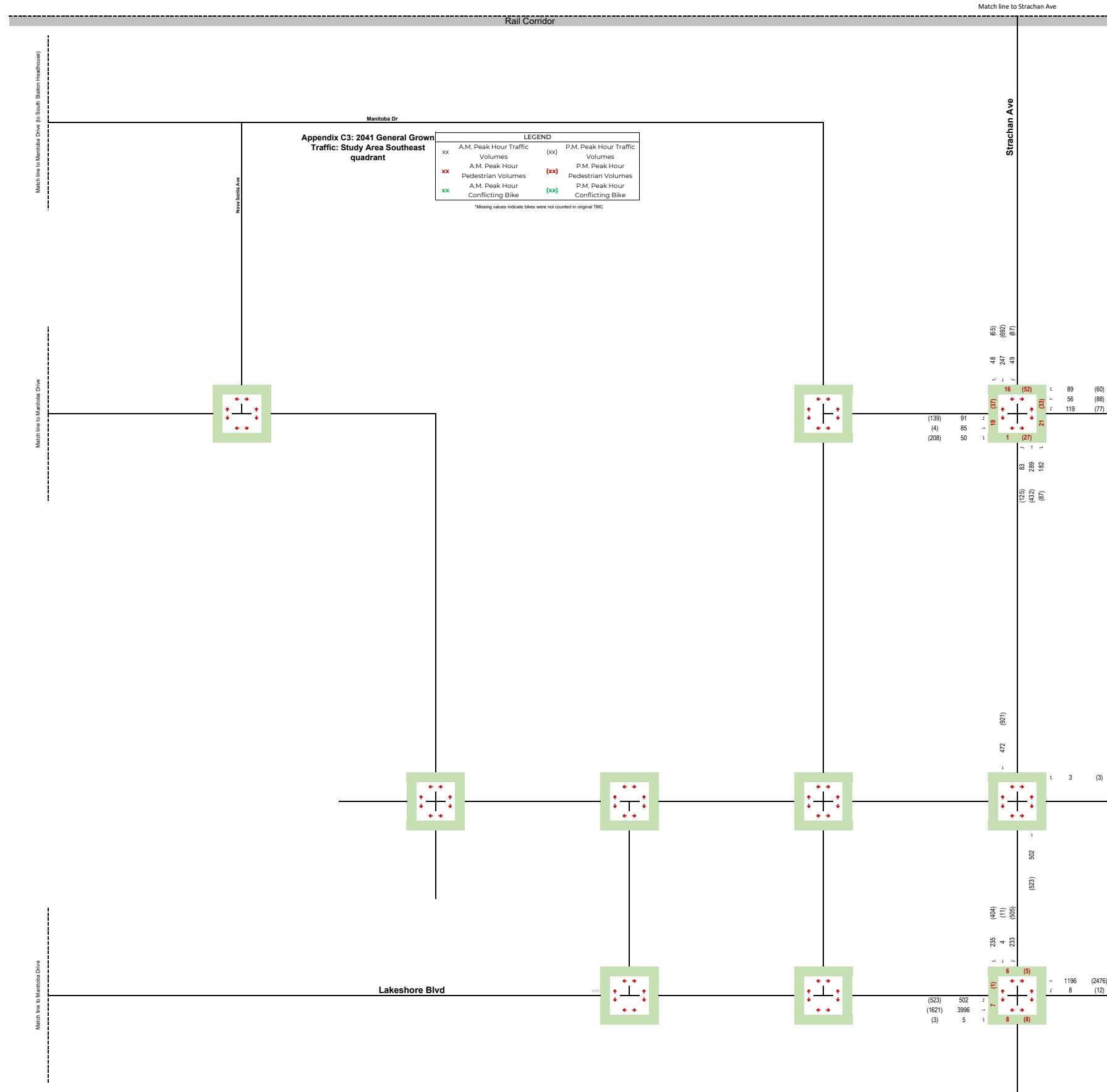
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20
30
(601)
(20)

Match line to Manitoba Drive

Match line to Manitoba Drive

Match line to Manitoba Drive

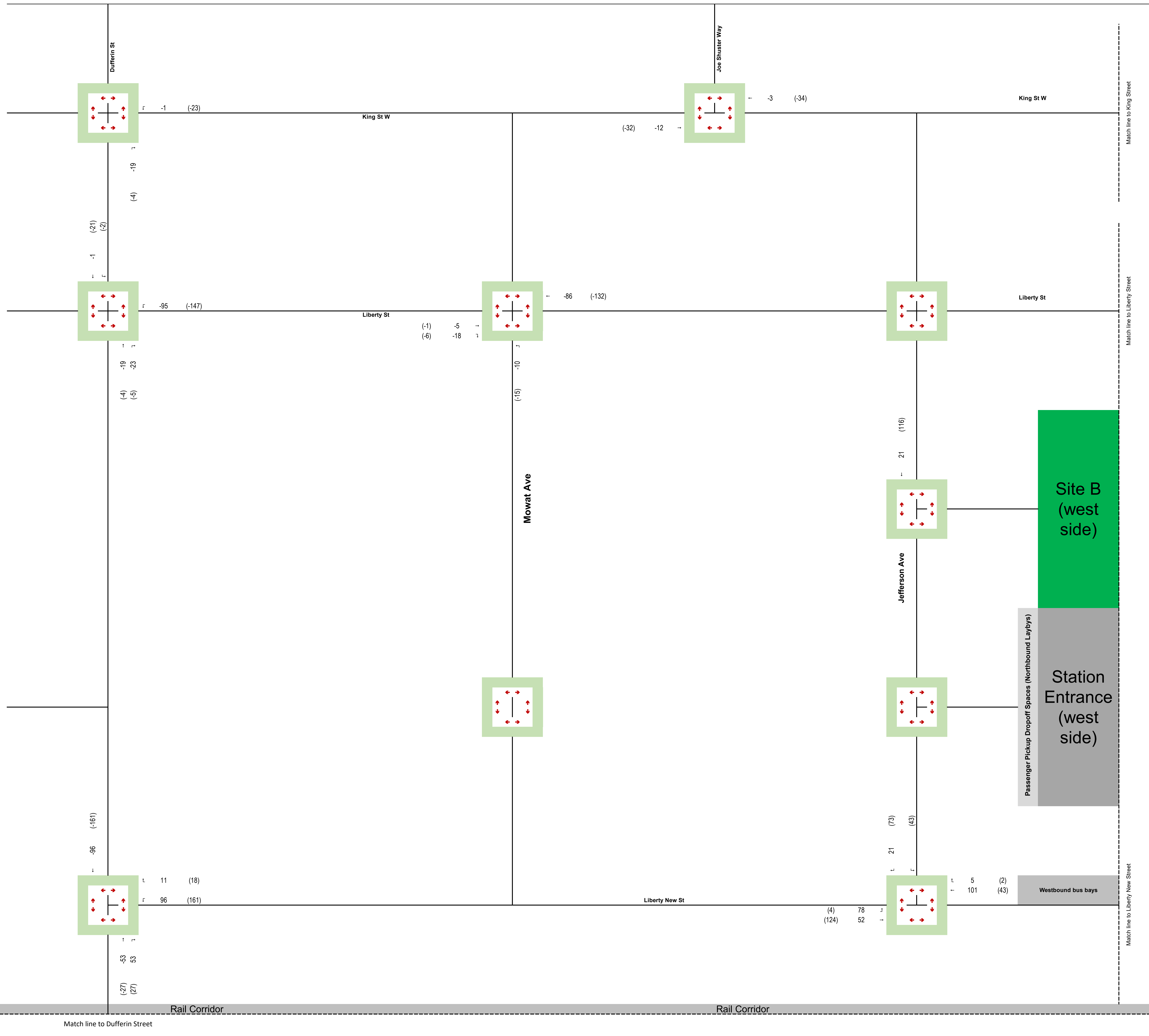


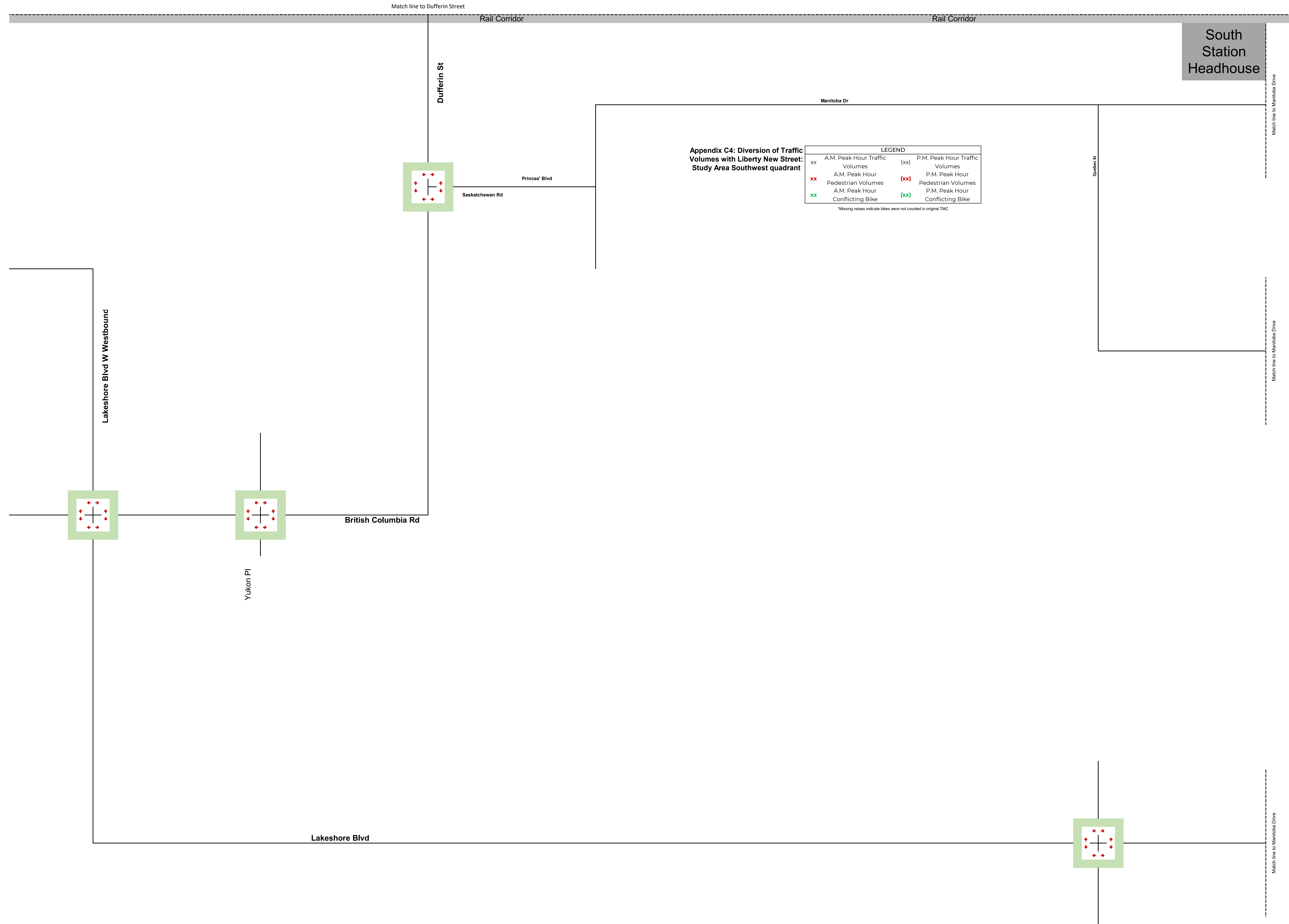


Appendix C4: Diversion of Traffic Volumes with Liberty New Street: Study Area Northwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC

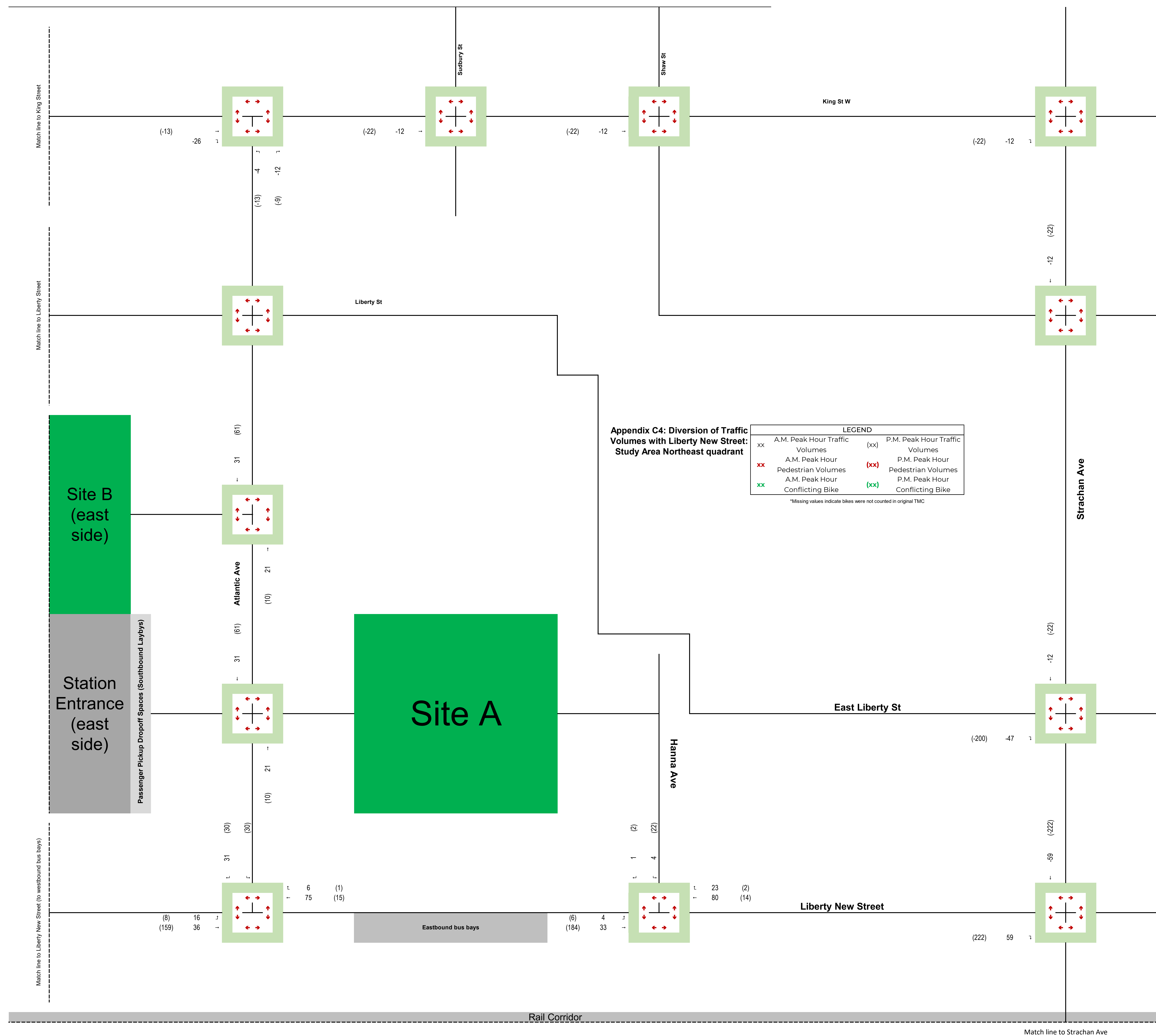


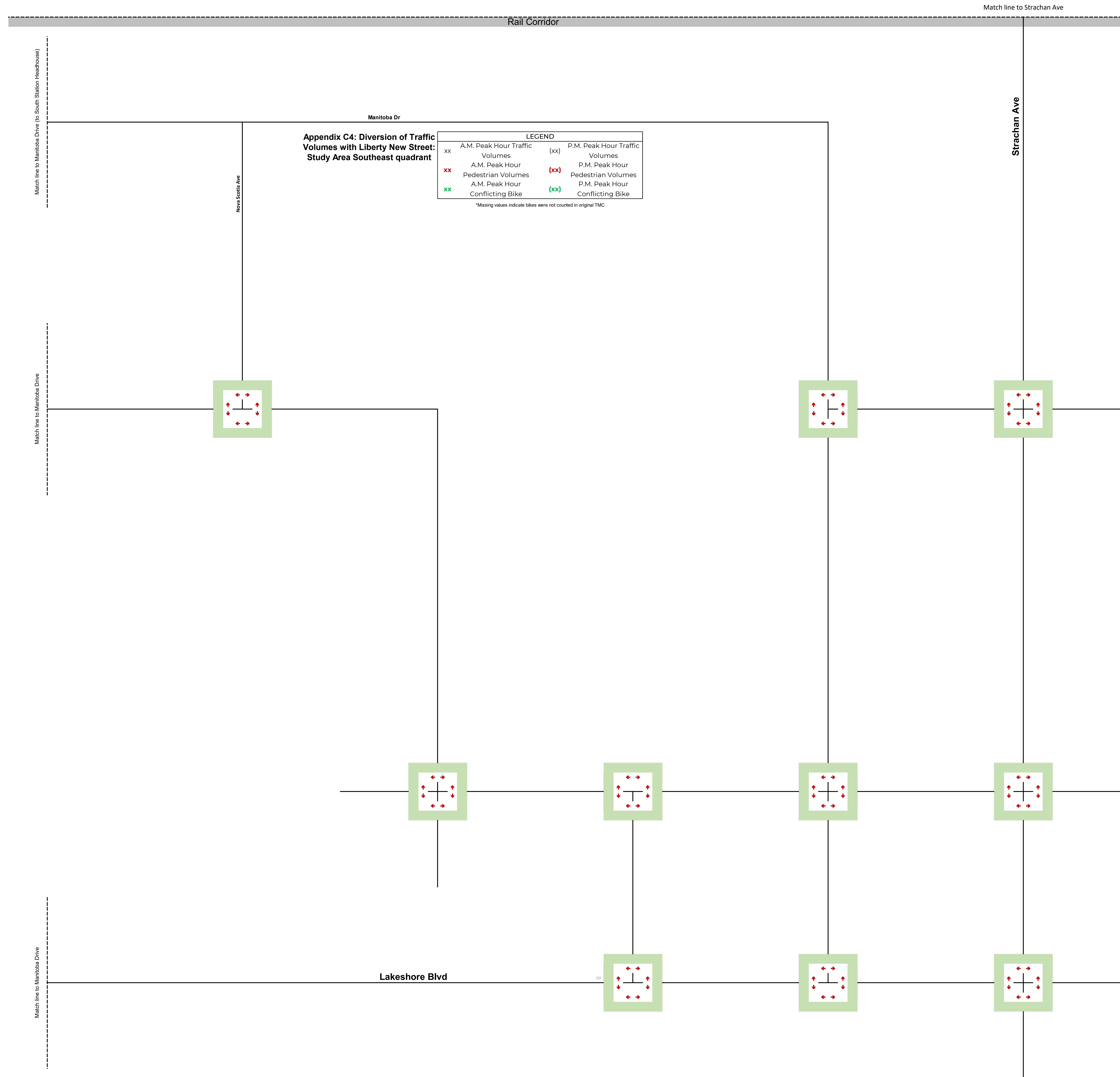


Appendix C4: Diversion of Traffic Volumes with Liberty New Street: Study Area Southwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC

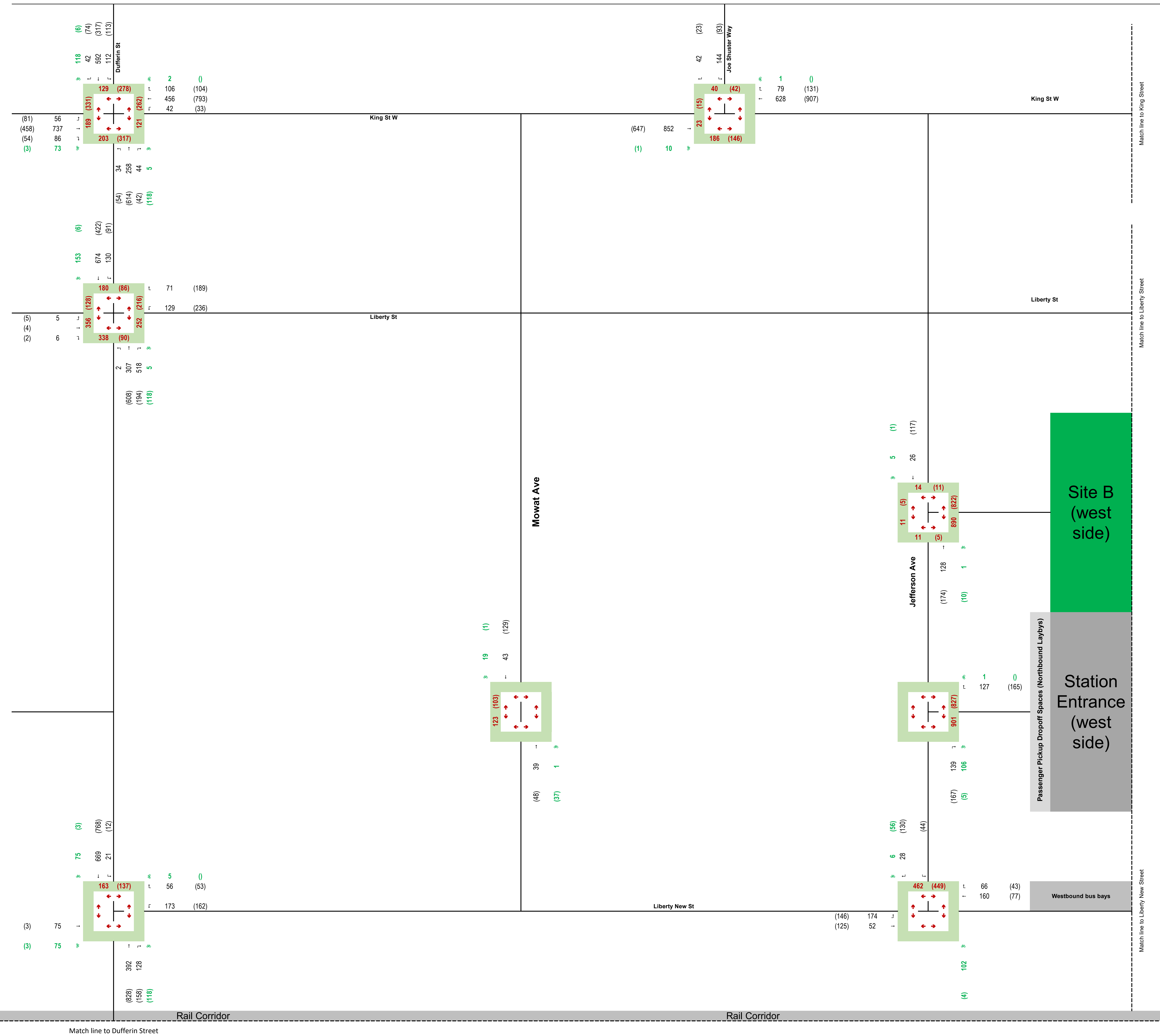


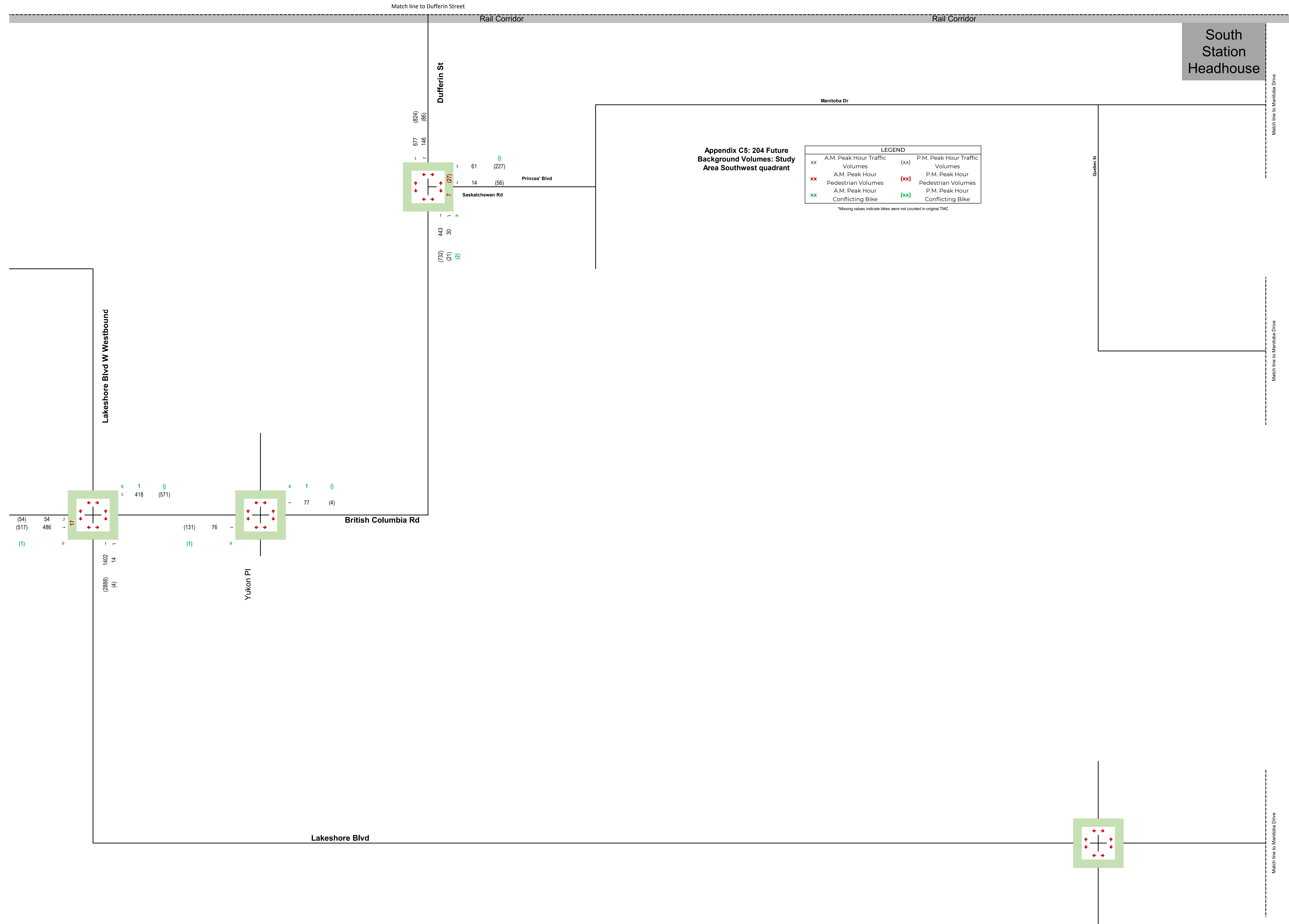


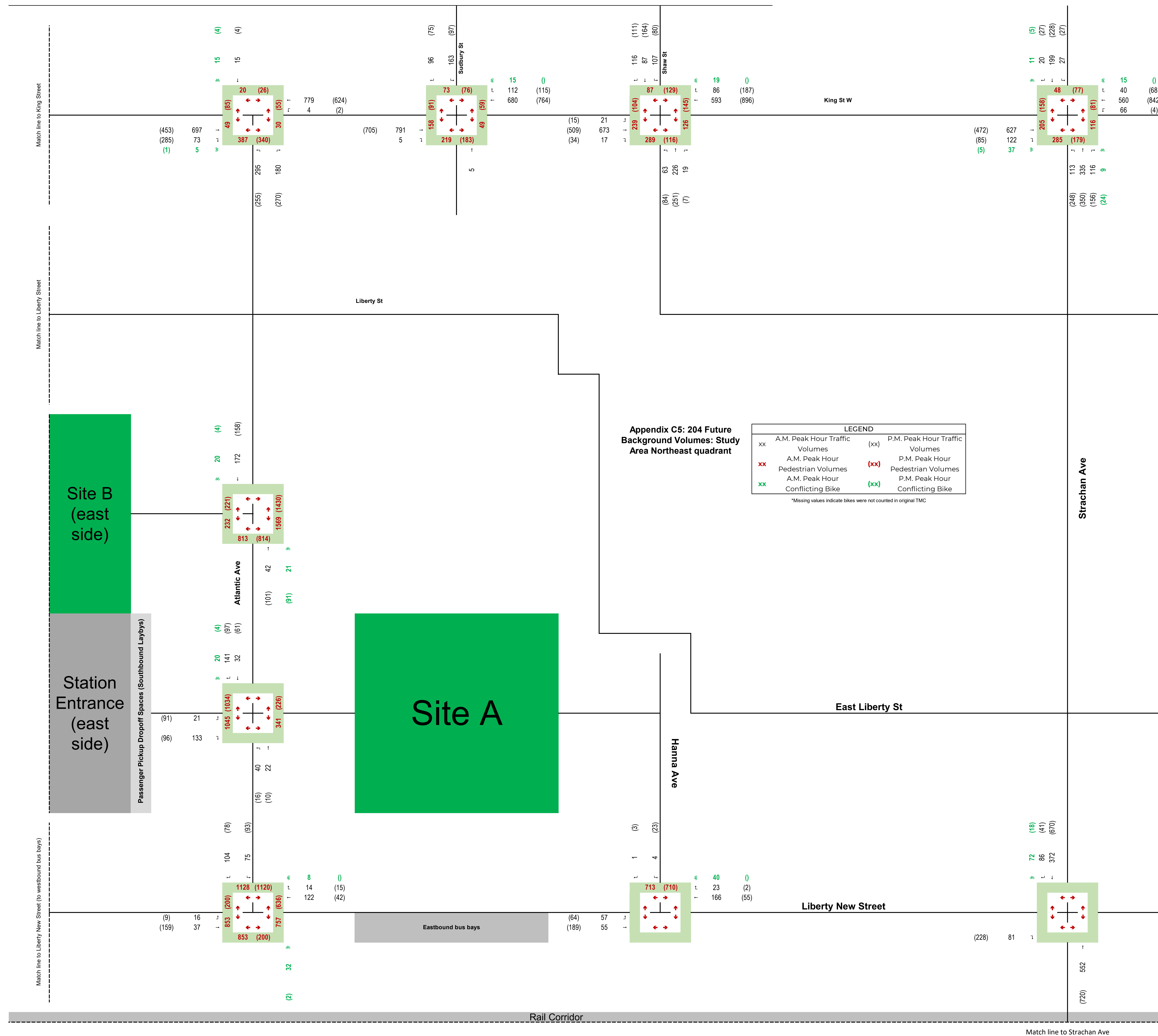
Appendix C5: 204 Future Background Volumes: Study Area Northwest quadrant

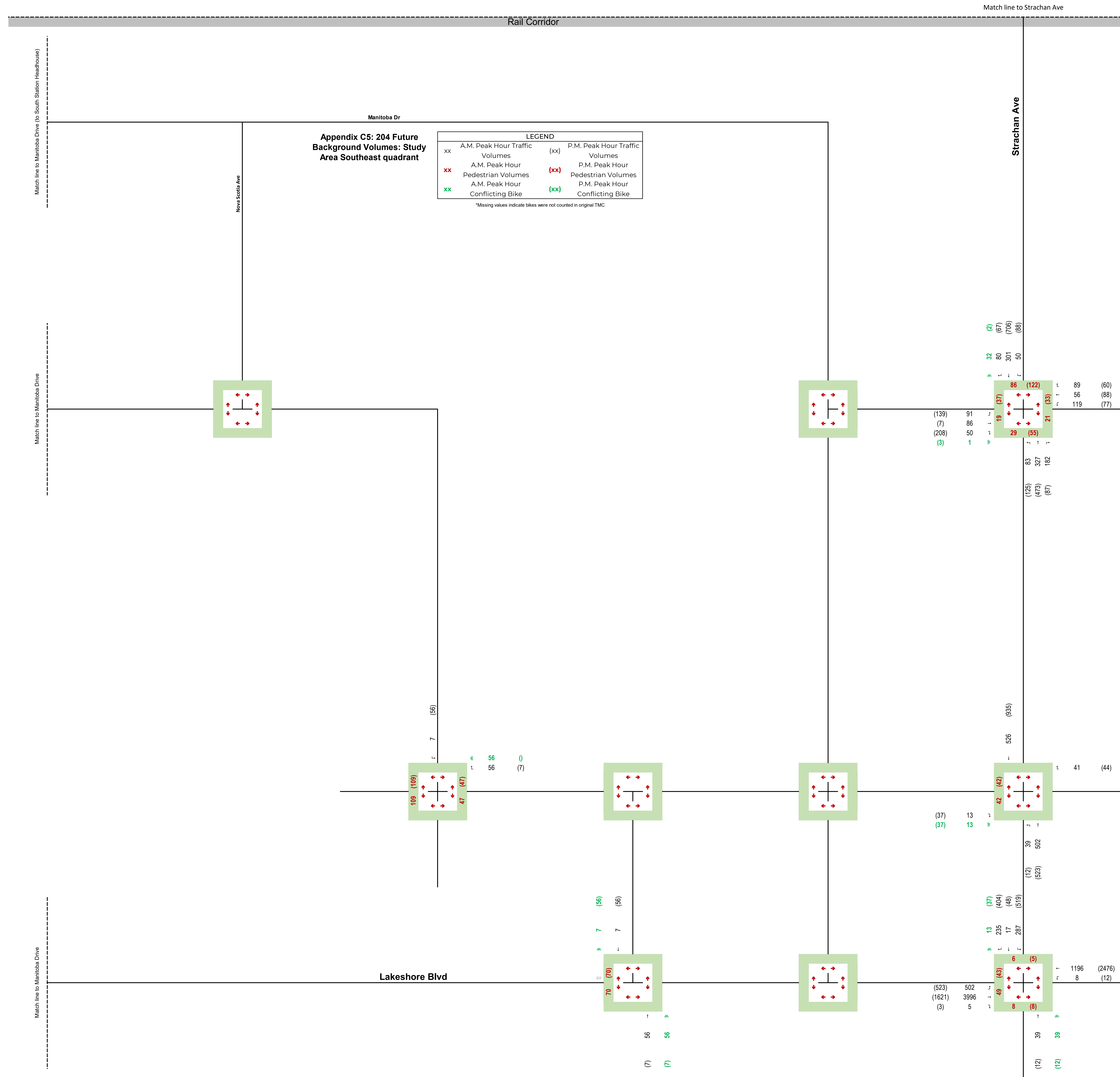
LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC





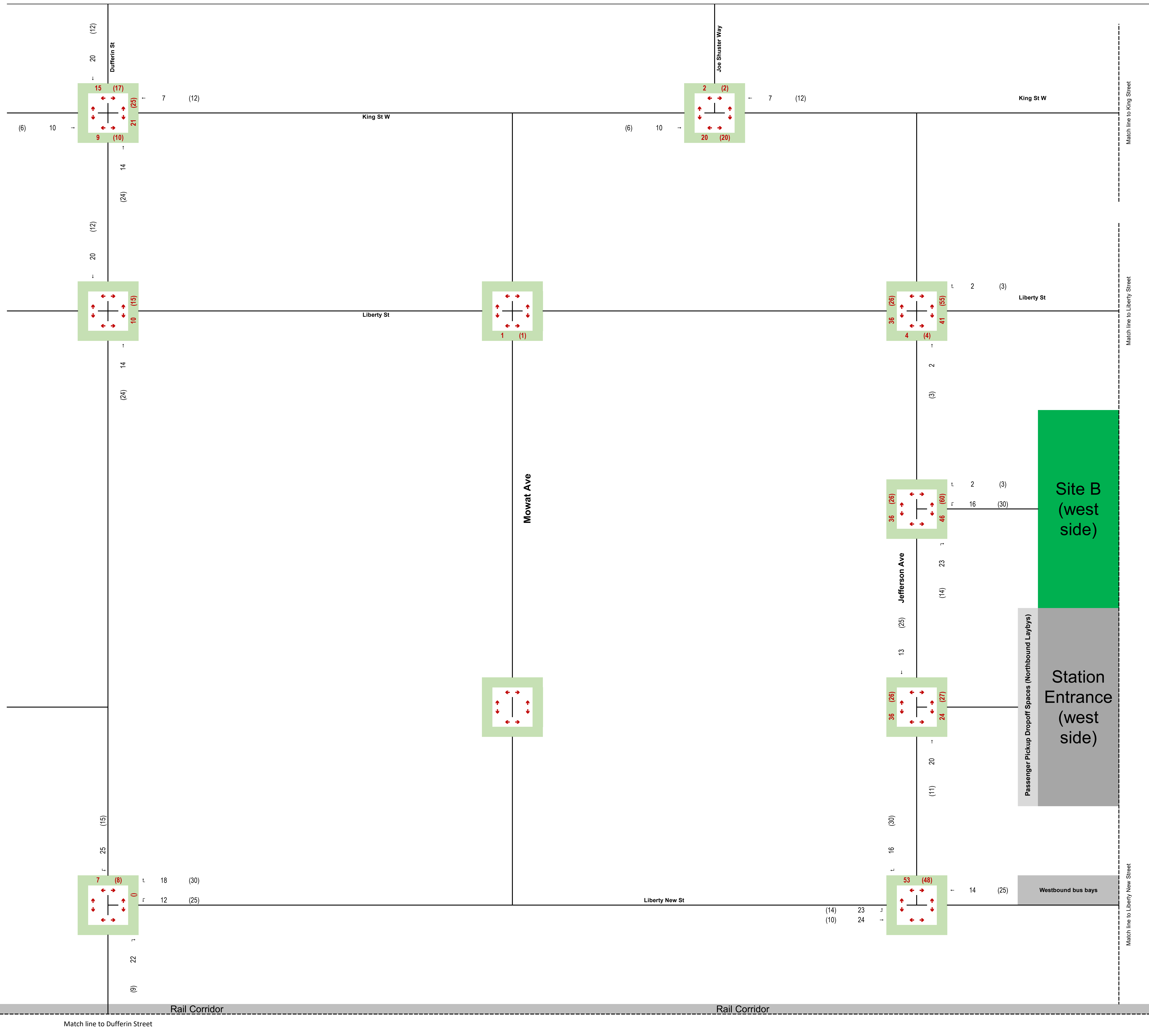


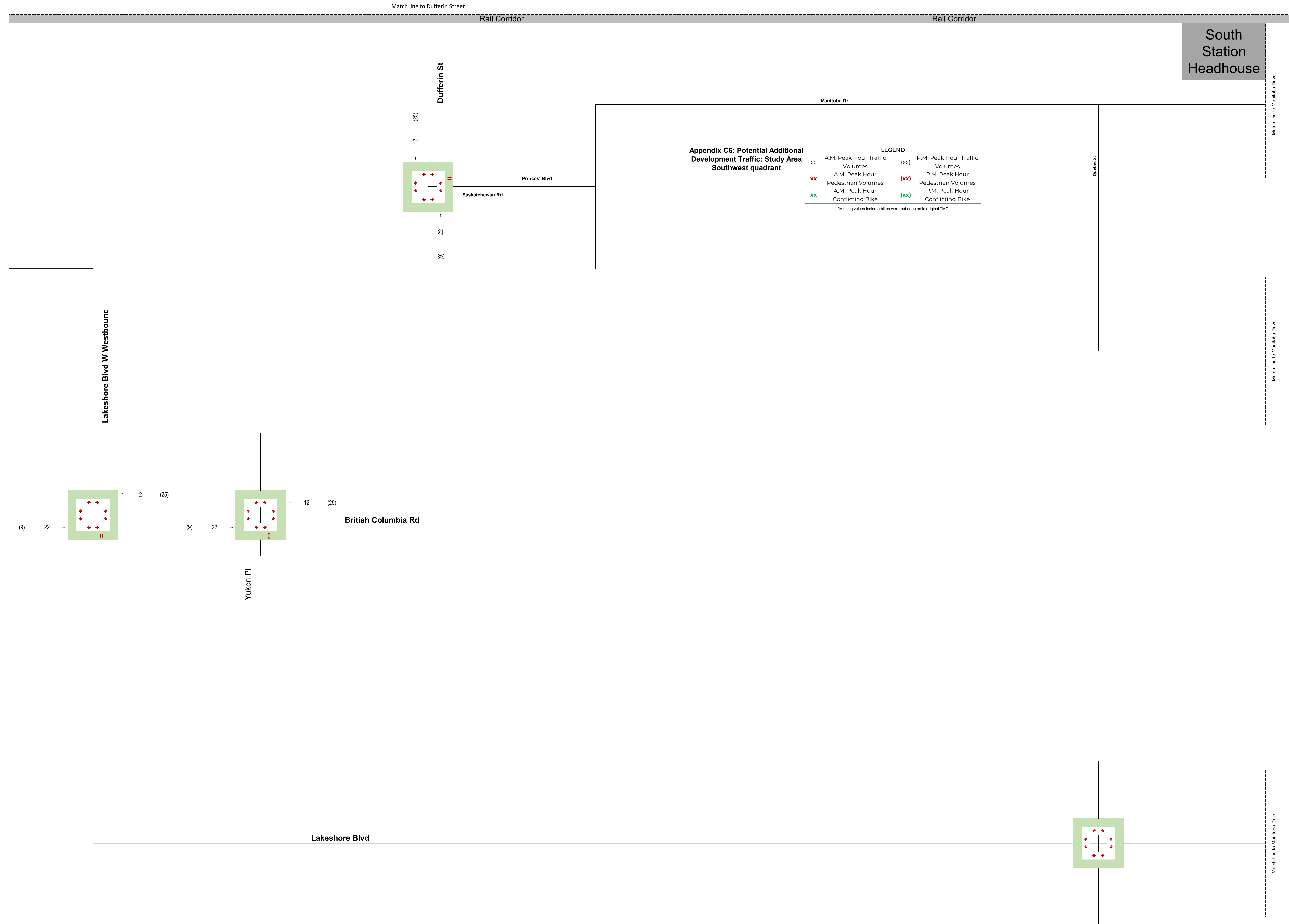


Appendix C6: Potential Additional Development Traffic: Study Area Northwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC

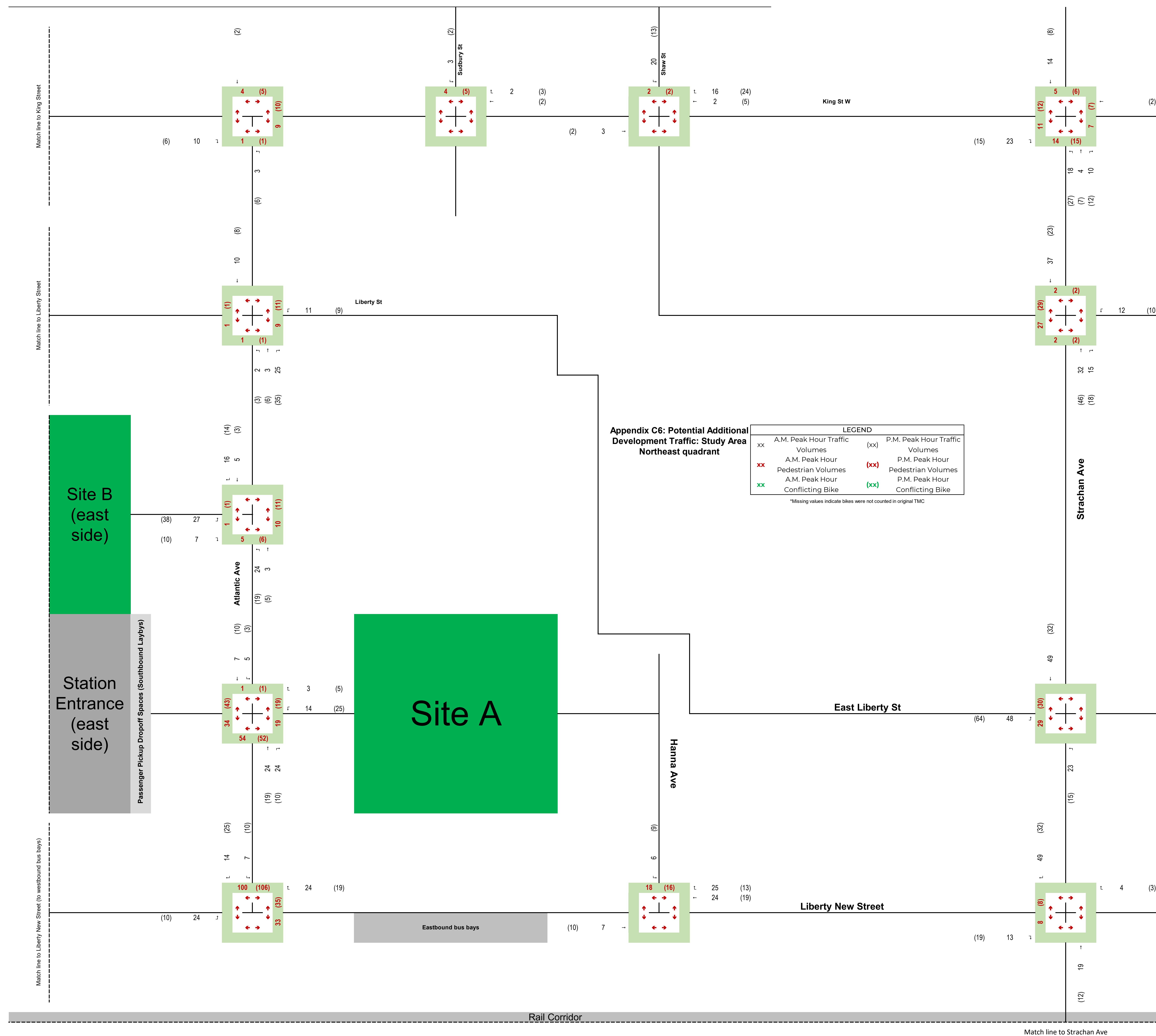


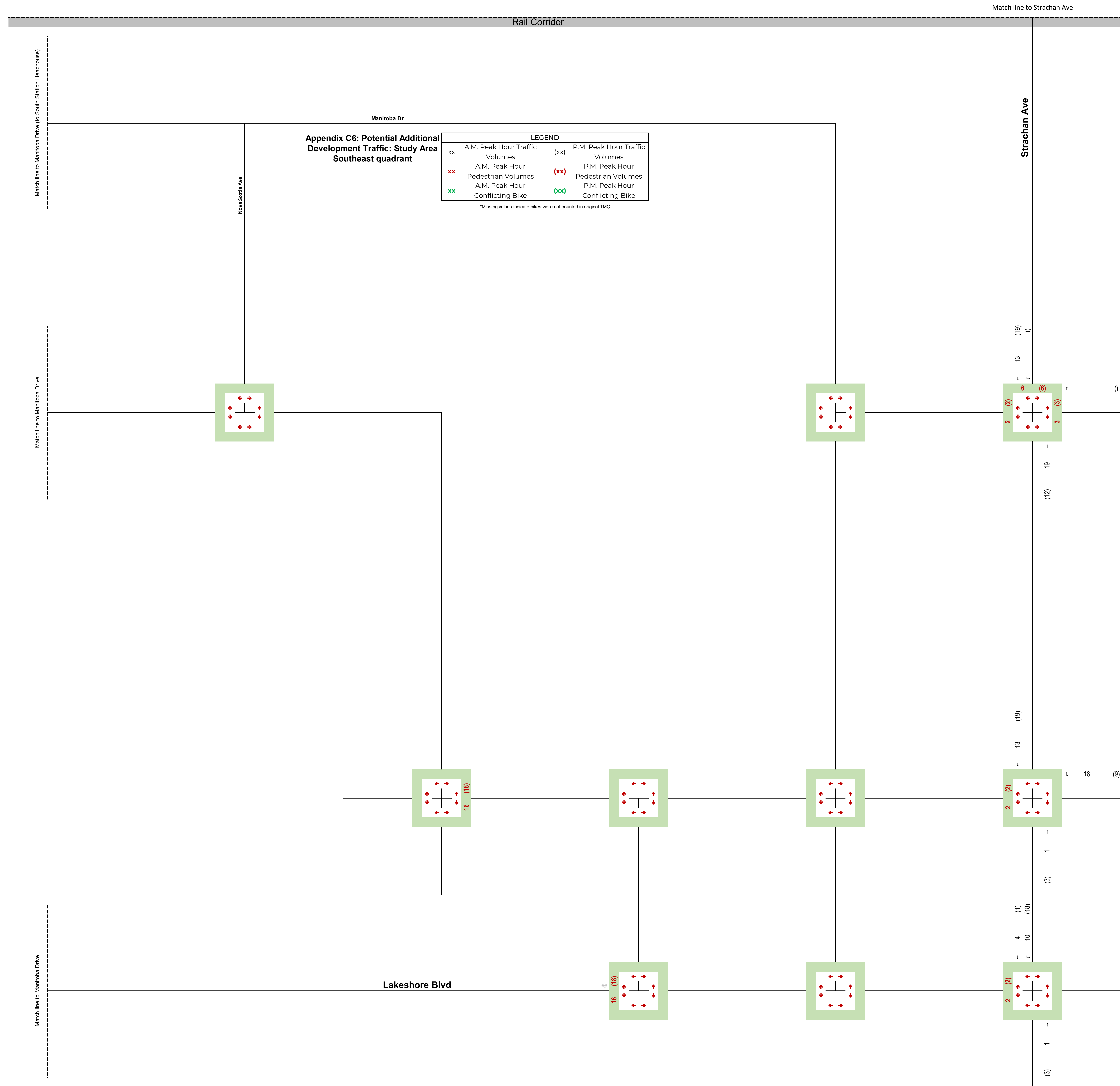


Appendix C6: Potential Additional Development Traffic: Study Area Southwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC

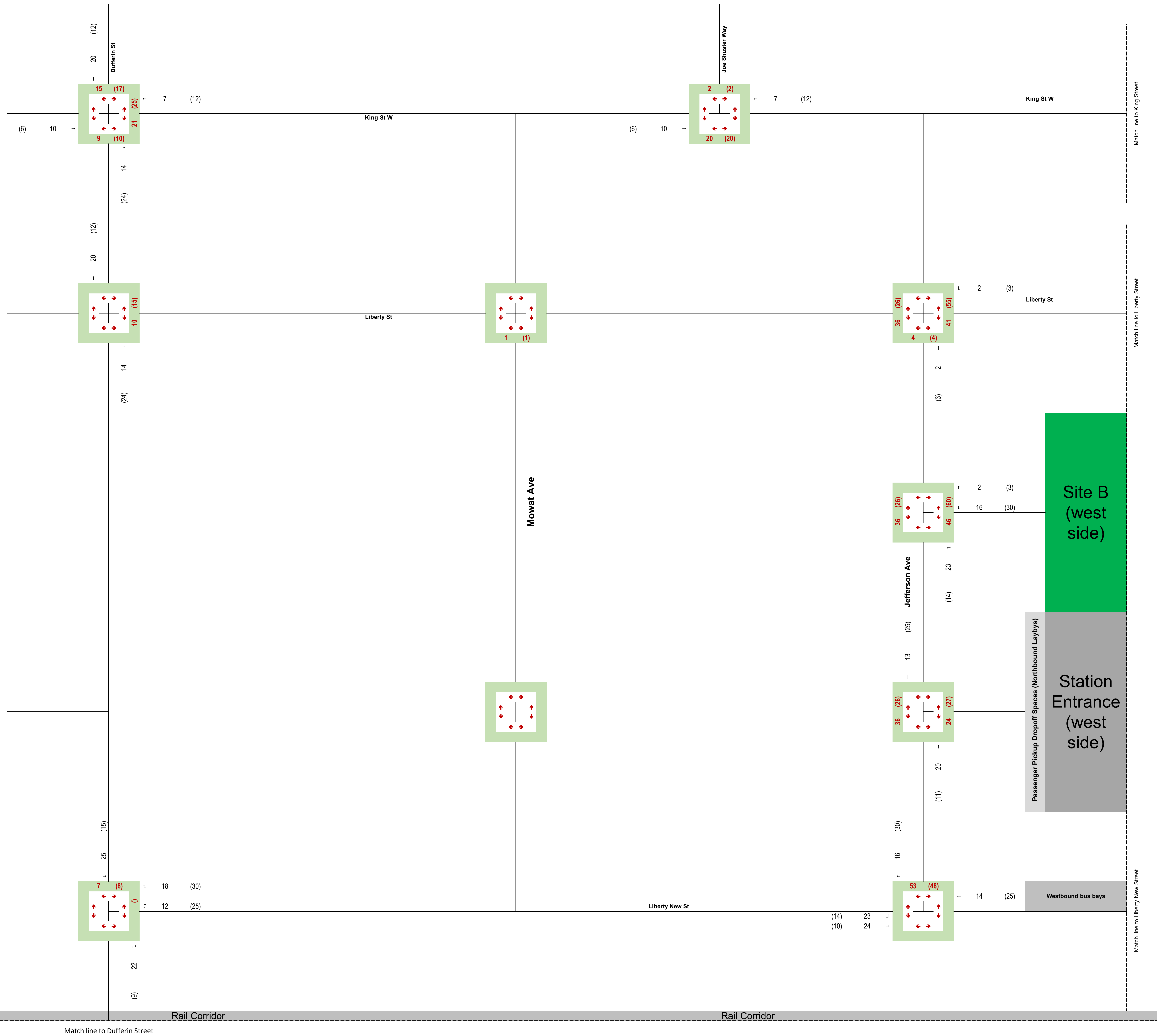


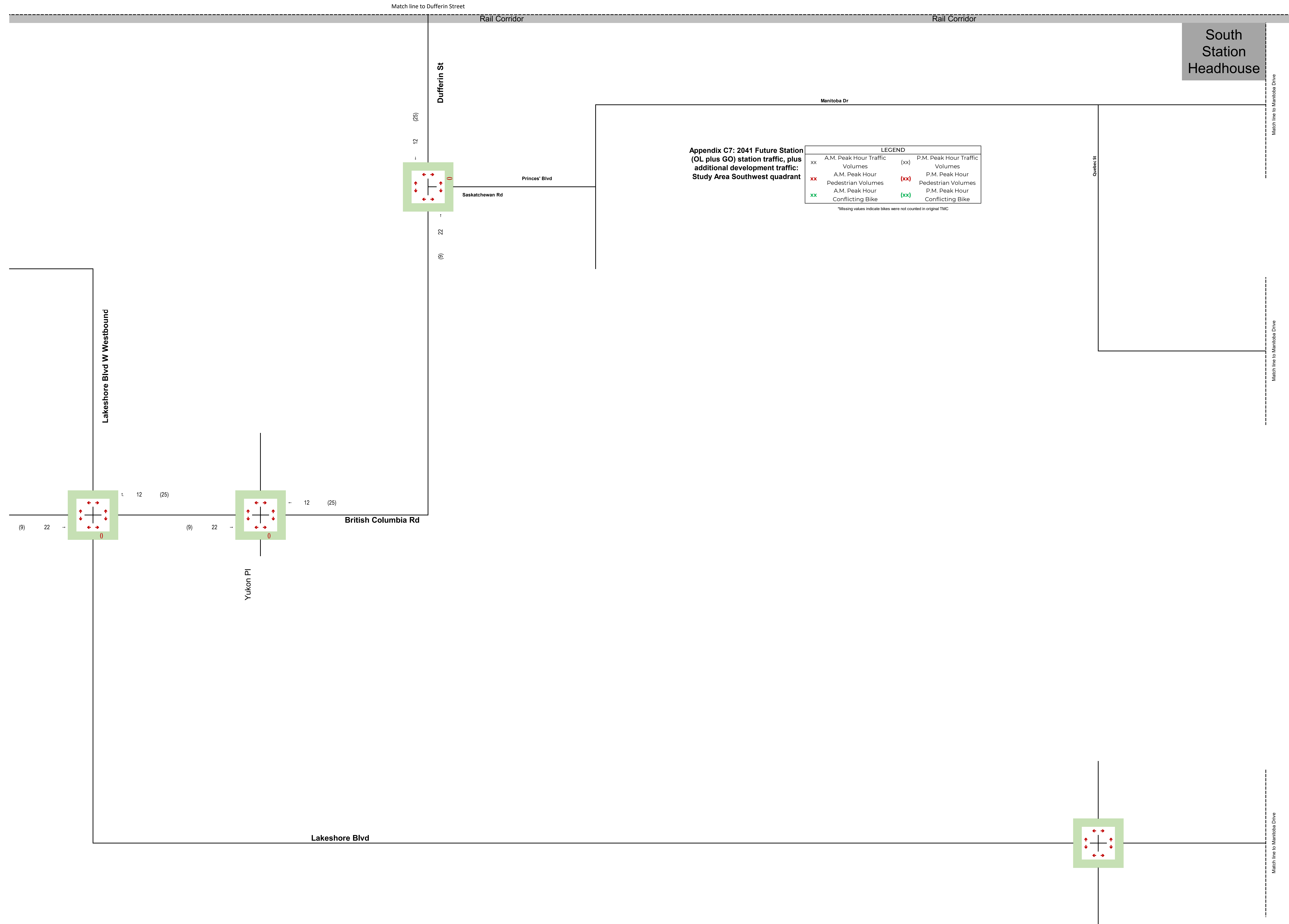


Appendix C7: 2041 Future Station (OL plus GO) station traffic, plus additional development traffic: Study Area Northwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC

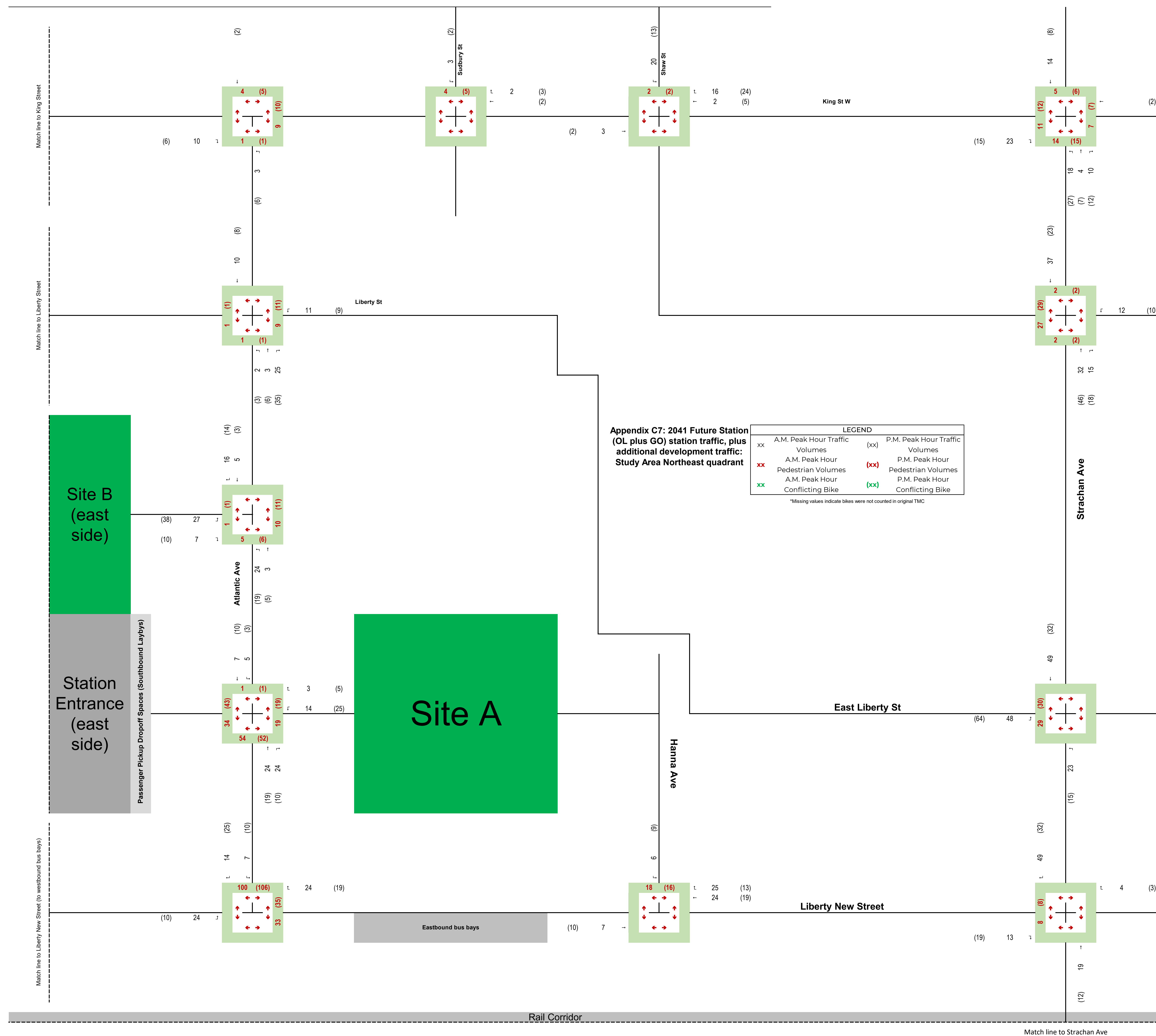


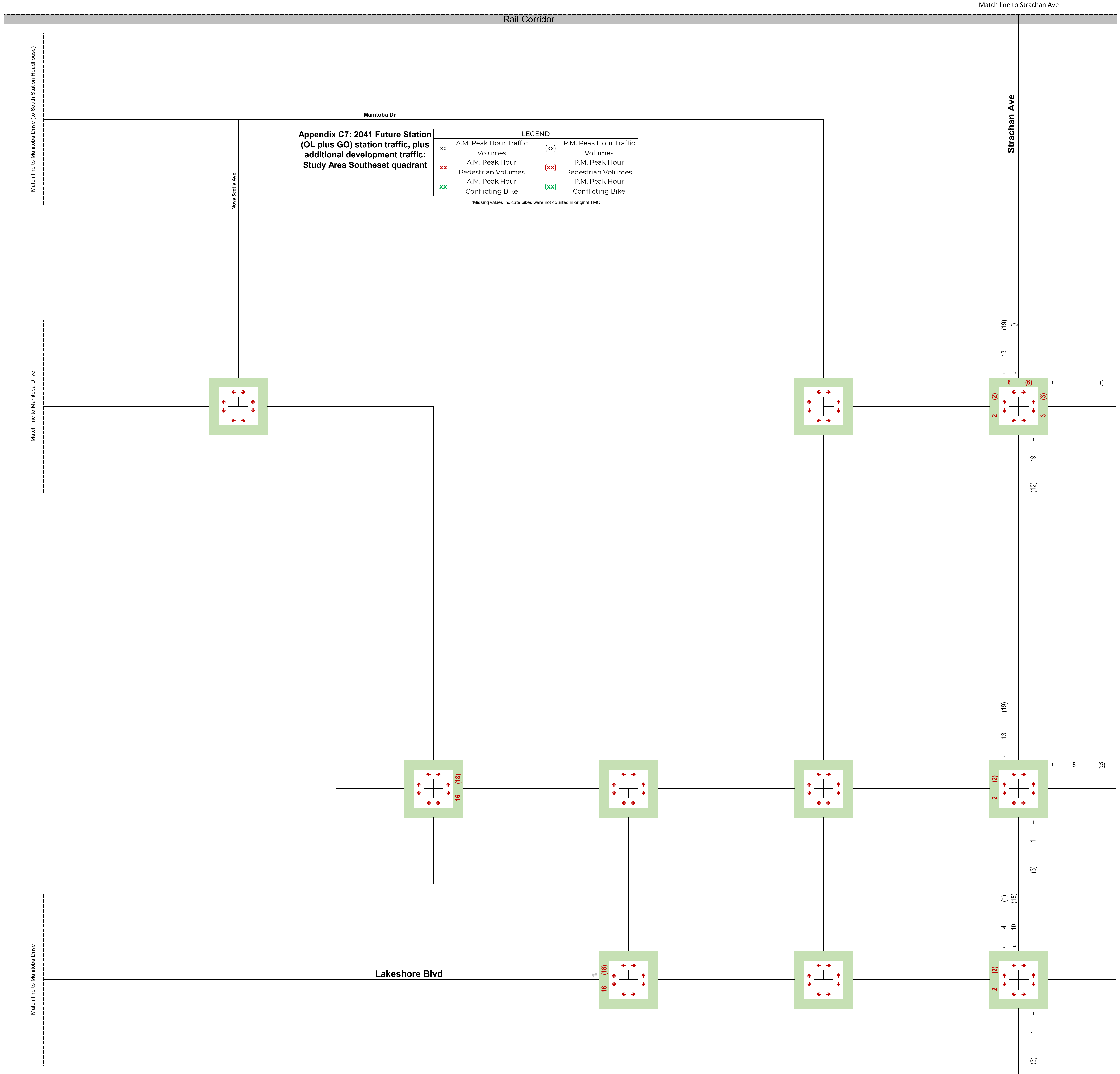


Appendix C7: 2041 Future Station (OL plus GO) station traffic, plus additional development traffic; Study Area Southwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC





Match line to Manitoba Drive (to South Station Headhouse)

Match line to Manitoba Drive

Match line to Manitoba Drive

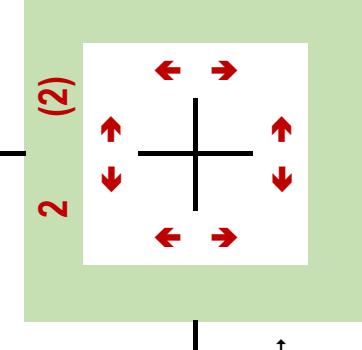
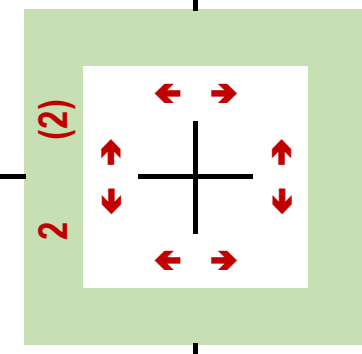
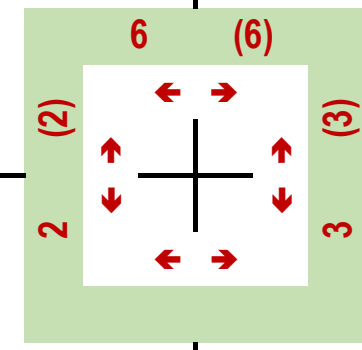
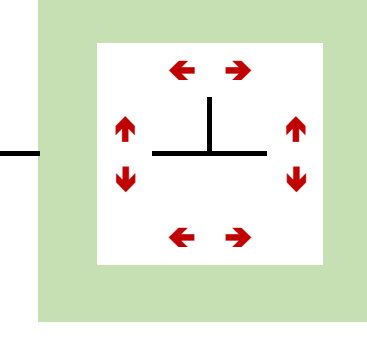
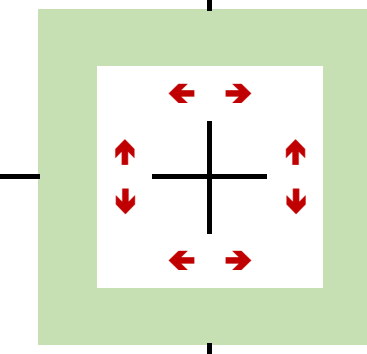
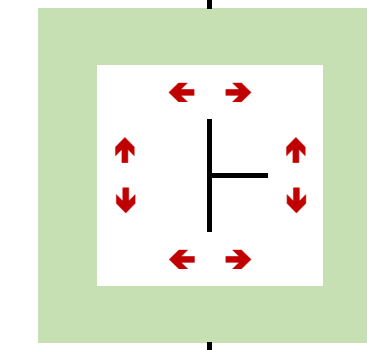
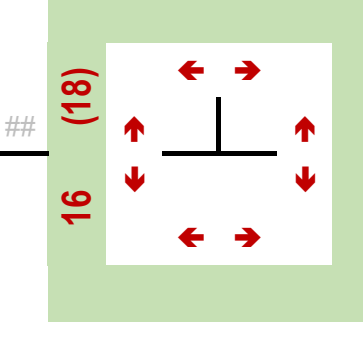
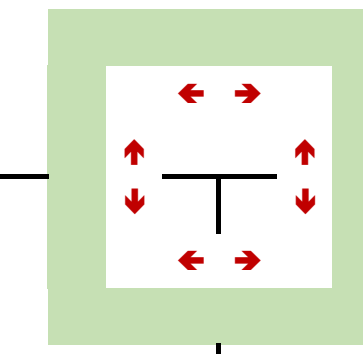
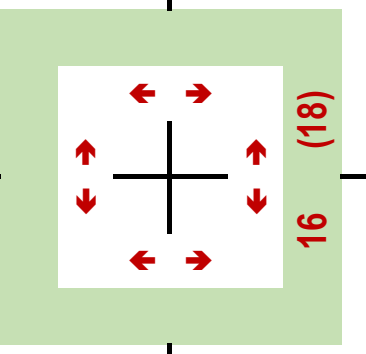
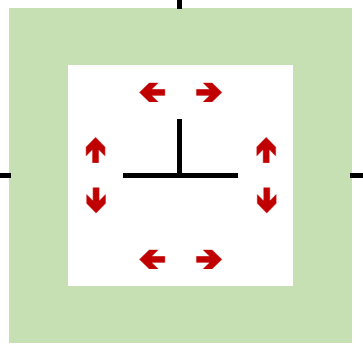
Manitoba Dr

Nova Scotia Ave

Lakeshore Blvd

Match line to Strachan Ave

Strachan Ave



13

(19)

0

2

(2)

19

(12)

0

13

(19)

18

(9)

2

(2)

1

(8)

(1)

4

(10)

1

(8)

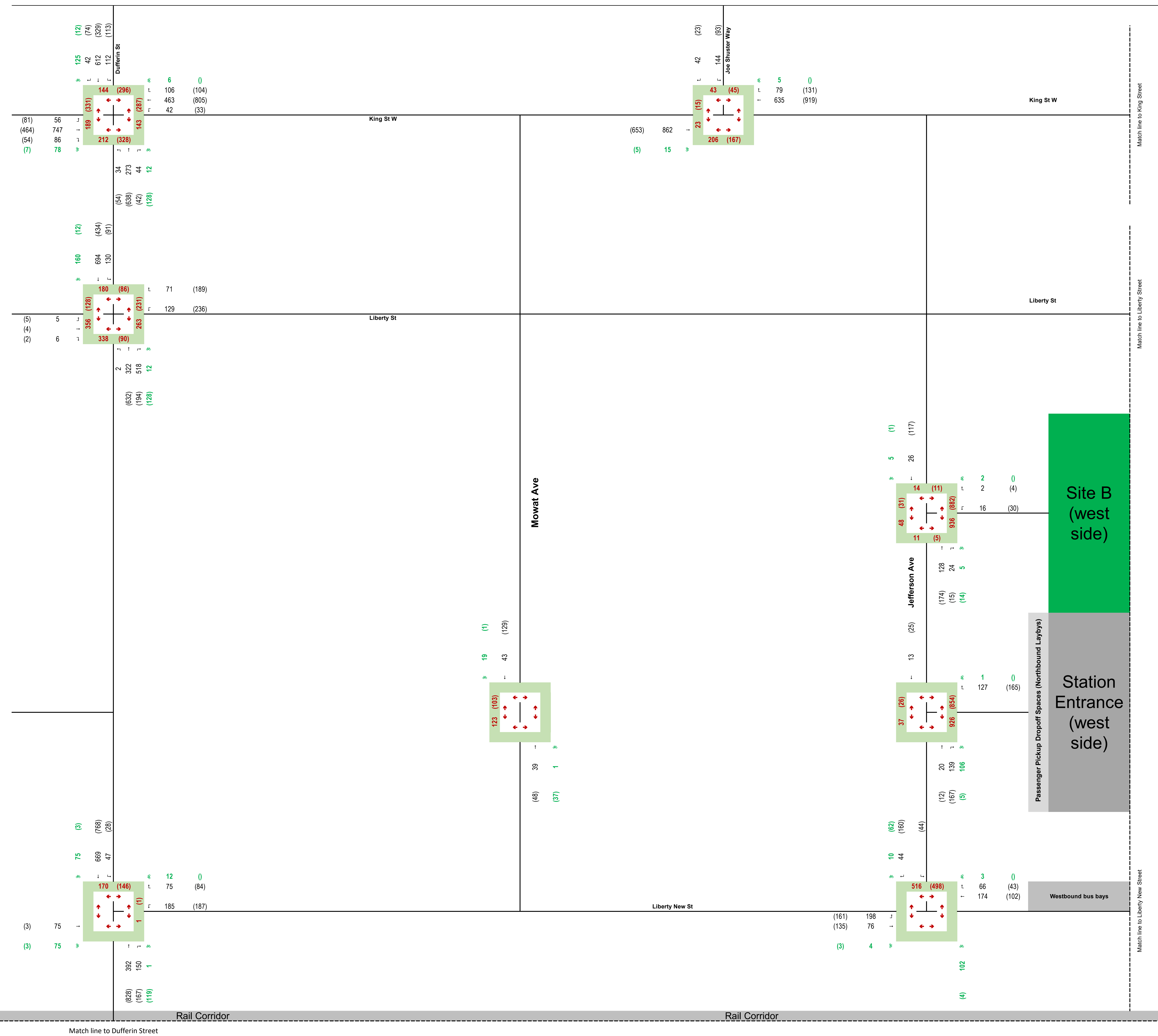
1

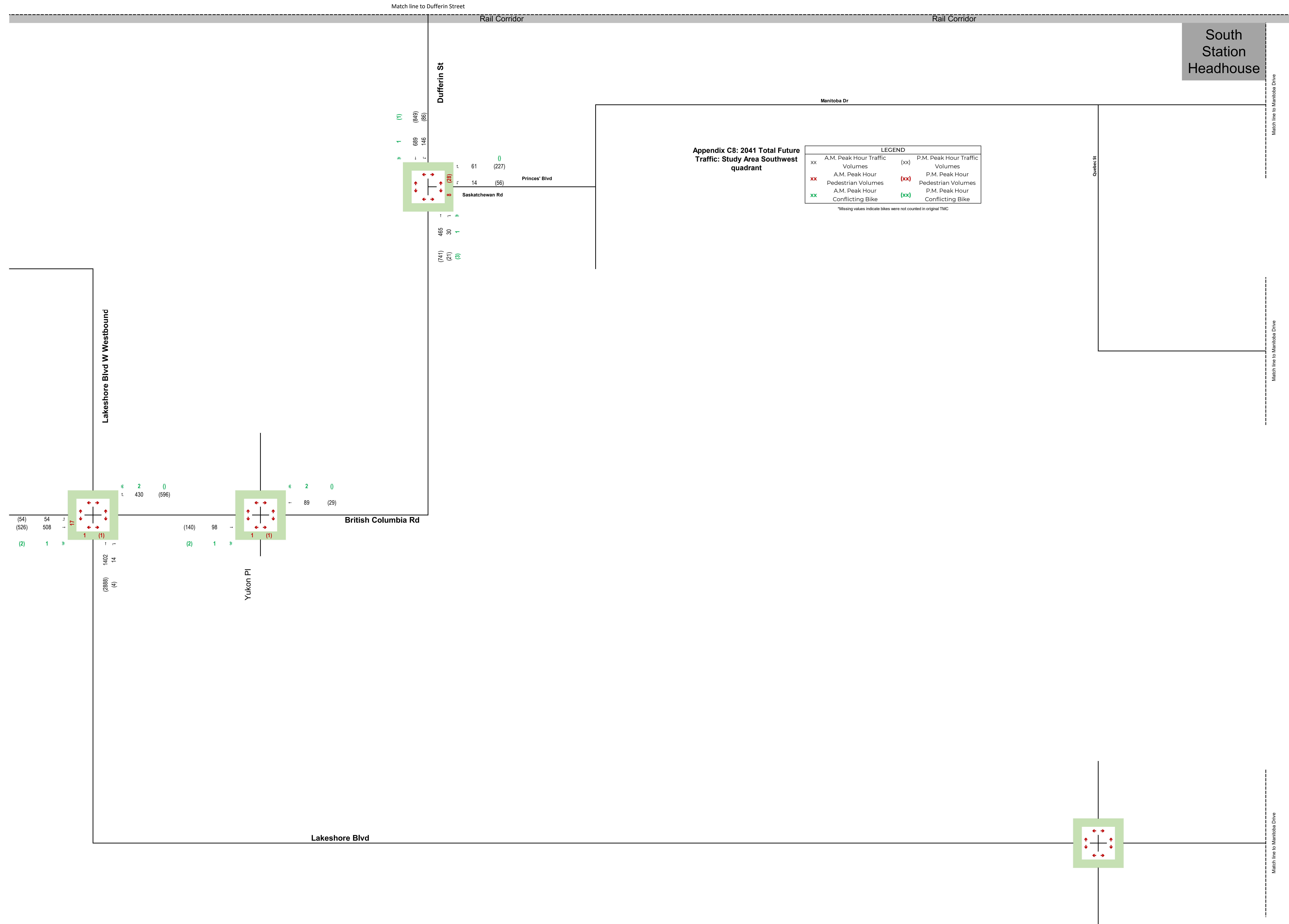
(9)

Appendix C8: 2041 Total Future Traffic: Study Area Northwest quadrant

LEGEND			
xx	A.M. Peak Hour Traffic Volumes	(xx)	P.M. Peak Hour Traffic Volumes
xx	A.M. Peak Hour Pedestrian Volumes	(xx)	P.M. Peak Hour Pedestrian Volumes
xx	A.M. Peak Hour Conflicting Bike	(xx)	P.M. Peak Hour Conflicting Bike

*Missing values indicate bikes were not counted in original TMC





Match line to Dufferin Street

Rail Corridor

South Station Headhouse

Match line to Manitoba Drive

Manitoba Dr

Quebec St

Match line to Manitoba Drive

Lakeshore Blvd W Westbound

British Columbia Rd

Yukon Pl

Dufferin St

Saskatchewan Rd

Princes Blvd

Lakeshore Blvd

Match line to Manitoba Drive

(54) 54
(526) 508
(2) 1

1402 14
(2888) (4)

2 0
430 (596)

(140) 98
(2) 1

2 0
89 (29)

1 (1)

1 (1)

1 (1)

888 (649)

146 (86)

61 0
(227)

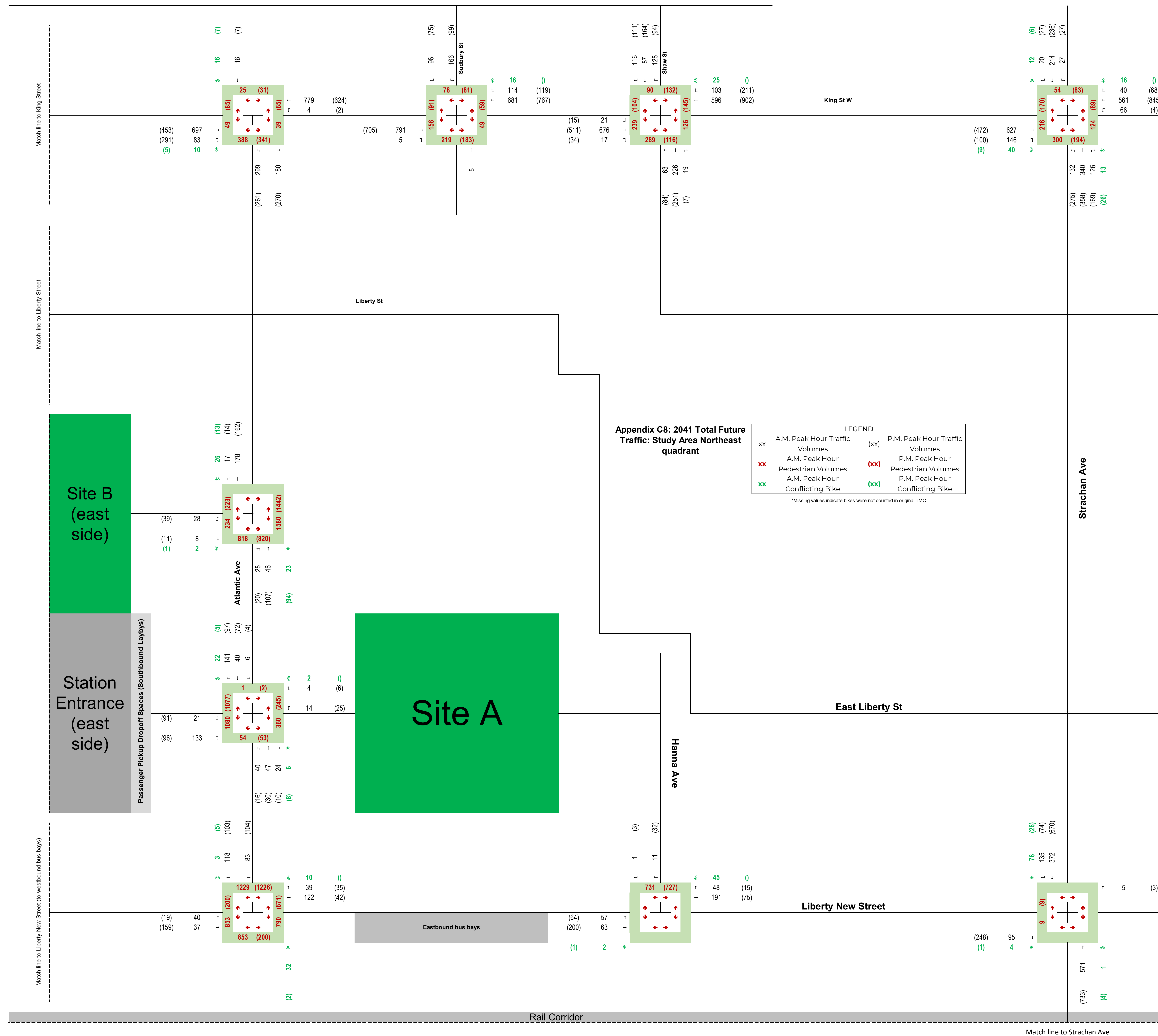
14 (56)

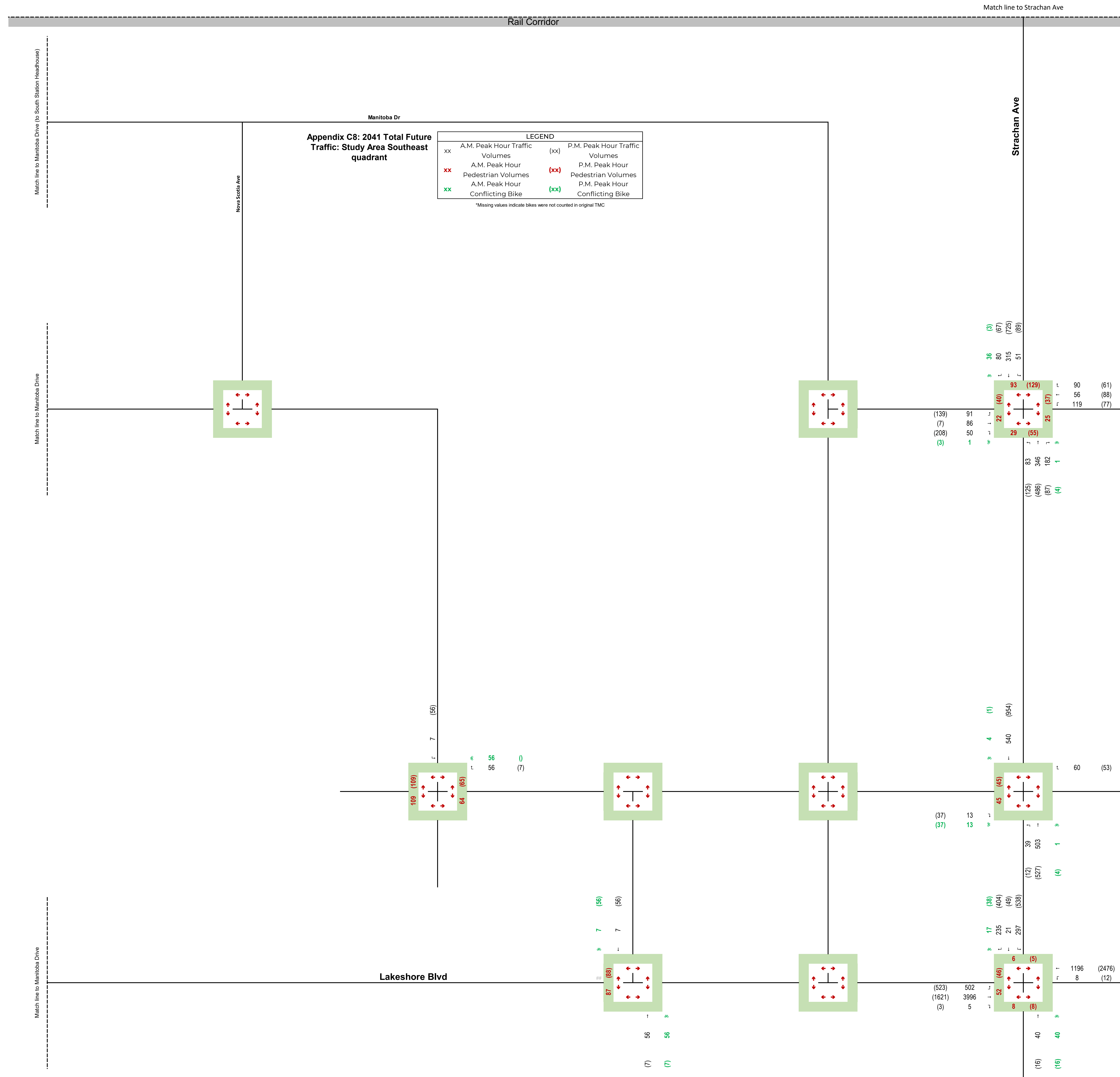
8 (20)

465 30
(74) (21)

1 (1)

0 (0)







Appendix D: Detailed Synchro Results

Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

12/18/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔					↔	↔	↔
Traffic Volume (vph)	402	3208	5	8	960	0	0	0	0	187	4	188
Future Volume (vph)	402	3208	5	8	960	0	0	0	0	187	4	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Storage Length (m)	60.0		0.0	60.0		50.0	0.0		0.0	140.0		50.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor	1.00	1.00										0.96
Fr												0.850
Fit Protected	0.950			0.950						0.950	0.954	
Satd. Flow (prot)	1452	4932	0	1685	4885	0	0	0	0	1585	1687	1507
Fit Permitted	0.175			0.089						0.950	0.954	
Satd. Flow (perm)	267	4932	0	158	4885	0	0	0	0	1585	1687	1448
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												176
Link Speed (k/h)		60			60			40				40
Link Distance (m)		310.3			196.6			116.5				205.6
Travel Time (s)		18.6			11.8			10.5				18.5
Confl. Peds. (#/hr)	5		7	7		5	24					24
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 (%)	16%	4%	0%	0%	5%	33%	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	447	3564	6	9	1067	0	0	0	0	208	4	209
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	447	3570	0	9	1067	0	0	0	0	106	106	209
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)		3.0			3.0			3.0				3.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	1.09	1.01	1.01	1.09	1.01	1.09	1.01	1.01	1.01	1.09	1.01	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2					1	2	1
Detector Template	Left	Thru		Left	Thru					Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5					6.1	30.5	6.1
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	1.8		6.1	1.8					6.1	1.8	6.1
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)		28.7			28.7						28.7	
Detector 2 Size(m)		1.8			1.8						1.8	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

12/18/2020

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (m)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Fr	
Fit Protected	
Satd. Flow (prot)	
Fit Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(m)	
Link Offset(m)	
Crosswalk Width(m)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (k/h)	
Number of Detectors	
Detector Template	
Leading Detector (m)	
Trailing Detector (m)	
Detector 1 Position(m)	
Detector 1 Size(m)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(m)	
Detector 2 Size(m)	
Detector 2 Type	
Detector 2 Channel	

Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

12/18/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0				0.0						
Turn Type	pm+pt	NA		Perm	NA					Perm	NA	pm+ov
Protected Phases	5	2			6						4	5
Permitted Phases	2			6						4		4
Detector Phase	5	2		6	6					4	4	5
Switch Phase												
Minimum Initial (s)	6.0	30.0		30.0	30.0					7.0	7.0	6.0
Minimum Split (s)	12.0	36.0		36.0	36.0					44.0	44.0	12.0
Total Split (s)	33.0	83.0		50.0	50.0					45.0	45.0	33.0
Total Split (%)	22.9%	57.6%		34.7%	34.7%					31.3%	31.3%	22.9%
Maximum Green (s)	27.0	77.0		44.0	44.0					38.0	38.0	27.0
Yellow Time (s)	3.0	4.0		4.0	4.0					3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		2.0	2.0					4.0	4.0	3.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0					-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0		5.0	5.0					6.0	6.0	5.0
Lead/Lag	Lead			Lag	Lag					Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes					Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode	None	Max		Max	Max					None	None	None
Walk Time (s)		7.0		7.0	7.0					7.0	7.0	
Flash Dont Walk (s)		23.0		23.0	23.0					30.0	30.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)	78.1	78.1		45.1	45.1					13.1	13.1	42.1
Actuated g/C Ratio	0.76	0.76		0.44	0.44					0.13	0.13	0.41
v/c Ratio	0.84	0.95		0.13	0.50					0.52	0.49	0.29
Control Delay	33.9	18.3		24.1	21.8					51.1	49.3	4.9
Queue Delay	0.0	0.0		0.0	0.0					0.0	0.0	0.0
Total Delay	33.9	18.3		24.1	21.8					51.1	49.3	4.9
LOS	C	B		C	C					D	D	A
Approach Delay		20.1			21.8						27.7	
Approach LOS		C			C						C	

Intersection Summary

Area Type: Other

Cycle Length: 144

Actuated Cycle Length: 102.2

Natural Cycle: 150

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 21.0

Intersection LOS: C

Intersection Capacity Utilization 120.0%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 222: Lakeshore Blvd & Strachan Ave



Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

12/18/2020

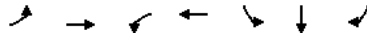
Lane Group	Ø3
Detector 2 Extend (s)	
Turn Type	
Protected Phases	3
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	15.0
Total Split (s)	16.0
Total Split (%)	11%
Maximum Green (s)	8.0
Yellow Time (s)	3.0
All-Red Time (s)	5.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Queues

222: Lakeshore Blvd & Strachan Ave

12/18/2020



Lane Group	EBL	EBT	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	447	3570	9	1067	106	106	209
v/c Ratio	0.84	0.95	0.13	0.50	0.52	0.49	0.29
Control Delay	33.9	18.3	24.1	21.8	51.1	49.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	18.3	24.1	21.8	51.1	49.3	4.9
Queue Length 50th (m)	52.2	181.5	1.0	53.9	20.9	20.8	3.5
Queue Length 95th (m)	#116.0	#305.7	5.1	71.7	38.4	38.1	15.5
Internal Link Dist (m)		286.3		172.6		181.6	
Turn Bay Length (m)	60.0		60.0		140.0		50.0
Base Capacity (vph)	529	3768	69	2153	605	644	716
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.95	0.13	0.50	0.18	0.16	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

222: Lakeshore Blvd & Strachan Ave

12/18/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔					↔	↔	↔
Traffic Volume (vph)	402	3208	5	8	960	0	0	0	0	187	4	188
Future Volume (vph)	402	3208	5	8	960	0	0	0	0	187	4	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Total Lost time (s)	5.0	5.0		5.0	5.0					6.0	6.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91					0.95	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00					1.00	1.00	0.99
Frbp, ped/bikes	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	0.85
Flt Protected	0.95	1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)	1452	4931		1685	4885					1585	1687	1492
Flt Permitted	0.17	1.00		0.09	1.00					0.95	0.95	1.00
Satd. Flow (perm)	267	4931		157	4885					1585	1687	1492
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)	447	3564	6	9	1067	0	0	0	0	208	4	209
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	105
Lane Group Flow (vph)	447	3570	0	9	1067	0	0	0	0	106	106	104
Confl. Peds. (#/hr)	5		7	7		5	24					24
Heavy Vehicles (%)	16%	4%	0%	0%	5%	33%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA					Perm	NA	pm+ov
Protected Phases	5	2			6						4	5
Permitted Phases	2			6						4		4
Actuated Green, G (s)	77.1	77.1		44.1	44.1					12.1	12.1	39.1
Effective Green, g (s)	78.1	78.1		45.1	45.1					13.1	13.1	41.1
Actuated g/C Ratio	0.76	0.76		0.44	0.44					0.13	0.13	0.40
Clearance Time (s)	6.0	6.0		6.0	6.0					7.0	7.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	528	3768		69	2155					203	216	600
v/s Ratio Prot	0.23	c0.72			0.22							0.05
v/s Ratio Perm	0.41			0.06						c0.07	0.06	0.02
v/c Ratio	0.85	0.95		0.13	0.50					0.52	0.49	0.17
Uniform Delay, d1	19.1	10.3		16.9	20.4					41.6	41.4	19.6
Progression Factor	1.00	1.00		1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2	11.9	6.7		3.9	0.8					2.4	1.8	0.1
Delay (s)	31.0	17.0		20.8	21.2					44.0	43.2	19.8
Level of Service	C	B		C	C					D	D	B
Approach Delay (s)		18.6			21.2			0.0			31.8	
Approach LOS		B			C			A			C	

Intersection Summary

HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	102.2	Sum of lost time (s)	24.0
Intersection Capacity Utilization	120.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
538: Strachan Ave & King St

12/18/2020

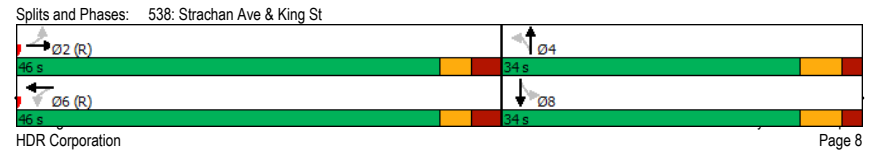
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	0	501	64	66	438	40	81	258	106	27	140	20
Future Volume (vph)	0	501	64	66	438	40	81	258	106	27	140	20
Ideal Flow (vphpl)	1900	1900	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	0.0	0.0	0.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Storage Lanes	0	0	0	0	1	0	1	0	1	0	1	0
Taper Length (m)	2.5			2.5			2.5			2.5		
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		0.94			0.98		0.77	0.97		0.96	0.96	
Frt		0.985			0.990		0.956			0.981		
Fit Protected					0.994		0.950			0.950		
Satd. Flow (prot)	0	1273	0	0	1430	0	1458	1486	0	1516	1565	0
Fit Permitted					0.703		0.621			0.326		
Satd. Flow (perm)	0	1273	0	0	997	0	731	1486	0	498	1565	0
Right Turn on Red			Yes		Yes		Yes			Yes		Yes
Satd. Flow (RTOR)		12			8		29			10		
Link Speed (k/h)		50			50		40			40		
Link Distance (m)		255.2			358.6		424.1			379.9		
Travel Time (s)		18.4			25.8		38.2			34.2		
Conf. Peds. (#/hr)	41		315	315		41	162		92	92		162
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	9%	28%	100%	7%	5%	4%	6%	3%	0%	2%	0%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	0	583	74	77	509	47	94	300	123	31	163	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	657	0	0	633	0	94	423	0	31	186	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		3.0			3.0		
Link Offset(m)		0.0			0.0		0.0			0.0		
Crosswalk Width(m)		1.6			1.6		1.6			1.6		
Two way Left Turn Lane												
Headway Factor	1.16	1.32	1.16	1.16	1.13	1.16	1.25	1.16	1.16	1.25	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
538: Strachan Ave & King St

12/18/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			Perm		NA	Perm		NA	Perm	NA
Protected Phases		2			6		6	4		4		8
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		27.0	27.0		27.0	27.0	
Total Split (s)	46.0	46.0		46.0	46.0		34.0	34.0		34.0	34.0	
Total Split (%)	57.5%	57.5%		57.5%	57.5%		42.5%	42.5%		42.5%	42.5%	
Maximum Green (s)	40.0	40.0		40.0	40.0		28.0	28.0		28.0	28.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-3.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			3.0		5.0	5.0		5.0	5.0	
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	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		14	14		31	31		100	100	
Act Effct Green (s)		41.0			43.0		29.0	29.0		29.0	29.0	
Actuated g/C Ratio		0.51			0.54		0.36	0.36		0.36	0.36	
v/c Ratio		1.00			1.17		0.36	0.76		0.17	0.32	
Control Delay		56.5			115.3		23.5	31.5		26.9	26.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		56.5			115.3		23.5	31.5		26.9	26.7	
LOS		E			F		C	C		C	C	
Approach Delay		56.5			115.3		30.1			26.7		
Approach LOS		E			F		C			C		

Intersection Summary	
Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	42 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.17
Intersection Signal Delay:	65.0
Intersection Capacity Utilization:	120.7%
Analysis Period (min):	15
ICU Level of Service:	H



Queues

538: Strachan Ave & King St

12/18/2020



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	657	633	94	423	31	186
v/c Ratio	1.00	1.17	0.36	0.76	0.17	0.32
Control Delay	56.5	115.3	23.5	31.5	26.9	26.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.5	115.3	23.5	31.5	26.9	26.7
Queue Length 50th (m)	92.7	~116.5	10.3	51.8	4.5	27.4
Queue Length 95th (m)	#154.0	#157.7	21.6	#80.7	m7.4	m41.6
Internal Link Dist (m)	231.2	334.6		400.1		355.9
Turn Bay Length (m)			25.0		25.0	
Base Capacity (vph)	658	539	264	557	180	573
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	1.00	1.17	0.36	0.76	0.17	0.32

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.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

538: Strachan Ave & King St

12/18/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	0	501	64	66	438	40	81	258	106	27	140	20
Future Volume (vph)	0	501	64	66	438	40	81	258	106	27	140	20
Ideal Flow (vphpl)	1900	1900	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)		5.0			3.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.94			0.99		1.00	0.97		1.00	0.96	
Ftbp, ped/bikes		1.00			0.99		0.77	1.00		0.96	1.00	
Frt		0.98			0.99		1.00	0.96		1.00	0.98	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1273			1409		1118	1487		1450	1566	
Flt Permitted		1.00			0.70		0.62	1.00		0.33	1.00	
Satd. Flow (perm)		1273			996		731	1487		497	1566	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	583	74	77	509	47	94	300	123	31	163	23
RTOR Reduction (vph)	0	6	0	0	4	0	0	18	0	0	6	0
Lane Group Flow (vph)	0	651	0	0	629	0	94	405	0	31	180	0
Confl. Peds. (#/hr)	41		315	315		41	162		92	92		162
Heavy Vehicles (%)	0%	9%	28%	100%	7%	5%	4%	6%	3%	0%	2%	0%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA			Perm		NA		Perm	NA		Perm
Protected Phases		2			6		4		4			8
Permitted Phases		2			6		4		4			8
Actuated Green, G (s)		40.0			40.0		28.0		28.0		28.0	28.0
Effective Green, g (s)		41.0			43.0		29.0		29.0		29.0	29.0
Actuated g/C Ratio		0.51			0.54		0.36		0.36		0.36	0.36
Clearance Time (s)		6.0			6.0		6.0		6.0		6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0		3.0		3.0	3.0
Lane Grp Cap (vph)		652			535		264		539		180	567
v/s Ratio Prot		0.51					c0.27					0.11
v/s Ratio Perm					c0.63		0.13				0.06	
v/c Ratio		1.00			1.18		0.36		0.75		0.17	0.32
Uniform Delay, d1		19.5			18.5		18.7		22.3		17.3	18.4
Progression Factor		1.00			0.81		1.00		1.00		1.37	1.43
Incremental Delay, d2		34.9			96.7		3.7		9.3		1.6	1.2
Delay (s)		54.4			111.8		22.4		31.6		25.4	27.4
Level of Service		D			F		C		C		C	C
Approach Delay (s)		54.4			111.8		29.9				27.1	
Approach LOS		D			F		C				C	

Intersection Summary

HCM 2000 Control Delay	63.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	120.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
539: Dufferin St & King St

12/18/2020

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	551	50	0	357	94	0	192	62	112	360	42
Future Volume (vph)	0	551	50	0	357	94	0	192	62	112	360	42
Ideal Flow (vphpl)	1900	2150	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	0.95	0.95	0.95
Ped Bike Factor		0.98			0.98			0.98			0.98	
Frt		0.989			0.972			0.967			0.988	
Fit Protected											0.989	
Satd. Flow (prot)	0	1691	0	0	1392	0	0	1346	0	0	2844	0
Fit Permitted											0.799	
Satd. Flow (perm)	0	1691	0	0	1392	0	0	1346	0	0	2271	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			21			25			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		291.1			316.7			212.5			385.1	
Travel Time (s)		21.0			22.8			15.3			27.7	
Conf. Peds. (#/hr)	65		97	97		65	98		42	42		98
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	5%	4%	10%	2%	4%	7%	8%	12%	0%	3%	9%	7%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	20	20	0	8	8
Adj. Flow (vph)	0	641	58	0	415	109	0	223	72	130	419	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	699	0	0	524	0	0	295	0	0	598	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	Right	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.16	1.06	1.16	1.16	1.32	1.16	1.16	1.29	1.16	1.16	1.18	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA			NA			NA		Perm		NA
Protected Phases		2			6			3	8			4
Permitted Phases	2			6			8			4		
Minimum Split (s)	27.0	27.0		27.0	27.0		10.0	27.0		27.0		27.0
Total Split (s)	41.0	41.0		41.0	41.0		11.0	39.0		28.0		28.0
Total Split (%)	51.3%	51.3%		51.3%	51.3%		13.8%	48.8%		35.0%		35.0%
Maximum Green (s)	35.0	35.0		35.0	35.0		7.0	33.0		22.0		22.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		2.0		2.0
Lost Time Adjust (s)		-3.0			-1.0			-1.0				-1.0
Total Lost Time (s)		3.0			5.0			5.0				5.0
Lead/Lag							Lead			Lag		Lag
Lead-Lag Optimize?							Yes			Yes		Yes
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0		7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			14.0		14.0		14.0
Pedestrian Calls (#/hr)	32	32		22	22			33		14		14
Act Effect Green (s)		38.0			36.0			34.0				23.0
Actuated g/C Ratio		0.48			0.45			0.42				0.29

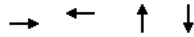
Lanes, Volumes, Timings
539: Dufferin St & King St

12/18/2020

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.87			0.82			0.50			0.90	
Control Delay		26.6			23.6			13.3			46.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		26.6			23.6			13.3			46.7	
LOS		C			C			B			D	
Approach Delay		26.6			23.6			13.3			46.7	
Approach LOS		C			C			B			D	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	80											
Actuated Cycle Length:	80											
Offset:	15 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green											
Natural Cycle:	70											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.90											
Intersection Signal Delay:	29.7						Intersection LOS: C					
Intersection Capacity Utilization:	78.6%						ICU Level of Service D					
Analysis Period (min):	15											
Splits and Phases:	539: Dufferin St & King St											

Queues
539: Dufferin St & King St

12/18/2020



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	699	524	295	598
v/c Ratio	0.87	0.82	0.50	0.90
Control Delay	26.6	23.6	13.3	46.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.6	23.6	13.3	46.7
Queue Length 50th (m)	89.4	29.9	20.4	45.0
Queue Length 95th (m)	#144.1	#107.9	m19.2	#69.7
Internal Link Dist (m)	267.1	292.7	188.5	361.1
Turn Bay Length (m)				
Base Capacity (vph)	807	637	586	661
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	0.87	0.82	0.50	0.90

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
539: Dufferin St & King St

12/18/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	551	50	0	357	94	0	192	62	112	360	42
Future Volume (vph)	0	551	50	0	357	94	0	192	62	112	360	42
Ideal Flow (vphpl)	1900	2150	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			0.95	
Frbp, ped/bikes		0.98			0.98			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Flt		0.99			0.97			0.97			0.99	
Flt Protected		1.00			1.00			1.00			0.99	
Satd. Flow (prot)		1691			1391			1346			2811	
Flt Permitted		1.00			1.00			1.00			0.80	
Satd. Flow (perm)		1691			1391			1346			2271	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	641	58	0	415	109	0	223	72	130	419	49
RTOR Reduction (vph)	0	4	0	0	12	0	0	14	0	0	9	0
Lane Group Flow (vph)	0	695	0	0	512	0	0	281	0	0	589	0
Confl. Peds. (#/hr)	65		97	97		65	98		42	42		98
Heavy Vehicles (%)	5%	4%	10%	2%	4%	7%	8%	12%	0%	3%	9%	7%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	20	20	0	8	8
Turn Type		NA			NA			NA		Perm	NA	
Protected Phases		2			6			3	8		4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		35.0			35.0			33.0			22.0	
Effective Green, g (s)		38.0			36.0			34.0			23.0	
Actuated g/C Ratio		0.48			0.45			0.42			0.29	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		803			625			572			652	
v/s Ratio Prot		c0.41			0.37			c0.21				
v/s Ratio Perm											c0.26	
v/c Ratio		0.87			0.82			0.49			0.90	
Uniform Delay, d1		18.7			19.2			16.7			27.4	
Progression Factor		0.71			0.74			0.82			1.00	
Incremental Delay, d2		11.7			8.4			0.3			18.3	
Delay (s)		25.0			22.5			14.0			45.7	
Level of Service		C			C			B			D	
Approach Delay (s)		25.0			22.5			14.0			45.7	
Approach LOS		C			C			B			D	

Intersection Summary

HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

12/18/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔			↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	91	85	50	119	56	89	83	232	182	49	198	48
Future Volume (vph)	91	85	50	119	56	89	83	232	182	49	198	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	25.0		0.0	0.0		50.0	30.0		0.0	25.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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	0.97	0.97			0.97	0.93	0.97	0.96			0.99	
Frt		0.944				0.850		0.934			0.971	
Fit Protected	0.950				0.967		0.950			0.950		
Satd. Flow (prot)	1589	1660	0	0	1682	1436	1652	1647	0	1620	1721	0
Fit Permitted	0.592				0.706		0.581			0.429		
Satd. Flow (perm)	960	1660	0	0	1194	1339	980	1647	0	731	1721	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21				152		31			10	
Link Speed (k/h)		30			50			40			40	
Link Distance (m)		143.4			229.0			205.6			241.4	
Travel Time (s)		17.2			16.5			18.5			21.7	
Confl. Peds. (#/hr)	14		16	16		14	17		18	18		17
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 (%)	6%	5%	2%	0%	25%	5%	2%	5%	0%	4%	5%	2%
Adj. Flow (vph)	101	94	56	132	62	99	92	258	202	54	220	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	150	0	0	194	99	92	460	0	54	273	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)		3.0			3.0			3.0			3.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.09	1.01	1.01	1.01	1.01	1.09	1.09	1.01	1.01	1.09	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

12/18/2020

Lane Group	Ø10	Ø16
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (m)		
Storage Length (m)		
Storage Lanes		
Taper Length (m)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Fit Protected		
Satd. Flow (prot)		
Fit Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (k/h)		
Link Distance (m)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(m)		
Link Offset(m)		
Crosswalk Width(m)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (k/h)		
Number of Detectors		
Detector Template		
Leading Detector (m)		
Trailing Detector (m)		
Detector 1 Position(m)		
Detector 1 Size(m)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(m)		
Detector 2 Size(m)		
Detector 2 Type		
Detector 2 Channel		

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

12/18/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0				0.0		0.0				0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	4				8		2				6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0	25.0	40.0	40.0		40.0	40.0	
Minimum Split (s)	32.0	32.0		32.0	32.0	32.0	47.0	47.0		47.0	47.0	
Total Split (s)	48.0	48.0		48.0	48.0	48.0	59.0	59.0		59.0	59.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%	33.3%	41.0%	41.0%		41.0%	41.0%	
Maximum Green (s)	41.0	41.0		41.0	41.0	41.0	52.0	52.0		52.0	52.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0			-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
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	3.0	
Recall Mode	None	None		None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	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	0	
Act Effect Green (s)	26.8	26.8		26.8	26.8	26.8	53.0	53.0		53.0	53.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29	0.29	0.58	0.58		0.58	0.58	
v/c Ratio	0.36	0.30		0.56	0.20	0.16	0.48	0.48		0.13	0.27	
Control Delay	30.1	23.4		34.6	2.0	10.3	12.7	12.7		10.2	10.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.1	0.1		0.0	0.0	
Total Delay	30.1	23.4		34.6	2.0	10.3	12.8	12.8		10.2	10.4	
LOS	C	C		C	A	B	B	B		B	B	
Approach Delay	26.1			23.6			12.3			10.4		
Approach LOS	C			C			B			B		

Intersection Summary

Area Type: Other

Cycle Length: 144

Actuated Cycle Length: 91.8

Natural Cycle: 100

Control Type: Semi-Act-Uncoord

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 16.6

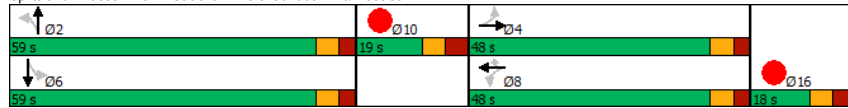
Intersection LOS: B

Intersection Capacity Utilization 125.6%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 571: Strachan Ave & Canada Blvd/Fleet St



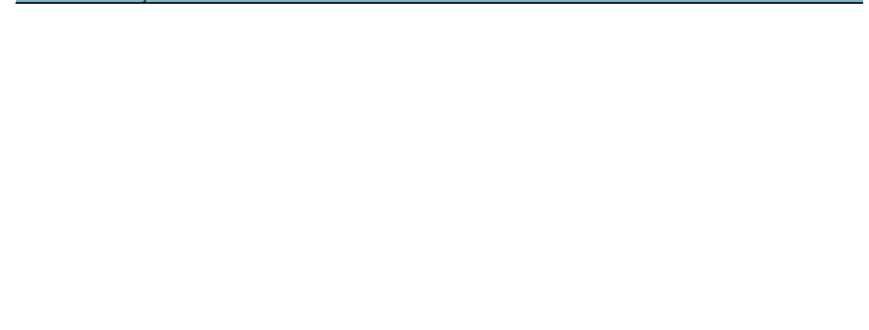
Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

12/18/2020

Lane Group	Ø10	Ø16
Detector 2 Extend (s)	0.0	
Turn Type		
Protected Phases	10	16
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	9.0	9.0
Total Split (s)	19.0	18.0
Total Split (%)	13%	13%
Maximum Green (s)	11.0	10.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	4.0	4.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary



Queues

571: Strachan Ave & Canada Blvd/Fleet St

12/18/2020



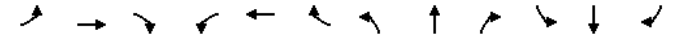
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	101	150	194	99	92	460	54	273
v/c Ratio	0.36	0.30	0.56	0.20	0.16	0.48	0.13	0.27
Control Delay	30.1	23.4	34.6	2.0	10.3	12.7	10.2	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	30.1	23.4	34.6	2.0	10.3	12.8	10.2	10.4
Queue Length 50th (m)	14.1	17.4	28.9	0.0	6.9	39.7	4.0	21.0
Queue Length 95th (m)	28.2	32.8	50.4	3.6	15.7	69.3	10.4	38.0
Internal Link Dist (m)		119.4	205.0		181.6		217.4	
Turn Bay Length (m)	25.0			50.0	30.0		25.0	
Base Capacity (vph)	439	770	546	694	565	964	421	997
Starvation Cap Reductn	0	0	0	0	0	33	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	0.19	0.36	0.14	0.16	0.49	0.13	0.27

Intersection Summary

HCM Signalized Intersection Capacity Analysis

571: Strachan Ave & Canada Blvd/Fleet St

12/18/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	91	85	50	119	56	89	83	232	182	49	198	48
Future Volume (vph)	91	85	50	119	56	89	83	232	182	49	198	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
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
Frbp, ped/bikes	1.00	0.98		1.00	0.95	1.00	0.97	1.00	0.97	1.00	0.99	1.00
Frbp, ped/bikes	0.98	1.00		0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	1.00
Frt	1.00	0.94		1.00	0.85	1.00	0.93	1.00	0.93	1.00	0.97	1.00
Flt Protected	0.95	1.00		0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1554	1673		1650	1364	1611	1663	1592	1728	1592	1728	1728
Flt Permitted	0.59	1.00		0.71	1.00	0.58	1.00	0.43	1.00	0.43	1.00	1.00
Satd. Flow (perm)	968	1673		1204	1364	985	1663	720	1728	720	1728	1728
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)	101	94	56	132	62	99	92	258	202	54	220	53
RTOR Reduction (vph)	0	15	0	0	0	70	0	13	0	0	4	0
Lane Group Flow (vph)	101	135	0	0	194	29	92	447	0	54	269	0
Confl. Peds. (#/hr)	14		16	16		14	17		18	18		17
Heavy Vehicles (%)	6%	5%	2%	0%	25%	5%	2%	5%	0%	4%	5%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2				6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	25.8	25.8			25.8	25.8	52.0	52.0		52.0	52.0	
Effective Green, g (s)	26.8	26.8			26.8	26.8	53.0	53.0		53.0	53.0	
Actuated g/C Ratio	0.29	0.29			0.29	0.29	0.58	0.58		0.58	0.58	
Clearance Time (s)	7.0	7.0			7.0	7.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	282	488			351	398	568	960		415	997	
v/s Ratio Prot		0.08						c0.27			0.16	
v/s Ratio Perm	0.10				c0.16	0.02	0.09			0.08		
v/c Ratio	0.36	0.28			0.55	0.07	0.16	0.47		0.13	0.27	
Uniform Delay, d1	25.7	25.0			27.4	23.5	9.0	11.2		8.9	9.7	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.3			1.9	0.1	0.6	1.6		0.6	0.7	
Delay (s)	26.5	25.3			29.3	23.6	9.7	12.8		9.5	10.4	
Level of Service	C	C			C	C	A	B		A	B	
Approach Delay (s)		25.8			27.4			12.3			10.2	
Approach LOS		C			C			B			B	

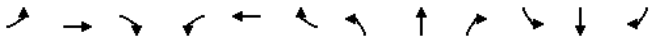
Intersection Summary

HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	91.8	Sum of lost time (s)	28.0
Intersection Capacity Utilization	125.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

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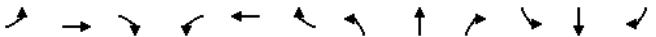


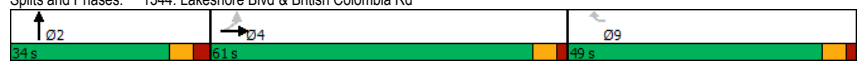
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕	↔	↔	↕		↔	↕	
Traffic Volume (vph)	54	410	0	0	0	341	0	1125	14	0	0	0
Future Volume (vph)	54	410	0	0	0	341	0	1125	14	0	0	0
Ideal Flow (vphpl)	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	15.0		0.0	0.0		80.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor												
Fit						0.850			0.998			
Fit Protected	0.950											
Satd. Flow (prot)	1620	1807	0	0	0	2652	0	4968	0	0	0	0
Fit Permitted	0.950											
Satd. Flow (perm)	1620	1807	0	0	0	2652	0	4968	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	76					1059			1			
Link Speed (k/h)	60			30			60			60		
Link Distance (m)	411.9			164.9			800.6			492.6		
Travel Time (s)	24.7			19.8			48.0			29.6		
Confl. Peds. (#/hr)				1			15			15		
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 (%)	4%	4%	4%	0%	0%	6%	0%	3%	7%	0%	0%	0%
Adj. Flow (vph)	60	456	0	0	0	379	0	1250	16	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	456	0	0	0	379	0	1266	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)	3.0			3.0			3.0			3.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	1.09	1.01	0.86	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14		24		14		24		14	
Number of Detectors	1	2					1	2				
Detector Template	Left	Thru					Right	Thru				
Leading Detector (m)	6.1	30.5					6.1	30.5				
Trailing Detector (m)	0.0	0.0					0.0	0.0				
Detector 1 Position(m)	0.0	0.0					0.0	0.0				
Detector 1 Size(m)	6.1	1.8					6.1	1.8				
Detector 1 Type	CI+Ex	CI+Ex					CI+Ex	CI+Ex				
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0					0.0	0.0				
Detector 1 Queue (s)	0.0	0.0					0.0	0.0				
Detector 1 Delay (s)	0.0	0.0					0.0	0.0				
Detector 2 Position(m)	28.7						28.7					
Detector 2 Size(m)	1.8						1.8					
Detector 2 Type	CI+Ex						CI+Ex					
Detector 2 Channel												

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)	0.0											
Turn Type	Perm	NA					Perm	NA				
Protected Phases					4				2			
Permitted Phases	4								9			
Detector Phase	4		4						9		2	
Switch Phase												
Minimum Initial (s)	10.0	10.0					10.0	10.0				
Minimum Split (s)	27.0	27.0					31.0	29.0				
Total Split (s)	61.0	61.0					49.0	34.0				
Total Split (%)	42.4%	42.4%					34.0%	23.6%				
Maximum Green (s)	55.0	55.0					43.0	27.0				
Yellow Time (s)	4.0	4.0					4.0	4.0				
All-Red Time (s)	2.0	2.0					2.0	3.0				
Lost Time Adjust (s)	-1.0	-1.0					-1.0	-1.0				
Total Lost Time (s)	5.0	5.0					5.0	6.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0					3.0	3.0				
Recall Mode	Max	Max					None	Max				
Walk Time (s)	0.0	0.0						7.0				
Flash Dont Walk (s)	0.0	0.0						15.0				
Pedestrian Calls (#/hr)	0											
Act Effect Green (s)	56.0	56.0					11.0	28.0				
Actuated g/C Ratio	0.50	0.50					0.10	0.25				
v/c Ratio	0.07	0.50					0.31	1.01				
Control Delay	2.4	20.6					0.7	69.6				
Queue Delay	0.0	0.0					0.0	0.0				
Total Delay	2.4	20.6					0.7	69.6				
LOS	A	C					A	E				
Approach Delay	18.5						0.7	69.6				
Approach LOS	B						A	E				
Intersection Summary												
Area Type:	Other											
Cycle Length:	144											
Actuated Cycle Length:	111											
Natural Cycle:	90											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	1.01											
Intersection Signal Delay:	45.3						Intersection LOS: D					
Intersection Capacity Utilization:	55.6%						ICU Level of Service B					
Analysis Period (min)	15											
Splits and Phases:	1344: Lakeshore Blvd & British Columbia Rd											
												

Queues

1344: Lakeshore Blvd & British Columbia Rd

12/18/2020



Lane Group	EBL	EBT	WBR	NBT
Lane Group Flow (vph)	60	456	379	1266
v/c Ratio	0.07	0.50	0.31	1.01
Control Delay	2.4	20.6	0.7	69.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.4	20.6	0.7	69.6
Queue Length 50th (m)	0.0	63.1	0.0	~102.5
Queue Length 95th (m)	4.7	90.6	0.0	#134.9
Internal Link Dist (m)		387.9		776.6
Turn Bay Length (m)	15.0		80.0	
Base Capacity (vph)	854	911	1690	1253
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	0.07	0.50	0.22	1.01

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.

HCM Signalized Intersection Capacity Analysis

1344: Lakeshore Blvd & British Columbia Rd

12/18/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	→	↘	↵	→	↘	↵	→	↘	↵	→	↘
Traffic Volume (vph)	54	410	0	0	0	341	0	1125	14	0	0	0
Future Volume (vph)	54	410	0	0	0	341	0	1125	14	0	0	0
Ideal Flow (vphpl)	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0				5.0		6.0				
Lane Util. Factor	1.00	1.00				0.88		0.91				
Frbp, ped/bikes	1.00	1.00				1.00		1.00				
Fpb, ped/bikes	1.00	1.00				1.00		1.00				
Frt	1.00	1.00				0.85		1.00				
Flt Protected	0.95	1.00				1.00		1.00				
Satd. Flow (prot)	1620	1807				2652		4968				
Flt Permitted	0.95	1.00				1.00		1.00				
Satd. Flow (perm)	1620	1807				2652		4968				
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)	60	456	0	0	0	379	0	1250	16	0	0	0
RTOR Reduction (vph)	30	0	0	0	0	341	0	1	0	0	0	0
Lane Group Flow (vph)	30	456	0	0	0	38	0	1265	0	0	0	0
Confl. Peds. (#/hr)			1	1			15					15
Heavy Vehicles (%)	4%	4%	4%	0%	0%	6%	0%	3%	7%	0%	0%	0%
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					9						
Actuated Green, G (s)	55.0	55.0				10.0		27.0				
Effective Green, g (s)	56.0	56.0				11.0		28.0				
Actuated g/C Ratio	0.50	0.50				0.10		0.25				
Clearance Time (s)	6.0	6.0				6.0		7.0				
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Lane Grp Cap (vph)	817	911				262		1253				
v/s Ratio Prot		c0.25						c0.25				
v/s Ratio Perm	0.02					c0.01						
v/c Ratio	0.04	0.50				0.14		1.01				
Uniform Delay, d1	13.9	18.2				45.7		41.5				
Progression Factor	1.00	1.00				1.00		1.00				
Incremental Delay, d2	0.1	2.0				0.3		27.8				
Delay (s)	14.0	20.2				45.9		69.3				
Level of Service	B	C				D		E				
Approach Delay (s)		19.5			45.9			69.3			0.0	
Approach LOS		B			D			E			A	
Intersection Summary												
HCM 2000 Control Delay			53.3			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			111.0			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			55.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

12/18/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	5	0	6	176	0	56	0	240	434	0	419	0
Future Volume (vph)	5	0	6	176	0	56	0	240	434	0	419	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
Ped Bike Factor		0.75			0.70			0.68				
Frt		0.921			0.967			0.913				
Flt Protected					0.963							
Satd. Flow (prot)	0	1375	0	0	1561	0	0	1016	0	0	1571	0
Flt Permitted		0.899			0.771							
Satd. Flow (perm)	0	1163	0	0	958	0	0	1016	0	0	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			41			87				
Link Speed (k/h)		50			40			50				50
Link Distance (m)		106.6			106.9			249.2				212.5
Travel Time (s)		7.7			9.6			17.9				15.3
Confl. Peds. (#/hr)	157		273	273		157	260		222	222		260
Confl. Bikes (#/hr)			15			25			2			13
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%	2%	0%	1%	0%	4%	0%	12%	1%	0%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	20	20	12	20	20
Adj. Flow (vph)	5	0	7	191	0	61	0	261	472	0	455	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	252	0	0	733	0	0	455	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.13	1.01	1.01	1.13	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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		Perm	NA		NA			NA		NA

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

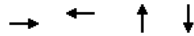
12/18/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8	8		2			6	6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		25.0	25.0		25.0	25.0	
Total Split (s)	28.0	28.0		28.0	28.0		52.0	52.0		52.0	52.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		65.0%	65.0%		65.0%	65.0%	
Maximum Green (s)	23.0	23.0		23.0	23.0		46.0	46.0		46.0	46.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		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)		-1.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		4.0			4.0			5.0			5.0	
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		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	
Act Effect Green (s)		22.5			22.5			48.5			48.5	
Actuated g/C Ratio		0.28			0.28			0.61			0.61	
v/c Ratio		0.03			0.84			1.13			0.48	
Control Delay		0.5			48.6			94.8			24.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		0.5			48.6			94.8			24.2	
LOS		A			D			F			C	
Approach Delay		0.5			48.6			94.8			24.2	
Approach LOS		A			D			F			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	80											
Actuated Cycle Length:	80											
Offset:	40 (50%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	70											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.13											
Intersection Signal Delay:	63.9						Intersection LOS: E					
Intersection Capacity Utilization:	73.5%						ICU Level of Service D					
Analysis Period (min):	15											
Splits and Phases:	1449: Dufferin St & Dwy/Liberty St											

Queues

1449: Dufferin St & Dwy/Liberty St

12/18/2020



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	12	252	733	455
v/c Ratio	0.03	0.84	1.13	0.48
Control Delay	0.5	48.6	94.8	24.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	0.5	48.6	94.8	24.2
Queue Length 50th (m)	0.0	29.6	~128.6	58.0
Queue Length 95th (m)	0.4	#68.3	#193.1	m65.9
Internal Link Dist (m)	82.6	82.9	225.2	188.5
Turn Bay Length (m)				
Base Capacity (vph)	377	316	649	952
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	0.03	0.80	1.13	0.48

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.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1449: Dufferin St & Dwy/Liberty St

12/18/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	5	0	6	176	0	56	0	240	434	0	419	0
Future Volume (vph)	5	0	6	176	0	56	0	240	434	0	419	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frbp, ped/bikes		0.81			0.91			0.68			1.00	
Flpb, ped/bikes		0.92			0.77			1.00			1.00	
Frt		0.92			0.97			0.91			1.00	
Flt Protected		0.98			0.96			1.00			1.00	
Satd. Flow (prot)		1269			1198			1016			1571	
Flt Permitted		0.90			0.77			1.00			1.00	
Satd. Flow (perm)		1164			958			1016			1571	
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)	5	0	7	191	0	61	0	261	472	0	455	0
RTOR Reduction (vph)	0	9	0	0	29	0	0	34	0	0	0	0
Lane Group Flow (vph)	0	3	0	0	223	0	0	699	0	0	455	0
Confl. Peds. (#/hr)	157		273	273		157	260		222	222		260
Confl. Bikes (#/hr)			15			25			2			13
Heavy Vehicles (%)	0%	2%	0%	1%	0%	4%	0%	12%	1%	0%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	20	20	12	20	20
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.5			21.5			47.5			47.5	
Effective Green, g (s)		22.5			22.5			48.5			48.5	
Actuated g/C Ratio		0.28			0.28			0.61			0.61	
Clearance Time (s)		5.0			5.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		327			269			615			952	
v/s Ratio Prot								c0.69			0.29	
v/s Ratio Perm		0.00			c0.23							
v/c Ratio		0.01			0.83			1.14			0.48	
Uniform Delay, d1		20.7			26.9			15.8			8.7	
Progression Factor		1.00			1.00			1.00			2.47	
Incremental Delay, d2		0.0			18.4			80.0			0.7	
Delay (s)		20.7			45.4			95.7			22.3	
Level of Service		C			D			F			C	
Approach Delay (s)		20.7			45.4			95.7			22.3	
Approach LOS		C			D			F			C	

Intersection Summary

HCM 2000 Control Delay	63.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1628: Shaw St & King St

12/18/2020

	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Volume (vph)	0	542	17	0	459	60	63	226	19	45	87	116
Future Volume (vph)	0	542	17	0	459	60	63	226	19	45	87	116
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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99		0.99		0.94		0.991		0.930		0.92	
Frt	0.996		0.984		0.991		0.991		0.930		0.92	
Fit Protected							0.990		0.991			
Satd. Flow (prot)	0	1415	0	0	1391	0	0	3063	0	0	2249	0
Fit Permitted							0.819		0.828			
Satd. Flow (perm)	0	1415	0	0	1391	0	0	2416	0	0	1845	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	4		15		10		133					
Link Speed (k/h)	50		50		40		40					
Link Distance (m)	199.1		255.2		127.7		380.6					
Travel Time (s)	14.3		18.4		11.5		34.3					
Confl. Peds. (#/hr)	60		239	239	60	194		93	93		194	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	100%	7%	0%	100%	8%	2%	5%	1%	0%	33%	2%	7%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	0	623	20	0	528	69	72	260	22	52	100	133
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	643	0	0	597	0	0	354	0	0	285	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		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6		1.6		1.6		1.6	
Two way Left Turn Lane												
Headway Factor	1.16	1.32	1.16	1.16	1.32	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)	28.7		28.7		28.7		28.7		28.7		28.7	
Detector 2 Size(m)	1.8		1.8		1.8		1.8		1.8		1.8	
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	NA		NA		Perm		NA		Perm		NA	
Protected Phases	2		6		4		8					

Lanes, Volumes, Timings
1628: Shaw St & King St

12/18/2020

	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		6		4		8		8		8	
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	22.0	22.0		22.0	22.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		26.0	26.0		26.0	26.0	
Total Split (s)	43.0	43.0		43.0	43.0		27.0	27.0		27.0	27.0	
Total Split (%)	61.4%	61.4%		61.4%	61.4%		38.6%	38.6%		38.6%	38.6%	
Maximum Green (s)	37.0	37.0		37.0	37.0		21.0	21.0		21.0	21.0	
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)			-1.0		-1.0		-1.0		-1.0		-1.0	
Total Lost Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	100	100		20	20		31	31		100	100	
Act Effect Green (s)	38.9		38.9		21.1		21.1		21.1		21.1	
Actuated g/C Ratio	0.56		0.56		0.30		0.30		0.30		0.30	
v/c Ratio	0.82		0.77		0.48		0.44		0.44		0.44	
Control Delay	23.6		20.4		22.0		12.6		12.6		12.6	
Queue Delay	0.0		0.0		0.0		0.0		0.0		0.0	
Total Delay	23.6		20.4		22.0		12.6		12.6		12.6	
LOS	C		C		C		B		B		B	
Approach Delay	23.6		20.4		22.0		12.6		12.6		12.6	
Approach LOS	C		C		C		B		B		B	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	70											
Actuated Cycle Length:	70											
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green												
Natural Cycle:	60											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.82											
Intersection Signal Delay:	20.6						Intersection LOS: C					
Intersection Capacity Utilization:	78.9%						ICU Level of Service D					
Analysis Period (min):	15											
Splits and Phases:	1628: Shaw St & King St											

Queues
1628: Shaw St & King St

12/18/2020

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	643	597	354	285
v/c Ratio	0.82	0.77	0.48	0.44
Control Delay	23.6	20.4	22.0	12.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.6	20.4	22.0	12.6
Queue Length 50th (m)	61.9	53.5	19.2	7.8
Queue Length 95th (m)	#120.3	#91.1	29.1	16.4
Internal Link Dist (m)	175.1	231.2	103.7	356.6
Turn Bay Length (m)				
Base Capacity (vph)	788	779	766	671
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	0.82	0.77	0.46	0.42

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1628: Shaw St & King St

12/18/2020

	↖	→	↗	↙	←	↖	↗	↑	↘	↙	↓	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	542	17	0	459	60	63	226	19	45	87	116
Future Volume (vph)	0	542	17	0	459	60	63	226	19	45	87	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			0.99			0.84	
Flpb, ped/bikes		1.00			1.00			0.95			0.98	
Frt		1.00			0.98			0.99			0.93	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1415			1391			2920			2209	
Flt Permitted		1.00			1.00			0.82			0.83	
Satd. Flow (perm)		1415			1391			2417			1846	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	623	20	0	528	69	72	260	22	52	100	133
RTOR Reduction (vph)	0	2	0	0	7	0	0	7	0	0	93	0
Lane Group Flow (vph)	0	641	0	0	590	0	0	347	0	0	192	0
Confl. Peds. (#/hr)	60		239	239		60	194		93	93		194
Heavy Vehicles (%)	100%	7%	0%	100%	8%	2%	5%	1%	0%	33%	2%	7%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6		4			8		
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		37.9			37.9			20.1			20.1	
Effective Green, g (s)		38.9			38.9			21.1			21.1	
Actuated g/C Ratio		0.56			0.56			0.30			0.30	
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)		786			772			728			556	
v/s Ratio Prot		c0.45			0.42							
v/s Ratio Perm								c0.14			0.10	
v/c Ratio		0.82			0.76			0.48			0.35	
Uniform Delay, d1		12.6			12.0			19.9			19.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		9.1			7.1			0.5			0.4	
Delay (s)		21.8			19.1			20.4			19.4	
Level of Service		C			B			C			B	
Approach Delay (s)		21.8			19.1			20.4			19.4	
Approach LOS		C			B			C			B	
Intersection Summary												
HCM 2000 Control Delay		20.3									C	
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		70.0					Sum of lost time (s)		10.0			
Intersection Capacity Utilization		78.9%					ICU Level of Service				D	
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
1851: King St & Sudbury St

12/18/2020

	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	0	644	5	0	534	105	0	5	0	154	0	96
Future Volume (vph)	0	644	5	0	534	105	0	5	0	154	0	96
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
Ped Bike Factor	1.00			0.99			0.98			0.87		
Frt	0.999			0.978						0.948		
Flt Protected										0.970		
Satd. Flow (prot)	0	1293	0	0	1334	0	0	1409	0	0	1314	0
Flt Permitted										0.809		
Satd. Flow (perm)	0	1293	0	0	1334	0	0	1409	0	0	1054	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	1			22			50			41		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	318.4			199.1			158.6			196.7		
Travel Time (s)	22.9			14.3			11.4			14.2		
Confl. Peds. (#/hr)	41		148	148		41	117		33	33		117
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	18%	0%	0%	11%	8%	0%	20%	0%	6%	0%	10%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	0	732	6	0	607	119	0	6	0	175	0	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	738	0	0	726	0	0	6	0	0	284	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)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	1.16	1.32	1.16	1.16	1.32	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
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	NA			NA			NA			Perm		NA
Protected Phases	2			6			8			4		

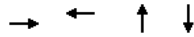
Lanes, Volumes, Timings
1851: King St & Sudbury St

12/18/2020

	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	24.0	24.0		24.0	24.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0		26.0	26.0	
Total Split (s)	53.0	53.0		53.0	53.0		27.0	27.0		27.0	27.0	
Total Split (%)	66.3%	66.3%		66.3%	66.3%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	47.0	47.0		47.0	47.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)				-1.0			-1.0			-1.0		
Total Lost Time (s)				5.0			5.0			4.0		
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		14	14		100	100		11	11	
Act Effct Green (s)	48.2			48.2			22.8			22.8		
Actuated g/C Ratio	0.60			0.60			0.28			0.28		
v/c Ratio	0.95			0.89			0.01			0.86		
Control Delay	39.0			29.8			20.6			50.1		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	39.0			29.8			20.6			50.1		
LOS	D			C			C			D		
Approach Delay	39.0			29.8			20.6			50.1		
Approach LOS	D			C			C			D		
Intersection Summary												
Area Type:	CBD											
Cycle Length:	80											
Actuated Cycle Length:	80											
Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green												
Natural Cycle:	80											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.95											
Intersection Signal Delay:	37.0						Intersection LOS: D					
Intersection Capacity Utilization:	71.5%						ICU Level of Service C					
Analysis Period (min):	15											
Splits and Phases:	1851: King St & Sudbury St											

Queues
1851: King St & Sudbury St

12/18/2020



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	738	726	6	284
v/c Ratio	0.95	0.89	0.01	0.86
Control Delay	39.0	29.8	20.6	50.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	39.0	29.8	20.6	50.1
Queue Length 50th (m)	94.3	84.3	0.7	35.1
Queue Length 95th (m)	#169.6	#158.4	3.2	#75.4
Internal Link Dist (m)	294.4	175.1	134.6	172.7
Turn Bay Length (m)				
Base Capacity (vph)	779	812	405	332
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	0.95	0.89	0.01	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1851: King St & Sudbury St

12/18/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	0	644	5	0	534	105	0	5	0	154	0	96
Future Volume (vph)	0	644	5	0	534	105	0	5	0	154	0	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frbp, ped/bikes		1.00			0.99			1.00			0.91	
Flpb, ped/bikes		1.00			1.00			1.00			0.96	
Frt		1.00			0.98			1.00			0.95	
Flt Protected		1.00			1.00			1.00			0.97	
Satd. Flow (prot)		1293			1333			1409			1264	
Flt Permitted		1.00			1.00			1.00			0.81	
Satd. Flow (perm)		1293			1333			1409			1053	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	732	6	0	607	119	0	6	0	175	0	109
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	738	0	0	717	0	0	6	0	255	0	0
Confl. Peds. (#/hr)	41		148	148		41	117		33	33		117
Heavy Vehicles (%)	0%	18%	0%	0%	11%	8%	0%	20%	0%	6%	0%	10%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA			NA			NA		Perm		NA
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.2			47.2			21.8				21.8
Effective Green, g (s)		48.2			48.2			22.8				22.8
Actuated g/C Ratio		0.60			0.60			0.29				0.29
Clearance Time (s)		6.0			6.0			5.0				5.0
Vehicle Extension (s)		3.0			3.0			3.0				3.0
Lane Grp Cap (vph)		779			803			401				300
v/s Ratio Prot		c0.57			0.54			0.00				
v/s Ratio Perm												c0.24
v/c Ratio		0.95			0.89			0.01				0.85
Uniform Delay, d1		14.7			13.7			20.5				27.0
Progression Factor		1.00			1.00			1.00				1.00
Incremental Delay, d2		21.6			14.4			0.0				19.5
Delay (s)		36.3			28.1			20.6				46.5
Level of Service		D			C			C				D
Approach Delay (s)		36.3			28.1			20.6				46.5
Approach LOS		D			C			C				D

Intersection Summary

HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
1912: Atlantic Ave & King St

12/18/2020

	→	↖	↙	←	↘	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↖	↖
Traffic Volume (vph)	558	64	0	626	239	152
Future Volume (vph)	558	64	0	626	239	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.0	3.0
Storage Length (m)		0.0	0.0		30.0	0.0
Storage Lanes		0	0		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95				0.96	0.96
Frt	0.986					0.850
Fit Protected					0.950	
Satd. Flow (prot)	1298	0	0	1390	1458	1159
Fit Permitted					0.950	
Satd. Flow (perm)	1298	0	0	1390	1399	1114
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	12					49
Link Speed (k/h)	50			50	30	
Link Distance (m)	191.3			318.4	198.0	
Travel Time (s)	13.8			22.9	23.8	
Confl. Peds. (#/hr)		279	279		23	11
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	11%	6%	100%	10%	4%	17%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	649	74	0	728	278	177
Shared Lane Traffic (%)						
Lane Group Flow (vph)	723	0	0	728	278	177
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.32	1.16	1.16	1.32	1.25	1.25
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (m)	30.5		6.1	30.5	6.1	6.1
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)	1.8		6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+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)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		

Lanes, Volumes, Timings
1912: Atlantic Ave & King St

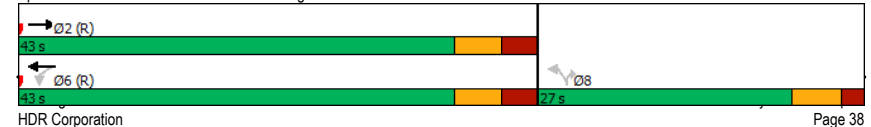
12/18/2020

	→	↖	↙	←	↘	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA			NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Detector Phase	2		6	6	8	8
Switch Phase						
Minimum Initial (s)	21.0		21.0	21.0	20.0	20.0
Minimum Split (s)	28.0		28.0	28.0	26.0	26.0
Total Split (s)	43.0		43.0	43.0	27.0	27.0
Total Split (%)	61.4%		61.4%	61.4%	38.6%	38.6%
Maximum Green (s)	36.0		36.0	36.0	21.0	21.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	3.0		3.0	3.0	2.0	2.0
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0
Total Lost Time (s)	6.0			6.0	5.0	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)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	14.0		14.0	14.0	13.0	13.0
Pedestrian Calls (#/hr)	100		0	0	8	8
Act Effct Green (s)	37.6			37.6	21.4	21.4
Actuated g/C Ratio	0.54			0.54	0.31	0.31
v/c Ratio	1.03			0.98	0.65	0.47
Control Delay	61.2			46.6	29.3	18.8
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	61.2			46.6	29.3	18.8
LOS	E			D	C	B
Approach Delay	61.2			46.6	25.2	
Approach LOS	E			D	C	

Intersection Summary

Area Type: CBD
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 6 (9%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 47.1
 Intersection LOS: D
 Intersection Capacity Utilization 63.7%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1912: Atlantic Ave & King St



Queues
1912: Atlantic Ave & King St

12/18/2020



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	723	728	278	177
v/c Ratio	1.03	0.98	0.65	0.47
Control Delay	61.2	46.6	29.3	18.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	61.2	46.6	29.3	18.8
Queue Length 50th (m)	~92.3	84.0	31.5	13.1
Queue Length 95th (m)	#153.7	#148.6	51.3	27.6
Internal Link Dist (m)	167.3	294.4	174.0	
Turn Bay Length (m)			30.0	
Base Capacity (vph)	702	746	439	383
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	1.03	0.98	0.63	0.46

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.

HCM Signalized Intersection Capacity Analysis
1912: Atlantic Ave & King St

12/18/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	EB	EB	WB	WB	NB	NB
Traffic Volume (vph)	558	64	0	626	239	152
Future Volume (vph)	558	64	0	626	239	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.0	3.0
Total Lost time (s)	6.0			6.0	5.0	5.0
Lane Util. Factor	1.00			1.00	1.00	1.00
Frbp, ped/bikes	0.95			1.00	1.00	0.96
Fipb, ped/bikes	1.00			1.00	0.96	1.00
Frt	0.99			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1298			1390	1399	1114
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1298			1390	1399	1114
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	649	74	0	728	278	177
RTOR Reduction (vph)	6	0	0	0	0	34
Lane Group Flow (vph)	717	0	0	728	278	143
Conf. Peds. (#/hr)		279	279		23	11
Heavy Vehicles (%)	11%	6%	100%	10%	4%	17%
Bus Blockages (#/hr)	24	24	24	24	0	0
Turn Type	NA			NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Actuated Green, G (s)	36.6			36.6	20.4	20.4
Effective Green, g (s)	37.6			37.6	21.4	21.4
Actuated g/C Ratio	0.54			0.54	0.31	0.31
Clearance Time (s)	7.0			7.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	697			746	427	340
v/s Ratio Prot	c0.55			0.52		
v/s Ratio Perm					c0.20	0.13
v/c Ratio	1.03			0.98	0.65	0.42
Uniform Delay, d1	16.2			15.8	21.1	19.4
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	41.8			27.6	3.5	0.8
Delay (s)	58.0			43.3	24.6	20.2
Level of Service	E			D	C	C
Approach Delay (s)	58.0			43.3	22.9	
Approach LOS	E			D	C	

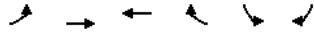
Intersection Summary

HCM 2000 Control Delay	44.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

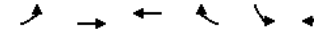
12/18/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	0	676	490	79	144	42
Future Volume (vph)	0	676	490	79	144	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.969	
Flt Protected					0.963	
Satd. Flow (prot)	0	1429	1398	0	1474	0
Flt Permitted					0.963	
Satd. Flow (perm)	0	1429	1398	0	1474	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			20		18	
Link Speed (k/h)		50	50		50	
Link Distance (m)		316.7	191.3		100.8	
Travel Time (s)		22.8	13.8		7.3	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	8%	3%	3%	21%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	0	768	557	90	164	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	768	647	0	212	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.16	1.32	1.32	1.16	1.16	1.16
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				8	
Detector Phase	2	2	6		8	

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

12/18/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0		18.0	
Minimum Split (s)	26.0	26.0	26.0		23.0	
Total Split (s)	56.0	56.0	56.0		24.0	
Total Split (%)	70.0%	70.0%	70.0%		30.0%	
Maximum Green (s)	50.0	50.0	50.0		19.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	None		None	
Walk Time (s)	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	
Pedestrian Calls (#/hr)	0	0	0		0	
Act Effect Green (s)		51.7	51.7		19.3	
Actuated g/C Ratio		0.65	0.65		0.24	
v/c Ratio		0.83	0.71		0.58	
Control Delay		19.5	14.5		31.4	
Queue Delay		0.0	0.0		0.0	
Total Delay		19.5	14.5		31.4	
LOS		B	B		C	
Approach Delay		19.5	14.5		31.4	
Approach LOS		B	B		C	

Intersection Summary

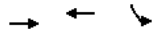
Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 19.1
 Intersection Capacity Utilization 62.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 2081: King St & Joe Shuster Way



Queues
2081: King St & Joe Shuster Way

12/18/2020



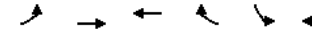
Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	768	647	212
v/c Ratio	0.83	0.71	0.58
Control Delay	19.5	14.5	31.4
Queue Delay	0.0	0.0	0.0
Total Delay	19.5	14.5	31.4
Queue Length 50th (m)	72.0	53.8	26.0
Queue Length 95th (m)	m102.2	92.7	45.2
Internal Link Dist (m)	292.7	167.3	76.8
Turn Bay Length (m)			
Base Capacity (vph)	923	910	382
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.83	0.71	0.55

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2081: King St & Joe Shuster Way

12/18/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Volume (vph)	0	676	490	79	144	42
Future Volume (vph)	0	676	490	79	144	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	
Lane Util. Factor		1.00	1.00		1.00	
Flt		1.00	0.98		0.97	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		1429	1398		1474	
Flt Permitted		1.00	1.00		0.96	
Satd. Flow (perm)		1429	1398		1474	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	768	557	90	164	48
RTOR Reduction (vph)	0	0	7	0	14	0
Lane Group Flow (vph)	0	768	640	0	198	0
Heavy Vehicles (%)	0%	7%	8%	3%	3%	21%
Bus Blockages (#/hr)	24	24	24	0	0	0
Turn Type		NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases		2			8	
Actuated Green, G (s)		50.7	50.7		18.3	
Effective Green, g (s)		51.7	51.7		19.3	
Actuated g/C Ratio		0.65	0.65		0.24	
Clearance Time (s)		6.0	6.0		5.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		923	903		355	
v/s Ratio Prot		c0.54	0.46			
v/s Ratio Perm					c0.13	
v/c Ratio		0.83	0.71		0.56	
Uniform Delay, d1		10.8	9.2		26.6	
Progression Factor		1.20	1.00		1.00	
Incremental Delay, d2		4.7	2.6		1.9	
Delay (s)		17.6	11.8		28.5	
Level of Service		B	B		C	
Approach Delay (s)		17.6	11.8		28.5	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	16.7	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)	10.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

12/18/2020

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↘	↙	↓
Traffic Volume (vph)	13	61	295	30	71	483
Future Volume (vph)	13	61	295	30	71	483
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.0	3.5	3.0	3.0	3.5
Storage Length (m)	30.0	0.0		15.0	30.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				0.97	0.99	
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1560	1122	1807	1370	1276	1807
Fit Permitted	0.950				0.521	
Satd. Flow (perm)	1560	1122	1807	1329	696	1807
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		73		24		
Link Speed (k/h)	30		30		30	
Link Distance (m)	148.7		265.9		191.3	
Travel Time (s)	17.8		31.9		23.0	
Confl. Peds. (#/hr)				7	7	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	8%	30%	4%	10%	32%	4%
Bus Blockages (#/hr)	0	8	0	0	0	0
Adj. Flow (vph)	15	73	351	36	85	575
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	73	351	36	85	575
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.0		3.0		3.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.09	1.14	1.01	1.09	1.09	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	6.1	6.1	30.5	6.1	6.1	30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	6.1	1.8	6.1	6.1	1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex

Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

12/18/2020

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	21.0	6.0	27.0	27.0	6.0	27.0
Minimum Split (s)	26.0	10.0	34.0	34.0	10.0	34.0
Total Split (s)	29.0	11.0	40.0	40.0	11.0	51.0
Total Split (%)	36.3%	13.8%	50.0%	50.0%	13.8%	63.8%
Maximum Green (s)	24.0	7.0	33.0	33.0	7.0	44.0
Yellow Time (s)	3.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	1.0	3.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Walk Time (s)	7.0		7.0	7.0		0.0
Flash Dont Walk (s)	14.0		20.0	20.0		0.0
Pedestrian Calls (#/hr)	0		2	2		0
Act Effct Green (s)	22.0	13.3	60.9	60.9	71.8	73.6
Actuated g/C Ratio	0.28	0.17	0.76	0.76	0.90	0.92
v/c Ratio	0.03	0.30	0.26	0.04	0.12	0.35
Control Delay	21.7	8.2	7.1	5.0	2.7	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	8.2	7.1	5.0	2.7	3.6
LOS	C	A	A	A	A	A
Approach Delay	10.5		6.9			3.5
Approach LOS	B		A			A

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 15 (19%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 5.2
 Intersection LOS: A
 Intersection Capacity Utilization 56.7%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2134: British Columbia Rd/Dufferin St & Saskatchewan Rd



Queues

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

12/18/2020



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	15	73	351	36	85	575
v/c Ratio	0.03	0.30	0.26	0.04	0.12	0.35
Control Delay	21.7	8.2	7.1	5.0	2.7	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	8.2	7.1	5.0	2.7	3.6
Queue Length 50th (m)	1.7	0.0	9.2	0.3	0.0	0.0
Queue Length 95th (m)	5.6	5.6	53.1	5.5	8.7	63.7
Internal Link Dist (m)	124.7		241.9			167.3
Turn Bay Length (m)	30.0			15.0	30.0	
Base Capacity (vph)	487	254	1376	1018	687	1662
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	0.03	0.29	0.26	0.04	0.12	0.35
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

12/18/2020



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Traffic Volume (vph)	13	61	295	30	71	483
Future Volume (vph)	13	61	295	30	71	483
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.5	3.0	3.0	3.5
Total Lost time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Fpfb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1560	1122	1807	1329	1272	1807
Flt Permitted	0.95	1.00	1.00	1.00	0.52	1.00
Satd. Flow (perm)	1560	1122	1807	1329	698	1807
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	15	73	351	36	85	575
RTOR Reduction (vph)	0	62	0	8	0	0
Lane Group Flow (vph)	15	11	351	28	85	575
Confl. Peds. (#/hr)				7	7	
Heavy Vehicles (%)	8%	30%	4%	10%	32%	4%
Bus Blockages (#/hr)	0	8	0	0	0	0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	4.2	10.1	53.9	53.9	63.8	63.8
Effective Green, g (s)	5.2	12.1	54.9	54.9	64.8	64.8
Actuated g/C Ratio	0.07	0.15	0.69	0.69	0.81	0.81
Clearance Time (s)	5.0	4.0	7.0	7.0	4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	101	169	1240	912	614	1463
v/s Ratio Prot		0.01	0.19		0.01	c0.32
v/s Ratio Perm	c0.01	0.00		0.02	0.10	
v/c Ratio	0.15	0.07	0.28	0.03	0.14	0.39
Uniform Delay, d1	35.3	29.1	4.9	4.0	1.6	2.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2	0.6	0.1	0.1	0.8
Delay (s)	36.0	29.3	5.5	4.1	1.7	2.9
Level of Service	D	C	A	A	A	A
Approach Delay (s)	30.4		5.3			2.8
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	[Diagrammatic lane configurations]											
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	30.0		0.0	20.0		20.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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				0.97
Frt						0.850						0.865
Fit Protected	0.950			0.950				0.957				
Satd. Flow (prot)	1685	1824	0	1685	1756	1507	0	1798	0	0	1574	0
Fit Permitted	0.555			0.494								
Satd. Flow (perm)	984	1824	0	874	1756	1507	0	1860	0	0	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						45						523
Link Speed (k/h)		30			30			30				30
Link Distance (m)		164.9			265.9			92.0				121.3
Travel Time (s)		19.8			31.9			11.0				14.6
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
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 (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	470	0	1	342	1	8	1	0	0	0	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	29	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)		3.0			3.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.09	1.01	1.01	1.09	1.01	1.09	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				NA
Protected Phases		4			8		8		2			6
Permitted Phases	4			8		8	2				6	
Detector Phase	4	4		8	8	8	2	2			6	6
Switch Phase												
Minimum Initial (s)	33.0	33.0		33.0	33.0	33.0	7.0	7.0			7.0	7.0
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	24.0	24.0			24.0	24.0
Total Split (s)	48.0	48.0		48.0	48.0	48.0	24.0	24.0			24.0	24.0
Total Split (%)	66.7%	66.7%		66.7%	66.7%	66.7%	33.3%	33.3%			33.3%	33.3%
Maximum Green (s)	42.0	42.0		42.0	42.0	42.0	18.0	18.0			18.0	18.0
Yellow Time (s)	4.0	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	2.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0				-1.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0				5.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	Max	Max		Max	Max	Max	None	None			None	None
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	9.0	9.0		9.0	9.0	9.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	0
Act Effct Green (s)	59.5	59.5		59.5	59.5	59.5		8.0			8.0	
Actuated g/C Ratio	0.90	0.90		0.90	0.90	0.90		0.12			0.12	
v/c Ratio	0.00	0.29		0.00	0.22	0.00		0.04				0.04
Control Delay	2.0	2.3		2.0	2.0	0.0		27.5			0.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	
Total Delay	2.0	2.3		2.0	2.0	0.0		27.5			0.1	
LOS	A	A		A	A	A		C			A	
Approach Delay		2.3			2.0			27.5			0.1	
Approach LOS		A			A			C			A	

Intersection Summary

Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	66.2
Natural Cycle:	65
Control Type:	Semi Act-Uncooord
Maximum v/c Ratio:	0.29
Intersection Signal Delay:	2.4
Intersection Capacity Utilization:	73.3%
ICU Level of Service:	D
Analysis Period (min):	15

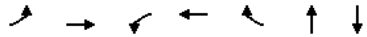
Splits and Phases: 97: Yukon Place & British Columbia Rd



Queues

97: Yukon Place & British Columbia Rd

05/20/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	1	470	1	342	1	9	29
v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.04	0.04
Control Delay	2.0	2.3	2.0	2.0	0.0	27.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.0	2.3	2.0	2.0	0.0	27.5	0.1
Queue Length 50th (m)	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Queue Length 95th (m)	0.3	26.3	0.3	18.3	0.0	4.6	0.0
Internal Link Dist (m)		140.9		241.9		68.0	97.3
Turn Bay Length (m)	30.0		20.0		20.0		
Base Capacity (vph)	883	1638	785	1577	1358	536	825
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.02	0.04

Intersection Summary

HCM Signalized Intersection Capacity Analysis

97: Yukon Place & British Columbia Rd

05/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔		↔	↔	↔	↔	↔
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0				5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00				0.97
Fipb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99				1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00				0.86
Fit Protected	0.95	1.00		0.95	1.00	1.00		0.96				1.00
Satd. Flow (prot)	1685	1824		1681	1756	1507		1781				1574
Fit Permitted	0.56	1.00		0.49	1.00	1.00		1.00				1.00
Satd. Flow (perm)	985	1824		873	1756	1507		1860				1574
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)	1	470	0	1	342	1	8	1	0	0	0	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	28
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	1	0
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				NA
Protected Phases		4			8		8		2		6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	55.3	55.3		55.3	55.3	55.3		2.6				2.6
Effective Green, g (s)	56.3	56.3		56.3	56.3	56.3		3.6				3.6
Actuated g/C Ratio	0.81	0.81		0.81	0.81	0.81		0.05				0.05
Clearance Time (s)	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
Lane Grp Cap (vph)	793	1469		703	1414	1213		95				81
v/s Ratio Prot		c0.26			0.19							0.00
v/s Ratio Perm	0.00			0.00		0.00		c0.00				
v/c Ratio	0.00	0.32		0.00	0.24	0.00		0.09				0.02
Uniform Delay, d1	1.3	1.8		1.3	1.6	1.3		31.6				31.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Incremental Delay, d2	0.0	0.6		0.0	0.4	0.0		0.4				0.1
Delay (s)	1.3	2.4		1.3	2.0	1.3		32.0				31.6
Level of Service	A	A		A	A	A		C				C
Approach Delay (s)		2.4			2.0			32.0				31.6
Approach LOS		A			A			C				C

Intersection Summary

HCM 2000 Control Delay	3.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	69.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

05/20/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑		↓	↓↑↑			↑		↓	↓	↓
Traffic Volume (vph)	420	1302	3	12	1991	0	0	0	0	405	11	324
Future Volume (vph)	420	1302	3	12	1991	0	0	0	0	405	11	324
Ideal Flow (vphpl)	2150	1900	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Storage Length (m)	60.0		0.0	60.0		50.0	0.0		0.0	140.0		50.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	*0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00		1.00								0.94
Frt												0.850
Fit Protected	0.950			0.950						0.950	0.955	
Satd. Flow (prot)	1816	4794	0	1685	5883	0	0	1879	0	1585	1689	1507
Fit Permitted	0.079			0.185						0.950	0.950	
Satd. Flow (perm)	151	4794	0	327	5883	0	0	1879	0	1585	1680	1415
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												247
Link Speed (k/h)		60			60			40				40
Link Distance (m)		310.3			196.6			116.5				205.6
Travel Time (s)		18.6			11.8			10.5				18.5
Confl. Peds. (#/hr)	4		7	7		4	43					43
Confl. Bikes (#/hr)								1				
Peak Hour Factor	0.90	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	7%	0%	0%	3%	0%	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	467	1371	3	13	2096	0	0	0	0	426	12	341
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	467	1374	0	13	2096	0	0	0	0	217	221	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)		3.0			3.0			3.0				3.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.93	1.01	1.01	1.09	0.86	1.09	1.01	1.01	1.01	1.09	1.01	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
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)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex

Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

05/20/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	pm+pt	NA		pm+pt	NA					Perm	NA	pm+ov
Protected Phases	5	2		1	6			3			4	5
Permitted Phases	2			6				3			4	4
Detector Phase	5	2		1	6			3	3		4	4
Switch Phase												
Minimum Initial (s)	6.0	29.0		6.0	30.0			12.0	12.0		10.0	10.0
Minimum Split (s)	12.0	35.0		12.0	36.0			21.0	21.0		45.0	45.0
Total Split (s)	31.0	62.0		16.0	47.0			21.0	21.0		45.0	45.0
Total Split (%)	21.5%	43.1%		11.1%	32.6%			14.6%	14.6%		31.3%	31.3%
Maximum Green (s)	25.0	56.0		10.0	41.0			12.0	12.0		37.0	37.0
Yellow Time (s)	3.0	4.0		3.0	4.0			3.0	3.0		3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0			6.0	6.0		5.0	5.0
Lost Time Adjust (s)	-3.0	-1.0		-1.0	-3.0			-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	3.0	5.0		5.0	3.0			8.0	8.0		7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag			Lag	Lag		Lead	Lead
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	Max		None	Max			None	None		None	None
Walk Time (s)		7.0			7.0						7.0	7.0
Flash Dont Walk (s)		22.0			22.0						30.0	30.0
Pedestrian Calls (#/hr)		2			1						0	0
Act Effct Green (s)	75.0	68.1		49.1	44.0						38.0	38.0
Actuated g/C Ratio	0.61	0.55		0.40	0.36						0.31	0.31
v/c Ratio	0.99	0.52		0.06	1.00						0.44	0.43
Control Delay	76.6	18.9		13.4	58.3						37.6	37.0
Queue Delay	0.0	0.0		0.0	17.3						0.0	0.0
Total Delay	76.6	18.9		13.4	75.6						37.6	37.0
LOS	E	B		B	E						D	D
Approach Delay		33.5			75.2							23.2
Approach LOS		C			E							C

Intersection Summary

Area Type: Other

Cycle Length: 144

Actuated Cycle Length: 123

Natural Cycle: 115

Control Type: Semi Act-Uncoord

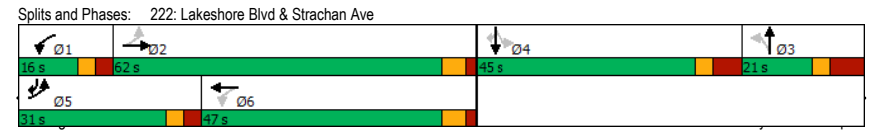
Maximum v/c Ratio: 1.00

Intersection Signal Delay: 50.4

Intersection Capacity Utilization 93.3%

Analysis Period (min) 15

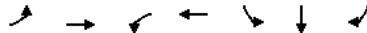
* User Entered Value



Queues

222: Lakeshore Blvd & Strachan Ave

05/20/2021



Lane Group	EBL	EBT	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	467	1374	13	2096	217	221	341
v/c Ratio	0.99	0.52	0.06	1.00	0.44	0.43	0.38
Control Delay	76.6	18.9	13.4	58.3	37.6	37.0	5.1
Queue Delay	0.0	0.0	0.0	17.3	0.0	0.0	0.0
Total Delay	76.6	18.9	13.4	75.6	37.6	37.0	5.1
Queue Length 50th (m)	98.0	65.4	1.2	176.1	44.2	44.6	9.7
Queue Length 95th (m)	#165.7	98.6	3.9	#211.7	68.5	68.8	24.5
Internal Link Dist (m)		286.3		172.6		181.6	
Turn Bay Length (m)	60.0		60.0		140.0		50.0
Base Capacity (vph)	471	2653	262	2104	489	519	893
Starvation Cap Reductn	0	0	0	108	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.52	0.05	1.05	0.44	0.43	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

222: Lakeshore Blvd & Strachan Ave

05/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔			↔	↔	↔	↔	↔
Traffic Volume (vph)	420	1302	3	12	1991	0	0	0	0	405	11	324
Future Volume (vph)	420	1302	3	12	1991	0	0	0	0	405	11	324
Ideal Flow (vphpl)	2150	1900	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Total Lost time (s)	3.0	5.0		5.0	3.0					7.0	7.0	5.0
Lane Util. Factor	1.00	0.91		1.00	*0.95					0.95	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00					1.00	1.00	0.97
Frbp, ped/bikes	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	0.85
Flt Protected	0.95	1.00		0.95	1.00					0.95	0.95	1.00
Satd. Flow (prot)	1816	4793		1684	5883					1585	1688	1458
Flt Permitted	0.08	1.00		0.19	1.00					0.95	0.95	1.00
Satd. Flow (perm)	151	4793		329	5883					1585	1680	1458
Peak-hour factor, PHF	0.90	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	467	1371	3	13	2096	0	0	0	0	426	12	341
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	122
Lane Group Flow (vph)	467	1374	0	13	2096	0	0	0	0	217	221	219
Confl. Peds. (#/hr)	4		7	7		4	43					43
Confl. Bikes (#/hr)										1		
Heavy Vehicles (%)	5%	7%	0%	0%	3%	0%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA					Perm	NA	pm+ov
Protected Phases	5	2		1	6			3			4	5
Permitted Phases	2			6			3			4		4
Actuated Green, G (s)	75.6	67.1		47.1	44.6					37.0	37.0	62.0
Effective Green, g (s)	78.6	68.1		49.1	47.6					38.0	38.0	64.0
Actuated g/C Ratio	0.62	0.54		0.39	0.38					0.30	0.30	0.51
Clearance Time (s)	6.0	6.0		6.0	6.0					8.0	8.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	461	2578		165	2211					475	504	737
v/s Ratio Prot	c0.22	0.29		0.00	0.36							0.06
v/s Ratio Perm	c0.40			0.03						c0.14	0.13	0.09
v/c Ratio	1.01	0.53		0.08	0.95					0.46	0.44	0.30
Uniform Delay, d1	40.9	18.9		23.9	38.3					35.9	35.7	18.2
Progression Factor	1.00	1.00		1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2	45.2	0.8		0.2	10.3					0.7	0.6	0.2
Delay (s)	86.1	19.7		24.1	48.6					36.6	36.3	18.4
Level of Service	F	B		C	D					D	D	B
Approach Delay (s)		36.6			48.5			0.0				28.6
Approach LOS		D			D			A				C

Intersection Summary

HCM 2000 Control Delay	40.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	126.6	Sum of lost time (s)	25.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
538: Strachan Ave & King St

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←↑↔			←↑↔		←↑↔	←↑↔		←↑↔	←↑↔	
Traffic Volume (vph)	0	378	77	4	673	68	133	268	84	27	172	27
Future Volume (vph)	0	378	77	4	673	68	133	268	84	27	172	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0	0.0
Storage Lanes	0	0	0	0	0	1	0	1	0	1	0	0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.91			0.98		0.89	0.97		0.95	0.98	
Frt		0.975			0.986		0.964			0.979		
Fit Protected						0.950				0.950		
Satd. Flow (prot)	0	2539	0	0	2879	0	1486	1572	0	1516	1604	0
Fit Permitted					0.953		0.586			0.383		
Satd. Flow (perm)	0	2539	0	0	2740	0	813	1572	0	579	1604	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)		44		19		22			11			
Link Speed (k/h)		50		50		40		40		40		
Link Distance (m)		255.2		358.6		424.1		379.9		34.2		
Travel Time (s)		18.4		25.8		38.2		34.2				
Confl. Peds. (#/hr)	71		292	292		71	139		96	96		139
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	6%	17%	100%	4%	0%	2%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	20	20	20	20	20	20	0	0	0	0	0	0
Adj. Flow (vph)	0	402	82	4	716	72	141	285	89	29	183	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	484	0	0	792	0	141	374	0	29	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			3.0			3.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.16	1.22	1.16	1.16	1.22	1.16	1.25	1.16	1.16	1.25	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
538: Strachan Ave & King St

05/20/2021

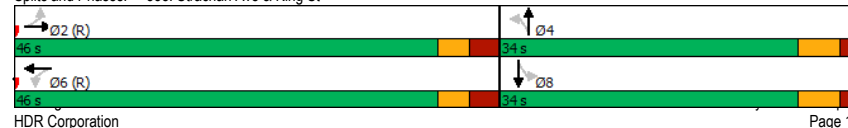


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		27.0	27.0		27.0	27.0	
Total Split (s)	46.0	46.0		46.0	46.0		34.0	34.0		34.0	34.0	
Total Split (%)	57.5%	57.5%		57.5%	57.5%		42.5%	42.5%		42.5%	42.5%	
Maximum Green (s)	40.0	40.0		40.0	40.0		28.0	28.0		28.0	28.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
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	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		24	24		32	32		100	100	
Act Effct Green (s)		41.0			41.0		29.0	29.0		29.0	29.0	
Actuated g/C Ratio		0.51			0.51		0.36	0.36		0.36	0.36	
v/c Ratio		0.37			0.56		0.48	0.64		0.14	0.36	
Control Delay		11.5			5.5		25.7	24.5		31.0	32.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		11.5			5.5		25.7	24.5		31.0	32.1	
LOS		B			A		C	C		C	C	
Approach Delay		11.5			5.5		24.8	32.0				
Approach LOS		B			A		C	C				

Intersection Summary

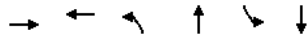
Area Type:	CBD	
Cycle Length:	80	
Actuated Cycle Length:	80	
Offset: 50 (63%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green		
Natural Cycle:	55	
Control Type:	Actuated-Coordinated	
Maximum v/c Ratio:	0.64	
Intersection Signal Delay:	15.0	Intersection LOS: B
Intersection Capacity Utilization:	79.4%	ICU Level of Service D
Analysis Period (min):	15	

Splits and Phases: 538: Strachan Ave & King St



Queues
538: Strachan Ave & King St

05/20/2021



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	484	792	141	374	29	212
v/c Ratio	0.37	0.56	0.48	0.64	0.14	0.36
Control Delay	11.5	5.5	25.7	24.5	31.0	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	5.5	25.7	24.5	31.0	32.1
Queue Length 50th (m)	19.5	8.3	17.7	44.6	4.3	31.5
Queue Length 95th (m)	29.8	16.3	m24.6	m62.8	m7.8	m47.9
Internal Link Dist (m)	231.2	334.6		400.1		355.9
Turn Bay Length (m)			25.0		25.0	
Base Capacity (vph)	1322	1413	294	583	209	588
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	0.56	0.48	0.64	0.14	0.36

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
538: Strachan Ave & King St

05/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕		↕	↕	
Traffic Volume (vph)	0	378	77	4	673	68	133	268	84	27	172	27
Future Volume (vph)	0	378	77	4	673	68	133	268	84	27	172	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.91			0.99		1.00	0.97		1.00	0.98	
Fipb, ped/bikes		1.00			1.00		0.89	1.00		0.95	1.00	
Frt		0.97			0.99		1.00	0.96		1.00	0.98	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2538			2875		1318	1572		1437	1604	
Flt Permitted		1.00			0.95		0.59	1.00		0.38	1.00	
Satd. Flow (perm)		2538			2741		814	1572		580	1604	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	402	82	4	716	72	141	285	89	29	183	29
RTOR Reduction (vph)	0	21	0	0	9	0	0	14	0	0	7	0
Lane Group Flow (vph)	0	463	0	0	783	0	141	360	0	29	205	0
Confl. Peds. (#/hr)	71		292	292		71	139		96	96		139
Heavy Vehicles (%)	0%	6%	17%	100%	4%	0%	2%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	20	20	20	20	20	20	0	0	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases		2			6			4			8	
Actuated Green, G (s)		40.0			40.0		28.0	28.0		28.0	28.0	
Effective Green, g (s)		41.0			41.0		29.0	29.0		29.0	29.0	
Actuated g/C Ratio		0.51			0.51		0.36	0.36		0.36	0.36	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1300			1404		295	569		210	581	
v/s Ratio Prot		0.18						c0.23			0.13	
v/s Ratio Perm					c0.29		0.17			0.05		
v/c Ratio		0.36			0.56		0.48	0.63		0.14	0.35	
Uniform Delay, d1		11.6			13.3		19.7	21.1		17.1	18.6	
Progression Factor		1.00			0.30		1.07	1.03		1.66	1.69	
Incremental Delay, d2		0.8			1.5		3.3	3.2		1.2	1.4	
Delay (s)		12.4			5.5		24.3	25.0		29.5	32.9	
Level of Service		B			A		C	C		C	C	
Approach Delay (s)		12.4			5.5		24.8			32.5		
Approach LOS		B			A		C			C		

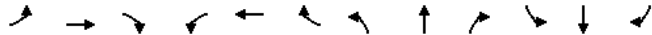
Intersection Summary

HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
539: Dufferin St & King St

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕↕		
Traffic Volume (vph)	81	359	53	55	574	92	45	387	46	113	235	74
Future Volume (vph)	81	359	53	55	574	92	45	387	46	113	235	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Ped Bike Factor	0.96			0.96			0.97			0.93		
Frt	0.984			0.981			0.986			0.974		
Flt Protected	0.992			0.996			0.995			0.987		
Satd. Flow (prot)	0	2879	0	0	2849	0	0	2707	0	0	2611	0
Flt Permitted	0.654			0.859			0.871			0.693		
Satd. Flow (perm)	0	1880	0	0	2437	0	0	2345	0	0	1791	0
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)	21			26			18			33		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	291.1			316.7			212.5			385.1		
Travel Time (s)	21.0			22.8			15.3			27.7		
Conf. Peds. (#/hr)	190		200	200		190	235		160	160		235
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	6%	3%	4%	2%	2%	4%	7%	9%	9%	5%	13%	5%
Bus Blockages (#/hr)	10	10	10	20	20	20	10	24	24	0	14	14
Adj. Flow (vph)	93	413	61	63	660	106	52	445	53	130	270	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	567	0	0	829	0	0	550	0	0	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)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	1.16	1.19	1.16	1.16	1.22	1.16	1.16	1.23	1.16	1.16	1.20	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	2			6			3			8		
Permitted Phases	2			6			8			4		
Minimum Split (s)	27.0	27.0		27.0	27.0		10.0	27.0		27.0	27.0	
Total Split (s)	40.0	40.0		40.0	40.0		10.0	40.0		30.0	30.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		12.5%	50.0%		37.5%	37.5%	
Maximum Green (s)	34.0	34.0		34.0	34.0		6.0	34.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0			-1.0			-1.0			-2.0		
Total Lost Time (s)	5.0			5.0			5.0			4.0		
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0		7.0	7.0		7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		14.0		14.0	14.0		14.0
Pedestrian Calls (#/hr)	100	100		100	100		100		100	100		100
Act Effect Green (s)	35.0			35.0			35.0			26.0		
Actuated g/C Ratio	0.44			0.44			0.44			0.32		

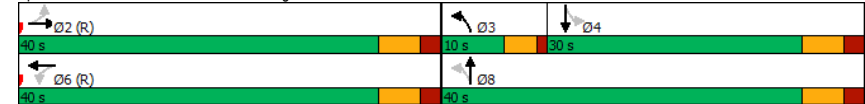
Lanes, Volumes, Timings
539: Dufferin St & King St

05/20/2021



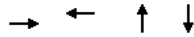
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.68			0.77			0.52			0.80		
Control Delay	21.8			23.5			19.8			35.1		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	21.8			23.5			19.8			35.1		
LOS	C			C			B			D		
Approach Delay	21.8			23.5			19.8			35.1		
Approach LOS	C			C			B			D		
Intersection Summary												
Area Type:	CBD											
Cycle Length: 80												
Actuated Cycle Length: 80												
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green												
Natural Cycle: 65												
Control Type: Pretimed												
Maximum v/c Ratio: 0.80												
Intersection Signal Delay: 24.6	Intersection LOS: C											
Intersection Capacity Utilization 92.0%	ICU Level of Service F											
Analysis Period (min) 15												

Splits and Phases: 539: Dufferin St & King St



Queues
539: Dufferin St & King St

05/20/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	567	829	550	485
v/c Ratio	0.68	0.77	0.52	0.80
Control Delay	21.8	23.5	19.8	35.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.8	23.5	19.8	35.1
Queue Length 50th (m)	21.3	38.4	29.7	32.7
Queue Length 95th (m)	33.5	55.8	m47.1	#54.0
Internal Link Dist (m)	267.1	292.7	188.5	361.1
Turn Bay Length (m)				
Base Capacity (vph)	834	1080	1058	604
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	0.77	0.52	0.80

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
539: Dufferin St & King St

05/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	81	359	53	55	574	92	45	387	46	113	235	74
Future Volume (vph)	81	359	53	55	574	92	45	387	46	113	235	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			4.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.97			0.97			0.98			0.95	
Flpb, ped/bikes		0.99			0.99			0.99			0.98	
Frt		0.98			0.98			0.99			0.97	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		2851			2826			2682			2550	
Flt Permitted		0.65			0.86			0.87			0.69	
Satd. Flow (perm)		1880			2436			2347			1790	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	93	413	61	63	660	106	52	445	53	130	270	85
RTOR Reduction (vph)	0	12	0	0	15	0	0	10	0	0	22	0
Lane Group Flow (vph)	0	555	0	0	814	0	0	540	0	0	463	0
Confl. Peds. (#/hr)	190		200	200		190	235		160	160		235
Heavy Vehicles (%)	6%	3%	4%	2%	2%	4%	7%	9%	9%	5%	13%	5%
Bus Blockages (#/hr)	10	10	10	20	20	20	10	24	24	0	14	14
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		34.0			34.0			34.0			24.0	
Effective Green, g (s)		35.0			35.0			35.0			26.0	
Actuated g/C Ratio		0.44			0.44			0.44			0.32	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		822			1065			1056			581	
v/s Ratio Prot								c0.04				
v/s Ratio Perm		0.30			c0.33			0.18			c0.26	
v/c Ratio		0.68			0.76			0.51			0.80	
Uniform Delay, d1		18.0			19.0			16.3			24.6	
Progression Factor		0.98			0.99			1.16			1.00	
Incremental Delay, d2		4.3			4.8			1.4			10.8	
Delay (s)		21.8			23.6			20.3			35.4	
Level of Service		C			C			C			D	
Approach Delay (s)		21.8			23.6			20.3			35.4	
Approach LOS		C			C			C			D	

Intersection Summary

HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔			↔	↔	↔	↔		↔	↔	
Traffic Volume (vph)	139	4	208	77	88	60	125	347	87	87	555	65
Future Volume (vph)	139	4	208	77	88	60	125	347	87	87	555	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	25.0		0.0	0.0		50.0	30.0		0.0	25.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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	0.91	0.87			0.97	0.83		0.98		0.98	0.99	
Frt		0.853				0.850		0.970			0.984	
Fit Protected	0.950				0.977		0.950			0.950		
Satd. Flow (prot)	1589	1307	0	0	1605	1507	1652	1667	0	1574	1705	0
Fit Permitted	0.584				0.623		0.172			0.346		
Satd. Flow (perm)	889	1307	0	0	988	1246	299	1667	0	561	1705	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		219				152		10			5	
Link Speed (k/h)		30			50			40			40	
Link Distance (m)		143.4			229.0			205.6			241.4	
Travel Time (s)		17.2			16.5			18.5			21.7	
Confl. Peds. (#/hr)	56		53	53		56	33		29	29		33
Confl. Bikes (#/hr)						22			26			
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 (%)	6%	12%	6%	1%	26%	0%	2%	8%	2%	7%	8%	1%
Adj. Flow (vph)	146	4	219	81	93	63	132	365	92	92	584	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	146	223	0	0	174	63	132	457	0	92	652	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)		3.0			3.0			3.0			3.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.09	1.01	1.01	1.01	1.01	1.09	1.09	1.01	1.01	1.09	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2			1	2	1	1	2		1	2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	2.0	2.0	30.5		2.0	30.5	
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)	6.1	1.8		6.1	1.8	2.0	2.0	1.8		2.0	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

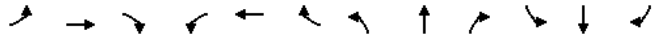
05/20/2021

Lane Group	Ø10	Ø12	Ø14	Ø16
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (m)				
Storage Length (m)				
Storage Lanes				
Taper Length (m)				
Lane Util. Factor				
Ped Bike Factor				
Frt				
Fit Protected				
Satd. Flow (prot)				
Fit Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (k/h)				
Link Distance (m)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(m)				
Link Offset(m)				
Crosswalk Width(m)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (k/h)				
Number of Detectors				
Detector Template				
Leading Detector (m)				
Trailing Detector (m)				
Detector 1 Position(m)				
Detector 1 Size(m)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(m)				
Detector 2 Size(m)				
Detector 2 Type				

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	32.0	32.0		32.0	32.0	32.0	29.0	29.0		29.0	29.0	
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		36.0	36.0	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	60.0	60.0		60.0	60.0	
Total Split (%)	27.8%	27.8%		27.8%	27.8%	27.8%	41.7%	41.7%		41.7%	41.7%	
Maximum Green (s)	33.0	33.0		33.0	33.0	33.0	53.0	53.0		53.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
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	3.0	
Recall Mode	Max	Max		Max	Max	Max	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0	22.0	22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	18	18		19	19	19	10	10		11	11	
Act Effct Green (s)	34.6	34.6		34.6	34.6	54.9	54.9	54.9		54.9	54.9	
Actuated g/C Ratio	0.31	0.31		0.31	0.31	0.49	0.49	0.49		0.49	0.49	
v/c Ratio	0.53	0.40		0.57	0.13	0.90	0.56	0.56		0.34	0.78	
Control Delay	44.4	7.5		44.9	0.6	85.5	25.7	25.7		26.2	34.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.2	0.2		0.0	0.0	
Total Delay	44.4	7.5		44.9	0.6	85.5	25.9	25.9		26.2	34.2	
LOS	D	A		D	A	F	C	C		C	C	
Approach Delay		22.1			33.1			39.2			33.2	
Approach LOS		C			C			D			C	

Intersection Summary

Area Type: Other

Cycle Length: 144

Actuated Cycle Length: 112

Natural Cycle: 135

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 32.9

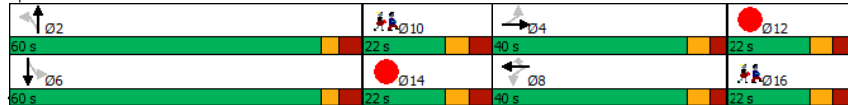
Intersection LOS: C

Intersection Capacity Utilization 131.0%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 571: Strachan Ave & Canada Blvd/Fleet St



Existing PM 05/06/2014
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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

05/20/2021

Lane Group	Ø10	Ø12	Ø14	Ø16
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	10	12	14	16
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	15.0	15.0
Total Split (s)	22.0	22.0	22.0	22.0
Total Split (%)	15%	15%	15%	15%
Maximum Green (s)	14.0	14.0	14.0	14.0
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	0.0	0.0	0.0	0.0
Flash Dont Walk (s)	0.0	0.0	0.0	0.0
Pedestrian Calls (#/hr)	16	16	16	16
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary

Existing PM 05/06/2014
HDR Corporation

Synchro 10 Report
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Queues

571: Strachan Ave & Canada Blvd/Fleet St

05/20/2021



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	146	223	174	63	132	457	92	652
v/c Ratio	0.53	0.40	0.57	0.13	0.90	0.56	0.34	0.78
Control Delay	44.4	7.5	44.9	0.6	85.5	25.7	26.2	34.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	44.4	7.5	44.9	0.6	85.5	25.9	26.2	34.2
Queue Length 50th (m)	22.1	0.5	26.8	0.0	20.0	51.9	9.3	88.4
Queue Length 95th (m)	57.6	21.0	#67.0	0.0	#77.7	128.4	32.5	#228.9
Internal Link Dist (m)		119.4	205.0			181.6		217.4
Turn Bay Length (m)	25.0			50.0	30.0		25.0	
Base Capacity (vph)	274	554	304	489	146	822	274	838
Starvation Cap Reductn	0	0	0	0	0	46	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	0.53	0.40	0.57	0.13	0.90	0.59	0.34	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

571: Strachan Ave & Canada Blvd/Fleet St

05/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	139	4	208	77	88	60	125	347	87	87	555	65
Future Volume (vph)	139	4	208	77	88	60	125	347	87	87	555	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.88		1.00	0.85	1.00	0.98	1.00		1.00	0.99	
Fpb, ped/bikes	0.92	1.00		0.97	1.00	1.00	1.00	1.00		0.98	1.00	
Frt	1.00	0.85		1.00	0.85	1.00	0.97	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.98	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1463	1333		1556	1280	1652	1672	1538		1708	1708	
Flt Permitted	0.58	1.00		0.62	1.00	0.17	1.00	1.00		0.35	1.00	
Satd. Flow (perm)	899	1333		992	1280	300	1672	560		1708	1708	
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)	146	4	219	81	93	63	132	365	92	92	584	68
RTOR Reduction (vph)	0	157	0	0	0	45	0	6	0	0	3	0
Lane Group Flow (vph)	146	66	0	0	174	18	132	451	0	92	649	0
Confl. Peds. (#/hr)	56		53	53		56	33		29	29		33
Confl. Bikes (#/hr)						22			26			
Heavy Vehicles (%)	6%	12%	6%	1%	26%	0%	2%	8%	2%	7%	8%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2				6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	33.5	33.5		33.5	33.5	53.9	53.9			53.9	53.9	
Effective Green, g (s)	34.5	34.5		34.5	34.5	54.9	54.9			54.9	54.9	
Actuated g/C Ratio	0.28	0.28		0.28	0.28	0.45	0.45			0.45	0.45	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0			7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	253	376		280	361	134	751			251	767	
v/s Ratio Prot		0.05					0.27				0.38	
v/s Ratio Perm	0.16			c0.18	0.01	c0.44				0.16		
v/c Ratio	0.58	0.18		0.62	0.05	0.99	0.60			0.37	0.85	
Uniform Delay, d1	37.6	33.1		38.2	31.9	33.2	25.4			22.2	29.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	9.3	1.0		10.0	0.3	73.9	3.5			4.1	11.1	
Delay (s)	46.9	34.1		48.1	32.2	107.1	28.9			26.3	41.0	
Level of Service	D	C		D	C	F	C			C	D	
Approach Delay (s)		39.2			43.9		46.5				39.2	
Approach LOS		D			D		D				D	

Intersection Summary

HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	122.2	Sum of lost time (s)	28.0
Intersection Capacity Utilization	131.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	54	386	0	0	0	567	0	2322	4	0	0	0
Future Volume (vph)	54	386	0	0	0	567	0	2322	4	0	0	0
Ideal Flow (vphpl)	1900	2000	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	15.0		0.0	0.0		80.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.91	0.91	1.00	1.00	1.00
Frt						0.850						
Flt Protected	0.950											
Satd. Flow (prot)	1652	1939	0	0	0	2756	0	5029	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	1652	1939	0	0	0	2756	0	5029	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	76					293						
Link Speed (k/h)		60			30			60			60	
Link Distance (m)		411.9			164.9			800.6			492.6	
Travel Time (s)		24.7			19.8			48.0			29.6	
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
Adj. Flow (vph)	57	406	0	0	0	597	0	2444	4	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	406	0	0	0	597	0	2448	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)		3.0			3.0			3.0			3.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.09	0.95	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2				1		2				
Detector Template	Left	Thru				Right		Thru				
Leading Detector (m)	6.1	30.5				6.1		30.5				
Trailing Detector (m)	0.0	0.0				0.0		0.0				
Detector 1 Position(m)	0.0	0.0				0.0		0.0				
Detector 1 Size(m)	6.1	1.8				6.1		1.8				
Detector 1 Type	CI+Ex	CI+Ex				CI+Ex		CI+Ex				
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0				0.0		0.0				
Detector 1 Queue (s)	0.0	0.0				0.0		0.0				
Detector 1 Delay (s)	0.0	0.0				0.0		0.0				
Detector 2 Position(m)		28.7						28.7				
Detector 2 Size(m)		1.8						1.8				
Detector 2 Type		CI+Ex						CI+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0				
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					9						
Detector Phase	4	4				9		2				
Switch Phase												
Minimum Initial (s)	7.0	7.0				7.0		22.0				
Minimum Split (s)	13.0	13.0				30.0		29.0				
Total Split (s)	29.0	29.0				33.0		82.0				
Total Split (%)	20.1%	20.1%				22.9%		56.9%				
Maximum Green (s)	23.0	23.0				27.0		75.0				
Yellow Time (s)	4.0	4.0				4.0		4.0				
All-Red Time (s)	2.0	2.0				2.0		3.0				
Lost Time Adjust (s)	-1.0	-3.0				-1.0		-1.0				
Total Lost Time (s)	5.0	3.0				5.0		6.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Recall Mode	None	None				None		None				
Walk Time (s)	0.0	0.0				0.0		7.0				
Flash Dont Walk (s)	0.0	0.0				0.0		15.0				
Pedestrian Calls (#/hr)	0	0				0		0				
Act Effect Green (s)	24.0	26.0				22.2		75.7				
Actuated g/C Ratio	0.17	0.19				0.16		0.55				
v/c Ratio	0.16	1.11				0.87		0.89				
Control Delay	6.4	131.2				42.0		33.1				
Queue Delay	0.0	0.0				0.0		0.0				
Total Delay	6.4	131.2				42.0		33.1				
LOS	A	F				D		C				
Approach Delay		115.8				42.0		33.1				
Approach LOS		F				D		C				

Intersection Summary

Area Type: Other
 Cycle Length: 144
 Actuated Cycle Length: 138
 Natural Cycle: 120
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.11
 Intersection Signal Delay: 45.5
 Intersection Capacity Utilization 84.0%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service E

Splits and Phases: 1344: Lakeshore Blvd & British Columbia Rd



Queues

1344: Lakeshore Blvd & British Columbia Rd

05/20/2021



Lane Group	EBL	EBT	WBR	NBT
Lane Group Flow (vph)	57	406	597	2448
v/c Ratio	0.16	1.11	0.87	0.89
Control Delay	6.4	131.2	42.0	33.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	6.4	131.2	42.0	33.1
Queue Length 50th (m)	0.0	~128.6	48.5	211.5
Queue Length 95th (m)	7.6	#201.0	72.9	252.0
Internal Link Dist (m)		387.9		776.6
Turn Bay Length (m)	15.0		80.0	
Base Capacity (vph)	350	365	793	2773
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	0.16	1.11	0.75	0.88

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.

HCM Signalized Intersection Capacity Analysis

1344: Lakeshore Blvd & British Columbia Rd

05/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗				↗↘	↗↘	↗↘				
Traffic Volume (vph)	54	386	0	0	0	567	0	2322	4	0	0	0
Future Volume (vph)	54	386	0	0	0	567	0	2322	4	0	0	0
Ideal Flow (vphpl)	1900	2000	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	3.0				5.0		6.0				
Lane Util. Factor	1.00	1.00				0.88		0.91				
Frt	1.00	1.00				0.85		1.00				
Fit Protected	0.95	1.00				1.00		1.00				
Satd. Flow (prot)	1652	1939				2756		5028				
Fit Permitted	0.95	1.00				1.00		1.00				
Satd. Flow (perm)	1652	1939				2756		5028				
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)	57	406	0	0	0	597	0	2444	4	0	0	0
RTOR Reduction (vph)	47	0	0	0	0	246	0	0	0	0	0	0
Lane Group Flow (vph)	10	406	0	0	0	351	0	2448	0	0	0	0
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					9						
Actuated Green, G (s)	23.0	23.0				21.2		74.7				
Effective Green, g (s)	24.0	26.0				22.2		75.7				
Actuated g/C Ratio	0.17	0.19				0.16		0.55				
Clearance Time (s)	6.0	6.0				6.0		7.0				
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Lane Grp Cap (vph)	287	365				443		2760				
v/s Ratio Prot		c0.21						c0.49				
v/s Ratio Perm	0.01					c0.13						
v/c Ratio	0.03	1.11				0.79		0.89				
Uniform Delay, d1	47.3	56.0				55.6		27.3				
Progression Factor	1.00	1.00				1.00		1.00				
Incremental Delay, d2	0.0	81.0				9.4		3.8				
Delay (s)	47.4	137.0				65.0		31.2				
Level of Service	D	F				E		C				
Approach Delay (s)		125.9			65.0			31.2			0.0	
Approach LOS		F			E			C			A	

Intersection Summary

HCM 2000 Control Delay	49.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	137.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

05/20/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔↔			↔↔	
Traffic Volume (vph)	5	4	2	376	0	151	0	379	159	58	350	0
Future Volume (vph)	5	4	2	376	0	151	0	379	159	58	350	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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.97			0.90			0.87			0.98	
Frt		0.979			0.961			0.956				
Flt Protected		0.977			0.966						0.993	
Satd. Flow (prot)	0	1763	0	0	1672	0	0	2784	0	0	3346	0
Flt Permitted		0.856			0.781						0.794	
Satd. Flow (perm)	0	1530	0	0	1252	0	0	2784	0	0	2620	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			41			103				
Link Speed (k/h)		50			40			50			50	
Link Distance (m)		106.6			106.9			249.2			212.5	
Travel Time (s)		7.7			9.6			17.9			15.3	
Confl. Peds. (#/hr)	64		79	79		64	107		178	178		107
Confl. Bikes (#/hr)			18			16			36			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	2%	0%	1%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	10	24	24	10	24	24
Adj. Flow (vph)	6	5	2	427	0	172	0	431	181	66	398	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	599	0	0	612	0	0	464	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.08	1.01	1.01	1.08	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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		Perm	NA		NA	Perm		NA	Perm	NA

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

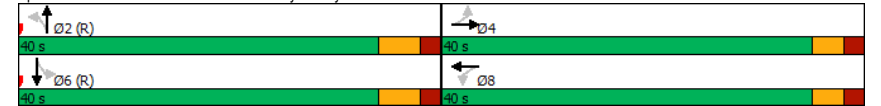
05/20/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		25.0	25.0		25.0	25.0	
Total Split (s)	40.0	40.0		40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	35.0	35.0		35.0	35.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		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)		-1.0			-2.0			-1.0			-1.0	
Total Lost Time (s)		4.0			3.0			5.0			5.0	
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		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	26	26		21	21		100	100		100	100	
Act Effct Green (s)		36.0			37.0			35.0			35.0	
Actuated g/C Ratio		0.45			0.46			0.44			0.44	
v/c Ratio		0.02			1.00			0.48			0.40	
Control Delay		11.5			58.6			15.7			13.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.5			58.6			15.7			13.4	
LOS		B			E			B			B	
Approach Delay		11.5			58.6			15.7			13.4	
Approach LOS		B			E			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 79 (99%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 30.3
 Intersection LOS: C
 Intersection Capacity Utilization 82.5%
 ICU Level of Service E
 Analysis Period (min) 15

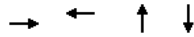
Splits and Phases: 1449: Dufferin St & Dwy/Liberty St



Queues

1449: Dufferin St & Dwy/Liberty St

05/20/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	13	599	612	464
v/c Ratio	0.02	1.00	0.48	0.40
Control Delay	11.5	58.6	15.7	13.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.5	58.6	15.7	13.4
Queue Length 50th (m)	0.9	82.7	35.7	30.2
Queue Length 95th (m)	3.7	#146.8	m46.0	m34.3
Internal Link Dist (m)	82.6	82.9	225.2	188.5
Turn Bay Length (m)				
Base Capacity (vph)	689	601	1275	1146
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	0.02	1.00	0.48	0.40

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

1449: Dufferin St & Dwy/Liberty St

05/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Volume (vph)	5	4	2	376	0	151	0	379	159	58	350	0
Future Volume (vph)	5	4	2	376	0	151	0	379	159	58	350	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			3.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.98			0.97			0.87			1.00	
Flpb, ped/bikes		0.99			0.93			1.00			0.98	
Frt		0.98			0.96			0.96			1.00	
Flt Protected		0.98			0.97			1.00			0.99	
Satd. Flow (prot)		1747			1548			2783			3276	
Flt Permitted		0.86			0.78			1.00			0.79	
Satd. Flow (perm)		1530			1251			2783			2618	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	6	5	2	427	0	172	0	431	181	66	398	0
RTOR Reduction (vph)	0	1	0	0	22	0	0	58	0	0	0	0
Lane Group Flow (vph)	0	12	0	0	577	0	0	554	0	0	464	0
Confl. Peds. (#/hr)	64		79	79		64	107		178	178		107
Confl. Bikes (#/hr)			18			16			36			
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	2%	2%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	10	24	24	10	24	24
Turn Type	Perm	NA		Perm	NA		NA		Perm	NA		NA
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		35.0			35.0			34.0			34.0	
Effective Green, g (s)		36.0			37.0			35.0			35.0	
Actuated g/C Ratio		0.45			0.46			0.44			0.44	
Clearance Time (s)		5.0			5.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		688			578			1217			1145	
v/s Ratio Prot								c0.20				
v/s Ratio Perm		0.01			c0.46						0.18	
v/c Ratio		0.02			1.00			0.46			0.41	
Uniform Delay, d1		12.2			21.5			15.8			15.4	
Progression Factor		1.00			1.00			1.13			0.80	
Incremental Delay, d2		0.0			36.7			0.6			0.8	
Delay (s)		12.2			58.2			18.5			13.1	
Level of Service		B			E			B			B	
Approach Delay (s)		12.2			58.2			18.5			13.1	
Approach LOS		B			E			B			B	

Intersection Summary

HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1628: Shaw St & King St

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕↕		
Traffic Volume (vph)	15	420	34	0	710	80	84	251	7	57	164	111
Future Volume (vph)	15	420	34	0	710	80	84	251	7	57	164	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Ped Bike Factor	0.99			0.99			0.99			0.96		
Frt	0.989			0.985			0.997			0.950		
Flt Protected	0.998						0.988			0.992		
Satd. Flow (prot)	0	2784	0	0	2902	0	0	3134	0	0	2745	0
Flt Permitted	0.914						0.732			0.811		
Satd. Flow (perm)	0	2548	0	0	2902	0	0	2297	0	0	2220	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	18			27			3			86		
Link Speed (k/h)	50			50			40			40		
Link Distance (m)	199.1			255.2			127.7			380.6		
Travel Time (s)	14.3			18.4			11.5			34.3		
Confl. Peds. (#/hr)	99		83	83		99	73		109	109		73
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	100%	6%	0%	100%	4%	0%	0%	1%	0%	19%	3%	7%
Bus Blockages (#/hr)	20	20	20	20	20	20	0	0	0	0	0	0
Adj. Flow (vph)	18	494	40	0	835	94	99	295	8	67	193	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	552	0	0	929	0	0	402	0	0	391	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)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	1.16	1.22	1.16	1.16	1.22	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14		24		14		24		14	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+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)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		NA	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			4			8		

Lanes, Volumes, Timings
1628: Shaw St & King St

05/20/2021

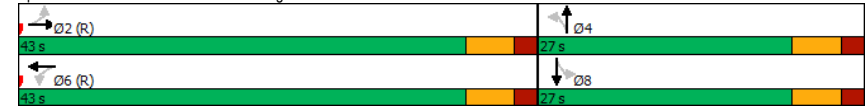


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	22.0	22.0		22.0	22.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		26.0	26.0		26.0	26.0	
Total Split (s)	43.0	43.0		43.0	43.0		27.0	27.0		27.0	27.0	
Maximum Green (s)	37.0	37.0		37.0	37.0		21.0	21.0		21.0	21.0	
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)	-1.0			-1.0			-1.0			-1.0		
Total Lost Time (s)	5.0			5.0			5.0			5.0		
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	28	28		33	33		100	100		24	24	
Act Effect Green (s)	38.8			38.8			21.2			21.2		
Actuated g/C Ratio	0.55			0.55			0.30			0.30		
v/c Ratio	0.39			0.57			0.58			0.53		
Control Delay	9.6			11.7			24.3			18.7		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	9.6			11.7			24.3			18.7		
LOS	A			B			C			B		
Approach Delay	9.6			11.7			24.3			18.7		
Approach LOS	A			B			C			B		

Intersection Summary

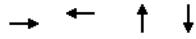
Area Type: CBD
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 14.6
 Intersection LOS: B
 Intersection Capacity Utilization 72.5%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1628: Shaw St & King St



Queues
1628: Shaw St & King St

05/20/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	552	929	402	391
v/c Ratio	0.39	0.57	0.58	0.53
Control Delay	9.6	11.7	24.3	18.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.6	11.7	24.3	18.7
Queue Length 50th (m)	18.7	36.5	23.1	17.0
Queue Length 95th (m)	27.3	49.4	33.0	26.4
Internal Link Dist (m)	175.1	231.2	103.7	356.6
Turn Bay Length (m)				
Base Capacity (vph)	1420	1620	723	756
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	0.39	0.57	0.56	0.52
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
1628: Shaw St & King St

05/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	15	420	34	0	710	80	84	251	7	57	164	111
Future Volume (vph)	15	420	34	0	710	80	84	251	7	57	164	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			1.00			0.97	
Flpb, ped/bikes		1.00			1.00			0.99			0.99	
Frt		0.99			0.98			1.00			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		2784			2901			3100			2713	
Flt Permitted		0.91			1.00			0.73			0.81	
Satd. Flow (perm)		2549			2901			2298			2220	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	18	494	40	0	835	94	99	295	8	67	193	131
RTOR Reduction (vph)	0	8	0	0	12	0	0	2	0	0	60	0
Lane Group Flow (vph)	0	544	0	0	917	0	0	400	0	0	331	0
Confl. Peds. (#/hr)	99		83	83		99	73		109	109		73
Heavy Vehicles (%)	100%	6%	0%	100%	4%	0%	0%	1%	0%	19%	3%	7%
Bus Blockages (#/hr)	20	20	20	20	20	20	0	0	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		37.8			37.8			20.2			20.2	
Effective Green, g (s)		38.8			38.8			21.2			21.2	
Actuated g/C Ratio		0.55			0.55			0.30			0.30	
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)		1412			1607			695			672	
v/s Ratio Prot					0.32							
v/s Ratio Perm		0.21						0.17			0.15	
v/c Ratio		0.39			0.57			0.58			0.49	
Uniform Delay, d1		8.8			10.2			20.6			20.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.8			1.5			1.2			0.6	
Delay (s)		9.6			11.6			21.8			20.6	
Level of Service		A			B			C			C	
Approach Delay (s)		9.6			11.6			21.8			20.6	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay				14.5				HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio				0.57								
Actuated Cycle Length (s)				70.0			Sum of lost time (s)			10.0		
Intersection Capacity Utilization				72.5%			ICU Level of Service			C		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
1851: King St & Sudbury St

05/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕↕		
Traffic Volume (vph)	0	583	0	0	610	106	0	0	0	89	0	75
Future Volume (vph)	0	583	0	0	610	106	0	0	0	89	0	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98											
Frt	0.978											
Flt Protected	0.974											
Satd. Flow (prot)	0	2730	0	0	2611	0	0	1691	0	0	1273	0
Flt Permitted	0.841											
Satd. Flow (perm)	0	2730	0	0	2611	0	0	1691	0	0	1076	0
Right Turn on Red	Yes				Yes		Yes		Yes			Yes
Satd. Flow (RTOR)	44											
Link Speed (k/h)	50											
Link Distance (m)	318.4				199.1		158.6		196.7			
Travel Time (s)	22.9				14.3		11.4		14.2			
Confl. Peds. (#/hr)	54		106	106		54	67		34	34		67
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 (%)	0%	13%	0%	0%	14%	12%	0%	0%	0%	17%	0%	16%
Bus Blockages (#/hr)	20	20	20	20	20	20	0	0	0	0	0	0
Adj. Flow (vph)	0	601	0	0	629	109	0	0	0	92	0	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	601	0	0	738	0	0	0	0	0	169	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			0.0
Link Offset(m)	0.0				0.0		0.0		0.0			0.0
Crosswalk Width(m)	1.6				1.6		1.6		1.6			1.6
Two way Left Turn Lane												
Headway Factor	1.16	1.22	1.16	1.16	1.22	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)	28.7				28.7		28.7		28.7			
Detector 2 Size(m)	1.8				1.8		1.8		1.8			
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	NA				NA		NA		Perm			NA
Protected Phases	2				6		8		4			

Lanes, Volumes, Timings
1851: King St & Sudbury St

05/20/2021

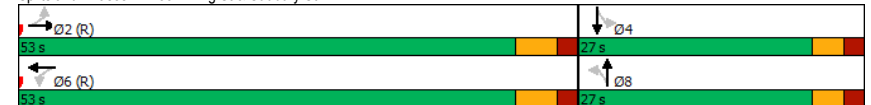


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2				6		8		4			
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	24.0	24.0		24.0	24.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0		26.0	26.0	
Total Split (s)	53.0	53.0		53.0	53.0		27.0	27.0		27.0	27.0	
Total Split (%)	66.3%	66.3%		66.3%	66.3%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	47.0	47.0		47.0	47.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0				-1.0		-1.0		-1.0			
Total Lost Time (s)	5.0				5.0		4.0		4.0			
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		18	18		22	22		11	11	
Act Effct Green (s)	48.8				48.8		22.2		22.2			
Actuated g/C Ratio	0.61				0.61		0.28		0.28			
v/c Ratio	0.36				0.46		0.50		0.50			
Control Delay	8.6				9.0		22.3		22.3			
Queue Delay	0.0				0.0		0.0		0.0			
Total Delay	8.6				9.0		22.3		22.3			
LOS	A				A		C		C			
Approach Delay	8.6				9.0		22.3		22.3			
Approach LOS	A				A		C		C			

Intersection Summary

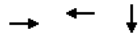
Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 10.4
 Intersection LOS: B
 Intersection Capacity Utilization 48.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 1851: King St & Sudbury St



Queues
1851: King St & Sudbury St

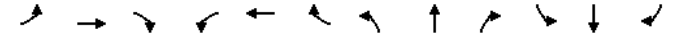
05/20/2021



Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	601	738	169
v/c Ratio	0.36	0.46	0.50
Control Delay	8.6	9.0	22.3
Queue Delay	0.0	0.0	0.0
Total Delay	8.6	9.0	22.3
Queue Length 50th (m)	21.4	26.4	14.3
Queue Length 95th (m)	31.8	39.5	32.3
Internal Link Dist (m)	294.4	175.1	172.7
Turn Bay Length (m)			
Base Capacity (vph)	1665	1610	347
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.36	0.46	0.49
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
1851: King St & Sudbury St

05/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↔			↕↔			↕↔			↕↔	
Traffic Volume (vph)	0	583	0	0	610	106	0	0	0	89	0	75
Future Volume (vph)	0	583	0	0	610	106	0	0	0	89	0	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0						4.0	
Lane Util. Factor		0.95			0.95						1.00	
Frbp, ped/bikes		1.00			0.98						0.96	
Flpb, ped/bikes		1.00			1.00						0.98	
Frt		1.00			0.98						0.94	
Flt Protected		1.00			1.00						0.97	
Satd. Flow (prot)		2730			2610						1246	
Flt Permitted		1.00			1.00						0.84	
Satd. Flow (perm)		2730			2610						1077	
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)	0	601	0	0	629	109	0	0	0	92	0	77
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	601	0	0	721	0	0	0	0	0	131	0
Confl. Peds. (#/hr)	54		106	106		54	67		34	34		67
Heavy Vehicles (%)	0%	13%	0%	0%	14%	12%	0%	0%	0%	17%	0%	16%
Bus Blockages (#/hr)	20	20	20	20	20	20	0	0	0	0	0	0
Turn Type		NA			NA					Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.8			47.8						21.2	
Effective Green, g (s)		48.8			48.8						22.2	
Actuated g/C Ratio		0.61			0.61						0.28	
Clearance Time (s)		6.0			6.0						5.0	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		1665			1592						298	
v/s Ratio Prot		0.22			0.28							
v/s Ratio Perm											0.12	
v/c Ratio		0.36			0.45						0.44	
Uniform Delay, d1		7.8			8.4						23.8	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.6			0.9						1.0	
Delay (s)		8.4			9.3						24.8	
Level of Service		A			A						C	
Approach Delay (s)		8.4			9.3			0.0			24.8	
Approach LOS		A			A			A			C	
Intersection Summary												
HCM 2000 Control Delay				10.7							B	
HCM 2000 Volume to Capacity ratio				0.45								
Actuated Cycle Length (s)				80.0				Sum of lost time (s)		9.0		
Intersection Capacity Utilization				48.1%				ICU Level of Service		A		
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings
1912: Atlantic Ave & King St

05/20/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕	↕
Traffic Volume (vph)	373	276	2	624	206	223
Future Volume (vph)	373	276	2	624	206	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.0	3.0
Storage Length (m)		0.0	0.0		30.0	0.0
Storage Lanes		0	0		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.81			1.00	0.95	0.96
Frt	0.936					0.850
Fit Protected					0.950	
Satd. Flow (prot)	2234	0	0	2798	1486	1233
Fit Permitted				0.953	0.950	
Satd. Flow (perm)	2234	0	0	2665	1416	1183
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	317					97
Link Speed (k/h)	50			50	30	
Link Distance (m)	191.3			318.4	198.0	
Travel Time (s)	13.8			22.9	23.8	
Confl. Peds. (#/hr)		261	261		45	28
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	6%	3%	100%	10%	2%	10%
Bus Blockages (#/hr)	20	20	20	20	0	0
Adj. Flow (vph)	429	317	2	717	237	256
Shared Lane Traffic (%)						
Lane Group Flow (vph)	746	0	0	719	237	256
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.22	1.16	1.16	1.22	1.25	1.25
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (m)	30.5		6.1	30.5	6.1	6.1
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)	1.8		6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+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)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex		

Lanes, Volumes, Timings
1912: Atlantic Ave & King St

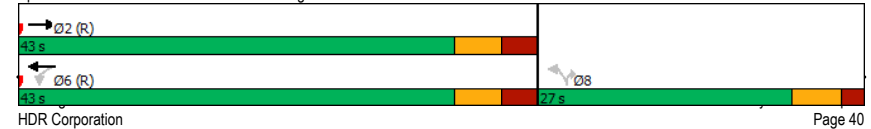
05/20/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Detector Phase	2		6	6	8	8
Switch Phase						
Minimum Initial (s)	21.0		21.0	21.0	20.0	20.0
Minimum Split (s)	28.0		28.0	28.0	26.0	26.0
Total Split (s)	43.0		43.0	43.0	27.0	27.0
Total Split (%)	61.4%		61.4%	61.4%	38.6%	38.6%
Maximum Green (s)	36.0		36.0	36.0	21.0	21.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	3.0		3.0	3.0	2.0	2.0
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0
Total Lost Time (s)	6.0			6.0	5.0	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)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	14.0		14.0	14.0	13.0	13.0
Pedestrian Calls (#/hr)	100		0	0	15	15
Act Effct Green (s)	37.8			37.8	21.2	21.2
Actuated g/C Ratio	0.54			0.54	0.30	0.30
v/c Ratio	0.55			0.50	0.55	0.60
Control Delay	7.5			11.7	26.2	19.5
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	7.5			11.7	26.2	19.5
LOS	A			B	C	B
Approach Delay	7.5			11.7	22.7	
Approach LOS	A			B	C	

Intersection Summary

Area Type: CBD
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 6 (9%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 12.9
 Intersection LOS: B
 Intersection Capacity Utilization 51.9%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 1912: Atlantic Ave & King St



Queues
1912: Atlantic Ave & King St

05/20/2021



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	746	719	237	256
v/c Ratio	0.55	0.50	0.55	0.60
Control Delay	7.5	11.7	26.2	19.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.5	11.7	26.2	19.5
Queue Length 50th (m)	15.4	28.4	25.9	16.9
Queue Length 95th (m)	27.8	40.8	43.7	36.4
Internal Link Dist (m)	167.3	294.4	174.0	
Turn Bay Length (m)		30.0		
Base Capacity (vph)	1352	1438	445	438
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	0.50	0.53	0.58

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1912: Atlantic Ave & King St

05/20/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (vph)	373	276	2	624	206	223
Future Volume (vph)	373	276	2	624	206	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.0	3.0
Total Lost time (s)				6.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	0.81			1.00	1.00	0.96
Fipb, ped/bikes	1.00			1.00	0.95	1.00
Frt	0.94			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2235			2796	1416	1183
Flt Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	2235			2666	1416	1183
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	429	317	2	717	237	256
RTOR Reduction (vph)	146	0	0	0	0	68
Lane Group Flow (vph)	600	0	0	719	237	188
Confl. Peds. (#/hr)		261	261		45	28
Heavy Vehicles (%)	6%	3%	100%	10%	2%	10%
Bus Blockages (#/hr)	20	20	20	20	0	0
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Actuated Green, G (s)	36.8			36.8	20.2	20.2
Effective Green, g (s)	37.8			37.8	21.2	21.2
Actuated g/C Ratio	0.54			0.54	0.30	0.30
Clearance Time (s)	7.0			7.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1206			1439	428	358
v/s Ratio Prot	0.27					
v/s Ratio Perm				c0.27	c0.17	0.16
v/c Ratio	0.50			0.50	0.55	0.53
Uniform Delay, d1	10.1			10.1	20.4	20.2
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.5			1.2	1.6	1.4
Delay (s)	11.6			11.4	22.0	21.6
Level of Service	B			B	C	C
Approach Delay (s)	11.6			11.4	21.8	
Approach LOS	B			B	C	

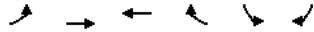
Intersection Summary

HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

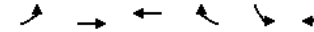
05/20/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	
Traffic Volume (vph)	0	539	728	131	93	23
Future Volume (vph)	0	539	728	131	93	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt		0.977		0.973		
Flt Protected					0.962	
Satd. Flow (prot)	0	2966	2915	0	1468	0
Flt Permitted					0.962	
Satd. Flow (perm)	0	2966	2915	0	1468	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			51		15	
Link Speed (k/h)		50	50		50	
Link Distance (m)		316.7	191.3		100.8	
Travel Time (s)		22.8	13.8		7.3	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	4%	4%	0%	0%	39%
Bus Blockages (#/hr)	20	20	20	20	0	0
Adj. Flow (vph)	0	606	818	147	104	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	606	965	0	130	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.16	1.22	1.22	1.16	1.16	1.16
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				8	
Detector Phase	2	2	6		8	

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

05/20/2021

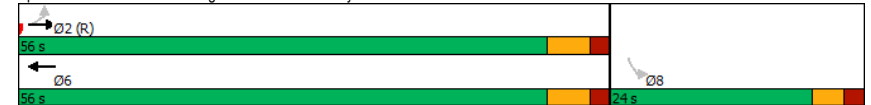


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0		18.0	
Minimum Split (s)	26.0	26.0	26.0		23.0	
Total Split (s)	56.0	56.0	56.0		24.0	
Total Split (%)	70.0%	70.0%	70.0%		30.0%	
Maximum Green (s)	50.0	50.0	50.0		19.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	None		None	
Walk Time (s)	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	
Pedestrian Calls (#/hr)	0	0	0		0	
Act Effect Green (s)		57.6	57.6		19.0	
Actuated g/C Ratio		0.72	0.72		0.24	
v/c Ratio		0.28	0.46		0.36	
Control Delay		4.5	6.9		25.8	
Queue Delay		0.0	0.0		0.0	
Total Delay		4.5	6.9		25.8	
LOS		A	A		C	
Approach Delay		4.5	6.9		25.8	
Approach LOS		A	A		C	

Intersection Summary

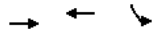
Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.46
 Intersection Signal Delay: 7.5 Intersection LOS: A
 Intersection Capacity Utilization 49.5% ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 2081: King St & Joe Shuster Way



Queues
2081: King St & Joe Shuster Way

05/20/2021



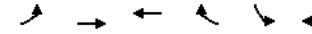
Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	606	965	130
v/c Ratio	0.28	0.46	0.36
Control Delay	4.5	6.9	25.8
Queue Delay	0.0	0.0	0.0
Total Delay	4.5	6.9	25.8
Queue Length 50th (m)	15.4	33.0	14.5
Queue Length 95th (m)	m16.6	44.7	29.1
Internal Link Dist (m)	292.7	167.3	76.8
Turn Bay Length (m)			
Base Capacity (vph)	2135	2113	378
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.28	0.46	0.34

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2081: King St & Joe Shuster Way

05/20/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓	↓
Traffic Volume (vph)	0	539	728	131	93	23
Future Volume (vph)	0	539	728	131	93	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	
Lane Util. Factor		0.95	0.95		1.00	
Frt		1.00	0.98		0.97	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		2966	2915		1468	
Flt Permitted		1.00	1.00		0.96	
Satd. Flow (perm)		2966	2915		1468	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	606	818	147	104	26
RTOR Reduction (vph)	0	0	16	0	12	0
Lane Group Flow (vph)	0	606	949	0	118	0
Heavy Vehicles (%)	0%	4%	4%	0%	0%	39%
Bus Blockages (#/hr)	20	20	20	20	0	0
Turn Type		NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases		2			8	
Actuated Green, G (s)		54.6	54.6		14.4	
Effective Green, g (s)		55.6	55.6		15.4	
Actuated g/C Ratio		0.70	0.70		0.19	
Clearance Time (s)		6.0	6.0		5.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		2061	2025		282	
v/s Ratio Prot		0.20	c0.33			
v/s Ratio Perm					c0.08	
v/c Ratio		0.29	0.47		0.42	
Uniform Delay, d1		4.7	5.5		28.4	
Progression Factor		0.77	1.00		1.00	
Incremental Delay, d2		0.3	0.2		1.0	
Delay (s)		3.9	5.7		29.4	
Level of Service		A	A		C	
Approach Delay (s)		3.9	5.7		29.4	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

05/20/2021

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↘	↙	↓
Traffic Volume (vph)	52	110	483	20	83	661
Future Volume (vph)	52	110	483	20	83	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.0	3.5	3.0	3.0	3.5
Storage Length (m)	30.0	0.0		15.0	30.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				0.94	0.99	
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1685	1315	1842	1507	1478	1842
Fit Permitted	0.950				0.345	
Satd. Flow (perm)	1685	1315	1842	1416	529	1842
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		124		9		
Link Speed (k/h)	30		30		30	
Link Distance (m)	148.7		265.9		191.3	
Travel Time (s)	17.8		31.9		23.0	
Confl. Peds. (#/hr)				28	28	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	11%	2%	0%	14%	2%
Bus Blockages (#/hr)	0	8	0	0	0	0
Adj. Flow (vph)	58	124	543	22	93	743
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	124	543	22	93	743
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.0		3.0		3.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.09	1.14	1.01	1.09	1.09	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	6.1	6.1	30.5	6.1	6.1	30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	6.1	1.8	6.1	6.1	1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex

Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

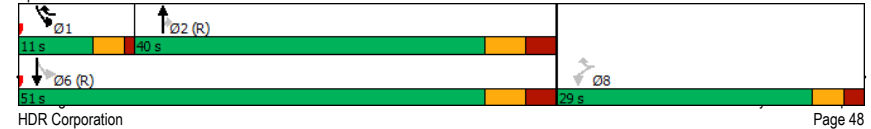
05/20/2021

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	21.0	6.0	27.0	27.0	6.0	27.0
Minimum Split (s)	26.0	10.0	34.0	34.0	10.0	34.0
Total Split (s)	29.0	11.0	40.0	40.0	11.0	51.0
Total Split (%)	36.3%	13.8%	50.0%	50.0%	13.8%	63.8%
Maximum Green (s)	24.0	7.0	33.0	33.0	7.0	44.0
Yellow Time (s)	3.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	1.0	3.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Walk Time (s)	7.0		7.0	7.0		0.0
Flash Dont Walk (s)	14.0		20.0	20.0		0.0
Pedestrian Calls (#/hr)	0		9	9		0
Act Effct Green (s)	22.0	24.0	47.0	47.0	61.4	60.8
Actuated g/C Ratio	0.28	0.30	0.59	0.59	0.77	0.76
v/c Ratio	0.13	0.26	0.50	0.03	0.18	0.53
Control Delay	22.8	4.1	15.8	9.7	1.3	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.8	4.1	15.8	9.7	1.3	8.0
LOS	C	A	B	A	A	A
Approach Delay	10.0		15.5			7.2
Approach LOS	B		B			A

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 31 (39%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 10.5
 Intersection LOS: B
 Intersection Capacity Utilization 60.6%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2134: British Columbia Rd/Dufferin St & Saskatchewan Rd



Queues

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

05/20/2021



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	58	124	543	22	93	743
v/c Ratio	0.13	0.26	0.50	0.03	0.18	0.53
Control Delay	22.8	4.1	15.8	9.7	1.3	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.8	4.1	15.8	9.7	1.3	8.0
Queue Length 50th (m)	6.6	0.0	60.8	1.0	0.5	77.5
Queue Length 95th (m)	14.9	8.3	96.7	4.9	m0.5	m73.7
Internal Link Dist (m)	124.7		241.9			167.3
Turn Bay Length (m)	30.0			15.0	30.0	
Base Capacity (vph)	526	487	1082	835	510	1400
Starvation Cap Reductn	0	0	0	0	0	12
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.25	0.50	0.03	0.18	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

05/20/2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (vph)	52	110	483	20	83	661
Future Volume (vph)	52	110	483	20	83	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.5	3.0	3.0	3.5
Total Lost time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.94	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1685	1315	1842	1416	1471	1842
Fit Permitted	0.95	1.00	1.00	1.00	0.34	1.00
Satd. Flow (perm)	1685	1315	1842	1416	534	1842
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	58	124	543	22	93	743
RTOR Reduction (vph)	0	90	0	4	0	0
Lane Group Flow (vph)	58	34	543	18	93	743
Confl. Peds. (#/hr)			28	28		
Heavy Vehicles (%)	0%	11%	2%	0%	14%	2%
Bus Blockages (#/hr)	0	8	0	0	0	0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	12.6	20.0	44.0	44.0	55.4	55.4
Effective Green, g (s)	13.6	22.0	45.0	45.0	56.4	56.4
Actuated g/C Ratio	0.17	0.28	0.56	0.56	0.70	0.70
Clearance Time (s)	5.0	4.0	7.0	7.0	4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	361	1036	796	474	1298
v/s Ratio Prot		0.01	0.29		0.02	c0.40
v/s Ratio Perm	c0.03	0.02		0.01	0.12	
v/c Ratio	0.20	0.09	0.52	0.02	0.20	0.57
Uniform Delay, d1	28.5	21.6	10.9	7.8	4.8	5.8
Progression Factor	1.00	1.00	1.00	1.00	0.24	0.94
Incremental Delay, d2	0.4	0.1	1.9	0.1	0.0	0.2
Delay (s)	28.9	21.7	12.8	7.8	1.2	5.6
Level of Service	C	C	B	A	A	A
Approach Delay (s)	24.0		12.6			5.1
Approach LOS	C		B			A

Intersection Summary

HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔		↔	↔		↔	↔
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	30.0		0.0	20.0		20.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		0
Taper Length (m)	7.5			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				0.97
Frt						0.850						0.865
Fit Protected	0.950			0.950				0.957				
Satd. Flow (prot)	1685	1824	0	1685	1756	1507	0	1798	0	0	1574	0
Fit Permitted	0.555			0.494								
Satd. Flow (perm)	984	1824	0	874	1756	1507	0	1860	0	0	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						45						514
Link Speed (k/h)		30			30			30				30
Link Distance (m)		164.9			265.9			92.0				121.3
Travel Time (s)		19.8			31.9			11.0				14.6
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
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 (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	470	0	1	342	1	8	1	0	0	0	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	29	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)		3.0			3.0			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	1.09	1.01	1.01	1.09	1.01	1.09	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

09/30/2021

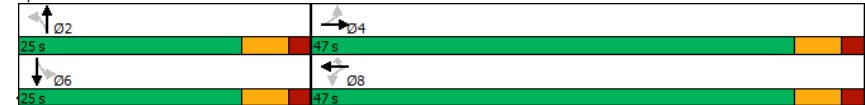


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				NA
Protected Phases		4			8			2				6
Permitted Phases	4			8		8	2				6	
Detector Phase	4	4		8	8	8	2	2			6	6
Switch Phase												
Minimum Initial (s)	33.0	33.0		33.0	33.0	33.0	7.0	7.0			7.0	7.0
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	24.0	24.0			24.0	24.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0	25.0	25.0			25.0	25.0
Total Split (%)	65.3%	65.3%		65.3%	65.3%	65.3%	34.7%	34.7%			34.7%	34.7%
Maximum Green (s)	41.0	41.0		41.0	41.0	41.0	19.0	19.0			19.0	19.0
Yellow Time (s)	4.0	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	2.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0			-1.0	-1.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	Max	Max		Max	Max	Max	None	None			None	None
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	9.0	9.0		9.0	9.0	9.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	0
Act Effct Green (s)	58.5	58.5		58.5	58.5	58.5	8.0	8.0			8.0	8.0
Actuated g/C Ratio	0.90	0.90		0.90	0.90	0.90	0.12	0.12			0.12	0.12
v/c Ratio	0.00	0.29		0.00	0.22	0.00	0.04	0.05			0.05	0.05
Control Delay	2.0	2.3		2.0	2.1	0.0	27.0	0.1			27.0	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	2.0	2.3		2.0	2.1	0.0	27.0	0.1			27.0	0.1
LOS	A	A		A	A	A	C	A			C	A
Approach Delay		2.3			2.1		27.0	0.1				
Approach LOS		A			A		C	A				

Intersection Summary

Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	65.2
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.29
Intersection Signal Delay:	2.4
Intersection Capacity Utilization:	73.3%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 97: Yukon Place & British Columbia Rd



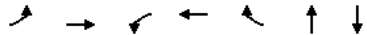
Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
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Synchro 11 Report
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Queues

97: Yukon Place & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	1	470	1	342	1	9	29
v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.04	0.05
Control Delay	2.0	2.3	2.0	2.1	0.0	27.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.0	2.3	2.0	2.1	0.0	27.0	0.1
Queue Length 50th (m)	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Queue Length 95th (m)	0.3	26.4	0.3	18.3	0.0	4.5	0.0
Internal Link Dist (m)		140.9		241.9		68.0	97.3
Turn Bay Length (m)	30.0		20.0		20.0		
Base Capacity (vph)	882	1635	783	1574	1356	574	840
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.02	0.03

Intersection Summary

HCM Signalized Intersection Capacity Analysis

97: Yukon Place & British Columbia Rd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔		↔	↔		↔	↔
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0				5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00				0.97
Fipb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99				1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00				0.86
Fit Protected	0.95	1.00		0.95	1.00	1.00		0.96				1.00
Satd. Flow (prot)	1685	1824		1681	1756	1507		1781				1574
Fit Permitted	0.56	1.00		0.49	1.00	1.00		1.00				1.00
Satd. Flow (perm)	985	1824		873	1756	1507		1860				1574
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)	1	470	0	1	342	1	8	1	0	0	0	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	27
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	2	0
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA			NA	
Protected Phases		4			8		2				6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	54.3	54.3		54.3	54.3	54.3		2.6			2.6	
Effective Green, g (s)	55.3	55.3		55.3	55.3	55.3		3.6			3.6	
Actuated g/C Ratio	0.80	0.80		0.80	0.80	0.80		0.05			0.05	
Clearance Time (s)	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	
Lane Grp Cap (vph)	790	1463		700	1409	1209		97			82	
v/s Ratio Prot		0.26			0.19							0.00
v/s Ratio Perm	0.00			0.00		0.00		0.00				0.02
v/c Ratio	0.00	0.32		0.00	0.24	0.00		0.09				0.02
Uniform Delay, d1	1.3	1.8		1.3	1.7	1.3		31.1				31.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Incremental Delay, d2	0.0	0.6		0.0	0.4	0.0		0.4				0.1
Delay (s)	1.3	2.4		1.3	2.1	1.3		31.5				31.1
Level of Service	A	A		A	A	A		C				C
Approach Delay (s)		2.4			2.1			31.5				31.1
Approach LOS		A			A			C				C

Intersection Summary

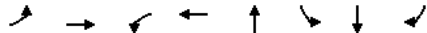
HCM 2000 Control Delay	3.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	68.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues

222: Strachan Ave & Lakeshore Blvd

09/30/2021



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	558	4446	9	1329	43	163	175	261
v/c Ratio	1.29	1.24	0.16	0.83	0.21	0.71	0.73	0.34
Control Delay	178.6	134.8	44.1	45.5	58.5	65.2	66.1	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	178.6	134.8	44.1	45.5	58.5	65.2	66.1	3.6
Queue Length 50th (m)	~170.2	~475.5	1.6	115.2	10.1	41.0	44.2	0.0
Queue Length 95th (m)	#267.9	#557.7	7.4	#160.6	23.4	66.1	70.2	13.9
Internal Link Dist (m)		286.3		172.6	92.5		181.6	
Turn Bay Length (m)	60.0		60.0			140.0		50.0
Base Capacity (vph)	433	3595	57	1606	216	390	407	759
Starvation Cap Reductn	0	67	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	1.29	1.26	0.16	0.83	0.20	0.42	0.43	0.34

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.

HCM Signalized Intersection Capacity Analysis

222: Strachan Ave & Lakeshore Blvd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔			↔	↔	↔	↔	↔
Traffic Volume (vph)	502	3996	5	8	1196	0	0	39	0	287	17	235
Future Volume (vph)	502	3996	5	8	1196	0	0	39	0	287	17	235
Ideal Flow (vphpl)	2150	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Total Lost time (s)	3.0	3.0		5.0	5.0			8.0		7.0	7.0	5.0
Lane Util. Factor	1.00	*1.00		1.00	0.91			1.00		0.95	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	0.97
Frbp, 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	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	1.00
Satd. Flow (prot)	1643	5989		1685	4885			1879		1585	1694	1460
Flt Permitted	0.09	1.00		0.10	1.00			1.00		0.73	0.72	1.00
Satd. Flow (perm)	151	5989		174	4885			1879		1216	1271	1460
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)	558	4440	6	9	1329	0	0	43	0	319	19	261
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	158
Lane Group Flow (vph)	558	4446	0	9	1329	0	0	43	0	163	175	103
Confl. Peds. (#/hr)	6		8	8		6	49					49
Confl. Bikes (#/hr)									39			13
Heavy Vehicles (%)	16%	4%	0%	0%	5%	33%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		NA		Perm	NA	pm+ov	
Protected Phases	5	2			6			3			4	5
Permitted Phases	2			6			3			4		4
Actuated Green, G (s)	71.2	71.2		39.8	39.8			9.1		22.3	22.3	47.7
Effective Green, g (s)	74.2	74.2		40.8	40.8			10.1		23.3	23.3	49.7
Actuated g/C Ratio	0.59	0.59		0.32	0.32			0.08		0.19	0.19	0.40
Clearance Time (s)	6.0	6.0		6.0	6.0			9.0		8.0	8.0	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)	426	3538		56	1586			151		225	235	577
v/s Ratio Prot	c0.30	0.74			0.27			c0.02				0.04
v/s Ratio Perm	c0.48			0.05						0.13	c0.14	0.03
v/c Ratio	1.31	1.26		0.16	0.84			0.28		0.72	0.74	0.18
Uniform Delay, d1	39.0	25.7		30.2	39.3			54.4		48.1	48.3	24.7
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	155.5	117.9		6.1	5.5			1.0		11.0	12.1	0.1
Delay (s)	194.5	143.6		36.3	44.8			55.4		59.1	60.4	24.8
Level of Service	F	F		D	D			E		E	E	C
Approach Delay (s)		149.3			44.7			55.4			44.5	
Approach LOS		F			D			E			D	

Intersection Summary

HCM 2000 Control Delay	119.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	125.6	Sum of lost time (s)	25.0
Intersection Capacity Utilization	136.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
538: Strachan Ave & King St

09/30/2021



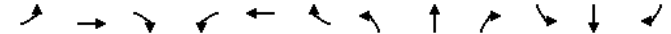
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↔	↔		↔	↔	
Traffic Volume (vph)	0	627	122	66	560	40	113	335	116	27	199	20
Future Volume (vph)	0	627	122	66	560	40	113	335	116	27	199	20
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0	0.0
Storage Lanes	0	0	0	0	0	1	0	1	0	1	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.91			0.98		0.85	0.96		0.96	0.98	
Frt		0.976			0.991		0.961			0.986		
Fit Protected					0.995		0.950			0.950		
Satd. Flow (prot)	0	1599	0	0	1696	0	1458	1486	0	1516	1601	0
Fit Permitted					0.776		0.505			0.160		
Satd. Flow (perm)	0	1599	0	0	1306	0	660	1486	0	246	1601	0
Right Turn on Red			Yes		Yes		Yes			Yes		Yes
Satd. Flow (RTOR)		46			13			23			7	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		255.2			358.6			424.1			379.9	
Travel Time (s)		18.4			25.8			38.2			34.2	
Confl. Peds. (#/hr)	48		285	285		48	205		116	116		205
Confl. Bikes (#/hr)			37			15			9			11
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	9%	28%	100%	7%	5%	4%	6%	3%	0%	2%	0%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	0	729	142	77	651	47	131	390	135	31	231	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	871	0	0	775	0	131	525	0	31	254	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			3.0			3.0	
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	1.92	2.03	1.92	1.92	2.03	1.92	1.25	1.16	1.16	1.25	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	

Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings
538: Strachan Ave & King St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases		2			6			4			8	
Detector Phase		2			6			4			8	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		27.0	27.0		27.0	27.0	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Maximum Green (s)	44.0	44.0		44.0	44.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
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	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		16	16		100	100		100	100	
Act Effct Green (s)		45.0			45.0		25.0	25.0		25.0	25.0	
Actuated g/C Ratio		0.56			0.56		0.31	0.31		0.31	0.31	
v/c Ratio		0.95			1.05		0.64	1.09		0.41	0.50	
Control Delay		37.1			61.3		40.2	97.1		46.0	32.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		37.1			61.3		40.2	97.1		46.0	32.4	
LOS		D			E		D	F		D	C	
Approach Delay		37.1			61.3			85.8			33.9	
Approach LOS		D			E			F			C	

Intersection Summary

Area Type: CBD

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 42 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 56.3

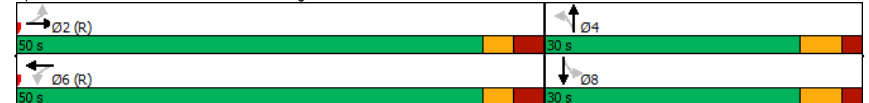
Intersection LOS: E

Intersection Capacity Utilization 132.2%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 538: Strachan Ave & King St



Queues

538: Strachan Ave & King St

09/30/2021



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	871	775	131	525	31	254
v/c Ratio	0.95	1.05	0.64	1.09	0.41	0.50
Control Delay	37.1	61.3	40.2	97.1	46.0	32.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	61.3	40.2	97.1	46.0	32.4
Queue Length 50th (m)	57.7	-52.2	16.9	-89.2	4.8	38.6
Queue Length 95th (m)	#94.8	#93.3	#37.9	#136.6	m9.1	m54.4
Internal Link Dist (m)	231.2	334.6		400.1		355.9
Turn Bay Length (m)			25.0		25.0	
Base Capacity (vph)	919	740	206	480	76	505
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	0.95	1.05	0.64	1.09	0.41	0.50

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.

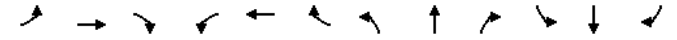
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

538: Strachan Ave & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	0	627	122	66	560	40	113	335	116	27	199	20
Future Volume (vph)	0	627	122	66	560	40	113	335	116	27	199	20
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.91			0.99		1.00	0.96		1.00	0.98	
Ftbp, ped/bikes		1.00			0.99		0.85	1.00		0.96	1.00	
Frt		0.98			0.99		1.00	0.96		1.00	0.99	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1598			1675		1241	1487		1460	1602	
Flt Permitted		1.00			0.78		0.50	1.00		0.16	1.00	
Satd. Flow (perm)		1598			1307		659	1487		246	1602	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	729	142	77	651	47	131	390	135	31	231	23
RTOR Reduction (vph)	0	20	0	0	6	0	0	16	0	0	5	0
Lane Group Flow (vph)	0	851	0	0	769	0	131	509	0	31	249	0
Confl. Peds. (#/hr)	48		285	285		48	205		116	116		205
Confl. Bikes (#/hr)			37			15			9			11
Heavy Vehicles (%)	0%	9%	28%	100%	7%	5%	4%	6%	3%	0%	2%	0%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases		2			6			4			8	
Actuated Green, G (s)		44.0			44.0		24.0	24.0		24.0	24.0	
Effective Green, g (s)		45.0			45.0		25.0	25.0		25.0	25.0	
Actuated g/C Ratio		0.56			0.56		0.31	0.31		0.31	0.31	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		898			735		205	464		76	500	
v/s Ratio Prot		0.53						c0.34			0.16	
v/s Ratio Perm					c0.59		0.20			0.13		
v/c Ratio		0.95			1.05		0.64	1.10		0.41	0.50	
Uniform Delay, d1		16.4			17.5		23.6	27.5		21.7	22.4	
Progression Factor		1.00			0.68		1.00	1.00		1.28	1.30	
Incremental Delay, d2		19.7			45.4		14.3	70.9		13.9	3.2	
Delay (s)		36.1			57.3		37.9	98.4		41.7	32.4	
Level of Service		D			E		D	F		D	C	
Approach Delay (s)		36.1			57.3			86.3			33.4	
Approach LOS		D			E			F			C	

Intersection Summary

HCM 2000 Control Delay	54.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	132.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
539: Dufferin St & King St

09/30/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔↔			↔↔	
Traffic Volume (vph)	56	737	86	42	456	106	34	258	44	112	592	42
Future Volume (vph)	56	737	86	42	456	106	34	258	44	112	592	42
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1250	1250	1250	1900	1900	1900
Lane Util. 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
Ped Bike Factor		0.97			0.97			0.98			0.97	
Frt		0.985			0.974			0.980			0.992	
Flt Protected		0.997			0.997			0.995			0.993	
Satd. Flow (prot)	0	1880	0	0	1813	0	0	1727	0	0	2781	0
Flt Permitted		0.855			0.761			0.746			0.807	
Satd. Flow (perm)	0	1607	0	0	1380	0	0	1289	0	0	2233	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			41			25			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		291.1			316.7			212.5			385.1	
Travel Time (s)		21.0			22.8			15.3			27.7	
Confl. Peds. (#/hr)	129		203	203		129	189		121	121		189
Confl. Bikes (#/hr)			73			2			5			118
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	5%	4%	10%	2%	4%	7%	8%	12%	0%	3%	9%	7%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	30	30	0	18	18
Adj. Flow (vph)	65	857	100	49	530	123	40	300	51	130	688	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1022	0	0	702	0	0	391	0	0	867	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	1.92	1.97	1.92	1.92	2.03	1.92	1.92	2.06	1.92	1.16	1.22	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6			3	8			4
Permitted Phases	2			6			8			4		
Minimum Split (s)	27.0	27.0		27.0	27.0		10.0	27.0		27.0	27.0	
Total Split (s)	41.0	41.0		41.0	41.0		10.0	39.0		29.0	29.0	
Total Split (%)	51.3%	51.3%		51.3%	51.3%		12.5%	48.8%		36.3%	36.3%	
Maximum Green (s)	35.0	35.0		35.0	35.0		6.0	33.0		23.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		4.0			5.0			5.0			5.0	
Lead/Lag							Lead			Lag		Lag
Lead-Lag Optimize?							Yes			Yes		Yes
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		100	100			100		100	100	
Act Effect Green (s)		37.0			36.0			34.0			24.0	

Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
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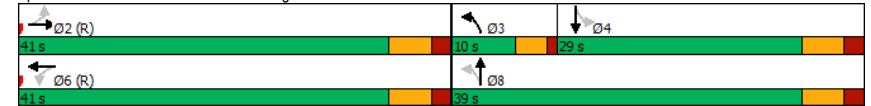
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Lanes, Volumes, Timings
539: Dufferin St & King St

09/30/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.46			0.45			0.42			0.30	
v/c Ratio		1.36			1.09			0.66			1.28	
Control Delay		190.3			76.9			16.9			166.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		190.3			76.9			16.9			166.4	
LOS		F			E			B			F	
Approach Delay		190.3			76.9			16.9			166.4	
Approach LOS		F			E			B			F	
Intersection Summary												
Area Type:	CBD											
Cycle Length:	80											
Actuated Cycle Length:	80											
Offset:	15 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green											
Natural Cycle:	140											
Control Type:	Pretimed											
Maximum v/c Ratio:	1.36											
Intersection Signal Delay:	133.9						Intersection LOS: F					
Intersection Capacity Utilization:	129.8%						ICU Level of Service H					
Analysis Period (min):	15											

Splits and Phases: 539: Dufferin St & King St



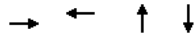
Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Queues

539: Dufferin St & King St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	1022	702	391	867
v/c Ratio	1.36	1.09	0.66	1.28
Control Delay	190.3	76.9	16.9	166.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	190.3	76.9	16.9	166.4
Queue Length 50th (m)	-109.3	-62.8	16.1	-89.7
Queue Length 95th (m)	#137.4	#87.6	m18.5	#117.2
Internal Link Dist (m)	267.1	292.7	188.5	361.1
Turn Bay Length (m)				
Base Capacity (vph)	753	643	589	675
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	1.36	1.09	0.66	1.28

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.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

539: Dufferin St & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	56	737	86	42	456	106	34	258	44	112	592	42
Future Volume (vph)	56	737	86	42	456	106	34	258	44	112	592	42
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1250	1250	1250	1900	1900	1900
Total Lost time (s)		4.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.97			0.97			0.98			0.98	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.97			0.98			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1874			1806			1722			2745	
Flt Permitted		0.86			0.76			0.75			0.81	
Satd. Flow (perm)		1607			1380			1292			2232	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	65	857	100	49	530	123	40	300	51	130	688	49
RTOR Reduction (vph)	0	10	0	0	23	0	0	14	0	0	6	0
Lane Group Flow (vph)	0	1012	0	0	679	0	0	377	0	0	861	0
Conf. Peds. (#/hr)	129		203	203		129	189		121	121		189
Conf. Bikes (#/hr)			73			2			5			118
Heavy Vehicles (%)	5%	4%	10%	2%	4%	7%	8%	12%	0%	3%	9%	7%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	30	30	0	18	18
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		35.0			35.0			33.0			23.0	
Effective Green, g (s)		37.0			36.0			34.0			24.0	
Actuated g/C Ratio		0.46			0.45			0.42			0.30	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		743			621			586			669	
v/s Ratio Prot								c0.06				
v/s Ratio Perm		c0.63			0.49			0.22			c0.39	
v/c Ratio		1.36			1.09			0.64			1.29	
Uniform Delay, d1		21.5			22.0			18.2			28.0	
Progression Factor		0.83			0.68			0.85			1.00	
Incremental Delay, d2		171.3			59.9			2.0			140.5	
Delay (s)		189.1			74.8			17.5			168.5	
Level of Service		F			E			B			F	
Approach Delay (s)		189.1			74.8			17.5			168.5	
Approach LOS		F			E			B			F	

Intersection Summary

HCM 2000 Control Delay	133.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	129.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔			↔	↔	↔	↔		↔	↔	
Traffic Volume (vph)	91	86	50	119	56	89	83	327	182	50	301	80
Future Volume (vph)	91	86	50	119	56	89	83	327	182	50	301	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	25.0		0.0	0.0		50.0	30.0		0.0	25.0		0.0
Storage Lanes	1		0	0		1	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	0.87	0.97			0.97	0.79	0.98	0.97			0.98	
Frt		0.945				0.850		0.946			0.968	
Fit Protected	0.950				0.967		0.950			0.950		
Satd. Flow (prot)	1589	1655	0	0	1682	1436	1652	1678	0	1620	1708	0
Fit Permitted	0.546				0.659		0.383			0.255		
Satd. Flow (perm)	794	1655	0	0	1108	1135	655	1678	0	435	1708	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				152		23			11	
Link Speed (k/h)		30			50			40			40	
Link Distance (m)		143.4			229.0			205.6			241.4	
Travel Time (s)		17.2			16.5			18.5			21.7	
Confl. Peds. (#/hr)	86		29	29		86	19		21	21		19
Confl. Bikes (#/hr)			1									32
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 (%)	6%	5%	2%	0%	25%	5%	2%	5%	0%	4%	5%	2%
Adj. Flow (vph)	101	96	56	132	62	99	92	363	202	56	334	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	152	0	0	194	99	92	565	0	56	423	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)		3.0			3.0			3.5			3.5	
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	1.09	1.01	1.01	1.01	1.01	1.09	1.09	1.01	1.01	1.09	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	2.0	2.0	30.5		2.0	30.5	
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)	6.1	1.8		6.1	1.8	2.0	2.0	1.8		2.0	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

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Lane Group	Ø10	Ø12	Ø14	Ø16
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (m)				
Storage Length (m)				
Storage Lanes				
Taper Length (m)				
Lane Util. Factor				
Ped Bike Factor				
Frt				
Fit Protected				
Satd. Flow (prot)				
Fit Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (k/h)				
Link Distance (m)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(m)				
Link Offset(m)				
Crosswalk Width(m)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (k/h)				
Number of Detectors				
Detector Template				
Leading Detector (m)				
Trailing Detector (m)				
Detector 1 Position(m)				
Detector 1 Size(m)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(m)				
Detector 2 Size(m)				
Detector 2 Type				

Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	32.0	32.0		32.0	32.0	32.0	29.0	29.0		29.0	29.0	
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		36.0	36.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	61.0	61.0		61.0	61.0	
Total Split (%)	27.1%	27.1%		27.1%	27.1%	27.1%	42.4%	42.4%		42.4%	42.4%	
Maximum Green (s)	32.0	32.0		32.0	32.0	32.0	54.0	54.0		54.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
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	3.0	
Recall Mode	Max	Max		Max	Max	Max	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0	22.0	22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	10	10		28	28	28	7	7		6	6	
Act Effct Green (s)	33.5	33.5		33.5	33.5	55.9	55.9	55.9		55.9	55.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30	0.50	0.50	0.50		0.50	0.50	
v/c Ratio	0.42	0.30		0.59	0.22	0.28	0.67	0.67		0.26	0.49	
Control Delay	42.5	31.2		45.2	2.2	23.5	27.9	27.9		25.2	23.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.4	0.4		0.0	0.0	
Total Delay	42.5	31.2		45.2	2.2	23.5	28.3	28.3		25.2	23.4	
LOS	D	C		D	A	C	C	C		C	C	
Approach Delay		35.7			30.7			27.6			23.6	
Approach LOS		D			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 144

Actuated Cycle Length: 112

Natural Cycle: 130

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 28.2

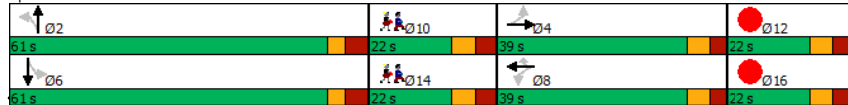
Intersection LOS: C

Intersection Capacity Utilization 126.5%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 571: Strachan Ave & Canada Blvd/Fleet St



Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021

Lane Group	Ø10	Ø12	Ø14	Ø16
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	10	12	14	16
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	22.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0
Total Split (%)	15%	15%	15%	15%
Maximum Green (s)	14.0	14.0	14.0	14.0
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	0.0	0.0	0.0	0.0
Flash Dont Walk (s)	0.0	0.0	0.0	0.0
Pedestrian Calls (#/hr)	19	19	19	19
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary

Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
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Queues

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	101	152	194	99	92	565	56	423
v/c Ratio	0.42	0.30	0.59	0.22	0.28	0.67	0.26	0.49
Control Delay	42.5	31.2	45.2	2.2	23.5	27.9	25.2	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	42.5	31.2	45.2	2.2	23.5	28.3	25.2	23.4
Queue Length 50th (m)	14.9	18.6	30.3	0.0	8.8	66.9	5.3	44.9
Queue Length 95th (m)	41.3	47.6	#74.4	2.9	30.3	166.2	21.2	112.9
Internal Link Dist (m)		119.4	205.0			181.6		217.4
Turn Bay Length (m)	25.0			50.0	30.0		25.0	
Base Capacity (vph)	238	508	331	446	327	849	217	858
Starvation Cap Reductn	0	0	0	0	0	55	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	0.30	0.59	0.22	0.28	0.71	0.26	0.49

Intersection Summary

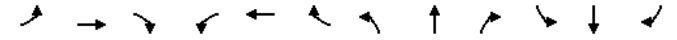
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	91	86	50	119	56	89	83	327	182	50	301	80
Future Volume (vph)	91	86	50	119	56	89	83	327	182	50	301	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.97		1.00	0.82	1.00	0.98			1.00	0.98	
Fipb, ped/bikes	0.88	1.00		0.97	1.00	0.98	1.00			0.99	1.00	
Frt	1.00	0.94		1.00	0.85	1.00	0.95			1.00	0.97	
Flt Protected	0.95	1.00		0.97	1.00	0.95	1.00			0.95	1.00	
Satd. Flow (prot)	1405	1661		1633	1176	1624	1684			1601	1713	
Flt Permitted	0.55	1.00		0.66	1.00	0.38	1.00			0.26	1.00	
Satd. Flow (perm)	808	1661		1113	1176	655	1684			430	1713	
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)	101	96	56	132	62	99	92	363	202	56	334	89
RTOR Reduction (vph)	0	14	0	0	0	72	0	12	0	0	6	0
Lane Group Flow (vph)	101	138	0	0	194	27	92	553	0	56	417	0
Confl. Peds. (#/hr)	86		29	29		86	19		21	21		19
Confl. Bikes (#/hr)			1									32
Heavy Vehicles (%)	6%	5%	2%	0%	25%	5%	2%	5%	0%	4%	5%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	32.5	32.5		32.5	32.5	54.9	54.9			54.9	54.9	
Effective Green, g (s)	33.5	33.5		33.5	33.5	55.9	55.9			55.9	55.9	
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.46	0.46			0.46	0.46	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0			7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	221	455		305	322	299	770			196	783	
v/s Ratio Prot		0.08					c0.33					0.24
v/s Ratio Perm	0.13			c0.17	0.02	0.14				0.13		
v/c Ratio	0.46	0.30		0.64	0.08	0.31	0.72			0.29	0.53	
Uniform Delay, d1	36.8	35.1		39.0	33.0	20.9	26.8			20.7	23.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	6.7	1.7		9.7	0.5	2.7	5.7			3.6	2.6	
Delay (s)	43.5	36.8		48.7	33.5	23.6	32.5			24.3	26.4	
Level of Service	D	D		D	C	C	C			C	C	
Approach Delay (s)		39.5			43.6		31.2				26.1	
Approach LOS		D			D		C				C	

Intersection Summary

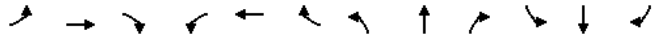
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	122.2	Sum of lost time (s)	28.0
Intersection Capacity Utilization	126.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕				↕↔		↕↔				
Traffic Volume (vph)	54	486	0	0	0	418	0	1402	14	0	0	0
Future Volume (vph)	54	486	0	0	0	418	0	1402	14	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	15.0		0.0	0.0		80.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		1	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	0.88	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor						0.99						
Frt						0.850		0.998				
Fit Protected	0.950											
Satd. Flow (prot)	1620	1807	0	0	0	2652	0	4968	0	0	0	0
Fit Permitted	0.950											
Satd. Flow (perm)	1620	1807	0	0	0	2617	0	4968	0	0	0	0
Right Turn on Red	Yes		Yes			Yes		Yes				Yes
Satd. Flow (RTOR)	99					740		1				
Link Speed (k/h)		60			30			60			60	
Link Distance (m)		411.9			164.9			800.6			492.6	
Travel Time (s)		24.7			19.8			48.0			29.6	
Confl. Peds. (#/hr)							17					17
Confl. Bikes (#/hr)						1						
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 (%)	4%	4%	4%	0%	0%	6%	0%	3%	7%	0%	0%	0%
Adj. Flow (vph)	60	540	0	0	0	464	0	1558	16	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	540	0	0	0	464	0	1574	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)		3.0			3.0			3.0			3.0	
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	1.09	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2				1		2				
Detector Template	Left	Thru				Right		Thru				
Leading Detector (m)	6.1	30.5				6.1		30.5				
Trailing Detector (m)	0.0	0.0				0.0		0.0				
Detector 1 Position(m)	0.0	0.0				0.0		0.0				
Detector 1 Size(m)	6.1	1.8				6.1		1.8				
Detector 1 Type	Cl+Ex	Cl+Ex				Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0				0.0		0.0				
Detector 1 Queue (s)	0.0	0.0				0.0		0.0				
Detector 1 Delay (s)	0.0	0.0				0.0		0.0				
Detector 2 Position(m)		28.7						28.7				
Detector 2 Size(m)		1.8						1.8				
Detector 2 Type		Cl+Ex						Cl+Ex				

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0									0.0	
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4									2	
Permitted Phases	4					9						
Detector Phase	4	4				9					2	
Switch Phase												
Minimum Initial (s)	7.0	7.0				7.0					22.0	
Minimum Split (s)	13.0	13.0				30.0					29.0	
Total Split (s)	39.0	39.0				30.0					41.0	
Total Split (%)	35.5%	35.5%				27.3%					37.3%	
Maximum Green (s)	33.0	33.0				24.0					34.0	
Yellow Time (s)	4.0	4.0				4.0					4.0	
All-Red Time (s)	2.0	2.0				2.0					3.0	
Lost Time Adjust (s)	-1.0	-1.0				-1.0					-1.0	
Total Lost Time (s)	5.0	5.0				5.0					6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0				3.0					3.0	
Recall Mode	None	None				None		None			None	
Walk Time (s)	0.0	0.0									7.0	
Flash Dont Walk (s)	0.0	0.0									15.0	
Pedestrian Calls (#/hr)	0	0									0	
Act Effct Green (s)	33.2	33.2				8.0					35.0	
Actuated g/C Ratio	0.36	0.36				0.09					0.38	
v/c Ratio	0.09	0.83				0.51					0.83	
Control Delay	1.7	39.8				2.1					31.0	
Queue Delay	0.0	0.0				0.0					0.0	
Total Delay	1.7	39.8				2.1					31.0	
LOS	A	D				A					C	
Approach Delay		36.0				2.1					31.0	
Approach LOS		D				A					C	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	92.2
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	27.0
Intersection LOS:	C
Intersection Capacity Utilization:	62.1%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 1344: Lakeshore Blvd & British Columbia Rd



Queues

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	WBR	NBT
Lane Group Flow (vph)	60	540	464	1574
v/c Ratio	0.09	0.83	0.51	0.83
Control Delay	1.7	39.8	2.1	31.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	1.7	39.8	2.1	31.0
Queue Length 50th (m)	0.0	86.2	0.0	92.6
Queue Length 95th (m)	3.0	#139.0	0.0	111.7
Internal Link Dist (m)		387.9		776.6
Turn Bay Length (m)	15.0		80.0	
Base Capacity (vph)	660	666	1249	1887
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	0.09	0.81	0.37	0.83

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	→	↘	↵	→	↘	↵	→	↘	↵	→	↘
Traffic Volume (vph)	54	486	0	0	0	418	0	1402	14	0	0	0
Future Volume (vph)	54	486	0	0	0	418	0	1402	14	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0				5.0		6.0				
Lane Util. Factor	1.00	1.00				0.88		0.91				
Frbp, ped/bikes	1.00	1.00				0.99		1.00				
Ftpb, ped/bikes	1.00	1.00				1.00		1.00				
Frt	1.00	1.00				0.85		1.00				
Flt Protected	0.95	1.00				1.00		1.00				
Satd. Flow (prot)	1620	1807				2613		4970				
Flt Permitted	0.95	1.00				1.00		1.00				
Satd. Flow (perm)	1620	1807				2613		4970				
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)	60	540	0	0	0	464	0	1558	16	0	0	0
RTOR Reduction (vph)	38	0	0	0	0	424	0	1	0	0	0	0
Lane Group Flow (vph)	22	540	0	0	0	40	0	1573	0	0	0	0
Confl. Peds. (#/hr)							17					17
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	4%	4%	4%	0%	0%	6%	0%	3%	7%	0%	0%	0%
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					9						
Actuated Green, G (s)	32.2	32.2				7.0		34.0				
Effective Green, g (s)	33.2	33.2				8.0		35.0				
Actuated g/C Ratio	0.36	0.36				0.09		0.38				
Clearance Time (s)	6.0	6.0				6.0		7.0				
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Lane Grp Cap (vph)	583	650				226		1886				
v/s Ratio Prot		c0.30						c0.32				
v/s Ratio Perm	0.01					c0.02						
v/c Ratio	0.04	0.83				0.18		0.83				
Uniform Delay, d1	19.1	26.9				39.1		26.0				
Progression Factor	1.00	1.00				1.00		1.00				
Incremental Delay, d2	0.0	8.9				0.4		3.3				
Delay (s)	19.2	35.8				39.4		29.3				
Level of Service	B	D				D		C				
Approach Delay (s)		34.1			39.4			29.3			0.0	
Approach LOS		C			D			C			A	

Intersection Summary

HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	17.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	5	0	6	129	0	71	2	307	518	130	674	0
Future Volume (vph)	5	0	6	129	0	71	2	307	518	130	674	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1250	1400	1250	1250	1250	1250
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.76			0.72			0.67			0.98	
Frt		0.921			0.952			0.906				
Fit Protected		0.980			0.969						0.992	
Satd. Flow (prot)	0	1364	0	0	1549	0	0	1433	0	0	2021	0
Fit Permitted		0.898			0.798			0.954			0.645	
Satd. Flow (perm)	0	1178	0	0	1009	0	0	1367	0	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			41			23				
Link Speed (k/h)		50			40			50			50	
Link Distance (m)		106.6			106.9			249.2			212.5	
Travel Time (s)		7.7			9.6			17.9			15.3	
Confl. Peds. (#/hr)	180		338	338		180	356		252	252		356
Confl. Bikes (#/hr)									5			153
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%	2%	0%	1%	0%	4%	0%	12%	1%	0%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	30	30	12	30	30
Adj. Flow (vph)	5	0	7	140	0	77	2	334	563	141	733	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	217	0	0	899	0	0	874	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	1.01	1.01	1.01	1.01	1.01	1.01	1.70	1.60	1.70	1.70	1.83	1.70
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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		Perm	NA		Perm	NA		Perm	NA	

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

09/30/2021

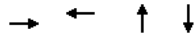


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4						8			2	6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		25.0	25.0		25.0	25.0	
Total Split (s)	24.0	24.0		24.0	24.0		56.0	56.0		56.0	56.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		70.0%	70.0%		70.0%	70.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		50.0	50.0		50.0	50.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		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)		-1.0			-1.0			-3.0			-1.0	
Total Lost Time (s)		4.0			4.0			3.0			5.0	
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		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	
Act Effect Green (s)		19.6			19.6			53.4			51.4	
Actuated g/C Ratio		0.24			0.24			0.67			0.64	
v/c Ratio		0.04			0.78			1.19dr			1.06	
Control Delay		0.5			44.2			42.3			58.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		0.5			44.2			42.3			58.5	
LOS		A			D			D			E	
Approach Delay		0.5			44.2			42.3			58.5	
Approach LOS		A			D			D			E	
Intersection Summary												
Area Type:	Other											
Cycle Length:	80											
Actuated Cycle Length:	80											
Offset:	40 (50%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.06											
Intersection Signal Delay:	49.3						Intersection LOS: D					
Intersection Capacity Utilization:	104.0%						ICU Level of Service G					
Analysis Period (min):	15											
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.											
Splits and Phases:	1449: Dufferin St & Dwy/Liberty St											

Queues

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	12	217	899	874
v/c Ratio	0.04	0.78	1.19dr	1.06
Control Delay	0.5	44.2	42.3	58.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	0.5	44.2	42.3	58.5
Queue Length 50th (m)	0.0	24.9	73.4	~68.4
Queue Length 95th (m)	0.5	#59.7	#112.4	m48.0
Internal Link Dist (m)	82.6	82.9	225.2	188.5
Turn Bay Length (m)				
Base Capacity (vph)	325	283	920	827
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	0.04	0.77	0.98	1.06

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.

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕↕			↕↕	
Traffic Volume (vph)	5	0	6	129	0	71	2	307	518	130	674	0
Future Volume (vph)	5	0	6	129	0	71	2	307	518	130	674	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1250	1400	1250	1250	1250	1250
Total Lost time (s)		4.0			4.0			3.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.80			0.91			0.67			1.00	
Flpb, ped/bikes		0.94			0.79			1.00			0.98	
Frt		0.92			0.95			0.91			1.00	
Flt Protected		0.98			0.97			1.00			0.99	
Satd. Flow (prot)		1286			1225			1433			1981	
Flt Permitted		0.90			0.80			0.95			0.64	
Satd. Flow (perm)		1178			1008			1367			1288	
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)	5	0	7	140	0	77	2	334	563	141	733	0
RTOR Reduction (vph)	0	9	0	0	31	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	3	0	0	186	0	0	891	0	0	874	0
Conf. Peds. (#/hr)	180		338	338		180	356		252	252		356
Conf. Bikes (#/hr)									5			153
Heavy Vehicles (%)	0%	2%	0%	1%	0%	4%	0%	12%	1%	0%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	30	30	12	30	30
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.6			18.6			50.4			50.4	
Effective Green, g (s)		19.6			19.6			53.4			51.4	
Actuated g/C Ratio		0.25			0.25			0.67			0.64	
Clearance Time (s)		5.0			5.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		288			246			912			827	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.18			0.65			c0.68	
v/c Ratio		0.01			0.76			1.19dr			1.06	
Uniform Delay, d1		22.9			28.0			12.7			14.3	
Progression Factor		1.00			1.00			1.25			2.11	
Incremental Delay, d2		0.0			12.4			24.6			28.8	
Delay (s)		22.9			40.4			40.5			58.9	
Level of Service		C			D			D			E	
Approach Delay (s)		22.9			40.4			40.5			58.9	
Approach LOS		C			D			D			E	

Intersection Summary

HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1628: Shaw St & King St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	21	673	17	0	593	86	63	226	19	107	87	116
Future Volume (vph)	21	673	17	0	593	86	63	226	19	107	87	116
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Lane Util. 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
Ped Bike Factor		0.99			0.99			0.96			0.88	
Frt		0.996			0.981			0.991			0.944	
Fit Protected		0.999						0.990			0.983	
Satd. Flow (prot)	0	1815	0	0	1817	0	0	3071	0	0	2351	0
Fit Permitted		0.920						0.801			0.713	
Satd. Flow (perm)	0	1670	0	0	1817	0	0	2408	0	0	1659	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			37			10			133	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		199.1			255.2			127.7			380.6	
Travel Time (s)		14.3			18.4			11.5			34.3	
Confl. Peds. (#/hr)	87		289	289		87	239		126	126		239
Confl. Bikes (#/hr)					19							
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	100%	7%	0%	100%	8%	2%	5%	1%	0%	33%	2%	7%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	24	774	20	0	682	99	72	260	22	123	100	133
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	818	0	0	781	0	0	354	0	0	356	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	1.92	2.03	1.92	1.92	2.03	1.92	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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			NA			Perm	NA		Perm	NA

Lanes, Volumes, Timings
1628: Shaw St & King St

09/30/2021

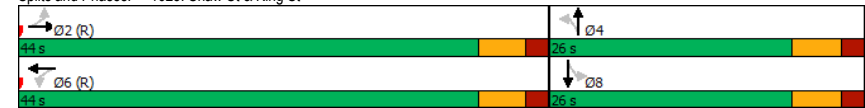


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	22.0	22.0		22.0	22.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		26.0	26.0		26.0	26.0	
Total Split (s)	44.0	44.0		44.0	44.0		26.0	26.0		26.0	26.0	
Total Split (%)	62.9%	62.9%		62.9%	62.9%		37.1%	37.1%		37.1%	37.1%	
Maximum Green (s)	38.0	38.0		38.0	38.0		20.0	20.0		20.0	20.0	
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)		-1.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	100	100		29	29		100	100		100	100	
Act Effct Green (s)		39.0			39.0			21.0			21.0	
Actuated g/C Ratio		0.56			0.56			0.30			0.30	
v/c Ratio		0.88			0.76			0.49			0.60	
Control Delay		26.6			17.4			22.2			17.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		26.6			17.4			22.2			17.8	
LOS		C			B			C			B	
Approach Delay		26.6			17.4			22.2			17.8	
Approach LOS		C			B			C			B	

Intersection Summary

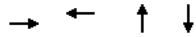
Area Type: CBD
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 21.5
 Intersection LOS: C
 Intersection Capacity Utilization 104.1%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 1628: Shaw St & King St



Queues
1628: Shaw St & King St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	818	781	354	356
v/c Ratio	0.88	0.76	0.49	0.60
Control Delay	26.6	17.4	22.2	17.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.6	17.4	22.2	17.8
Queue Length 50th (m)	44.2	35.8	19.2	12.4
Queue Length 95th (m)	#79.1	54.8	29.5	24.2
Internal Link Dist (m)	175.1	231.2	103.7	356.6
Turn Bay Length (m)				
Base Capacity (vph)	933	1028	729	590
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	0.88	0.76	0.49	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
1628: Shaw St & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	21	673	17	0	593	86	63	226	19	107	87	116
Future Volume (vph)	21	673	17	0	593	86	63	226	19	107	87	116
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			0.97			0.97	
Frt		1.00			0.98			0.99			0.94	
Flt Protected		1.00			1.00			0.99			0.98	
Satd. Flow (prot)		1813			1817			2976			2287	
Flt Permitted		0.92			1.00			0.80			0.71	
Satd. Flow (perm)		1671			1817			2408			1659	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	24	774	20	0	682	99	72	260	22	123	100	133
RTOR Reduction (vph)	0	3	0	0	16	0	0	7	0	0	93	0
Lane Group Flow (vph)	0	815	0	0	765	0	0	347	0	0	263	0
Confl. Peds. (#/hr)	87		289	289		87	239		126	126		239
Confl. Bikes (#/hr)						19						
Heavy Vehicles (%)	100%	7%	0%	100%	8%	2%	5%	1%	0%	33%	2%	7%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		38.0			38.0			20.0			20.0	
Effective Green, g (s)		39.0			39.0			21.0			21.0	
Actuated g/C Ratio		0.56			0.56			0.30			0.30	
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)		930			1012			722			497	
v/s Ratio Prot					0.42							
v/s Ratio Perm		c0.49						0.14			c0.16	
v/c Ratio		0.88			0.76			0.48			0.53	
Uniform Delay, d1		13.4			11.9			20.0			20.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		11.4			5.2			0.5			1.0	
Delay (s)		24.8			17.1			20.5			21.4	
Level of Service		C			B			C			C	
Approach Delay (s)		24.8			17.1			20.5			21.4	
Approach LOS		C			B			C			C	

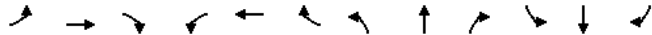
Intersection Summary

HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1851: King St & Sudbury St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	0	791	5	0	680	112	0	5	0	163	0	96
Future Volume (vph)	0	791	5	0	680	112	0	5	0	163	0	96
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.98						0.90	
Frt		0.999			0.979						0.950	
Fit Protected											0.969	
Satd. Flow (prot)	0	1701	0	0	1745	0	0	1409	0	0	1347	0
Fit Permitted											0.805	
Satd. Flow (perm)	0	1701	0	0	1745	0	0	1409	0	0	1080	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			41						41	
Link Speed (k/h)		50			50				50		50	
Link Distance (m)		318.4			199.1				158.6		196.7	
Travel Time (s)		22.9			14.3				11.4		14.2	
Confl. Peds. (#/hr)	73		219	219		73	158		49	49		158
Confl. Bikes (#/hr)						15						
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	18%	0%	0%	11%	8%	0%	20%	0%	6%	0%	10%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	0	899	6	0	773	127	0	6	0	185	0	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	905	0	0	900	0	0	6	0	0	294	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	1.92	2.03	1.92	1.92	2.03	1.92	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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		NA			NA			NA			Perm	NA

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Synchro 11 Report
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Lanes, Volumes, Timings
1851: King St & Sudbury St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2			6			8			4	4
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	24.0	24.0		24.0	24.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0		26.0	26.0	
Total Split (s)	53.0	53.0		53.0	53.0		27.0	27.0		27.0	27.0	
Total Split (%)	66.3%	66.3%		66.3%	66.3%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	47.0	47.0		47.0	47.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		5.0			5.0			4.0			4.0	
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		24	24		100	100		16	16	
Act Effect Green (s)		48.2			48.2			22.8			22.8	
Actuated g/C Ratio		0.60			0.60			0.28			0.28	
v/c Ratio		0.88			0.84			0.01			0.88	
Control Delay		26.2			21.8			20.6			51.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		26.2			21.8			20.6			51.5	
LOS		C			C			C			D	
Approach Delay		26.2			21.8			20.6			51.5	
Approach LOS		C			C			C			D	

Intersection Summary

Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 27.8
 Intersection Capacity Utilization 71.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 1851: King St & Sudbury St

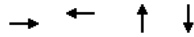


Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
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Synchro 11 Report
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Queues
1851: King St & Sudbury St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	905	900	6	294
v/c Ratio	0.88	0.84	0.01	0.88
Control Delay	26.2	21.8	20.6	51.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.2	21.8	20.6	51.5
Queue Length 50th (m)	55.9	50.7	0.7	36.8
Queue Length 95th (m)	#98.0	#83.3	3.2	#77.7
Internal Link Dist (m)	294.4	175.1	134.6	172.7
Turn Bay Length (m)				
Base Capacity (vph)	1025	1067	405	339
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	0.88	0.84	0.01	0.87

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1851: King St & Sudbury St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Volume (vph)	0	791	5	0	680	112	0	5	0	163	0	96
Future Volume (vph)	0	791	5	0	680	112	0	5	0	163	0	96
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			4.0				4.0
Lane Util. Factor		0.95			0.95			1.00				1.00
Frbp, ped/bikes		1.00			0.98			1.00				0.93
Flpb, ped/bikes		1.00			1.00			1.00				0.97
Flt		1.00			0.98			1.00				0.95
Flt Protected		1.00			1.00			1.00				0.97
Satd. Flow (prot)		1701			1744			1409				1300
Flt Permitted		1.00			1.00			1.00				0.81
Satd. Flow (perm)		1701			1744			1409				1080
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	899	6	0	773	127	0	6	0	185	0	109
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	0	0	0	29
Lane Group Flow (vph)	0	905	0	0	884	0	0	6	0	265	0	0
Confl. Peds. (#/hr)	73		219	219		73	158		49	49		158
Confl. Bikes (#/hr)						15						
Heavy Vehicles (%)	0%	18%	0%	0%	11%	8%	0%	20%	0%	6%	0%	10%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA			NA			NA		Perm		NA
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.2			47.2			21.8				21.8
Effective Green, g (s)		48.2			48.2			22.8				22.8
Actuated g/C Ratio		0.60			0.60			0.29				0.29
Clearance Time (s)		6.0			6.0			5.0				5.0
Vehicle Extension (s)		3.0			3.0			3.0				3.0
Lane Grp Cap (vph)		1024			1050			401				307
v/s Ratio Prot		c0.53			0.51			0.00				
v/s Ratio Perm												c0.25
v/c Ratio		0.88			0.84			0.01				0.86
Uniform Delay, d1		13.5			12.8			20.5				27.1
Progression Factor		1.00			1.00			1.00				1.00
Incremental Delay, d2		11.0			8.2			0.0				21.2
Delay (s)		24.5			21.0			20.6				48.3
Level of Service		C			C			C				D
Approach Delay (s)		24.5			21.0			20.6				48.3
Approach LOS		C			C			C				D

Intersection Summary

HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1912: Atlantic Ave & King St

09/30/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕	↕
Traffic Volume (vph)	697	73	4	779	295	180
Future Volume (vph)	697	73	4	779	295	180
Ideal Flow (vphpl)	1250	1250	1250	1250	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.0	3.0
Storage Length (m)		0.0	0.0		30.0	0.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.95			1.00	0.95	0.96
Frt	0.986					0.850
Flt Protected					0.950	
Satd. Flow (prot)	1703	0	0	1821	1458	1159
Flt Permitted				0.950	0.950	
Satd. Flow (perm)	1703	0	0	1729	1383	1110
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	25					19
Link Speed (k/h)	50			50	30	
Link Distance (m)	191.3			318.4	198.0	
Travel Time (s)	13.8			22.9	23.8	
Confl. Peds. (#/hr)		387	387		49	30
Confl. Bikes (#/hr)		5				
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	11%	6%	100%	10%	4%	17%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	810	85	5	906	343	209
Shared Lane Traffic (%)						
Lane Group Flow (vph)	895	0	0	911	343	209
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	2.03	1.92	1.92	2.03	1.25	1.25
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (m)	30.5		6.1	30.5	6.1	6.1
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)	1.8		6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+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)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		

Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings
1912: Atlantic Ave & King St

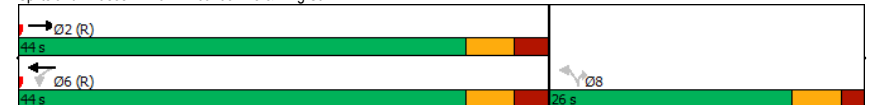
09/30/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector 2 Type	CI+Ex		CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)	0.0		0.0			
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2		6			
Permitted Phases			6	8	8	
Detector Phase	2		6	6	8	8
Switch Phase						
Minimum Initial (s)	21.0		21.0	21.0	20.0	20.0
Minimum Split (s)	28.0		28.0	28.0	26.0	26.0
Total Split (s)	44.0		44.0	44.0	26.0	26.0
Total Split (%)	62.9%		62.9%	62.9%	37.1%	37.1%
Maximum Green (s)	37.0		37.0	37.0	20.0	20.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	3.0		3.0	3.0	2.0	2.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	6.0		6.0	6.0	5.0	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)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	14.0		14.0	14.0	13.0	13.0
Pedestrian Calls (#/hr)	100		7	7	16	16
Act Effct Green (s)	38.0		38.0	21.0	21.0	
Actuated g/C Ratio	0.54		0.54	0.30	0.30	
v/c Ratio	0.96		0.97	0.83	0.60	
Control Delay	38.1		41.3	42.4	27.6	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	38.1		41.3	42.4	27.6	
LOS	D		D	D	C	
Approach Delay	38.1		41.3	36.8		
Approach LOS	D		D	D		

Intersection Summary

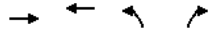
Area Type: CBD
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 6 (9%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 39.0 Intersection LOS: D
 Intersection Capacity Utilization 68.4% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1912: Atlantic Ave & King St



Queues
1912: Atlantic Ave & King St

09/30/2021



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	895	911	343	209
v/c Ratio	0.96	0.97	0.83	0.60
Control Delay	38.1	41.3	42.4	27.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	38.1	41.3	42.4	27.6
Queue Length 50th (m)	52.6	55.7	41.5	21.0
Queue Length 95th (m)	#88.5	#91.1	#76.6	39.3
Internal Link Dist (m)	167.3	294.4	174.0	
Turn Bay Length (m)		30.0		
Base Capacity (vph)	935	938	414	346
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	0.96	0.97	0.83	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
1912: Atlantic Ave & King St

09/30/2021



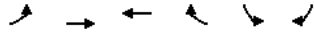
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (vph)	697	73	4	779	295	180
Future Volume (vph)	697	73	4	779	295	180
Ideal Flow (vphpl)	1250	1250	1250	1250	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.0	3.0
Total Lost time (s)				6.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	0.95			1.00	1.00	0.96
Fipb, ped/bikes	1.00			1.00	0.95	1.00
Frt	0.99			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1703			1819	1383	1110
Flt Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	1703			1729	1383	1110
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	810	85	5	906	343	209
RTOR Reduction (vph)	11	0	0	0	0	13
Lane Group Flow (vph)	884	0	0	911	343	196
Confl. Peds. (#/hr)		387	387		49	30
Confl. Bikes (#/hr)		5				
Heavy Vehicles (%)	11%	6%	100%	10%	4%	17%
Bus Blockages (#/hr)	24	24	24	24	0	0
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Actuated Green, G (s)	37.0			37.0	20.0	20.0
Effective Green, g (s)	38.0			38.0	21.0	21.0
Actuated g/C Ratio	0.54			0.54	0.30	0.30
Clearance Time (s)	7.0			7.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	924			938	414	333
v/s Ratio Prot	0.52					
v/s Ratio Perm				c0.53	c0.25	0.18
v/c Ratio	0.96			0.97	0.83	0.59
Uniform Delay, d1	15.2			15.5	22.8	20.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	20.7			23.2	12.8	2.6
Delay (s)	35.9			38.7	35.6	23.5
Level of Service	D			D	D	C
Approach Delay (s)	35.9			38.7	31.0	
Approach LOS	D			D	C	

Intersection Summary

HCM 2000 Control Delay	35.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

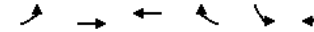
09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↔	
Traffic Volume (vph)	0	852	628	79	144	42
Future Volume (vph)	0	852	628	79	144	42
Ideal Flow (vphpl)	1250	1250	1250	1250	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			0.99		0.99	
Frt			0.983		0.969	
Flt Protected					0.963	
Satd. Flow (prot)	0	1881	1821	0	1460	0
Flt Permitted					0.963	
Satd. Flow (perm)	0	1881	1821	0	1460	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				35	17	
Link Speed (k/h)		50	50		50	
Link Distance (m)		316.7	191.3		100.8	
Travel Time (s)		22.8	13.8		7.3	
Confl. Peds. (#/hr)	40			40		23
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	8%	3%	3%	21%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	0	968	714	90	164	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	968	804	0	212	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
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	1.92	2.03	2.03	1.92	1.16	1.16
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Perm	

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		2	6			
Permitted Phases	2				8	
Detector Phase	2	2	6		8	
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0		18.0	
Minimum Split (s)	26.0	26.0	26.0		23.0	
Total Split (s)	57.0	57.0	57.0		23.0	
Total Split (%)	71.3%	71.3%	71.3%		28.8%	
Maximum Green (s)	51.0	51.0	51.0		18.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	None		None	
Walk Time (s)	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	
Pedestrian Calls (#/hr)	100	100	13		7	
Act Effct Green (s)		52.0	52.0		19.0	
Actuated g/C Ratio		0.65	0.65		0.24	
v/c Ratio		0.79	0.67		0.59	
Control Delay		16.1	11.8		32.5	
Queue Delay		0.0	0.0		0.0	
Total Delay		16.1	11.8		32.5	
LOS		B	B		C	
Approach Delay		16.1	11.8		32.5	
Approach LOS		B	B		C	

Intersection Summary

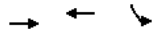
Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 16.1
 Intersection Capacity Utilization 62.3%
 Intersection LOS: B
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2081: King St & Joe Shuster Way



Queues
2081: King St & Joe Shuster Way

09/30/2021



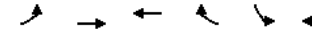
Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	968	804	212
v/c Ratio	0.79	0.67	0.59
Control Delay	16.1	11.8	32.5
Queue Delay	0.0	0.0	0.0
Total Delay	16.1	11.8	32.5
Queue Length 50th (m)	49.4	33.2	26.3
Queue Length 95th (m)	m34.1	49.9	46.3
Internal Link Dist (m)	292.7	167.3	76.8
Turn Bay Length (m)			
Base Capacity (vph)	1222	1195	359
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.79	0.67	0.59

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2081: King St & Joe Shuster Way

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓	↓
Traffic Volume (vph)	0	852	628	79	144	42
Future Volume (vph)	0	852	628	79	144	42
Ideal Flow (vphpl)	1250	1250	1250	1250	1900	1900
Total Lost time (s)		5.0	5.0		4.0	
Lane Util. Factor		0.95	0.95		1.00	
Frbp, ped/bikes		1.00	0.99		0.99	
Flpb, ped/bikes		1.00	1.00		1.00	
Frnt		1.00	0.98		0.97	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		1881	1821		1460	
Flt Permitted		1.00	1.00		0.96	
Satd. Flow (perm)		1881	1821		1460	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	968	714	90	164	48
RTOR Reduction (vph)	0	0	12	0	13	0
Lane Group Flow (vph)	0	968	792	0	199	0
Confl. Peds. (#/hr)	40			40		23
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	0%	7%	8%	3%	3%	21%
Bus Blockages (#/hr)	24	24	24	24	0	0
Turn Type		NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				8	
Actuated Green, G (s)		51.0	51.0		18.0	
Effective Green, g (s)		52.0	52.0		19.0	
Actuated g/C Ratio		0.65	0.65		0.24	
Clearance Time (s)		6.0	6.0		5.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		1222	1183		346	
v/s Ratio Prot		c0.51	0.43			
v/s Ratio Perm					c0.14	
v/c Ratio		0.79	0.67		0.58	
Uniform Delay, d1		10.1	8.7		26.9	
Progression Factor		1.42	1.00		1.00	
Incremental Delay, d2		0.5	1.5		2.3	
Delay (s)		14.9	10.1		29.2	
Level of Service		B	B		C	
Approach Delay (s)		14.9	10.1		29.2	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	14.5	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)	10.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↘	↙	↓
Traffic Volume (vph)	14	61	443	30	146	677
Future Volume (vph)	14	61	443	30	146	677
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.0	3.5	3.0	3.0	3.5
Storage Length (m)	30.0	0.0		15.0	30.0	
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				0.97	1.00	
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1560	1113	1807	1370	1276	1807
Fit Permitted	0.950				0.403	
Satd. Flow (perm)	1560	1113	1807	1329	540	1807
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		73		16		
Link Speed (k/h)	30		30			30
Link Distance (m)	148.7		265.9			191.3
Travel Time (s)	17.8		31.9			23.0
Confl. Peds. (#/hr)				7	7	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	8%	30%	4%	10%	32%	4%
Bus Blockages (#/hr)	0	10	0	0	0	0
Adj. Flow (vph)	17	73	527	36	174	806
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	73	527	36	174	806
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.0		3.0			3.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.09	1.15	1.01	1.09	1.09	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	6.1	6.1	30.5	6.1	6.1	30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	6.1	1.8	6.1	6.1	1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex

Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	21.0	6.0	27.0	27.0	6.0	27.0
Minimum Split (s)	26.0	10.0	34.0	34.0	10.0	34.0
Total Split (s)	26.0	14.0	40.0	40.0	14.0	54.0
Total Split (%)	32.5%	17.5%	50.0%	50.0%	17.5%	67.5%
Maximum Green (s)	21.0	10.0	33.0	33.0	10.0	47.0
Yellow Time (s)	3.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	1.0	3.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Walk Time (s)	7.0		7.0	7.0		0.0
Flash Dont Walk (s)	14.0		20.0	20.0		0.0
Pedestrian Calls (#/hr)	0		2	2		0
Act Effct Green (s)	22.0	13.3	57.7	57.7	71.8	73.6
Actuated g/C Ratio	0.28	0.17	0.72	0.72	0.90	0.92
v/c Ratio	0.04	0.30	0.40	0.04	0.31	0.48
Control Delay	21.7	8.2	8.7	5.8	2.5	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	8.2	8.7	5.8	2.5	2.4
LOS	C	A	A	A	A	A
Approach Delay	10.8		8.5			2.4
Approach LOS	B		A			A

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 15 (19%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.48
 Intersection Signal Delay: 5.0
 Intersection LOS: A
 Intersection Capacity Utilization 61.5%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2134: British Columbia Rd/Dufferin St & Saskatchewan Rd



HDR Corporation

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Queues

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	17	73	527	36	174	806
v/c Ratio	0.04	0.30	0.40	0.04	0.31	0.48
Control Delay	21.7	8.2	8.7	5.8	2.5	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	8.2	8.7	5.8	2.5	2.4
Queue Length 50th (m)	1.9	0.0	15.7	0.4	0.0	0.0
Queue Length 95th (m)	5.9	5.6	86.8	6.3	11.0	41.7
Internal Link Dist (m)	124.7		241.9			167.3
Turn Bay Length (m)	30.0		15.0		30.0	
Base Capacity (vph)	429	284	1302	962	585	1662
Starvation Cap Reductn	0	0	0	0	0	4
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.26	0.40	0.04	0.30	0.49
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021



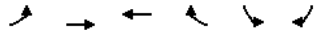
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (vph)	14	61	443	30	146	677
Future Volume (vph)	14	61	443	30	146	677
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.5	3.0	3.0	3.5
Total Lost time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1560	1113	1807	1329	1274	1807
Flt Permitted	0.95	1.00	1.00	1.00	0.40	1.00
Satd. Flow (perm)	1560	1113	1807	1329	541	1807
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	17	73	527	36	174	806
RTOR Reduction (vph)	0	61	0	5	0	0
Lane Group Flow (vph)	17	12	527	31	174	806
Confl. Peds. (#/hr)				7		7
Heavy Vehicles (%)	8%	30%	4%	10%	32%	4%
Bus Blockages (#/hr)	0	10	0	0	0	0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	4.2	11.3	52.7	52.7	63.8	63.8
Effective Green, g (s)	5.2	13.3	53.7	53.7	64.8	64.8
Actuated g/C Ratio	0.07	0.17	0.67	0.67	0.81	0.81
Clearance Time (s)	5.0	4.0	7.0	7.0	4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	101	185	1212	892	512	1463
v/s Ratio Prot		0.01	0.29		0.03	c0.45
v/s Ratio Perm	c0.01	0.00		0.02	0.24	
v/c Ratio	0.17	0.07	0.43	0.03	0.34	0.55
Uniform Delay, d1	35.4	28.1	6.1	4.4	2.2	2.6
Progression Factor	1.00	1.00	1.00	1.00	0.54	0.39
Incremental Delay, d2	0.8	0.2	1.1	0.1	0.3	1.3
Delay (s)	36.1	28.3	7.2	4.5	1.5	2.3
Level of Service	D	C	A	A	A	A
Approach Delay (s)	29.8		7.1			2.2
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9023: New Liberty St & Atlantic Ave

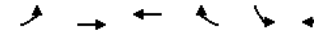
09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (vph)	16	37	122	14	75	104
Future Volume (vph)	16	37	122	14	75	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.84	0.93		0.47	
Frt			0.986		0.921	
Flt Protected		0.985			0.980	
Satd. Flow (prot)	0	1713	1691	0	1038	0
Flt Permitted		0.915			0.980	
Satd. Flow (perm)	0	1338	1691	0	774	0
Right Turn on Red			Yes		Yes	
Satd. Flow (RTOR)			14		1	
Link Speed (k/h)		40	40		50	
Link Distance (m)		87.6	198.4		54.1	
Travel Time (s)		7.9	17.9		3.9	
Confl. Peds. (#/hr)	878			878	757	853
Confl. Bikes (#/hr)				8		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Bus Blockages (#/hr)	0	14	0	0	0	0
Adj. Flow (vph)	18	41	136	16	83	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	59	152	0	199	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
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	1.01	1.09	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	6			

Lanes, Volumes, Timings
9023: New Liberty St & Atlantic Ave

09/30/2021

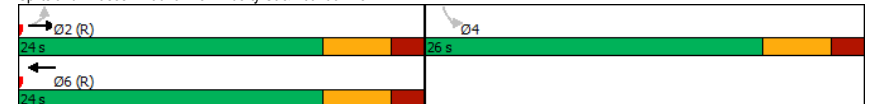


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2				4	
Detector Phase	2	2	6		4	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0		7.0	
Minimum Split (s)	24.0	24.0	24.0		24.0	
Total Split (s)	24.0	24.0	24.0		26.0	
Total Split (%)	48.0%	48.0%	48.0%		52.0%	
Maximum Green (s)	18.0	18.0	18.0		20.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	C-Max		None	
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)	100	100	100		100	
Act Effct Green (s)	26.7	26.7	26.7		17.2	
Actuated g/C Ratio		0.53	0.53		0.34	
v/c Ratio		0.08	0.17		0.75	
Control Delay		10.2	9.7		32.2	
Queue Delay		0.0	0.0		0.0	
Total Delay		10.2	9.7		32.2	
LOS		B	A		C	
Approach Delay		10.2	9.7		32.2	
Approach LOS		B	A		C	

Intersection Summary

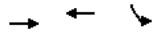
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 20.7
 Intersection LOS: C
 Intersection Capacity Utilization 41.7%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 9023: New Liberty St & Atlantic Ave



Queues
9023: New Liberty St & Atlantic Ave

09/30/2021



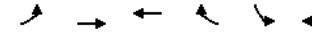
Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	59	152	199
v/c Ratio	0.08	0.17	0.75
Control Delay	10.2	9.7	32.2
Queue Delay	0.0	0.0	0.0
Total Delay	10.2	9.7	32.2
Queue Length 50th (m)	3.0	7.3	14.0
Queue Length 95th (m)	8.9	17.6	#37.8
Internal Link Dist (m)	63.6	174.4	30.1
Turn Bay Length (m)			
Base Capacity (vph)	715	910	325
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.08	0.17	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
9023: New Liberty St & Atlantic Ave

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	↑
Traffic Volume (vph)	16	37	122	14	75	104
Future Volume (vph)	16	37	122	14	75	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	
Lane Util. Factor		1.00	1.00		1.00	
Frbp, ped/bikes		1.00	0.93		0.62	
Flpb, ped/bikes		0.84	1.00		0.75	
Frnt		1.00	0.99		0.92	
Flt Protected		0.98	1.00		0.98	
Satd. Flow (prot)		1440	1691		774	
Flt Permitted		0.92	1.00		0.98	
Satd. Flow (perm)		1339	1691		774	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	18	41	136	16	83	116
RTOR Reduction (vph)	0	0	7	0	1	0
Lane Group Flow (vph)	0	59	145	0	198	0
Confl. Peds. (#/hr)	878			878	757	853
Confl. Bikes (#/hr)				8		
Bus Blockages (#/hr)	0	14	0	0	0	0
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				4	
Actuated Green, G (s)		23.5	23.5		14.5	
Effective Green, g (s)		24.5	24.5		15.5	
Actuated g/C Ratio		0.49	0.49		0.31	
Clearance Time (s)		6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		656	828		239	
v/s Ratio Prot			c0.09			
v/s Ratio Perm		0.04			c0.26	
v/c Ratio		0.09	0.17		0.83	
Uniform Delay, d1		6.8	7.1		16.0	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		0.3	0.5		20.6	
Delay (s)		7.1	7.6		36.6	
Level of Service		A	A		D	
Approach Delay (s)		7.1	7.6		36.6	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Traffic Volume (vph)	173	56	392	128	21	669
Future Volume (vph)	173	56	392	128	21	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	0.0	0.0		
Storage Lanes	1	1		0	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		0.62				
Frt		0.850	0.967			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1750	1566	1781	0	1750	1842
Flt Permitted	0.950				0.393	
Satd. Flow (perm)	1750	971	1781	0	724	1842
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		62	40			
Link Speed (k/h)	40		30		30	
Link Distance (m)	107.6		191.3		74.7	
Travel Time (s)	9.7		23.0		9.0	
Conf. Peds. (#/hr)		163				
Conf. Bikes (#/hr)		5				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	192	62	436	142	23	743
Shared Lane Traffic (%)						
Lane Group Flow (vph)	192	62	578	0	23	743
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5		3.5	
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	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
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)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+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)			28.7		28.7	
Detector 2 Size(m)			1.8		1.8	
Detector 2 Type			CI+Ex		CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)			0.0		0.0	

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Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0		7.0	7.0
Minimum Split (s)	24.0	24.0	24.0		24.0	24.0
Total Split (s)	24.0	24.0	56.0		56.0	56.0
Total Split (%)	30.0%	30.0%	70.0%		70.0%	70.0%
Maximum Green (s)	18.0	18.0	50.0		50.0	50.0
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)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	14.7	14.7	55.3		55.3	55.3
Actuated g/C Ratio	0.18	0.18	0.69		0.69	0.69
v/c Ratio	0.60	0.27	0.47		0.05	0.58
Control Delay	37.2	10.6	11.6		3.2	5.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	37.2	10.6	11.6		3.2	5.5
LOS	D	B	B		A	A
Approach Delay	30.7		11.6			5.4
Approach LOS	C		B			A
Intersection Summary						
Area Type:	Other					
Cycle Length:	80					
Actuated Cycle Length:	80					
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green					
Natural Cycle:	60					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	0.60					
Intersection Signal Delay:	11.7			Intersection LOS: B		
Intersection Capacity Utilization:	58.5%			ICU Level of Service B		
Analysis Period (min):	15					
Splits and Phases:	9024: Dufferin St & New Liberty St					



Scenario 1 Future Background AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

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Queues
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	192	62	578	23	743
v/c Ratio	0.60	0.27	0.47	0.05	0.58
Control Delay	37.2	10.6	11.6	3.2	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	10.6	11.6	3.2	5.5
Queue Length 50th (m)	26.9	0.0	31.4	0.5	32.3
Queue Length 95th (m)	43.9	9.1	121.2	m0.9	m56.6
Internal Link Dist (m)	83.6		167.3		50.7
Turn Bay Length (m)	15.0				
Base Capacity (vph)	415	277	1242	500	1273
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	0.46	0.22	0.47	0.05	0.58

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑		↖	↗
Traffic Volume (vph)	173	56	392	128	21	669
Future Volume (vph)	173	56	392	128	21	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	0.62	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	969	1781		1750	1842
Fit Permitted	0.95	1.00	1.00		0.39	1.00
Satd. Flow (perm)	1750	969	1781		724	1842
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	192	62	436	142	23	743
RTOR Reduction (vph)	0	51	12	0	0	0
Lane Group Flow (vph)	192	11	566	0	23	743
Confl. Peds. (#/hr)	163					
Confl. Bikes (#/hr)	5					
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases	2				6	
Permitted Phases	8	8			6	
Actuated Green, G (s)	13.7	13.7	54.3		54.3	54.3
Effective Green, g (s)	14.7	14.7	55.3		55.3	55.3
Actuated g/C Ratio	0.18	0.18	0.69		0.69	0.69
Clearance Time (s)	6.0	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)	321	178	1231		500	1273
v/s Ratio Prot			0.32			c0.40
v/s Ratio Perm	c0.11	0.01			0.03	
v/c Ratio	0.60	0.06	0.46		0.05	0.58
Uniform Delay, d1	29.9	27.0	5.6		3.9	6.4
Progression Factor	1.00	1.00	1.74		0.63	0.71
Incremental Delay, d2	3.0	0.2	1.2		0.0	0.2
Delay (s)	32.9	27.1	10.9		2.5	4.7
Level of Service	C	C	B		A	A
Approach Delay (s)	31.5		10.9			4.7
Approach LOS	C		B			A

Intersection Summary

HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9025: Strachan Ave & New Liberty St

09/30/2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	81	0	552	372	86
Future Volume (vph)	0	81	0	552	372	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	15.0			0.0
Storage Lanes	1	1	1			0
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						
Flt		0.850			0.975	
Flt Protected						
Satd. Flow (prot)	1842	1566	1842	1842	1796	0
Flt Permitted						
Satd. Flow (perm)	1842	1566	1842	1842	1796	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	579.0			241.4	424.1	
Travel Time (s)	52.1			21.7	38.2	
Confl. Bikes (#/hr)						72
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	90	0	613	413	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	90	0	613	509	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
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	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
9025: Strachan Ave & New Liberty St

09/30/2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	81	0	552	372	86
Future Volume (Veh/h)	0	81	0	552	372	86
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	90	0	613	413	96
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				241		
pX, platoon unblocked	0.86					
vC, conflicting volume	1074	461	509			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1006	461	509			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	85	100			
cM capacity (veh/h)	231	600	1056			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	0	90	0	613	509
Volume Left	0	0	0	0	0
Volume Right	0	90	0	0	96
cSH	1700	600	1700	1700	1700
Volume to Capacity	0.00	0.15	0.00	0.36	0.30
Queue Length 95th (m)	0.0	4.0	0.0	0.0	0.0
Control Delay (s)	0.0	12.0	0.0	0.0	0.0
Lane LOS	A	B			
Approach Delay (s)	12.0		0.0		0.0
Approach LOS	B				

Intersection Summary

Average Delay	0.9
Intersection Capacity Utilization	36.5%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔		↔	↔		↔	↔
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	30.0		0.0	20.0		20.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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				0.97
Frt						0.850						0.865
Fit Protected	0.950			0.950				0.957				
Satd. Flow (prot)	1685	1824	0	1685	1756	1507	0	1798	0	0	1574	0
Fit Permitted	0.555			0.494								
Satd. Flow (perm)	984	1824	0	874	1756	1507	0	1860	0	0	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						45						514
Link Speed (k/h)		30			30			30				30
Link Distance (m)		164.9			265.9			92.0				121.3
Travel Time (s)		19.8			31.9			11.0				14.6
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
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 (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	470	0	1	342	1	8	1	0	0	0	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	29	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)		3.0			3.0			0.0				0.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	1.09	1.01	1.01	1.09	1.01	1.09	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	

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Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				NA
Protected Phases		4			8			2				6
Permitted Phases	4			8		8	2				6	
Detector Phase	4	4		8	8	8	2	2			6	6
Switch Phase												
Minimum Initial (s)	33.0	33.0		33.0	33.0	33.0	7.0	7.0			7.0	7.0
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	24.0	24.0			24.0	24.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0	25.0	25.0			25.0	25.0
Total Split (%)	65.3%	65.3%		65.3%	65.3%	65.3%	34.7%	34.7%			34.7%	34.7%
Maximum Green (s)	41.0	41.0		41.0	41.0	41.0	19.0	19.0			19.0	19.0
Yellow Time (s)	4.0	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	2.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0			-1.0	-1.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	Max	Max		Max	Max	Max	None	None			None	None
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	9.0	9.0		9.0	9.0	9.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	0
Act Effct Green (s)	58.5	58.5		58.5	58.5	58.5	8.0	8.0			8.0	8.0
Actuated g/C Ratio	0.90	0.90		0.90	0.90	0.90	0.12	0.12			0.12	0.12
v/c Ratio	0.00	0.29		0.00	0.22	0.00	0.04	0.05			0.05	0.05
Control Delay	2.0	2.3		2.0	2.1	0.0	27.0	0.1			27.0	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	2.0	2.3		2.0	2.1	0.0	27.0	0.1			27.0	0.1
LOS	A	A		A	A	A	C	A			C	A
Approach Delay		2.3			2.1		27.0	0.1				
Approach LOS		A			A		C	A				

Intersection Summary

Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	65.2
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.29
Intersection Signal Delay:	2.4
Intersection LOS:	A
Intersection Capacity Utilization:	73.3%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 97: Yukon Place & British Columbia Rd



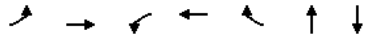
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Queues

97: Yukon Place & British Columbia Rd

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Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	1	470	1	342	1	9	29
v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.04	0.05
Control Delay	2.0	2.3	2.0	2.1	0.0	27.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.0	2.3	2.0	2.1	0.0	27.0	0.1
Queue Length 50th (m)	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Queue Length 95th (m)	0.3	26.4	0.3	18.3	0.0	4.5	0.0
Internal Link Dist (m)		140.9		241.9		68.0	97.3
Turn Bay Length (m)	30.0		20.0		20.0		
Base Capacity (vph)	882	1635	783	1574	1356	574	840
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.02	0.03
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

97: Yukon Place & British Columbia Rd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔		↔	↔		↔	↔
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0				5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00				0.97
Fipb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99				1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00				0.86
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96				1.00
Satd. Flow (prot)	1685	1824		1681	1756	1507		1781				1574
Flt Permitted	0.56	1.00		0.49	1.00	1.00		1.00				1.00
Satd. Flow (perm)	985	1824		873	1756	1507		1860				1574
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)	1	470	0	1	342	1	8	1	0	0	0	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	27
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	2	0
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				NA
Protected Phases		4			8		8		2		6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	54.3	54.3		54.3	54.3	54.3		2.6				2.6
Effective Green, g (s)	55.3	55.3		55.3	55.3	55.3		3.6				3.6
Actuated g/C Ratio	0.80	0.80		0.80	0.80	0.80		0.05				0.05
Clearance Time (s)	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
Lane Grp Cap (vph)	790	1463		700	1409	1209		97				82
v/s Ratio Prot		0.26			0.19							0.00
v/s Ratio Perm	0.00			0.00		0.00		0.00				0.02
v/c Ratio	0.00	0.32		0.00	0.24	0.00		0.09				0.02
Uniform Delay, d1	1.3	1.8		1.3	1.7	1.3		31.1				31.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Incremental Delay, d2	0.0	0.6		0.0	0.4	0.0		0.4				0.1
Delay (s)	1.3	2.4		1.3	2.1	1.3		31.5				31.1
Level of Service	A	A		A	A	A		C				C
Approach Delay (s)		2.4			2.1			31.5				31.1
Approach LOS		A			A			C				C

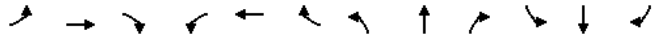
Intersection Summary			
HCM 2000 Control Delay	3.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	68.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔			↔		↔	↔	↔
Traffic Volume (vph)	523	1621	3	12	2476	0	0	12	0	519	48	404
Future Volume (vph)	523	1621	3	12	2476	0	0	12	0	519	48	404
Ideal Flow (vphpl)	2150	1900	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Storage Length (m)	60.0		0.0	60.0		50.0	0.0		0.0	140.0		50.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	*0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00		1.00								0.92
Frt												0.850
Fit Protected	0.950			0.950						0.950	0.960	
Satd. Flow (prot)	1816	4794	0	1685	5883	0	0	1879	0	1585	1699	1507
Fit Permitted	0.072			0.098						0.749	0.753	
Satd. Flow (perm)	138	4794	0	174	5883	0	0	1879	0	1249	1333	1388
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												230
Link Speed (k/h)		60			60			40				40
Link Distance (m)		310.3			196.6			116.5				205.6
Travel Time (s)		18.6			11.8			10.5				18.5
Confl. Peds. (#/hr)	5		8	8		5	43					43
Confl. Bikes (#/hr)								12				37
Peak Hour Factor	0.90	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	7%	0%	0%	3%	0%	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	581	1706	3	13	2606	0	0	13	0	546	51	425
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	581	1709	0	13	2606	0	0	13	0	295	302	425
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)		3.0			3.0			3.0				3.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.93	1.01	1.01	1.09	0.86	1.09	1.01	1.01	1.01	1.09	1.01	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
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)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex

Scenario 1 Future Background PM 11:59 pm 05/05/2014 No Improvements
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Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

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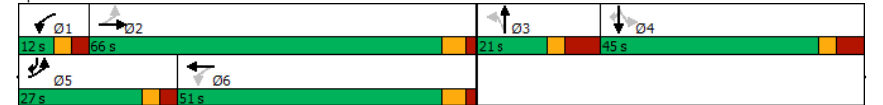


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA			NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6			3		4	4	5
Permitted Phases	2			6								4
Detector Phase	5	2		1	6			3	3		4	4
Switch Phase												
Minimum Initial (s)	6.0	29.0		6.0	30.0			12.0	12.0		10.0	10.0
Minimum Split (s)	12.0	35.0		12.0	36.0			21.0	21.0		45.0	45.0
Total Split (s)	27.0	66.0		12.0	51.0			21.0	21.0		45.0	45.0
Total Split (%)	18.8%	45.8%		8.3%	35.4%			14.6%	14.6%		31.3%	31.3%
Maximum Green (s)	21.0	60.0		6.0	45.0			12.0	12.0		37.0	37.0
Yellow Time (s)	3.0	4.0		3.0	4.0			3.0	3.0		3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0			6.0	6.0		5.0	5.0
Lost Time Adjust (s)	-3.0	-1.0		-1.0	-3.0			-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	3.0	5.0		5.0	3.0			8.0	8.0		7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag			Lead	Lead		Lag	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	Max		None	Max			None	None		None	None
Walk Time (s)		7.0			7.0						7.0	7.0
Flash Dont Walk (s)		22.0			22.0						30.0	30.0
Pedestrian Calls (#/hr)		3			2						0	0
Act Effct Green (s)	75.8	69.5		53.6	48.5			13.1			34.7	34.7
Actuated g/C Ratio	0.59	0.54		0.42	0.38			0.10			0.27	0.27
v/c Ratio	1.46	0.66		0.08	1.17			0.07			0.87	0.84
Control Delay	250.0	26.2		18.9	117.8			58.8			71.6	65.9
Queue Delay	0.0	0.0		0.0	0.2			0.0			0.0	0.0
Total Delay	250.0	26.2		18.9	118.1			58.8			71.6	65.9
LOS	F	C		B	F			E			E	B
Approach Delay		83.0			117.6			58.8				45.6
Approach LOS		F			F			E				D

Intersection Summary

Area Type:	Other
Cycle Length:	144
Actuated Cycle Length:	128.1
Natural Cycle:	145
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.46
Intersection Signal Delay:	91.7
Intersection LOS:	F
Intersection Capacity Utilization:	109.2%
ICU Level of Service:	H
Analysis Period (min):	15
* User Entered Value	

Splits and Phases: 222: Lakeshore Blvd & Strachan Ave



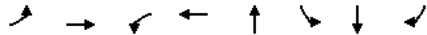
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Queues

222: Lakeshore Blvd & Strachan Ave

09/30/2021



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	581	1709	13	2606	13	295	302	425
v/c Ratio	1.46	0.66	0.08	1.17	0.07	0.87	0.84	0.54
Control Delay	250.0	26.2	18.9	117.8	58.8	71.6	65.9	13.0
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	250.0	26.2	18.9	118.1	58.8	71.6	65.9	13.0
Queue Length 50th (m)	~175.2	90.3	1.2	~257.1	2.9	67.7	68.5	24.6
Queue Length 95th (m)	#298.7	178.4	5.5	#361.5	10.5	#141.4	#140.1	66.7
Internal Link Dist (m)		286.3		172.6	92.5		181.6	
Turn Bay Length (m)	60.0		60.0			140.0		50.0
Base Capacity (vph)	399	2602	156	2228	192	374	399	783
Starvation Cap Reductn	0	0	0	186	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	1.46	0.66	0.08	1.28	0.07	0.79	0.76	0.54

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.

HCM Signalized Intersection Capacity Analysis

222: Lakeshore Blvd & Strachan Ave

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔			↔		↔	↔	↔
Traffic Volume (vph)	523	1621	3	12	2476	0	0	12	0	519	48	404
Future Volume (vph)	523	1621	3	12	2476	0	0	12	0	519	48	404
Ideal Flow (vphpl)	2150	1900	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Total Lost time (s)	3.0	5.0		5.0	3.0			8.0		7.0	7.0	5.0
Lane Util. Factor	1.00	0.91		1.00	*0.95			1.00		0.95	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	0.95
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	1.00
Satd. Flow (prot)	1816	4793		1685	5883			1879		1585	1700	1436
Flt Permitted	0.07	1.00		0.10	1.00			1.00		0.75	0.75	1.00
Satd. Flow (perm)	138	4793		174	5883			1879		1249	1333	1436
Peak-hour factor, PHF	0.90	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	581	1706	3	13	2606	0	0	13	0	546	51	425
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	135
Lane Group Flow (vph)	581	1709	0	13	2606	0	0	13	0	295	302	290
Confl. Peds. (#/hr)	5		8	8		5	43					43
Confl. Bikes (#/hr)									12			37
Heavy Vehicles (%)	5%	7%	0%	0%	3%	0%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA			NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6			3			4	5
Permitted Phases	2			6			3			4		4
Actuated Green, G (s)	76.6	68.5		51.5	49.4			4.3		33.7	33.7	54.9
Effective Green, g (s)	79.6	69.5		53.5	52.4			5.3		34.7	34.7	56.9
Actuated g/C Ratio	0.58	0.51		0.39	0.38			0.04		0.25	0.25	0.41
Clearance Time (s)	6.0	6.0		6.0	6.0			9.0		8.0	8.0	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)	374	2420		101	2240			72		314	336	593
v/s Ratio Prot	c0.27	0.36		0.00	0.44			c0.01				0.08
v/s Ratio Perm	c0.62			0.05						c0.24	0.23	0.12
v/c Ratio	1.55	0.71		0.13	1.16			0.18		0.94	0.90	0.49
Uniform Delay, d1	46.0	26.2		26.5	42.6			64.0		50.4	49.8	29.7
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	261.9	1.8		0.6	78.9			1.2		34.7	25.2	0.6
Delay (s)	307.9	28.0		27.1	121.5			65.3		85.2	75.0	30.3
Level of Service	F	C		C	F			E		F	E	C
Approach Delay (s)		99.0			121.0			65.3				59.3
Approach LOS		F			F			E				E

Intersection Summary

HCM 2000 Control Delay	101.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	137.6	Sum of lost time (s)	25.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
538: Strachan Ave & King St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕	↕	↕	↕	↕
Traffic Volume (vph)	0	472	85	4	842	68	248	350	156	27	228	27
Future Volume (vph)	0	472	85	4	842	68	248	350	156	27	228	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	0.0	0.0	0.0	0.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0	0.0
Storage Lanes	0	0	0	0	0	1	0	1	0	1	0	0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.94			0.99		0.89	0.97		0.97	0.98	
Frt		0.977			0.989		0.954			0.984		
Fit Protected							0.950			0.950		
Satd. Flow (prot)	0	2618	0	0	2869	0	1486	1546	0	1516	1616	0
Fit Permitted					0.953		0.541			0.276		
Satd. Flow (perm)	0	2618	0	0	2732	0	749	1546	0	428	1616	0
Right Turn on Red			Yes		Yes			Yes			Yes	
Satd. Flow (RTOR)		32			13			36			10	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		255.2			358.6			424.1			379.9	
Travel Time (s)		18.4			25.8			38.2			34.2	
Confl. Peds. (#/hr)	77		179	179		77	158		81	81		158
Confl. Bikes (#/hr)			5			4			24			5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	6%	17%	100%	4%	0%	2%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	24	24	24	24	24	0	0	0	0	0	0	0
Adj. Flow (vph)	0	502	90	4	896	72	264	372	166	29	243	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	592	0	0	972	0	264	538	0	29	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)		0.0			0.0			3.0			3.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.16	1.23	1.16	1.16	1.23	1.16	1.25	1.16	1.16	1.25	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	

Scenario 1 Future Background PM 11:59 pm 05/05/2014 No Improvements
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Lanes, Volumes, Timings
538: Strachan Ave & King St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases		2			6			4			8	
Detector Phase		2			6			4			8	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		27.0	27.0		27.0	27.0	
Total Split (s)	40.0	40.0		40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
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	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		25	25		27	27		100	100	
Act Effect Green (s)		35.0			35.0			35.0			35.0	
Actuated g/C Ratio		0.44			0.44		0.44	0.44		0.44	0.44	
v/c Ratio		0.51			0.81		0.81	0.77		0.16	0.38	
Control Delay		17.2			15.3		41.4	27.1		24.6	25.8	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		17.2			15.3		41.4	27.1		24.6	25.8	
LOS		B			B		D	C		C	C	
Approach Delay		17.2			15.3			31.8			25.7	
Approach LOS		B			B			C			C	

Intersection Summary

Area Type: CBD

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 50 (63%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 21.9

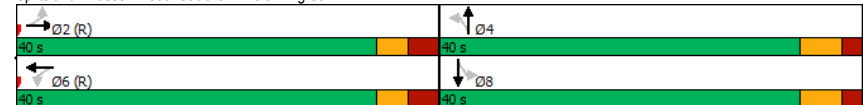
Intersection LOS: C

Intersection Capacity Utilization 94.5%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 538: Strachan Ave & King St



Queues
538: Strachan Ave & King St

09/30/2021



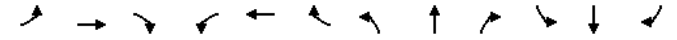
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	592	972	264	538	29	272
v/c Ratio	0.51	0.81	0.81	0.77	0.16	0.38
Control Delay	17.2	15.3	41.4	27.1	24.6	25.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	15.3	41.4	27.1	24.6	25.8
Queue Length 50th (m)	31.1	19.8	33.6	62.7	3.7	38.0
Queue Length 95th (m)	45.4	59.5	#75.5	#109.1	m8.0	m56.6
Internal Link Dist (m)	231.2	334.6		400.1		355.9
Turn Bay Length (m)			25.0		25.0	
Base Capacity (vph)	1163	1202	327	696	187	712
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	0.51	0.81	0.81	0.77	0.16	0.38

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
538: Strachan Ave & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕		↕	↕	
Traffic Volume (vph)	0	472	85	4	842	68	248	350	156	27	228	27
Future Volume (vph)	0	472	85	4	842	68	248	350	156	27	228	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.94			0.99		1.00	0.97		1.00	0.98	
Fipb, ped/bikes		1.00			1.00		0.89	1.00		0.97	1.00	
Frt		0.98			0.99		1.00	0.95		1.00	0.98	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2618			2866		1316	1546		1472	1616	
Flt Permitted		1.00			0.95		0.54	1.00		0.28	1.00	
Satd. Flow (perm)		2618			2732		749	1546		427	1616	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	502	90	4	896	72	264	372	166	29	243	29
RTOR Reduction (vph)	0	18	0	0	7	0	0	20	0	0	6	0
Lane Group Flow (vph)	0	574	0	0	965	0	264	518	0	29	266	0
Confl. Peds. (#/hr)	77		179	179		77	158		81	81		158
Confl. Bikes (#/hr)			5			4			24			5
Heavy Vehicles (%)	0%	6%	17%	100%	4%	0%	2%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		34.0			34.0		34.0	34.0		34.0	34.0	
Effective Green, g (s)		35.0			35.0		35.0	35.0		35.0	35.0	
Actuated g/C Ratio		0.44			0.44		0.44	0.44		0.44	0.44	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1145			1195		327	676		186	707	
v/s Ratio Prot		0.22						0.33			0.16	
v/s Ratio Perm					c0.35		c0.35			0.07		
v/c Ratio		0.50			0.81		0.81	0.77		0.16	0.38	
Uniform Delay, d1		16.2			19.6		19.6	19.0		13.6	15.2	
Progression Factor		1.00			0.46		1.00	1.00		1.58	1.62	
Incremental Delay, d2		1.6			5.8		18.9	8.1		1.6	1.4	
Delay (s)		17.8			14.8		38.5	27.1		23.1	26.0	
Level of Service		B			B		D	C		C	C	
Approach Delay (s)		17.8			14.8			30.9			25.7	
Approach LOS		B			B			C			C	

Intersection Summary

HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
539: Dufferin St & King St

09/30/2021

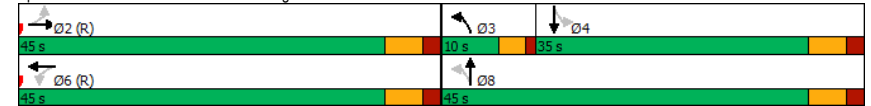
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕↕		
Traffic Volume (vph)	81	458	54	33	793	104	54	614	42	113	317	74
Future Volume (vph)	81	458	54	33	793	104	54	614	42	113	317	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Ped Bike Factor	0.96			0.96			0.97			0.93		
Frt	0.986			0.983			0.991			0.978		
Fit Protected	0.993			0.998			0.996			0.989		
Satd. Flow (prot)	0	2874	0	0	2821	0	0	2684	0	0	2590	0
Fit Permitted	0.587			0.904			0.808			0.638		
Satd. Flow (perm)	0	1690	0	0	2546	0	0	2159	0	0	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	15			20			9			24		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	291.1			316.7			212.5			385.1		
Travel Time (s)	21.0			22.8			15.3			27.7		
Confl. Peds. (#/hr)	278		317	317		278	331		263	263		331
Confl. Bikes (#/hr)			3			73			118			6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	6%	3%	4%	2%	2%	4%	7%	9%	5%	13%	5%	5%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	30	30	0	18	18
Adj. Flow (vph)	93	526	62	38	911	120	62	706	48	130	364	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	681	0	0	1069	0	0	816	0	0	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)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	1.16	1.20	1.16	1.16	1.23	1.16	1.16	1.25	1.16	1.16	1.22	1.16
Turning Speed (k/h)	24		14		24		14		24		14	
Turn Type	Perm		NA		Perm		pm+pt		NA		Perm	
Protected Phases	2				6		3		8		4	
Permitted Phases	2				6		8		4			
Minimum Split (s)	27.0	27.0		27.0	27.0		10.0	27.0		27.0	27.0	
Total Split (s)	45.0	45.0		45.0	45.0		10.0	45.0		35.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		11.1%	50.0%		38.9%	38.9%	
Maximum Green (s)	39.0	39.0		39.0	39.0		6.0	39.0		29.0	29.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0			-1.0			-1.0			-2.0		
Total Lost Time (s)	5.0			5.0			5.0			4.0		
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		14.0			14.0	14.0	
Pedestrian Calls (#/hr)	100	100		100	100		100			100	100	
Act Effect Green (s)	40.0			40.0			40.0			31.0		

Lanes, Volumes, Timings
539: Dufferin St & King St

09/30/2021

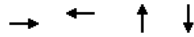
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.44			0.44			0.44			0.44		0.34
v/c Ratio	0.90			0.94			0.82			1.00		
Control Delay	39.6			39.7			29.6			68.1		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	39.6			39.7			29.6			68.1		
LOS	D			D			C			E		
Approach Delay	39.6			39.7			29.6			68.1		
Approach LOS	D			D			C			E		
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green											
Natural Cycle:	90											
Control Type:	Pretimed											
Maximum v/c Ratio:	1.00											
Intersection Signal Delay:	42.3						Intersection LOS: D					
Intersection Capacity Utilization:	105.4%						ICU Level of Service G					
Analysis Period (min):	15											

Splits and Phases: 539: Dufferin St & King St



Queues
539: Dufferin St & King St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	681	1069	816	579
v/c Ratio	0.90	0.94	0.82	1.00
Control Delay	39.6	39.7	29.6	68.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	39.6	39.7	29.6	68.1
Queue Length 50th (m)	54.4	88.2	56.6	~50.4
Queue Length 95th (m)	#85.2	#124.4	73.3	#81.6
Internal Link Dist (m)	267.1	292.7	188.5	361.1
Turn Bay Length (m)				
Base Capacity (vph)	759	1142	993	578
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	0.90	0.94	0.82	1.00

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.

HCM Signalized Intersection Capacity Analysis
539: Dufferin St & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	81	458	54	33	793	104	54	614	42	113	317	74
Future Volume (vph)	81	458	54	33	793	104	54	614	42	113	317	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			4.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.97			0.96			0.98			0.95	
Flpb, ped/bikes		0.99			1.00			0.99			0.98	
Frt		0.99			0.98			0.99			0.98	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		2861			2812			2667			2533	
Flt Permitted		0.59			0.90			0.81			0.64	
Satd. Flow (perm)		1690			2548			2164			1635	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	93	526	62	38	911	120	62	706	48	130	364	85
RTOR Reduction (vph)	0	8	0	0	11	0	0	5	0	0	16	0
Lane Group Flow (vph)	0	673	0	0	1058	0	0	811	0	0	563	0
Conf. Peds. (#/hr)	278		317	317		278	331		263	263		331
Conf. Bikes (#/hr)			3			73			118			6
Heavy Vehicles (%)	6%	3%	4%	2%	2%	4%	7%	9%	9%	5%	13%	5%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	30	30	0	18	18
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		39.0			39.0			39.0			29.0	
Effective Green, g (s)		40.0			40.0			40.0			31.0	
Actuated g/C Ratio		0.44			0.44			0.44			0.34	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		751			1132			1000			563	
v/s Ratio Prot								c0.06				
v/s Ratio Perm		0.40			c0.42			0.30			c0.34	
v/c Ratio		0.90			0.93			0.81			1.00	
Uniform Delay, d1		23.1			23.8			21.7			29.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		15.5			15.0			7.1			38.0	
Delay (s)		38.6			38.8			28.8			67.5	
Level of Service		D			D			C			E	
Approach Delay (s)		38.6			38.8			28.8			67.5	
Approach LOS		D			D			C			E	

Intersection Summary

HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	139	7	208	77	88	60	125	473	87	88	706	67
Future Volume (vph)	139	7	208	77	88	60	125	473	87	88	706	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	25.0		0.0	0.0		50.0	30.0		0.0	25.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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	0.80	0.86			0.96	0.71		0.98			0.99	
Fr		0.855				0.850		0.977			0.987	
Fit Protected	0.950				0.977		0.950			0.950		
Satd. Flow (prot)	1589	1300	0	0	1605	1507	1652	1688	0	1574	1710	0
Fit Permitted	0.580				0.605		0.072			0.234		
Satd. Flow (perm)	780	1300	0	0	959	1072	125	1688	0	388	1710	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		219				152		7			4	
Link Speed (k/h)		30			50			40			40	
Link Distance (m)		143.4			229.0			205.6			241.4	
Travel Time (s)		17.2			16.5			18.5			21.7	
Confl. Peds. (#/hr)	122		55	55		122	37		33	33		37
Confl. Bikes (#/hr)			3									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 (%)	6%	12%	6%	1%	26%	0%	2%	8%	2%	7%	8%	1%
Adj. Flow (vph)	146	7	219	81	93	63	132	498	92	93	743	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	146	226	0	0	174	63	132	590	0	93	814	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)		3.0			3.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.09	1.01	1.01	1.01	1.01	1.09	1.09	1.01	1.01	1.09	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2			1	2	1	1	2		1	2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	2.0	2.0	30.5		2.0	30.5	
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)	6.1	1.8		6.1	1.8	2.0	2.0	1.8		2.0	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	

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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

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Lane Group	Ø10	Ø12	Ø14	Ø16
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (m)				
Storage Length (m)				
Storage Lanes				
Taper Length (m)				
Lane Util. Factor				
Ped Bike Factor				
Fr				
Fit Protected				
Satd. Flow (prot)				
Fit Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (k/h)				
Link Distance (m)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(m)				
Link Offset(m)				
Crosswalk Width(m)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (k/h)				
Number of Detectors				
Detector Template				
Leading Detector (m)				
Trailing Detector (m)				
Detector 1 Position(m)				
Detector 1 Size(m)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(m)				
Detector 2 Size(m)				
Detector 2 Type				

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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	32.0	32.0		32.0	32.0	32.0	29.0	29.0		29.0	29.0	
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		36.0	36.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	61.0	61.0		61.0	61.0	
Total Split (%)	27.1%	27.1%		27.1%	27.1%	27.1%	42.4%	42.4%		42.4%	42.4%	
Maximum Green (s)	32.0	32.0		32.0	32.0	32.0	54.0	54.0		54.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
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	3.0	
Recall Mode	Max	Max		Max	Max	Max	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0	22.0	22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	18	18		100	100	100	11	11		12	12	
Act Effct Green (s)	33.5	33.5		33.5	33.5	55.9	55.9	55.9		55.9	55.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30	0.50	0.50	0.50		0.50	0.50	
v/c Ratio	0.63	0.42		0.61	0.15	2.13	0.70	0.70		0.48	0.95	
Control Delay	51.1	8.1		47.6	0.7	585.4	29.9	29.9		34.2	50.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.5	0.5		0.0	0.0	
Total Delay	51.1	8.1		47.6	0.7	585.4	30.4	30.4		34.2	50.4	
LOS	D	A		D	A	F	C	C		C	D	
Approach Delay		25.0			35.1		131.9				48.8	
Approach LOS		C			D		F				D	

Intersection Summary

Area Type: Other

Cycle Length: 144

Actuated Cycle Length: 112

Natural Cycle: 150

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 2.13

Intersection Signal Delay: 70.2

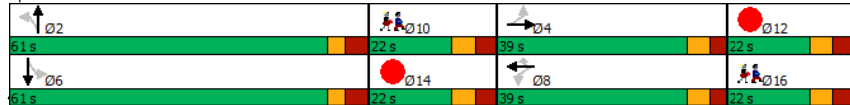
Intersection LOS: E

Intersection Capacity Utilization 139.0%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 571: Strachan Ave & Canada Blvd/Fleet St



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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

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Lane Group	Ø10	Ø12	Ø14	Ø16
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	10	12	14	16
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	22.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0
Total Split (%)	15%	15%	15%	15%
Maximum Green (s)	14.0	14.0	14.0	14.0
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	0.0	0.0	0.0	0.0
Flash Dont Walk (s)	0.0	0.0	0.0	0.0
Pedestrian Calls (#/hr)	16	16	16	16
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary

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Queues

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	146	226	174	63	132	590	93	814
v/c Ratio	0.63	0.42	0.61	0.15	2.13	0.70	0.48	0.95
Control Delay	51.1	8.1	47.6	0.7	585.4	29.9	34.2	50.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	51.1	8.1	47.6	0.7	585.4	30.4	34.2	50.4
Queue Length 50th (m)	23.1	0.9	27.4	0.0	~26.7	73.7	10.1	127.2
Queue Length 95th (m)	#67.6	22.1	#73.1	0.0	#84.5	#182.0	38.9	#316.4
Internal Link Dist (m)		119.4	205.0			181.6		217.4
Turn Bay Length (m)	25.0			50.0	30.0		25.0	
Base Capacity (vph)	233	542	287	427	62	846	193	855
Starvation Cap Reductn	0	0	0	0	0	57	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	0.42	0.61	0.15	2.13	0.75	0.48	0.95

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.

HCM Signalized Intersection Capacity Analysis

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	139	7	208	77	88	60	125	473	87	88	706	67
Future Volume (vph)	139	7	208	77	88	60	125	473	87	88	706	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.88		1.00	0.75	1.00	0.99	1.00		1.00	0.99	
Fipb, ped/bikes	0.83	1.00		0.97	1.00	1.00	1.00	1.00		0.98	1.00	
Frt	1.00	0.85		1.00	0.85	1.00	0.98	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.98	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1314	1327		1554	1133	1652	1690	1548		1712		
Flt Permitted	0.58	1.00		0.61	1.00	0.07	1.00	0.23		1.00		
Satd. Flow (perm)	802	1327		963	1133	124	1690	381		1712		
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)	146	7	219	81	93	63	132	498	92	93	743	71
RTOR Reduction (vph)	0	159	0	0	0	46	0	4	0	0	2	0
Lane Group Flow (vph)	146	67	0	0	174	17	132	586	0	93	812	0
Confl. Peds. (#/hr)	122		55	55		122	37		33	33		37
Confl. Bikes (#/hr)			3									2
Heavy Vehicles (%)	6%	12%	6%	1%	26%	0%	2%	8%	2%	7%	8%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8		2				6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	32.5	32.5		32.5	32.5	54.9	54.9			54.9	54.9	
Effective Green, g (s)	33.5	33.5		33.5	33.5	55.9	55.9			55.9	55.9	
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.46	0.46			0.46	0.46	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0			7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	219	363		263	310	56	773		174	783		
v/s Ratio Prot		0.05					0.35					0.47
v/s Ratio Perm	c0.18			0.18	0.02	c1.06				0.24		
v/c Ratio	0.67	0.18		0.66	0.06	2.36	0.76			0.53	1.04	
Uniform Delay, d1	39.4	33.9		39.3	32.7	33.2	27.5			23.8	33.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	14.9	1.1		12.4	0.3	662.2	6.9			11.3	42.1	
Delay (s)	54.3	35.0		51.7	33.0	695.4	34.4			35.1	75.2	
Level of Service	D	D		D	C	F	C			D	E	
Approach Delay (s)		42.6			46.7		155.2				71.1	
Approach LOS		D			D		F				E	

Intersection Summary

HCM 2000 Control Delay	90.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.62		
Actuated Cycle Length (s)	122.2	Sum of lost time (s)	28.0
Intersection Capacity Utilization	139.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↕	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	54	517	0	0	0	571	0	2888	4	0	0	0
Future Volume (vph)	54	517	0	0	0	571	0	2888	4	0	0	0
Ideal Flow (vphpl)	1900	2000	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	15.0		0.0	0.0		80.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor						0.98						
Frt						0.850						
Fit Protected	0.950											
Satd. Flow (prot)	1652	1939	0	0	0	2756	0	5029	0	0	0	0
Fit Permitted	0.950											
Satd. Flow (perm)	1652	1939	0	0	0	2709	0	5029	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	76					407						
Link Speed (k/h)		60			30			60			60	
Link Distance (m)		411.9			164.9			800.6			492.6	
Travel Time (s)		24.7			19.8			48.0			29.6	
Confl. Bikes (#/hr)			1			4						
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
Adj. Flow (vph)	57	544	0	0	0	601	0	3040	4	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	544	0	0	0	601	0	3044	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	Right	Left	Left	Right	Right
Median Width(m)		3.0			3.0			3.0			3.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.09	0.95	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2				1			2			
Detector Template	Left	Thru				Right			Thru			
Leading Detector (m)	6.1	30.5				6.1			30.5			
Trailing Detector (m)	0.0	0.0				0.0			0.0			
Detector 1 Position(m)	0.0	0.0				0.0			0.0			
Detector 1 Size(m)	6.1	1.8				6.1			1.8			
Detector 1 Type	CI+Ex	CI+Ex				CI+Ex			CI+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0				0.0			0.0			
Detector 1 Queue (s)	0.0	0.0				0.0			0.0			
Detector 1 Delay (s)	0.0	0.0				0.0			0.0			
Detector 2 Position(m)		28.7							28.7			
Detector 2 Size(m)		1.8							1.8			
Detector 2 Type		CI+Ex							CI+Ex			
Detector 2 Channel												
Detector 2 Extend (s)		0.0							0.0			

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					9						
Detector Phase	4	4				9		2				
Switch Phase												
Minimum Initial (s)	7.0	7.0				7.0		22.0				
Minimum Split (s)	13.0	13.0				30.0		29.0				
Total Split (s)	36.0	36.0				30.0		78.0				
Total Split (%)	25.0%	25.0%				20.8%		54.2%				
Maximum Green (s)	30.0	30.0				24.0		71.0				
Yellow Time (s)	4.0	4.0				4.0		4.0				
All-Red Time (s)	2.0	2.0				2.0		3.0				
Lost Time Adjust (s)	-1.0	-3.0				-1.0		-1.0				
Total Lost Time (s)	5.0	3.0				5.0		6.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Recall Mode	None	None				None		None				
Walk Time (s)	0.0	0.0				7.0		7.0				
Flash Dont Walk (s)	0.0	0.0				15.0		15.0				
Pedestrian Calls (#/hr)	0	0				0		0				
Act Effct Green (s)	31.1	33.1				17.2		72.1				
Actuated g/C Ratio	0.23	0.24				0.13		0.53				
v/c Ratio	0.13	1.16				0.86		1.14				
Control Delay	5.4	138.3				31.7		101.1				
Queue Delay	0.0	0.0				0.0		0.0				
Total Delay	5.4	138.3				31.7		101.1				
LOS	A	F				C		F				
Approach Delay		125.7				31.7		101.1				
Approach LOS		F				C		F				

Intersection Summary

Area Type: Other
 Cycle Length: 144
 Actuated Cycle Length: 136.4
 Natural Cycle: 150
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.16
 Intersection Signal Delay: 94.8
 Intersection Capacity Utilization 95.0%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service F

Splits and Phases: 1344: Lakeshore Blvd & British Columbia Rd



Queues

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	WBR	NBT
Lane Group Flow (vph)	57	544	601	3044
v/c Ratio	0.13	1.16	0.86	1.14
Control Delay	5.4	138.3	31.7	101.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.4	138.3	31.7	101.1
Queue Length 50th (m)	0.0	~173.7	30.0	~353.0
Queue Length 95th (m)	7.2	#260.1	54.4	#409.5
Internal Link Dist (m)		387.9		776.6
Turn Bay Length (m)	15.0		80.0	
Base Capacity (vph)	434	470	829	2659
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	0.13	1.16	0.72	1.14

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.

HCM Signalized Intersection Capacity Analysis

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗				↗↘	↗↘	↗↘				
Traffic Volume (vph)	54	517	0	0	0	571	0	2888	4	0	0	0
Future Volume (vph)	54	517	0	0	0	571	0	2888	4	0	0	0
Ideal Flow (vphpl)	1900	2000	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	3.0				5.0		6.0				
Lane Util. Factor	1.00	1.00				0.88		0.91				
Frbp, ped/bikes	1.00	1.00				0.98		1.00				
Ftpb, ped/bikes	1.00	1.00				1.00		1.00				
Frt	1.00	1.00				0.85		1.00				
Flt Protected	0.95	1.00				1.00		1.00				
Satd. Flow (prot)	1652	1939				2703		5028				
Flt Permitted	0.95	1.00				1.00		1.00				
Satd. Flow (perm)	1652	1939				2703		5028				
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)	57	544	0	0	0	601	0	3040	4	0	0	0
RTOR Reduction (vph)	44	0	0	0	0	356	0	0	0	0	0	0
Lane Group Flow (vph)	13	544	0	0	0	245	0	3044	0	0	0	0
Confl. Bikes (#/hr)			1			4						
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					9						
Actuated Green, G (s)	30.1	30.1				16.2		71.1				
Effective Green, g (s)	31.1	33.1				17.2		72.1				
Actuated g/C Ratio	0.23	0.24				0.13		0.53				
Clearance Time (s)	6.0	6.0				6.0		7.0				
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Lane Grp Cap (vph)	376	470				340		2657				
v/s Ratio Prot		c0.28						c0.61				
v/s Ratio Perm	0.01					c0.09						
v/c Ratio	0.03	1.16				0.72		1.15				
Uniform Delay, d1	41.0	51.6				57.3		32.2				
Progression Factor	1.00	1.00				1.00		1.00				
Incremental Delay, d2	0.0	92.4				7.4		70.5				
Delay (s)	41.0	144.1				64.7		102.6				
Level of Service	D	F				E		F				
Approach Delay (s)		134.3			64.7		102.6				0.0	
Approach LOS		F			E		F				A	

Intersection Summary

HCM 2000 Control Delay	101.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	136.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	5	4	2	236	0	189	0	608	194	91	422	0
Future Volume (vph)	5	4	2	236	0	189	0	608	194	91	422	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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.96			0.88			0.87			0.98	
Frt		0.979			0.940			0.964				
Fit Protected		0.977			0.973						0.991	
Satd. Flow (prot)	0	1761	0	0	1600	0	0	2756	0	0	3298	0
Fit Permitted		0.867			0.820						0.626	
Satd. Flow (perm)	0	1536	0	0	1260	0	0	2756	0	0	2049	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			41			68				
Link Speed (k/h)		50			40			50			50	
Link Distance (m)		106.6			106.9			249.2			212.5	
Travel Time (s)		7.7			9.6			17.9			15.3	
Confl. Peds. (#/hr)	86		90	90		86	128		216	216		128
Confl. Bikes (#/hr)									118			6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	2%	0%	1%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	30	30	12	30	30
Adj. Flow (vph)	6	5	2	268	0	215	0	691	220	103	480	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	483	0	0	911	0	0	583	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.10	1.01	1.01	1.10	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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		Perm	NA		NA	Perm		NA	Perm	NA

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

09/30/2021

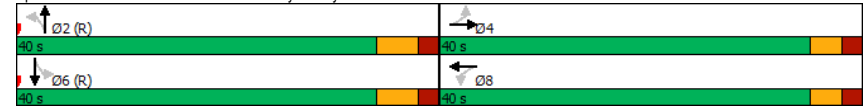


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		25.0	25.0		25.0	25.0	
Total Split (s)	40.0	40.0		40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	35.0	35.0		35.0	35.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		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)		-1.0			-2.0			-1.0			-1.0	
Total Lost Time (s)		4.0			3.0			5.0			5.0	
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		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	30	30		29	29		100	100		100	100	
Act Effect Green (s)		32.8			33.8			38.2			38.2	
Actuated g/C Ratio		0.41			0.42			0.48			0.48	
v/c Ratio		0.02			0.87			0.67			0.60	
Control Delay		11.5			36.6			18.8			19.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.5			36.6			18.8			19.5	
LOS		B			D			B			B	
Approach Delay		11.5			36.6			18.8			19.5	
Approach LOS		B			D			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 79 (99%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 23.3
 Intersection Capacity Utilization 85.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E

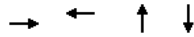
Splits and Phases: 1449: Dufferin St & Dwy/Liberty St



Queues

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	13	483	911	583
v/c Ratio	0.02	0.87	0.67	0.60
Control Delay	11.5	36.6	18.8	19.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.5	36.6	18.8	19.5
Queue Length 50th (m)	0.9	55.2	53.9	35.2
Queue Length 95th (m)	3.7	#104.7	73.2	51.0
Internal Link Dist (m)	82.6	82.9	225.2	188.5
Turn Bay Length (m)				
Base Capacity (vph)	692	604	1351	978
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	0.02	0.80	0.67	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

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Traffic Volume (vph)	5	4	2	236	0	189	0	608	194	91	422	0
Future Volume (vph)	5	4	2	236	0	189	0	608	194	91	422	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			3.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.98			0.94			0.87			1.00	
Flpb, ped/bikes		0.98			0.93			1.00			0.98	
Frt		0.98			0.94			0.96			1.00	
Flt Protected		0.98			0.97			1.00			0.99	
Satd. Flow (prot)		1733			1495			2759			3243	
Flt Permitted		0.87			0.82			1.00			0.63	
Satd. Flow (perm)		1538			1261			2759			2049	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	6	5	2	268	0	215	0	691	220	103	480	0
RTOR Reduction (vph)	0	1	0	0	24	0	0	36	0	0	0	0
Lane Group Flow (vph)	0	12	0	0	459	0	0	875	0	0	583	0
Confl. Peds. (#/hr)	86		90	90		86	128		216	216		128
Confl. Bikes (#/hr)									118			6
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	2%	2%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	30	30	12	30	30
Turn Type	Perm	NA		Perm	NA		NA		Perm	NA		NA
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.8			31.8			37.2			37.2	
Effective Green, g (s)		32.8			33.8			38.2			38.2	
Actuated g/C Ratio		0.41			0.42			0.48			0.48	
Clearance Time (s)		5.0			5.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		630			532			1317			978	
v/s Ratio Prot								c0.32				
v/s Ratio Perm		0.01			c0.36						0.28	
v/c Ratio		0.02			0.86			0.66			0.60	
Uniform Delay, d1		14.0			21.0			16.0			15.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.0			13.6			2.7			2.7	
Delay (s)		14.0			34.6			18.7			17.9	
Level of Service		B			C			B			B	
Approach Delay (s)		14.0			34.6			18.7			17.9	
Approach LOS		B			C			B			B	

Intersection Summary

HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1628: Shaw St & King St

09/30/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔			↔↔			↔↔			↔↔		
Traffic Volume (vph)	15	509	34	0	896	187	84	251	7	80	164	111
Future Volume (vph)	15	509	34	0	896	187	84	251	7	80	164	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Ped Bike Factor	0.99			0.97			0.98			0.94		
Frt	0.991			0.974			0.997			0.953		
Fit Protected	0.999						0.988			0.989		
Satd. Flow (prot)	0	2778	0	0	2811	0	0	3132	0	0	2703	0
Fit Permitted	0.903						0.716			0.739		
Satd. Flow (perm)	0	2510	0	0	2811	0	0	2237	0	0	1982	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	15			57			3			45		
Link Speed (k/h)	50			50			40			40		
Link Distance (m)	199.1			255.2			127.7			380.6		
Travel Time (s)	14.3			18.4			11.5			34.3		
Confl. Peds. (#/hr)	129		116	116		129	104		145	145		104
Confl. Bikes (#/hr)					42							
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	100%	6%	0%	100%	4%	0%	0%	1%	0%	19%	3%	7%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	18	599	40	0	1054	220	99	295	8	94	193	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	657	0	0	1274	0	0	402	0	0	418	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)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	1.16	1.23	1.16	1.16	1.23	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14		24		14		24		14	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
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		NA		Perm	NA		Perm	NA		NA

Lanes, Volumes, Timings
1628: Shaw St & King St

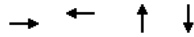
09/30/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	2			6			4			8		
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	22.0	22.0		22.0	22.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		26.0	26.0		26.0	26.0	
Total Split (s)	44.0	44.0		44.0	44.0		26.0	26.0		26.0	26.0	
Total Split (%)	62.9%	62.9%		62.9%	62.9%		37.1%	37.1%		37.1%	37.1%	
Maximum Green (s)	38.0	38.0		38.0	38.0		20.0	20.0		20.0	20.0	
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)			-1.0			-1.0			-1.0			-1.0
Total Lost Time (s)	5.0			5.0			5.0			5.0		
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	
Act Effct Green (s)	39.0			39.0			21.0			21.0		
Actuated g/C Ratio	0.56			0.56			0.30			0.30		
v/c Ratio	0.47			0.80			0.60			0.67		
Control Delay	10.4			16.7			25.1			25.2		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	10.4			16.7			25.1			25.2		
LOS	B			B			C			C		
Approach Delay	10.4			16.7			25.1			25.2		
Approach LOS	B			B			C			C		
Intersection Summary												
Area Type:	CBD											
Cycle Length:	70											
Actuated Cycle Length:	70											
Offset:	1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green											
Natural Cycle:	60											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.80											
Intersection Signal Delay:	17.7						Intersection LOS: B					
Intersection Capacity Utilization:	81.1%						ICU Level of Service D					
Analysis Period (min):	15											
Splits and Phases:	1628: Shaw St & King St											



Queues
1628: Shaw St & King St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	657	1274	402	418
v/c Ratio	0.47	0.80	0.60	0.67
Control Delay	10.4	16.7	25.1	25.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.4	16.7	25.1	25.2
Queue Length 50th (m)	24.0	61.2	23.2	22.2
Queue Length 95th (m)	32.7	78.1	34.0	33.8
Internal Link Dist (m)	175.1	231.2	103.7	356.6
Turn Bay Length (m)				
Base Capacity (vph)	1405	1591	673	626
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	0.47	0.80	0.60	0.67
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
1628: Shaw St & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔↔			↔↔	
Traffic Volume (vph)	15	509	34	0	896	187	84	251	7	80	164	111
Future Volume (vph)	15	509	34	0	896	187	84	251	7	80	164	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.99			0.97			1.00			0.96	
Flpb, ped/bikes		1.00			1.00			0.99			0.98	
Frt		0.99			0.97			1.00			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		2775			2811			3086			2652	
Flt Permitted		0.90			1.00			0.72			0.74	
Satd. Flow (perm)		2510			2811			2238			1983	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	18	599	40	0	1054	220	99	295	8	94	193	131
RTOR Reduction (vph)	0	7	0	0	25	0	0	2	0	0	32	0
Lane Group Flow (vph)	0	650	0	0	1249	0	0	400	0	0	387	0
Confl. Peds. (#/hr)	129		116	116		129	104		145	145		104
Confl. Bikes (#/hr)						42						
Heavy Vehicles (%)	100%	6%	0%	100%	4%	0%	0%	1%	0%	19%	3%	7%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		38.0			38.0			20.0			20.0	
Effective Green, g (s)		39.0			39.0			21.0			21.0	
Actuated g/C Ratio		0.56			0.56			0.30			0.30	
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)		1398			1566			671			594	
v/s Ratio Prot					c0.44							
v/s Ratio Perm		0.26						0.18			c0.19	
v/c Ratio		0.47			0.80			0.60			0.65	
Uniform Delay, d1		9.3			12.4			20.9			21.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			4.3			1.4			2.6	
Delay (s)		10.4			16.7			22.3			23.9	
Level of Service		B			B			C			C	
Approach Delay (s)		10.4			16.7			22.3			23.9	
Approach LOS		B			B			C			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)					70.0			Sum of lost time (s)			10.0	
Intersection Capacity Utilization					81.1%			ICU Level of Service			D	
Analysis Period (min)					15							

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)					70.0			Sum of lost time (s)			10.0	
Intersection Capacity Utilization					81.1%			ICU Level of Service			D	
Analysis Period (min)					15							

c Critical Lane Group

Lanes, Volumes, Timings
1851: King St & Sudbury St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	0	705	0	0	764	115	0	0	0	97	0	75
Future Volume (vph)	0	705	0	0	764	115	0	0	0	97	0	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.98						0.91	
Frt					0.980						0.941	
Fit Protected											0.973	
Satd. Flow (prot)	0	2707	0	0	2585	0	0	1691	0	0	1262	0
Fit Permitted											0.834	
Satd. Flow (perm)	0	2707	0	0	2585	0	0	1691	0	0	1041	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					34						51	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		318.4			199.1			158.6			196.7	
Travel Time (s)		22.9			14.3			11.4			14.2	
Confl. Peds. (#/hr)	76		183	183		76	91		59	59		91
Confl. Bikes (#/hr)						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 (%)	0%	13%	0%	0%	14%	12%	0%	0%	0%	17%	0%	16%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	0	727	0	0	788	119	0	0	0	100	0	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	727	0	0	907	0	0	0	0	0	177	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.16	1.23	1.16	1.16	1.23	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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		NA			NA					Perm		NA

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Lanes, Volumes, Timings
1851: King St & Sudbury St

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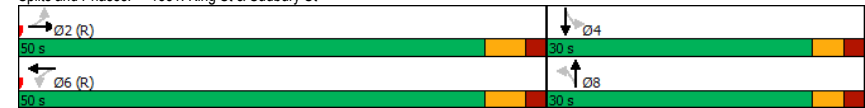


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2			6			8			4	4
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	24.0	24.0		24.0	24.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0		26.0	26.0	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Maximum Green (s)	44.0	44.0		44.0	44.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		5.0			5.0			4.0			4.0	
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		25	25		30	30		19	19	
Act Effect Green (s)		48.4			48.4						22.6	
Actuated g/C Ratio		0.60			0.60						0.28	
v/c Ratio		0.44			0.58						0.53	
Control Delay		9.8			11.2						23.6	
Queue Delay		0.0			0.0						0.0	
Total Delay		9.8			11.2						23.6	
LOS		A			B						C	
Approach Delay		9.8			11.2						23.6	
Approach LOS		A			B						C	

Intersection Summary

Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 11.8
 Intersection Capacity Utilization 53.2%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1851: King St & Sudbury St

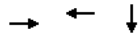


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Queues
1851: King St & Sudbury St

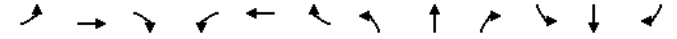
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Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	727	907	177
v/c Ratio	0.44	0.58	0.53
Control Delay	9.8	11.2	23.6
Queue Delay	0.0	0.0	0.0
Total Delay	9.8	11.2	23.6
Queue Length 50th (m)	27.5	37.1	15.9
Queue Length 95th (m)	43.7	59.0	33.7
Internal Link Dist (m)	294.4	175.1	172.7
Turn Bay Length (m)			
Base Capacity (vph)	1637	1576	372
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.44	0.58	0.48
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
1851: King St & Sudbury St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	0	705	0	0	764	115	0	0	0	97	0	75
Future Volume (vph)	0	705	0	0	764	115	0	0	0	97	0	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0							4.0
Lane Util. Factor		0.95			0.95							1.00
Frbp, ped/bikes		1.00			0.98							0.95
Flpb, ped/bikes		1.00			1.00							0.96
Frt		1.00			0.98							0.94
Flt Protected		1.00			1.00							0.97
Satd. Flow (prot)		2707			2586							1214
Flt Permitted		1.00			1.00							0.83
Satd. Flow (perm)		2707			2586							1041
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)	0	727	0	0	788	119	0	0	0	100	0	77
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	0	0	37	0
Lane Group Flow (vph)	0	727	0	0	894	0	0	0	0	0	140	0
Confl. Peds. (#/hr)	76		183	183		76	91		59	59		91
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	0%	13%	0%	0%	14%	12%	0%	0%	0%	17%	0%	16%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA			NA					Perm		NA
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.4			47.4							21.6
Effective Green, g (s)		48.4			48.4							22.6
Actuated g/C Ratio		0.60			0.60							0.28
Clearance Time (s)		6.0			6.0							5.0
Vehicle Extension (s)		3.0			3.0							3.0
Lane Grp Cap (vph)		1637			1564							294
v/s Ratio Prot		0.27			0.35							
v/s Ratio Perm												0.13
v/c Ratio		0.44			0.57							0.48
Uniform Delay, d1		8.5			9.5							23.8
Progression Factor		1.00			1.00							1.00
Incremental Delay, d2		0.9			1.5							1.2
Delay (s)		9.4			11.1							25.0
Level of Service		A			B							C
Approach Delay (s)		9.4			11.1			0.0				25.0
Approach LOS		A			B			A				C

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1912: Atlantic Ave & King St

09/30/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖↗			↖↗	↖	↗
Traffic Volume (vph)	453	285	2	624	255	270
Future Volume (vph)	453	285	2	624	255	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.0	3.0
Storage Length (m)		0.0	0.0		30.0	0.0
Storage Lanes		0	0		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.80			1.00	0.91	0.93
Frt	0.942					0.850
Flt Protected					0.950	
Satd. Flow (prot)	2192	0	0	2774	1486	1233
Flt Permitted				0.953	0.950	
Satd. Flow (perm)	2192	0	0	2643	1354	1149
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	268					33
Link Speed (k/h)	50			50	30	
Link Distance (m)	191.3			318.4	198.0	
Travel Time (s)	13.8			22.9	23.8	
Confl. Peds. (#/hr)		340	340		85	55
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	6%	3%	100%	10%	2%	10%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	521	328	2	717	293	310
Shared Lane Traffic (%)						
Lane Group Flow (vph)	849	0	0	719	293	310
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.23	1.16	1.16	1.23	1.25	1.25
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (m)	30.5		6.1	30.5	6.1	6.1
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)	1.8		6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+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)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		

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Lanes, Volumes, Timings
1912: Atlantic Ave & King St

09/30/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Detector Phase	2		6	6	8	8
Switch Phase						
Minimum Initial (s)	21.0		21.0	21.0	20.0	20.0
Minimum Split (s)	28.0		28.0	28.0	26.0	26.0
Total Split (s)	39.0		39.0	39.0	31.0	31.0
Total Split (%)	55.7%		55.7%	55.7%	44.3%	44.3%
Maximum Green (s)	32.0		32.0	32.0	25.0	25.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	3.0		3.0	3.0	2.0	2.0
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0
Total Lost Time (s)	6.0			6.0	5.0	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)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	14.0		14.0	14.0	13.0	13.0
Pedestrian Calls (#/hr)	100		8	8	28	28
Act Effct Green (s)	35.5			35.5	23.5	23.5
Actuated g/C Ratio	0.51			0.51	0.34	0.34
v/c Ratio	0.68			0.54	0.64	0.76
Control Delay	12.4			14.1	26.7	31.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	12.4			14.1	26.7	31.7
LOS	B			B	C	C
Approach Delay	12.4			14.1	29.3	
Approach LOS	B			B	C	

Intersection Summary

Area Type: CBD
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 6 (9%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 17.7 Intersection LOS: B
 Intersection Capacity Utilization 59.5% ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1912: Atlantic Ave & King St



Queues
1912: Atlantic Ave & King St

09/30/2021



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	849	719	293	310
v/c Ratio	0.68	0.54	0.64	0.76
Control Delay	12.4	14.1	26.7	31.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.4	14.1	26.7	31.7
Queue Length 50th (m)	27.4	31.5	31.8	31.7
Queue Length 95th (m)	47.0	47.0	50.7	#55.5
Internal Link Dist (m)	167.3	294.4	174.0	
Turn Bay Length (m)		30.0		
Base Capacity (vph)	1242	1338	502	447
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	0.54	0.58	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1912: Atlantic Ave & King St

09/30/2021



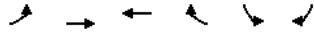
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (vph)	453	285	2	624	255	270
Future Volume (vph)	453	285	2	624	255	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.0	3.0
Total Lost time (s)				6.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	0.80			1.00	1.00	0.93
Fipb, ped/bikes	1.00			1.00	0.91	1.00
Frt	0.94			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2193			2773	1354	1149
Flt Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	2193			2643	1354	1149
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	521	328	2	717	293	310
RTOR Reduction (vph)	132	0	0	0	0	22
Lane Group Flow (vph)	717	0	0	719	293	288
Confl. Peds. (#/hr)		340	340		85	55
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	6%	3%	100%	10%	2%	10%
Bus Blockages (#/hr)	24	24	24	24	0	0
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Actuated Green, G (s)	34.5			34.5	22.5	22.5
Effective Green, g (s)	35.5			35.5	23.5	23.5
Actuated g/C Ratio	0.51			0.51	0.34	0.34
Clearance Time (s)	7.0			7.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1112			1340	454	385
v/s Ratio Prot	c0.33					
v/s Ratio Perm				0.27	0.22	c0.25
v/c Ratio	0.64			0.54	0.65	0.75
Uniform Delay, d1	12.6			11.7	19.7	20.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	2.9			1.5	3.1	7.8
Delay (s)	15.5			13.2	22.9	28.4
Level of Service	B			B	C	C
Approach Delay (s)	15.5			13.2	25.7	
Approach LOS	B			B	C	

Intersection Summary

HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

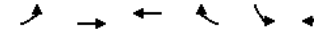
09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↔	
Traffic Volume (vph)	0	647	907	131	93	23
Future Volume (vph)	0	647	907	131	93	23
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			0.99		0.99	
Frt			0.981		0.973	
Fit Protected					0.962	
Satd. Flow (prot)	0	2941	2858	0	1459	0
Fit Permitted					0.962	
Satd. Flow (perm)	0	2941	2858	0	1459	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				38	15	
Link Speed (k/h)		50	50		50	
Link Distance (m)		316.7	191.3		100.8	
Travel Time (s)		22.8	13.8		7.3	
Confl. Peds. (#/hr)	42			42		15
Confl. Bikes (#/hr)				19		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	4%	4%	0%	0%	39%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	0	727	1019	147	104	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	727	1166	0	130	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.16	1.23	1.23	1.16	1.16	1.16
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Perm	

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		2	6			
Permitted Phases	2				8	
Detector Phase	2	2	6		8	
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0		18.0	
Minimum Split (s)	26.0	26.0	26.0		23.0	
Total Split (s)	55.0	55.0	55.0		25.0	
Total Split (%)	68.8%	68.8%	68.8%		31.3%	
Maximum Green (s)	49.0	49.0	49.0		20.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	None		None	
Walk Time (s)	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	
Pedestrian Calls (#/hr)	100	100	14		5	
Act Effct Green (s)		57.6	57.6		19.0	
Actuated g/C Ratio		0.72	0.72		0.24	
v/c Ratio		0.34	0.56		0.36	
Control Delay		6.3	8.3		25.9	
Queue Delay		0.0	0.0		0.0	
Total Delay		6.3	8.3		25.9	
LOS		A	A		C	
Approach Delay		6.3	8.3		25.9	
Approach LOS		A	A		C	

Intersection Summary

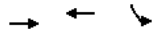
Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 8.7
 Intersection Capacity Utilization 55.4%
 Intersection LOS: A
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2081: King St & Joe Shuster Way



Queues
2081: King St & Joe Shuster Way

09/30/2021

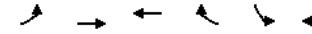


Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	727	1166	130
v/c Ratio	0.34	0.56	0.36
Control Delay	6.3	8.3	25.9
Queue Delay	0.0	0.0	0.0
Total Delay	6.3	8.3	25.9
Queue Length 50th (m)	23.6	46.1	14.5
Queue Length 95th (m)	32.3	62.3	29.1
Internal Link Dist (m)	292.7	167.3	76.8
Turn Bay Length (m)			
Base Capacity (vph)	2117	2068	394
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.34	0.56	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2081: King St & Joe Shuster Way

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓	↓
Traffic Volume (vph)	0	647	907	131	93	23
Future Volume (vph)	0	647	907	131	93	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	
Lane Util. Factor		0.95	0.95		1.00	
Frbp, ped/bikes		1.00	0.99		0.99	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.98		0.97	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		2941	2859		1458	
Flt Permitted		1.00	1.00		0.96	
Satd. Flow (perm)		2941	2859		1458	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	727	1019	147	104	26
RTOR Reduction (vph)	0	0	12	0	12	0
Lane Group Flow (vph)	0	727	1154	0	118	0
Confl. Peds. (#/hr)		42		42		15
Confl. Bikes (#/hr)				19		
Heavy Vehicles (%)	0%	4%	4%	0%	0%	39%
Bus Blockages (#/hr)	24	24	24	24	0	0
Turn Type		NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				8	
Actuated Green, G (s)		54.6	54.6		14.4	
Effective Green, g (s)		55.6	55.6		15.4	
Actuated g/C Ratio		0.70	0.70		0.19	
Clearance Time (s)		6.0	6.0		5.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		2043	1987		280	
v/s Ratio Prot		0.25	c0.40			
v/s Ratio Perm					c0.08	
v/c Ratio		0.36	0.58		0.42	
Uniform Delay, d1		4.9	6.2		28.4	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		0.5	0.4		1.0	
Delay (s)		5.4	6.7		29.4	
Level of Service		A	A		C	
Approach Delay (s)		5.4	6.7		29.4	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑	↘	↙	↓
Traffic Volume (vph)	56	227	732	21	86	824
Future Volume (vph)	56	227	732	21	86	824
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.0	3.5	3.0	3.0	3.5
Storage Length (m)	30.0	0.0		15.0	30.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.86		0.94		
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1685	1304	1842	1507	1478	1842
Fit Permitted	0.950				0.159	
Satd. Flow (perm)	1685	1122	1842	1416	247	1842
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		94		7		
Link Speed (k/h)	30		30			30
Link Distance (m)	148.7		265.9			191.3
Travel Time (s)	17.8		31.9			23.0
Confl. Peds. (#/hr)				27	27	
Confl. Bikes (#/hr)		117		2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	11%	2%	0%	14%	2%
Bus Blockages (#/hr)	0	10	0	0	0	0
Adj. Flow (vph)	63	255	822	24	97	926
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	255	822	24	97	926
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.0		3.0			3.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.09	1.15	1.01	1.09	1.09	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	6.1	6.1	30.5	6.1	6.1	30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	6.1	1.8	6.1	6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	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
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8

Scenario 1 Future Background PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

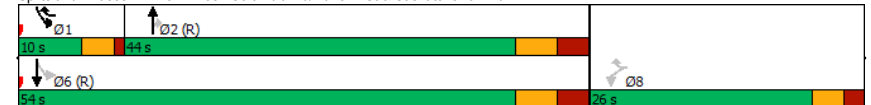
09/30/2021

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	21.0	6.0	27.0	27.0	6.0	27.0
Minimum Split (s)	26.0	10.0	34.0	34.0	10.0	34.0
Total Split (s)	26.0	10.0	44.0	44.0	10.0	54.0
Total Split (%)	32.5%	12.5%	55.0%	55.0%	12.5%	67.5%
Maximum Green (s)	21.0	6.0	37.0	37.0	6.0	47.0
Yellow Time (s)	3.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	1.0	3.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Walk Time (s)	7.0		7.0	7.0		0.0
Flash Dont Walk (s)	14.0		20.0	20.0		0.0
Pedestrian Calls (#/hr)	0		9	9		0
Act Effct Green (s)	22.0	22.3	46.9	46.9	61.4	60.8
Actuated g/C Ratio	0.28	0.28	0.59	0.59	0.77	0.76
v/c Ratio	0.14	0.64	0.76	0.03	0.30	0.66
Control Delay	22.9	20.4	22.8	9.1	7.4	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	22.9	20.4	22.8	9.1	7.4	13.3
LOS	C	C	C	A	A	B
Approach Delay	20.9		22.4			12.7
Approach LOS	C		C			B

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 31 (39%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 17.7 Intersection LOS: B
 Intersection Capacity Utilization 72.7% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 2134: British Columbia Rd/Dufferin St & Saskatchewan Rd



Queues

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	63	255	822	24	97	926
v/c Ratio	0.14	0.64	0.76	0.03	0.30	0.66
Control Delay	22.9	20.4	22.8	9.1	7.4	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	22.9	20.4	22.8	9.1	7.4	13.3
Queue Length 50th (m)	7.2	15.9	112.9	1.3	5.1	102.3
Queue Length 95th (m)	16.0	33.9	#184.8	4.9	10.2	#164.9
Internal Link Dist (m)	124.7		241.9			167.3
Turn Bay Length (m)	30.0			15.0	30.0	
Base Capacity (vph)	463	399	1080	833	319	1400
Starvation Cap Reductn	0	0	0	0	0	52
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.64	0.76	0.03	0.30	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021



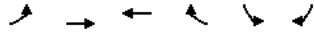
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Traffic Volume (vph)	56	227	732	21	86	824
Future Volume (vph)	56	227	732	21	86	824
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.5	3.0	3.0	3.5
Total Lost time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.89	1.00	0.94	1.00	1.00
Fpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1685	1162	1842	1416	1477	1842
Flt Permitted	0.95	1.00	1.00	1.00	0.16	1.00
Satd. Flow (perm)	1685	1162	1842	1416	247	1842
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	63	255	822	24	97	926
RTOR Reduction (vph)	0	68	0	3	0	0
Lane Group Flow (vph)	63	187	822	21	97	926
Confl. Peds. (#/hr)			27		27	
Confl. Bikes (#/hr)		117		2		
Heavy Vehicles (%)	0%	11%	2%	0%	14%	2%
Bus Blockages (#/hr)	0	10	0	0	0	0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	12.6	20.1	43.9	43.9	55.4	55.4
Effective Green, g (s)	13.6	22.1	44.9	44.9	56.4	56.4
Actuated g/C Ratio	0.17	0.28	0.56	0.56	0.70	0.70
Clearance Time (s)	5.0	4.0	7.0	7.0	4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	321	1033	794	304	1298
v/s Ratio Prot		c0.06	c0.45		0.03	c0.50
v/s Ratio Perm	0.04	0.10		0.01	0.19	
v/c Ratio	0.22	0.58	0.80	0.03	0.32	0.71
Uniform Delay, d1	28.6	25.0	13.9	7.8	9.0	7.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	2.7	6.3	0.1	0.6	3.4
Delay (s)	29.0	27.7	20.3	7.9	9.7	10.4
Level of Service	C	C	C	A	A	B
Approach Delay (s)	27.9		19.9			10.3
Approach LOS	C		B			B

Intersection Summary

HCM 2000 Control Delay	16.6	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)	14.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
9023: New Liberty St & Atlantic Ave

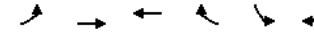
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	9	159	42	15	93	78
Future Volume (vph)	9	159	42	15	93	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97	0.83		0.60	
Frt			0.964		0.938	
Fit Protected		0.997			0.974	
Satd. Flow (prot)	0	1734	1467	0	1458	0
Fit Permitted		0.989			0.974	
Satd. Flow (perm)	0	1666	1467	0	1002	0
Right Turn on Red			Yes		Yes	
Satd. Flow (RTOR)			17		2	
Link Speed (k/h)		40	40		50	
Link Distance (m)		87.6	198.4		42.4	
Travel Time (s)		7.9	17.9		3.1	
Confl. Peds. (#/hr)	871			871	636	200
Confl. Bikes (#/hr)				14		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Bus Blockages (#/hr)	0	14	0	0	0	0
Adj. Flow (vph)	10	177	47	17	103	87
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	187	64	0	190	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.09	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	6			

Lanes, Volumes, Timings
9023: New Liberty St & Atlantic Ave

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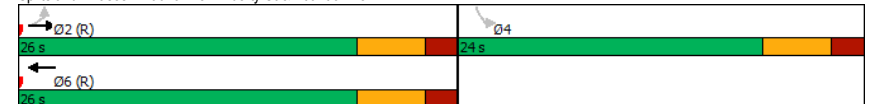


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2				4	
Detector Phase	2	2	6		4	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0		7.0	
Minimum Split (s)	24.0	24.0	24.0		24.0	
Total Split (s)	26.0	26.0	26.0		24.0	
Total Split (%)	52.0%	52.0%	52.0%		48.0%	
Maximum Green (s)	20.0	20.0	20.0		18.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	C-Max		None	
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)	100	100	100		100	
Act Effct Green (s)	28.1	28.1	28.1		15.6	
Actuated g/C Ratio		0.56	0.56		0.31	
v/c Ratio		0.20	0.08		0.61	
Control Delay		9.5	7.3		22.2	
Queue Delay		0.0	0.0		0.0	
Total Delay		9.5	7.3		22.2	
LOS		A	A		C	
Approach Delay		9.5	7.3		22.2	
Approach LOS		A	A		C	

Intersection Summary

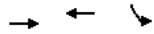
Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 14.6
 Intersection Capacity Utilization 38.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 9023: New Liberty St & Atlantic Ave



Queues
9023: New Liberty St & Atlantic Ave

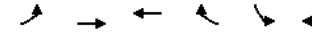
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Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	187	64	190
v/c Ratio	0.20	0.08	0.61
Control Delay	9.5	7.3	22.2
Queue Delay	0.0	0.0	0.0
Total Delay	9.5	7.3	22.2
Queue Length 50th (m)	10.3	2.4	12.2
Queue Length 95th (m)	20.8	7.6	27.5
Internal Link Dist (m)	63.6	174.4	18.4
Turn Bay Length (m)			
Base Capacity (vph)	935	831	382
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.20	0.08	0.50
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
9023: New Liberty St & Atlantic Ave

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (vph)	9	159	42	15	93	78
Future Volume (vph)	9	159	42	15	93	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	
Lane Util. Factor		1.00	1.00		1.00	
Frbp, ped/bikes		1.00	0.83		0.87	
Flpb, ped/bikes		0.97	1.00		0.69	
Frt		1.00	0.96		0.94	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		1680	1468		1002	
Flt Permitted		0.99	1.00		0.97	
Satd. Flow (perm)		1666	1468		1002	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	177	47	17	103	87
RTOR Reduction (vph)	0	0	8	0	1	0
Lane Group Flow (vph)	0	187	56	0	189	0
Confl. Peds. (#/hr)	871			871	636	200
Confl. Bikes (#/hr)				14		
Bus Blockages (#/hr)	0	14	0	0	0	0
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				4	
Actuated Green, G (s)		24.9	24.9		13.1	
Effective Green, g (s)		25.9	25.9		14.1	
Actuated g/C Ratio		0.52	0.52		0.28	
Clearance Time (s)		6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		862	760		282	
v/s Ratio Prot			0.04			
v/s Ratio Perm		c0.11			c0.19	
v/c Ratio		0.22	0.07		0.67	
Uniform Delay, d1		6.5	6.0		15.9	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		0.6	0.2		5.9	
Delay (s)		7.1	6.2		21.8	
Level of Service		A	A		C	
Approach Delay (s)		7.1	6.2		21.8	
Approach LOS		A	A		C	
Intersection Summary						
HCM 2000 Control Delay		13.3			HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio		0.39				
Actuated Cycle Length (s)		50.0			Sum of lost time (s)	11.0
Intersection Capacity Utilization		38.9%			ICU Level of Service	A
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	162	53	828	158	12	768
Future Volume (vph)	162	53	828	158	12	768
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	0.0	0.0		
Storage Lanes	1	1		0	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.79	0.98			
Frt		0.850	0.978			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1750	1566	1766	0	1750	1842
Flt Permitted	0.950				0.134	
Satd. Flow (perm)	1750	1240	1766	0	247	1842
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		58	24			
Link Speed (k/h)	40		30		30	
Link Distance (m)	107.6		191.3		74.7	
Travel Time (s)	9.7		23.0		9.0	
Conf. Peds. (#/hr)		137				
Conf. Bikes (#/hr)		2		118		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	180	59	920	176	13	853
Shared Lane Traffic (%)						
Lane Group Flow (vph)	180	59	1096	0	13	853
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5		3.5	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
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)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+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)			28.7		28.7	
Detector 2 Size(m)			1.8		1.8	
Detector 2 Type			CI+Ex		CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)			0.0		0.0	

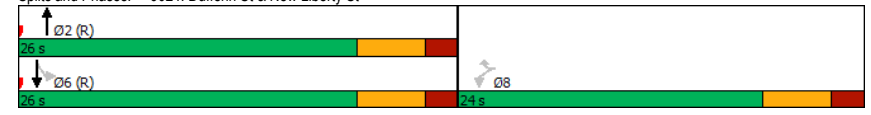
Scenario 1 Future Background PM 11:59 pm 05/05/2014 No Improvements
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Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0		7.0	7.0
Minimum Split (s)	24.0	24.0	24.0		24.0	24.0
Total Split (s)	24.0	24.0	26.0		26.0	26.0
Total Split (%)	48.0%	48.0%	52.0%		52.0%	52.0%
Maximum Green (s)	18.0	18.0	20.0		20.0	20.0
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)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	11.5	11.5	32.1		32.1	32.1
Actuated g/C Ratio	0.23	0.23	0.64		0.64	0.64
v/c Ratio	0.45	0.18	0.96		0.08	0.72
Control Delay	19.4	6.2	36.2		8.1	15.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	19.4	6.2	36.2		8.1	15.7
LOS	B	A	D		A	B
Approach Delay	16.1		36.2			15.6
Approach LOS	B		D			B
Intersection Summary						
Area Type:	Other					
Cycle Length:	50					
Actuated Cycle Length:	50					
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green					
Natural Cycle:	80					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	0.96					
Intersection Signal Delay:	25.9			Intersection LOS: C		
Intersection Capacity Utilization:	76.5%			ICU Level of Service D		
Analysis Period (min):	15					
Splits and Phases:	9024: Dufferin St & New Liberty St					



Scenario 1 Future Background PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Queues
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	180	59	1096	13	853
v/c Ratio	0.45	0.18	0.96	0.08	0.72
Control Delay	19.4	6.2	36.2	8.1	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	6.2	36.2	8.1	15.7
Queue Length 50th (m)	13.8	0.1	~113.5	0.4	51.8
Queue Length 95th (m)	24.6	5.9	#190.0	3.0	#132.6
Internal Link Dist (m)	83.6		167.3		50.7
Turn Bay Length (m)	15.0				
Base Capacity (vph)	665	507	1141	158	1181
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	0.27	0.12	0.96	0.08	0.72

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.

HCM Signalized Intersection Capacity Analysis
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑		↖	↗
Traffic Volume (vph)	162	53	828	158	12	768
Future Volume (vph)	162	53	828	158	12	768
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	0.79	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1238	1775		1750	1842
Fit Permitted	0.95	1.00	1.00		0.13	1.00
Satd. Flow (perm)	1750	1238	1775		246	1842
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	180	59	920	176	13	853
RTOR Reduction (vph)	0	46	10	0	0	0
Lane Group Flow (vph)	180	13	1086	0	13	853
Confl. Peds. (#/hr)		137				
Confl. Bikes (#/hr)		2		118		
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Actuated Green, G (s)	9.1	9.1	28.9		28.9	28.9
Effective Green, g (s)	10.1	10.1	29.9		29.9	29.9
Actuated g/C Ratio	0.20	0.20	0.60		0.60	0.60
Clearance Time (s)	6.0	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)	353	250	1061		147	1101
v/s Ratio Prot			c0.61			0.46
v/s Ratio Perm	c0.10	0.01			0.05	
v/c Ratio	0.51	0.05	1.02		0.09	0.77
Uniform Delay, d1	17.7	16.1	10.1		4.3	7.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.2	0.1	33.8		1.2	5.3
Delay (s)	18.9	16.2	43.9		5.5	12.9
Level of Service	B	B	D		A	B
Approach Delay (s)	18.2		43.9			12.8
Approach LOS	B		D			B

Intersection Summary

HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9025: Strachan Ave & New Liberty St

09/30/2021

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	228	0	720	670	41
Future Volume (vph)	0	228	0	720	670	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	15.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.992	
Flt Protected						
Satd. Flow (prot)	1842	1566	1842	1842	1827	0
Flt Permitted						
Satd. Flow (perm)	1842	1566	1842	1842	1827	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	579.0			241.4	424.1	
Travel Time (s)	52.1			21.7	38.2	
Confl. Bikes (#/hr)						18
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	253	0	800	744	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	253	0	800	790	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.5%
Analysis Period (min)	15
	ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
9025: Strachan Ave & New Liberty St

09/30/2021

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	228	0	720	670	41
Future Volume (Veh/h)	0	228	0	720	670	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	253	0	800	744	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				241		
pX, platoon unblocked	0.71					
vC, conflicting volume	1567	767	790			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1594	767	790			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	37	100			
cM capacity (veh/h)	84	402	830			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	0	253	0	800	790
Volume Left	0	0	0	0	0
Volume Right	0	253	0	0	46
cSH	1700	402	1700	1700	1700
Volume to Capacity	0.00	0.63	0.00	0.47	0.46
Queue Length 95th (m)	0.0	31.6	0.0	0.0	0.0
Control Delay (s)	0.0	28.0	0.0	0.0	0.0
Lane LOS	A	D			
Approach Delay (s)	28.0		0.0		0.0
Approach LOS	D				

Intersection Summary	
Average Delay	3.8
Intersection Capacity Utilization	58.5%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	139	7	208	77	88	60	125	473	87	88	706	67
Future Volume (vph)	139	7	208	77	88	60	125	473	87	88	706	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	25.0		0.0	0.0		50.0	30.0		0.0	25.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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	0.79	0.85			0.96	0.69		0.98		0.98	0.99	
Fr		0.855				0.850		0.977			0.987	
Fit Protected	0.950				0.977		0.950			0.950		
Satd. Flow (prot)	1589	1287	0	0	1605	1507	1652	1686	0	1574	1709	0
Fit Permitted	0.559				0.561		0.069			0.338		
Satd. Flow (perm)	743	1287	0	0	888	1044	120	1686	0	547	1709	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		219				191		7			3	
Link Speed (k/h)		30			50			40			40	
Link Distance (m)		143.4			229.0			205.6			241.4	
Travel Time (s)		17.2			16.5			18.5			21.7	
Confl. Peds. (#/hr)	122		55	55		122	37		33	33		37
Confl. Bikes (#/hr)			3									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 (%)	6%	12%	6%	1%	26%	0%	2%	8%	2%	7%	8%	1%
Adj. Flow (vph)	146	7	219	81	93	63	132	498	92	93	743	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	146	226	0	0	174	63	132	590	0	93	814	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)		3.0			3.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.09	1.01	1.01	1.01	1.01	1.09	1.09	1.01	1.01	1.09	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	2.0	2.0	30.5		2.0	30.5	
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)	6.1	1.8		6.1	1.8	2.0	2.0	1.8		2.0	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021

Lane Group	Ø10	Ø12	Ø14	Ø16
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (m)				
Storage Length (m)				
Storage Lanes				
Taper Length (m)				
Lane Util. Factor				
Ped Bike Factor				
Fr				
Fit Protected				
Satd. Flow (prot)				
Fit Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (k/h)				
Link Distance (m)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(m)				
Link Offset(m)				
Crosswalk Width(m)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (k/h)				
Number of Detectors				
Detector Template				
Leading Detector (m)				
Trailing Detector (m)				
Detector 1 Position(m)				
Detector 1 Size(m)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(m)				
Detector 2 Size(m)				
Detector 2 Type				

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		6	6	
Switch Phase												
Minimum Initial (s)	32.0	32.0		32.0	32.0	32.0	7.0	29.0		29.0	29.0	
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	14.0	36.0		36.0	36.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	14.0	71.0		57.0	57.0	
Total Split (%)	25.3%	25.3%		25.3%	25.3%	25.3%	9.1%	46.1%		37.0%	37.0%	
Maximum Green (s)	32.0	32.0		32.0	32.0	32.0	7.0	64.0		50.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0	-1.0			-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lag	Lag	
Lead-Lag Optimize?							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	Max	Max		Max	Max	Max	None	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0	25.0		22.0		22.0	22.0	
Pedestrian Calls (#/hr)	18	18		100	100	100		11		12	12	
Act Effct Green (s)	33.5	33.5		33.5	33.5	65.9	65.9	51.7		51.7		
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.54	0.54	0.42		0.42		
v/c Ratio	0.72	0.44		0.72	0.15	0.80	0.65	0.40		1.12		
Control Delay	64.2	9.0		60.7	0.7	56.8	26.7	35.4		106.0		
Queue Delay	0.0	0.0		0.0	0.0	0.0	1.1	0.0		0.0	0.0	
Total Delay	64.2	9.0		60.7	0.7	56.8	27.8	35.4		106.0		
LOS	E	A		E	A	E	C	D		F		
Approach Delay		30.7			44.8		33.1			98.8		
Approach LOS		C			D		C			F		

Intersection Summary

Area Type: Other

Cycle Length: 154

Actuated Cycle Length: 122

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 60.6

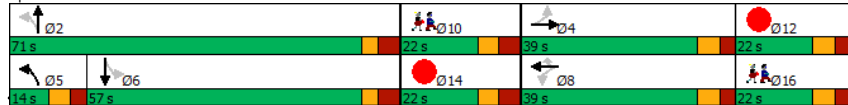
Intersection LOS: E

Intersection Capacity Utilization 128.1%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 571: Strachan Ave & Canada Blvd/Fleet St



Scenario 1 Future Background PM 11:59 pm 05/05/2014 With Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021

Lane Group	Ø10	Ø12	Ø14	Ø16
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	10	12	14	16
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	22.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0
Total Split (%)	14%	14%	14%	14%
Maximum Green (s)	14.0	14.0	14.0	14.0
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	0.0	0.0	0.0	0.0
Flash Dont Walk (s)	0.0	0.0	0.0	0.0
Pedestrian Calls (#/hr)	16	16	16	16
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary

Scenario 1 Future Background PM 11:59 pm 05/05/2014 With Improvements
HDR Corporation

Synchro 11 Report
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Queues

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	146	226	174	63	132	590	93	814
v/c Ratio	0.72	0.44	0.72	0.15	0.80	0.65	0.40	1.12
Control Delay	64.2	9.0	60.7	0.7	56.8	26.7	35.4	106.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Total Delay	64.2	9.0	60.7	0.7	56.8	27.8	35.4	106.0
Queue Length 50th (m)	27.2	1.1	32.5	0.0	13.4	73.8	12.5	~186.5
Queue Length 95th (m)	#77.2	23.7	#86.9	0.0	#62.7	178.5	38.3	#366.8
Internal Link Dist (m)		119.4	205.0			181.6		217.4
Turn Bay Length (m)	25.0			50.0	30.0		25.0	
Base Capacity (vph)	203	511	243	424	166	914	231	725
Starvation Cap Reductn	0	0	0	0	0	141	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	0.72	0.44	0.72	0.15	0.80	0.76	0.40	1.12

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.

HCM Signalized Intersection Capacity Analysis

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	139	7	208	77	88	60	125	473	87	88	706	67
Future Volume (vph)	139	7	208	77	88	60	125	473	87	88	706	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.87		1.00	0.73	1.00	0.99	1.00		1.00	0.99	
Fipb, ped/bikes	0.82	1.00		0.97	1.00	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	0.85		1.00	0.85	1.00	0.98	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.98	1.00	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1297	1314		1551	1105	1652	1689	1533		1711	1711	
Flt Permitted	0.56	1.00		0.56	1.00	0.07	1.00	0.34		1.00	1.00	
Satd. Flow (perm)	763	1314		891	1105	120	1689	545		1711	1711	
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)	146	7	219	81	93	63	132	498	92	93	743	71
RTOR Reduction (vph)	0	164	0	0	0	47	0	4	0	0	2	0
Lane Group Flow (vph)	146	62	0	0	174	16	132	586	0	93	812	0
Confl. Peds. (#/hr)	122		55	55		122	37		33	33		37
Confl. Bikes (#/hr)			3									2
Heavy Vehicles (%)	6%	12%	6%	1%	26%	0%	2%	8%	2%	7%	8%	1%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	32.4	32.4		32.4	32.4	64.9	64.9	64.9		50.8	50.8	
Effective Green, g (s)	33.4	33.4		33.4	33.4	65.9	65.9	65.9		51.8	51.8	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.50	0.50	0.50		0.39	0.39	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	332		225	279	153	842	213		670	670	
v/s Ratio Prot		0.05				0.05	c0.35				c0.47	
v/s Ratio Perm	0.19			c0.20	0.01	0.37				0.17		
v/c Ratio	0.76	0.19		0.77	0.06	0.86	0.70	0.44		1.21		
Uniform Delay, d1	45.6	38.7		45.8	37.4	32.7	25.4	29.4		40.1		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	24.3	1.2		22.4	0.4	36.2	4.7	6.4		108.9		
Delay (s)	69.9	40.0		68.2	37.8	68.9	30.2	35.8		149.1		
Level of Service	E	D		E	D	E	C	D		F		
Approach Delay (s)		51.7			60.1		37.2			137.5		
Approach LOS		D			E		D			F		

Intersection Summary

HCM 2000 Control Delay	82.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	132.1	Sum of lost time (s)	34.0
Intersection Capacity Utilization	128.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Traffic Volume (vph)	162	53	828	158	12	768
Future Volume (vph)	162	53	828	158	12	768
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	0.0	0.0		
Storage Lanes	1	1		0	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.64	0.99			
Frt		0.850	0.978			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1750	1566	1777	0	1750	1842
Flt Permitted	0.950				0.131	
Satd. Flow (perm)	1750	1005	1777	0	241	1842
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		59	24			
Link Speed (k/h)	40		30		30	
Link Distance (m)	107.6		191.3		74.7	
Travel Time (s)	9.7		23.0		9.0	
Conf. Peds. (#/hr)		137				
Conf. Bikes (#/hr)		2		118		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	180	59	920	176	13	853
Shared Lane Traffic (%)						
Lane Group Flow (vph)	180	59	1096	0	13	853
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5		3.5	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
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)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+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)			28.7		28.7	
Detector 2 Size(m)			1.8		1.8	
Detector 2 Type			CI+Ex		CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)			0.0		0.0	

Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0		7.0	7.0
Minimum Split (s)	24.0	24.0	24.0		24.0	24.0
Total Split (s)	24.0	24.0	66.0		66.0	66.0
Total Split (%)	26.7%	26.7%	73.3%		73.3%	73.3%
Maximum Green (s)	18.0	18.0	60.0		60.0	60.0
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)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	15.1	15.1	64.9		64.9	64.9
Actuated g/C Ratio	0.17	0.17	0.72		0.72	0.72
v/c Ratio	0.61	0.27	0.85		0.08	0.64
Control Delay	43.5	11.9	18.4		5.9	10.0
Queue Delay	0.0	0.0	3.8		0.0	0.0
Total Delay	43.5	11.9	22.2		5.9	10.0
LOS	D	B	C		A	B
Approach Delay	35.7		22.2			9.9
Approach LOS	D		C			A
Intersection Summary						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	90					
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green					
Natural Cycle:	80					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	0.85					
Intersection Signal Delay:	18.9			Intersection LOS: B		
Intersection Capacity Utilization:	76.5%			ICU Level of Service D		
Analysis Period (min):	15					
Splits and Phases:	9024: Dufferin St & New Liberty St					



Queues
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	180	59	1096	13	853
v/c Ratio	0.61	0.27	0.85	0.08	0.64
Control Delay	43.5	11.9	18.4	5.9	10.0
Queue Delay	0.0	0.0	3.8	0.0	0.0
Total Delay	43.5	11.9	22.2	5.9	10.0
Queue Length 50th (m)	29.0	0.0	114.5	0.6	65.5
Queue Length 95th (m)	47.3	9.7	#249.9	2.8	116.4
Internal Link Dist (m)	83.6		167.3		50.7
Turn Bay Length (m)	15.0				
Base Capacity (vph)	369	258	1288	173	1328
Starvation Cap Reductn	0	0	125	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.23	0.94	0.08	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
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑		↖	↗
Traffic Volume (vph)	162	53	828	158	12	768
Future Volume (vph)	162	53	828	158	12	768
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	0.64	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	1004	1779		1750	1842
Fit Permitted	0.95	1.00	1.00		0.13	1.00
Satd. Flow (perm)	1750	1004	1779		241	1842
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	180	59	920	176	13	853
RTOR Reduction (vph)	0	49	7	0	0	0
Lane Group Flow (vph)	180	10	1089	0	13	853
Confl. Peds. (#/hr)		137				
Confl. Bikes (#/hr)		2		118		
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Actuated Green, G (s)	14.1	14.1	63.9		63.9	63.9
Effective Green, g (s)	15.1	15.1	64.9		64.9	64.9
Actuated g/C Ratio	0.17	0.17	0.72		0.72	0.72
Clearance Time (s)	6.0	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)	293	168	1282		173	1328
v/s Ratio Prot			c0.61			0.46
v/s Ratio Perm	c0.10	0.01			0.05	
v/c Ratio	0.61	0.06	0.85		0.08	0.64
Uniform Delay, d1	34.7	31.5	9.0		3.7	6.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.8	0.1	7.2		0.8	2.4
Delay (s)	38.5	31.6	16.2		4.5	8.9
Level of Service	D	C	B		A	A
Approach Delay (s)	36.8		16.2			8.9
Approach LOS	D		B			A

Intersection Summary

HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔		↔	↔		↔	↔
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	30.0		0.0	20.0		20.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	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	1.00	1.00	1.00
Ped Bike Factor				1.00				0.99				0.97
Frt						0.850						0.865
Fit Protected	0.950			0.950				0.957				
Satd. Flow (prot)	1685	1824	0	1685	1756	1507	0	1798	0	0	1574	0
Fit Permitted	0.555			0.494								
Satd. Flow (perm)	984	1824	0	874	1756	1507	0	1860	0	0	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						45						514
Link Speed (k/h)		30			30			30				30
Link Distance (m)		164.9			265.9			92.0				121.3
Travel Time (s)		19.8			31.9			11.0				14.6
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
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 (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	470	0	1	342	1	8	1	0	0	0	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	29	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)		3.0			3.0			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	1.09	1.01	1.01	1.09	1.01	1.09	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Scenario 1 Total Future AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8		2			6	
Detector Phase	4	4		8	8	8		2			6	6
Switch Phase												
Minimum Initial (s)	33.0	33.0		33.0	33.0	33.0		7.0			7.0	7.0
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0		24.0			24.0	24.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0		25.0			25.0	25.0
Total Split (%)	65.3%	65.3%		65.3%	65.3%	65.3%		34.7%			34.7%	34.7%
Maximum Green (s)	41.0	41.0		41.0	41.0	41.0		19.0			19.0	19.0
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)	-1.0	-1.0		-1.0	-1.0	-1.0		-1.0			-1.0	-1.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0			5.0	5.0
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	Max		None			None	None
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	9.0	9.0		9.0	9.0	9.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0		0			0	0
Act Effct Green (s)	58.5	58.5		58.5	58.5	58.5		8.0			8.0	8.0
Actuated g/C Ratio	0.90	0.90		0.90	0.90	0.90		0.12			0.12	0.12
v/c Ratio	0.00	0.29		0.00	0.22	0.00		0.04			0.05	0.05
Control Delay	2.0	2.3		2.0	2.1	0.0		27.0			0.1	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	2.0	2.3		2.0	2.1	0.0		27.0			0.1	0.1
LOS	A	A		A	A	A		C			A	A
Approach Delay		2.3			2.1			27.0			0.1	
Approach LOS		A			A			C			A	

Intersection Summary

Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	65.2
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.29
Intersection Signal Delay:	2.4
Intersection LOS:	A
Intersection Capacity Utilization:	73.3%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 97: Yukon Place & British Columbia Rd



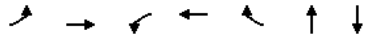
Scenario 1 Total Future AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Queues

97: Yukon Place & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	1	470	1	342	1	9	29
v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.04	0.05
Control Delay	2.0	2.3	2.0	2.1	0.0	27.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.0	2.3	2.0	2.1	0.0	27.0	0.1
Queue Length 50th (m)	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Queue Length 95th (m)	0.3	26.4	0.3	18.3	0.0	4.5	0.0
Internal Link Dist (m)		140.9		241.9		68.0	97.3
Turn Bay Length (m)	30.0		20.0		20.0		
Base Capacity (vph)	882	1635	783	1574	1356	574	840
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.02	0.03

Intersection Summary

HCM Signalized Intersection Capacity Analysis

97: Yukon Place & British Columbia Rd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔		↔	↔	↔	↔	↔
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0				5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00				0.97
Fipb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99				1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00				0.86
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96				1.00
Satd. Flow (prot)	1685	1824		1681	1756	1507		1781				1574
Flt Permitted	0.56	1.00		0.49	1.00	1.00		1.00				1.00
Satd. Flow (perm)	985	1824		873	1756	1507		1860				1574
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)	1	470	0	1	342	1	8	1	0	0	0	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	27
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	2	0
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				NA
Protected Phases		4			8		8		2			6
Permitted Phases	4			8		8	2				6	
Actuated Green, G (s)	54.3	54.3		54.3	54.3	54.3		2.6				2.6
Effective Green, g (s)	55.3	55.3		55.3	55.3	55.3		3.6				3.6
Actuated g/C Ratio	0.80	0.80		0.80	0.80	0.80		0.05				0.05
Clearance Time (s)	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
Lane Grp Cap (vph)	790	1463		700	1409	1209		97				82
v/s Ratio Prot		0.26			0.19							0.00
v/s Ratio Perm	0.00			0.00		0.00		0.00				0.02
v/c Ratio	0.00	0.32		0.00	0.24	0.00		0.09				0.02
Uniform Delay, d1	1.3	1.8		1.3	1.7	1.3		31.1				31.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Incremental Delay, d2	0.0	0.6		0.0	0.4	0.0		0.4				0.1
Delay (s)	1.3	2.4		1.3	2.1	1.3		31.5				31.1
Level of Service	A	A		A	A	A		C				C
Approach Delay (s)		2.4			2.1			31.5				31.1
Approach LOS		A			A			C				C

Intersection Summary

HCM 2000 Control Delay	3.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	68.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

222: Strachan Ave & Lakeshore Blvd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑			↑↑↑				↑↑		↑↑		
Traffic Volume (vph)	502	3996	5	8	1196	0	0	40	0	297	21	235
Future Volume (vph)	502	3996	5	8	1196	0	0	40	0	297	21	235
Ideal Flow (vphpl)	2150	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Storage Length (m)	60.0		0.0	60.0		50.0	0.0		0.0	140.0		50.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	7.5			7.5		7.5			7.5			
Lane Util. Factor	1.00	*1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00										0.92
Frt												0.850
Fit Protected	0.950			0.950						0.950	0.958	
Satd. Flow (prot)	1643	5990	0	1685	4885	0	0	1879	0	1585	1695	1507
Fit Permitted	0.087			0.098						0.728	0.721	
Satd. Flow (perm)	151	5990	0	174	4885	0	0	1879	0	1214	1276	1388
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												261
Link Speed (k/h)		60			60			40				40
Link Distance (m)		310.3			196.6			116.5				205.6
Travel Time (s)		18.6			11.8			10.5				18.5
Confl. Peds. (#/hr)	6		8	8		6	52					52
Confl. Bikes (#/hr)								40				17
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 (%)	16%	4%	0%	0%	5%	33%	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	558	4440	6	9	1329	0	0	44	0	330	23	261
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	558	4446	0	9	1329	0	0	44	0	168	185	261
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)		3.0			3.0			3.0				3.0
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	0.93	0.89	1.01	1.09	1.01	1.09	1.01	1.01	1.01	1.09	1.01	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
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)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex

Scenario 1 Total Future AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

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Lanes, Volumes, Timings

222: Strachan Ave & Lakeshore Blvd

09/30/2021

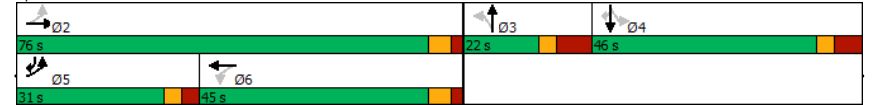


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA			NA		Perm	NA	pm+ov
Protected Phases	5	2			6			3			4	5
Permitted Phases	2			6				3			4	4
Detector Phase	5	2		6	6			3	3		4	4
Switch Phase												
Minimum Initial (s)	6.0	29.0		30.0	30.0		12.0	12.0		10.0	10.0	6.0
Minimum Split (s)	12.0	35.0		36.0	36.0		21.0	21.0		45.0	45.0	12.0
Total Split (s)	31.0	76.0		45.0	45.0		22.0	22.0		46.0	46.0	31.0
Total Split (%)	21.5%	52.8%		31.3%	31.3%		15.3%	15.3%		31.9%	31.9%	21.5%
Maximum Green (s)	25.0	70.0		39.0	39.0		13.0	13.0		38.0	38.0	25.0
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	3.0	2.0		2.0	2.0		6.0	6.0		5.0	5.0	3.0
Lost Time Adjust (s)	-3.0	-3.0		-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	3.0	3.0		5.0	5.0		8.0	8.0		7.0	7.0	5.0
Lead/Lag	Lead			Lag	Lag		Lead	Lead		Lag	Lag	Lead
Lead-Lag Optimize?												
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		None	None		None	None	None
Walk Time (s)		7.0		7.0	7.0					7.0	7.0	
Flash Dont Walk (s)		22.0		22.0	22.0					30.0	30.0	
Pedestrian Calls (#/hr)		3		2	2					0	0	
Act Effct Green (s)	74.2	74.2		40.7	40.7		13.2			24.4	24.4	52.8
Actuated g/C Ratio	0.60	0.60		0.33	0.33		0.11			0.20	0.20	0.42
v/c Ratio	1.30	1.25		0.16	0.83		0.22			0.71	0.74	0.34
Control Delay	183.0	139.6		44.8	46.4		59.2			64.3	66.2	3.5
Queue Delay	0.0	0.0		0.0	0.0		0.0			0.0	0.0	0.0
Total Delay	183.0	139.6		44.8	46.4		59.2			64.3	66.2	3.5
LOS	F	F		D	D		E			E	E	A
Approach Delay		144.5			46.4		59.3				39.0	
Approach LOS		F			D		E				D	

Intersection Summary

Area Type:	Other
Cycle Length:	144
Actuated Cycle Length:	124.7
Natural Cycle:	145
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.30
Intersection Signal Delay:	115.9
Intersection LOS:	F
Intersection Capacity Utilization:	136.4%
ICU Level of Service:	H
Analysis Period (min):	15
* User Entered Value	

Splits and Phases: 222: Strachan Ave & Lakeshore Blvd



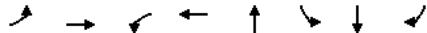
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Queues

222: Strachan Ave & Lakeshore Blvd

09/30/2021



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	558	4446	9	1329	44	168	185	261
v/c Ratio	1.30	1.25	0.16	0.83	0.22	0.71	0.74	0.34
Control Delay	183.0	139.6	44.8	46.4	59.2	64.3	66.2	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	183.0	139.6	44.8	46.4	59.2	64.3	66.2	3.5
Queue Length 50th (m)	~172.8	~482.3	1.7	116.8	10.4	42.5	47.1	0.0
Queue Length 95th (m)	#272.2	#566.5	7.5	#163.6	24.0	67.8	73.8	13.9
Internal Link Dist (m)		286.3		172.6	92.5		181.6	
Turn Bay Length (m)	60.0		60.0			140.0		50.0
Base Capacity (vph)	430	3565	56	1593	214	385	405	763
Starvation Cap Reductn	0	67	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	1.30	1.27	0.16	0.83	0.21	0.44	0.46	0.34

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.

HCM Signalized Intersection Capacity Analysis

222: Strachan Ave & Lakeshore Blvd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔			↔		↔	↔	↔
Traffic Volume (vph)	502	3996	5	8	1196	0	0	40	0	297	21	235
Future Volume (vph)	502	3996	5	8	1196	0	0	40	0	297	21	235
Ideal Flow (vphpl)	2150	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Total Lost time (s)	3.0	3.0		5.0	5.0			8.0		7.0	7.0	5.0
Lane Util. Factor	1.00	*1.00		1.00	0.91			1.00		0.95	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	0.96
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	1.00
Satd. Flow (prot)	1643	5989		1685	4885			1879		1585	1695	1455
Flt Permitted	0.09	1.00		0.10	1.00			1.00		0.73	0.72	1.00
Satd. Flow (perm)	151	5989		174	4885			1879		1215	1276	1455
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)	558	4440	6	9	1329	0	0	44	0	330	23	261
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	156
Lane Group Flow (vph)	558	4446	0	9	1329	0	0	44	0	168	185	105
Confl. Peds. (#/hr)	6		8	8		6	52					52
Confl. Bikes (#/hr)									40			17
Heavy Vehicles (%)	16%	4%	0%	0%	5%	33%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		Perm	NA		NA		Perm	NA	pm+ov	
Protected Phases	5	2			6			3			4	5
Permitted Phases	2			6			3			4		4
Actuated Green, G (s)	71.2	71.2		39.8	39.8			9.1		23.4	23.4	48.8
Effective Green, g (s)	74.2	74.2		40.8	40.8			10.1		24.4	24.4	50.8
Actuated g/C Ratio	0.59	0.59		0.32	0.32			0.08		0.19	0.19	0.40
Clearance Time (s)	6.0	6.0		6.0	6.0			9.0		8.0	8.0	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)	422	3507		56	1573			149		233	245	583
v/s Ratio Prot	c0.30	0.74			0.27			c0.02				0.04
v/s Ratio Perm	c0.48			0.05						0.14	c0.14	0.03
v/c Ratio	1.32	1.27		0.16	0.84			0.30		0.72	0.76	0.18
Uniform Delay, d1	39.5	26.2		30.7	40.0			54.9		48.0	48.3	24.5
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	160.8	122.9		6.1	5.8			1.1		10.5	12.4	0.1
Delay (s)	200.3	149.1		36.8	45.8			56.1		58.4	60.7	24.6
Level of Service	F	F		D	D			E		E	E	C
Approach Delay (s)		154.8			45.7			56.1			44.8	
Approach LOS		F			D			E			D	

Intersection Summary

HCM 2000 Control Delay	123.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	126.7	Sum of lost time (s)	25.0
Intersection Capacity Utilization	136.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
538: Strachan Ave & King St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕	↕	↕	↕	↕
Traffic Volume (vph)	0	627	146	66	561	40	132	340	126	27	214	20
Future Volume (vph)	0	627	146	66	561	40	132	340	126	27	214	20
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	0.0	0.0	0.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Storage Lanes	0	0	0	0	0	1	0	1	0	1	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.90			0.98		0.85	0.96		0.96	0.98	
Frt		0.972			0.991		0.959			0.987		
Fit Protected					0.995		0.950			0.950		
Satd. Flow (prot)	0	1559	0	0	1695	0	1458	1476	0	1516	1603	0
Fit Permitted					0.768		0.479			0.160		
Satd. Flow (perm)	0	1559	0	0	1293	0	625	1476	0	246	1603	0
Right Turn on Red			Yes		Yes		Yes			Yes		Yes
Satd. Flow (RTOR)		54			13			24			6	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		255.2			358.6			424.1			379.9	
Travel Time (s)		18.4			25.8			38.2			34.2	
Conf. Peds. (#/hr)	54		300	300		54	216		124	124		216
Conf. Bikes (#/hr)			40			16			13			12
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	9%	28%	100%	7%	5%	4%	6%	3%	0%	2%	0%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	0	729	170	77	652	47	153	395	147	31	249	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	899	0	0	776	0	153	542	0	31	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)		0.0			0.0			3.0			3.0	
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	1.92	2.03	1.92	1.92	2.03	1.92	1.25	1.16	1.16	1.25	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	

Scenario 1 Total Future AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

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Lanes, Volumes, Timings
538: Strachan Ave & King St

09/30/2021

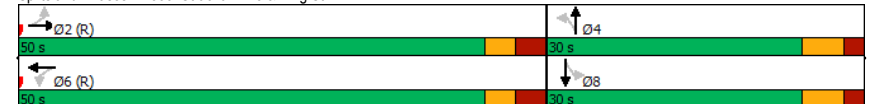


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Type	CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	NA			Perm			NA			Perm		
Protected Phases	2			6			4			8		
Permitted Phases	2			6			4			8		
Detector Phase	2			6			4			8		
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		27.0	27.0		27.0	27.0	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Maximum Green (s)	44.0	44.0		44.0	44.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
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	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		16	16		100	100		100	100	
Act Effct Green (s)		45.0			45.0		25.0	25.0		25.0	25.0	
Actuated g/C Ratio		0.56			0.56		0.31	0.31		0.31	0.31	
v/c Ratio		1.00			1.06		0.78	1.14		0.41	0.54	
Control Delay		48.5			65.3		55.1	112.0		45.8	33.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		48.5			65.3		55.1	112.0		45.8	33.1	
LOS		D			E		E	F		D	C	
Approach Delay		48.5			65.3			99.5			34.4	
Approach LOS		D			E			F			C	

Intersection Summary

Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 42 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.14
 Intersection Signal Delay: 65.0 Intersection LOS: E
 Intersection Capacity Utilization 135.0% ICU Level of Service H
 Analysis Period (min) 15

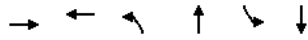
Splits and Phases: 538: Strachan Ave & King St



Queues

538: Strachan Ave & King St

09/30/2021



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	899	776	153	542	31	272
v/c Ratio	1.00	1.06	0.78	1.14	0.41	0.54
Control Delay	48.5	65.3	55.1	112.0	45.8	33.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.5	65.3	55.1	112.0	45.8	33.1
Queue Length 50th (m)	63.5	-53.2	21.0	-95.1	4.6	41.3
Queue Length 95th (m)	#101.3	#93.9	#48.6	#142.9	m9.2	m57.6
Internal Link Dist (m)	231.2	334.6		400.1		355.9
Turn Bay Length (m)			25.0		25.0	
Base Capacity (vph)	900	733	195	477	76	505
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	1.00	1.06	0.78	1.14	0.41	0.54

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.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

538: Strachan Ave & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕		↕	↕	↕
Traffic Volume (vph)	0	627	146	66	561	40	132	340	126	27	214	20
Future Volume (vph)	0	627	146	66	561	40	132	340	126	27	214	20
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.90			0.99		1.00	0.96		1.00	0.98	
Ftbp, ped/bikes		1.00			0.99		0.85	1.00		0.96	1.00	
Frt		0.97			0.99		1.00	0.96		1.00	0.99	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1558			1675		1239	1476		1460	1604	
Flt Permitted		1.00			0.77		0.48	1.00		0.16	1.00	
Satd. Flow (perm)		1558			1293		624	1476		246	1604	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	729	170	77	652	47	153	395	147	31	249	23
RTOR Reduction (vph)	0	24	0	0	6	0	0	17	0	0	4	0
Lane Group Flow (vph)	0	875	0	0	770	0	153	526	0	31	268	0
Confl. Peds. (#/hr)	54		300	300		54	216		124	124		216
Confl. Bikes (#/hr)			40			16			13			12
Heavy Vehicles (%)	0%	9%	28%	100%	7%	5%	4%	6%	3%	0%	2%	0%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases		2			6			4			8	
Actuated Green, G (s)		44.0			44.0		24.0	24.0		24.0	24.0	
Effective Green, g (s)		45.0			45.0		25.0	25.0		25.0	25.0	
Actuated g/C Ratio		0.56			0.56		0.31	0.31		0.31	0.31	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		876			727		195	461		76	501	
v/s Ratio Prot		0.56						c0.36			0.17	
v/s Ratio Perm					c0.60		0.25			0.13		
v/c Ratio		1.00			1.06		0.78	1.14		0.41	0.53	
Uniform Delay, d1		17.5			17.5		25.0	27.5		21.7	22.7	
Progression Factor		1.00			0.69		1.00	1.00		1.26	1.28	
Incremental Delay, d2		30.2			49.6		26.4	86.2		14.2	3.7	
Delay (s)		47.7			61.7		51.5	113.7		41.6	32.9	
Level of Service		D			E		D	F		D	C	
Approach Delay (s)		47.7			61.7		100.0				33.8	
Approach LOS		D			E		F				C	

Intersection Summary

HCM 2000 Control Delay	63.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	135.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
539: Dufferin St & King St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	56	747	86	42	463	106	34	273	44	112	612	42
Future Volume (vph)	56	747	86	42	463	106	34	273	44	112	612	42
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1250	1250	1250	1900	1900	1900
Lane Util. 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
Ped Bike Factor		0.97			0.96			0.97			0.97	
Frt		0.985			0.974			0.981			0.992	
Fit Protected		0.997			0.997			0.995			0.993	
Satd. Flow (prot)	0	1878	0	0	1806	0	0	1722	0	0	2781	0
Fit Permitted		0.855			0.758			0.738			0.806	
Satd. Flow (perm)	0	1605	0	0	1370	0	0	1273	0	0	2226	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			40			23			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		291.1			316.7			212.5			385.1	
Travel Time (s)		21.0			22.8			15.3			27.7	
Confl. Peds. (#/hr)	144		212	212		144	189		143	143		189
Confl. Bikes (#/hr)			78			6			12			125
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	5%	4%	10%	2%	4%	7%	8%	12%	0%	3%	9%	7%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	30	30	0	18	18
Adj. Flow (vph)	65	869	100	49	538	123	40	317	51	130	712	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1034	0	0	710	0	0	408	0	0	891	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	1.92	1.97	1.92	1.92	2.03	1.92	1.92	2.06	1.92	1.16	1.22	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6			3	8			4
Permitted Phases	2			6			8			4		
Minimum Split (s)	27.0	27.0		27.0	27.0		10.0	27.0		27.0	27.0	
Total Split (s)	41.0	41.0		41.0	41.0		10.0	39.0		29.0	29.0	
Total Split (%)	51.3%	51.3%		51.3%	51.3%		12.5%	48.8%		36.3%	36.3%	
Maximum Green (s)	35.0	35.0		35.0	35.0		6.0	33.0		23.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		4.0			5.0			5.0			5.0	
Lead/Lag							Lead			Lag		Lag
Lead-Lag Optimize?							Yes			Yes		Yes
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		100	100			100		100	100	
Act Effct Green (s)		37.0			36.0			34.0			24.0	

Lanes, Volumes, Timings
539: Dufferin St & King St

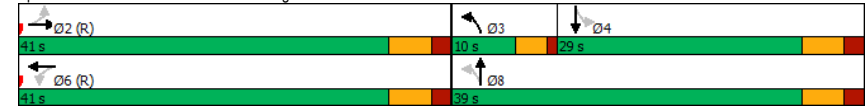
09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.46			0.45			0.42			0.30	
v/c Ratio		1.38			1.11			0.70			1.32	
Control Delay		198.1			84.8			17.8			183.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		198.1			84.8			17.8			183.0	
LOS		F			F			B			F	
Approach Delay		198.1			84.8			17.8			183.0	
Approach LOS		F			F			B			F	

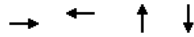
Intersection Summary	
Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	15 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Natural Cycle:	130
Control Type:	Pretimed
Maximum v/c Ratio:	1.38
Intersection Signal Delay:	143.0
Intersection Capacity Utilization:	131.4%
ICU Level of Service:	H
Analysis Period (min):	15

Splits and Phases: 539: Dufferin St & King St



Queues
539: Dufferin St & King St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	1034	710	408	891
v/c Ratio	1.38	1.11	0.70	1.32
Control Delay	198.1	84.8	17.8	183.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	198.1	84.8	17.8	183.0
Queue Length 50th (m)	-111.5	-64.7	17.4	-94.1
Queue Length 95th (m)	#139.3	#89.5	m19.4	#121.5
Internal Link Dist (m)	267.1	292.7	188.5	361.1
Turn Bay Length (m)				
Base Capacity (vph)	752	638	582	673
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	1.38	1.11	0.70	1.32

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.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
539: Dufferin St & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	56	747	86	42	463	106	34	273	44	112	612	42
Future Volume (vph)	56	747	86	42	463	106	34	273	44	112	612	42
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1250	1250	1250	1900	1900	1900
Total Lost time (s)		4.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.97			0.96			0.98			0.98	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Flt		0.99			0.97			0.98			0.99	
Flt Protected		1.00			1.00			1.00			0.99	
Satd. Flow (prot)		1872			1801			1719			2742	
Flt Permitted		0.85			0.76			0.74			0.81	
Satd. Flow (perm)		1605			1370			1275			2225	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	65	869	100	49	538	123	40	317	51	130	712	49
RTOR Reduction (vph)	0	10	0	0	22	0	0	13	0	0	6	0
Lane Group Flow (vph)	0	1024	0	0	688	0	0	395	0	0	885	0
Conf. Peds. (#/hr)	144		212	212		144	189		143	143		189
Conf. Bikes (#/hr)			78			6			12			125
Heavy Vehicles (%)	5%	4%	10%	2%	4%	7%	8%	12%	0%	3%	9%	7%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	30	30	0	18	18
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		35.0			35.0			33.0			23.0	
Effective Green, g (s)		37.0			36.0			34.0			24.0	
Actuated g/C Ratio		0.46			0.45			0.42			0.30	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		742			616			580			667	
v/s Ratio Prot								c0.06				
v/s Ratio Perm		c0.64			0.50			0.23			c0.40	
v/c Ratio		1.38			1.12			0.68			1.33	
Uniform Delay, d1		21.5			22.0			18.6			28.0	
Progression Factor		0.83			0.68			0.86			1.00	
Incremental Delay, d2		179.2			68.3			2.2			157.6	
Delay (s)		197.0			83.2			18.1			185.6	
Level of Service		F			F			B			F	
Approach Delay (s)		197.0			83.2			18.1			185.6	
Approach LOS		F			F			B			F	

Intersection Summary

HCM 2000 Control Delay	143.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	131.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔			↔	↔	↔	↔		↔	↔	
Traffic Volume (vph)	91	86	50	119	56	90	83	346	182	51	315	80
Future Volume (vph)	91	86	50	119	56	90	83	346	182	51	315	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	25.0		0.0	0.0		50.0	30.0		0.0	25.0		0.0
Storage Lanes	1		0	0		1	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	0.86	0.97			0.97	0.77	0.98	0.97			0.98	
Frt		0.945				0.850		0.948			0.970	
Fit Protected	0.950				0.967		0.950			0.950		
Satd. Flow (prot)	1589	1655	0	0	1682	1436	1652	1676	0	1620	1708	0
Fit Permitted	0.546				0.659		0.368			0.237		
Satd. Flow (perm)	784	1655	0	0	1108	1112	628	1676	0	404	1708	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				152		21			10	
Link Speed (k/h)		30			50			40			40	
Link Distance (m)		143.4			229.0			205.6			241.4	
Travel Time (s)		17.2			16.5			18.5			21.7	
Confl. Peds. (#/hr)	93		29	29		93	22		25	25		22
Confl. Bikes (#/hr)			1						1			36
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 (%)	6%	5%	2%	0%	25%	5%	2%	5%	0%	4%	5%	2%
Adj. Flow (vph)	101	96	56	132	62	100	92	384	202	57	350	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	152	0	0	194	100	92	586	0	57	439	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)		3.0			3.0			3.5			3.5	
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	1.09	1.01	1.01	1.01	1.01	1.09	1.09	1.01	1.01	1.09	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	2.0	2.0	30.5		2.0	30.5	
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)	6.1	1.8		6.1	1.8	2.0	2.0	1.8		2.0	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

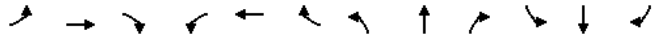
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Lane Group	Ø10	Ø12	Ø14	Ø16
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (m)				
Storage Length (m)				
Storage Lanes				
Taper Length (m)				
Lane Util. Factor				
Ped Bike Factor				
Frt				
Fit Protected				
Satd. Flow (prot)				
Fit Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (k/h)				
Link Distance (m)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(m)				
Link Offset(m)				
Crosswalk Width(m)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (k/h)				
Number of Detectors				
Detector Template				
Leading Detector (m)				
Trailing Detector (m)				
Detector 1 Position(m)				
Detector 1 Size(m)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(m)				
Detector 2 Size(m)				
Detector 2 Type				

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	32.0	32.0		32.0	32.0	32.0	29.0	29.0		29.0	29.0	
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		36.0	36.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	61.0	61.0		61.0	61.0	
Total Split (%)	27.1%	27.1%		27.1%	27.1%	27.1%	42.4%	42.4%		42.4%	42.4%	
Maximum Green (s)	32.0	32.0		32.0	32.0	32.0	54.0	54.0		54.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
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	3.0	
Recall Mode	Max	Max		Max	Max	Max	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0	22.0	22.0	22.0		22.0	22.0	
Pedestrian Calls (#/hr)	10	10		28	28	28	7	7		6	6	
Act Effct Green (s)	33.5	33.5		33.5	33.5	55.9	55.9	55.9		55.9	55.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30	0.50	0.50	0.50		0.50	0.50	
v/c Ratio	0.43	0.30		0.59	0.23	0.29	0.69	0.69		0.28	0.51	
Control Delay	42.8	31.2		45.2	2.3	24.0	29.0	29.0		26.4	23.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.5	0.5		0.0	0.0	
Total Delay	42.8	31.2		45.2	2.3	24.0	29.5	29.5		26.4	23.9	
LOS	D	C		D	A	C	C	C		C	C	
Approach Delay		35.8			30.6			28.7			24.2	
Approach LOS		D			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 144

Actuated Cycle Length: 112

Natural Cycle: 130

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 28.8

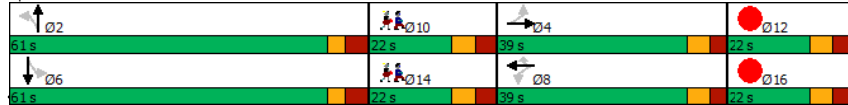
Intersection LOS: C

Intersection Capacity Utilization 127.6%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 571: Strachan Ave & Canada Blvd/Fleet St



Scenario 1 Total Future AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021

Lane Group	Ø10	Ø12	Ø14	Ø16
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	10	12	14	16
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	22.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0
Total Split (%)	15%	15%	15%	15%
Maximum Green (s)	14.0	14.0	14.0	14.0
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	0.0	0.0	0.0	0.0
Flash Dont Walk (s)	0.0	0.0	0.0	0.0
Pedestrian Calls (#/hr)	19	19	19	19
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary

Scenario 1 Total Future AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Queues

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	101	152	194	100	92	586	57	439
v/c Ratio	0.43	0.30	0.59	0.23	0.29	0.69	0.28	0.51
Control Delay	42.8	31.2	45.2	2.3	24.0	29.0	26.4	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	42.8	31.2	45.2	2.3	24.0	29.5	26.4	23.9
Queue Length 50th (m)	14.9	18.6	30.3	0.0	8.9	71.2	5.5	47.5
Queue Length 95th (m)	41.4	47.6	#74.4	3.1	30.8	176.3	22.0	118.4
Internal Link Dist (m)		119.4	205.0			181.6		217.4
Turn Bay Length (m)	25.0			50.0	30.0		25.0	
Base Capacity (vph)	234	508	331	439	313	847	201	857
Starvation Cap Reductn	0	0	0	0	0	54	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	0.30	0.59	0.23	0.29	0.74	0.28	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	91	86	50	119	56	90	83	346	182	51	315	80
Future Volume (vph)	91	86	50	119	56	90	83	346	182	51	315	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.97		1.00	0.81	1.00	0.98	1.00		1.00	0.98	
Fipb, ped/bikes	0.87	1.00		0.97	1.00	0.98	1.00	0.99		0.99	1.00	
Frt	1.00	0.94		1.00	0.85	1.00	0.95	1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.97	1.00	0.95	1.00	0.95		1.00	1.00	
Satd. Flow (prot)	1390	1661		1633	1157	1621	1682	1599		1712	1712	
Flt Permitted	0.55	1.00		0.66	1.00	0.37	1.00	0.24		1.00	1.00	
Satd. Flow (perm)	799	1661		1113	1157	628	1682	399		1712	1712	
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)	101	96	56	132	62	100	92	384	202	57	350	89
RTOR Reduction (vph)	0	14	0	0	0	73	0	11	0	0	5	0
Lane Group Flow (vph)	101	138	0	0	194	27	92	575	0	57	434	0
Confl. Peds. (#/hr)	93		29	29		93	22		25	25		22
Confl. Bikes (#/hr)			1						1			36
Heavy Vehicles (%)	6%	5%	2%	0%	25%	5%	2%	5%	0%	4%	5%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	32.5	32.5		32.5	32.5	54.9	54.9			54.9	54.9	
Effective Green, g (s)	33.5	33.5		33.5	33.5	55.9	55.9			55.9	55.9	
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.46	0.46			0.46	0.46	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0			7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	219	455		305	317	287	769		182	783		
v/s Ratio Prot		0.08					c0.34					0.25
v/s Ratio Perm	0.13			c0.17	0.02	0.15				0.14		
v/c Ratio	0.46	0.30		0.64	0.09	0.32	0.75		0.31	0.55		
Uniform Delay, d1	36.9	35.1		39.0	33.0	21.1	27.3		21.0	24.1		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	6.8	1.7		9.7	0.5	2.9	6.5		4.4	2.8		
Delay (s)	43.7	36.8		48.7	33.5	24.0	33.9		25.4	26.9		
Level of Service	D	D		D	C	C	C		C	C		
Approach Delay (s)		39.6			43.6		32.5			26.7		
Approach LOS		D			D		C			C		

Intersection Summary

HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	122.2	Sum of lost time (s)	28.0
Intersection Capacity Utilization	127.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕	↕	↔	↕		↔	↕	↕
Traffic Volume (vph)	54	508	0	0	0	430	0	1402	14	0	0	0
Future Volume (vph)	54	508	0	0	0	430	0	1402	14	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	15.0		0.0	0.0		80.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		1	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	0.88	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor						0.99						
Frt						0.850		0.998				
Fit Protected	0.950											
Satd. Flow (prot)	1620	1807	0	0	0	2652	0	4968	0	0	0	0
Fit Permitted	0.950											
Satd. Flow (perm)	1620	1807	0	0	0	2615	0	4968	0	0	0	0
Right Turn on Red	Yes		Yes			Yes		Yes				Yes
Satd. Flow (RTOR)	99					767		1				
Link Speed (k/h)		60			30			60			60	
Link Distance (m)		411.9			164.9			800.6			492.6	
Travel Time (s)		24.7			19.8			48.0			29.6	
Confl. Peds. (#/hr)			1	1				17				17
Confl. Bikes (#/hr)			1			2						
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 (%)	4%	4%	4%	0%	0%	6%	0%	3%	7%	0%	0%	0%
Adj. Flow (vph)	60	564	0	0	0	478	0	1558	16	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	564	0	0	0	478	0	1574	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)		3.0			3.0			3.0			3.0	
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	1.09	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2				1		2				
Detector Template	Left	Thru				Right		Thru				
Leading Detector (m)	6.1	30.5				6.1		30.5				
Trailing Detector (m)	0.0	0.0				0.0		0.0				
Detector 1 Position(m)	0.0	0.0				0.0		0.0				
Detector 1 Size(m)	6.1	1.8				6.1		1.8				
Detector 1 Type	Cl+Ex	Cl+Ex				Cl+Ex		Cl+Ex				
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0				0.0		0.0				
Detector 1 Queue (s)	0.0	0.0				0.0		0.0				
Detector 1 Delay (s)	0.0	0.0				0.0		0.0				
Detector 2 Position(m)		28.7						28.7				
Detector 2 Size(m)		1.8						1.8				
Detector 2 Type		Cl+Ex						Cl+Ex				

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0									0.0	
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					9						
Detector Phase	4	4				9		2				
Switch Phase												
Minimum Initial (s)	7.0	7.0				7.0		22.0				
Minimum Split (s)	13.0	13.0				30.0		29.0				
Total Split (s)	40.0	40.0				30.0		40.0				
Total Split (%)	36.4%	36.4%				27.3%		36.4%				
Maximum Green (s)	34.0	34.0				24.0		33.0				
Yellow Time (s)	4.0	4.0				4.0		4.0				
All-Red Time (s)	2.0	2.0				2.0		3.0				
Lost Time Adjust (s)	-1.0	-1.0				-1.0		-1.0				
Total Lost Time (s)	5.0	5.0				5.0		6.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Recall Mode	None	None				None		None				
Walk Time (s)	0.0	0.0						7.0				
Flash Dont Walk (s)	0.0	0.0						15.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)	34.8	34.8				8.0		34.0				
Actuated g/C Ratio	0.38	0.38				0.09		0.37				
v/c Ratio	0.09	0.83				0.52		0.86				
Control Delay	1.7	39.0				2.1		33.5				
Queue Delay	0.0	0.0				0.0		0.0				
Total Delay	1.7	39.0				2.1		33.5				
LOS	A	D				A		C				
Approach Delay		35.4				2.1		33.5				
Approach LOS		D				A		C				
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	92.8											
Natural Cycle:	100											
Control Type:	Semi Act-Uncoord											
Maximum v/c Ratio:	0.86											
Intersection Signal Delay:	28.3						Intersection LOS: C					
Intersection Capacity Utilization:	63.3%						ICU Level of Service B					
Analysis Period (min):	15											
Splits and Phases:	1344: Lakeshore Blvd & British Columbia Rd											

Queues

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	WBR	NBT
Lane Group Flow (vph)	60	564	478	1574
v/c Ratio	0.09	0.83	0.52	0.86
Control Delay	1.7	39.0	2.1	33.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	1.7	39.0	2.1	33.5
Queue Length 50th (m)	0.0	90.1	0.0	94.4
Queue Length 95th (m)	2.9	#145.1	0.0	113.8
Internal Link Dist (m)		387.9		776.6
Turn Bay Length (m)	15.0		80.0	
Base Capacity (vph)	672	682	1264	1821
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	0.09	0.83	0.38	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↓	↑				↑↑		↑↑↑				
Traffic Volume (vph)	54	508	0	0	0	430	0	1402	14	0	0	0
Future Volume (vph)	54	508	0	0	0	430	0	1402	14	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0				5.0		6.0				
Lane Util. Factor	1.00	1.00				0.88		0.91				
Frbp, ped/bikes	1.00	1.00				0.98		1.00				
Ftpb, ped/bikes	1.00	1.00				1.00		1.00				
Frt	1.00	1.00				0.85		1.00				
Flt Protected	0.95	1.00				1.00		1.00				
Satd. Flow (prot)	1620	1807				2606		4970				
Flt Permitted	0.95	1.00				1.00		1.00				
Satd. Flow (perm)	1620	1807				2606		4970				
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)	60	564	0	0	0	478	0	1558	16	0	0	0
RTOR Reduction (vph)	38	0	0	0	0	437	0	1	0	0	0	0
Lane Group Flow (vph)	23	564	0	0	0	41	0	1573	0	0	0	0
Confl. Peds. (#/hr)			1	1				17				17
Confl. Bikes (#/hr)			1			2						
Heavy Vehicles (%)	4%	4%	4%	0%	0%	6%	0%	3%	7%	0%	0%	0%
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					9						
Actuated Green, G (s)	33.8	33.8				7.0		33.0				
Effective Green, g (s)	34.8	34.8				8.0		34.0				
Actuated g/C Ratio	0.37	0.37				0.09		0.37				
Clearance Time (s)	6.0	6.0				6.0		7.0				
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Lane Grp Cap (vph)	607	677				224		1820				
v/s Ratio Prot		c0.31						c0.32				
v/s Ratio Perm	0.01					c0.02						
v/c Ratio	0.04	0.83				0.18		0.86				
Uniform Delay, d1	18.4	26.4				39.4		27.3				
Progression Factor	1.00	1.00				1.00		1.00				
Incremental Delay, d2	0.0	8.7				0.4		4.6				
Delay (s)	18.4	35.0				39.8		31.8				
Level of Service	B	D				D		C				
Approach Delay (s)		33.4				39.8		31.8				0.0
Approach LOS		C				D		C				A

Intersection Summary

HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	92.8	Sum of lost time (s)	17.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

09/30/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔				↔		↕		↕			
Traffic Volume (vph)	5	0	6	129	0	71	2	322	518	130	694	0
Future Volume (vph)	5	0	6	129	0	71	2	322	518	130	694	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1250	1400	1250	1250	1250	1250
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.76				0.72		0.67				0.98	
Frt	0.921				0.952		0.908					
Fit Protected	0.980				0.969						0.992	
Satd. Flow (prot)	0	1364	0	0	1549	0	0	1438	0	0	2020	0
Fit Permitted	0.898				0.798		0.954				0.643	
Satd. Flow (perm)	0	1178	0	0	1009	0	0	1372	0	0	1285	0
Right Turn on Red			Yes				Yes				Yes	
Satd. Flow (RTOR)	41				41		23					
Link Speed (k/h)	50				40		50				50	
Link Distance (m)	106.6				106.9		249.2				212.5	
Travel Time (s)	7.7				9.6		17.9				15.3	
Confl. Peds. (#/hr)	180		338	338		180	356		263	263		356
Confl. Bikes (#/hr)									12			160
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%	2%	0%	1%	0%	4%	0%	12%	1%	0%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	30	30	12	30	30
Adj. Flow (vph)	5	0	7	140	0	77	2	350	563	141	754	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	217	0	0	915	0	0	895	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	1.01	1.01	1.01	1.01	1.01	1.01	1.70	1.60	1.70	1.70	1.83	1.70
Turning Speed (k/h)	24		14		24		14		24		14	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)	28.7				28.7		28.7				28.7	
Detector 2 Size(m)	1.8				1.8		1.8				1.8	
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		Perm	NA		Perm	NA		Perm	NA	

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

09/30/2021

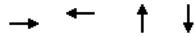
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	4				8		8				2	
Permitted Phases	4				8		8				2	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		25.0	25.0		25.0	25.0	
Total Split (s)	24.0	24.0		24.0	24.0		56.0	56.0		56.0	56.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		70.0%	70.0%		70.0%	70.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		50.0	50.0		50.0	50.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		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)			-1.0				-1.0				-1.0	
Total Lost Time (s)	4.0				4.0		3.0				5.0	
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		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	
Act Effect Green (s)	19.6				19.6		53.4				51.4	
Actuated g/C Ratio	0.24				0.24		0.67				0.64	
v/c Ratio	0.04				0.78		1.18dr				1.08	
Control Delay	0.5				44.2		45.2				70.3	
Queue Delay	0.0				0.0		0.0				0.0	
Total Delay	0.5				44.2		45.2				70.3	
LOS	A				D		D				E	
Approach Delay	0.5				44.2		45.2				70.3	
Approach LOS	A				D		D				E	
Intersection Summary												
Area Type:	Other											
Cycle Length:	80											
Actuated Cycle Length:	80											
Offset:	40 (50%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.08											
Intersection Signal Delay:	55.8						Intersection LOS: E					
Intersection Capacity Utilization:	105.4%						ICU Level of Service G					
Analysis Period (min)	15											
dr	Defacto Right Lane. Recode with 1 though lane as a right lane.											
Splits and Phases:	1449: Dufferin St & Dwy/Liberty St											



Queues

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	12	217	915	895
v/c Ratio	0.04	0.78	1.18dr	1.08
Control Delay	0.5	44.2	45.2	70.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	0.5	44.2	45.2	70.3
Queue Length 50th (m)	0.0	24.9	75.1	~75.8
Queue Length 95th (m)	0.5	#59.7	#115.0	m47.5
Internal Link Dist (m)	82.6	82.9	225.2	188.5
Turn Bay Length (m)				
Base Capacity (vph)	325	283	923	825
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	0.04	0.77	0.99	1.08

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.

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕↕			↕↕	
Traffic Volume (vph)	5	0	6	129	0	71	2	322	518	130	694	0
Future Volume (vph)	5	0	6	129	0	71	2	322	518	130	694	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1250	1400	1250	1250	1250	1250
Total Lost time (s)		4.0			4.0			3.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.80			0.91			0.67			1.00	
Flpb, ped/bikes		0.94			0.79			1.00			0.98	
Frt		0.92			0.95			0.91			1.00	
Flt Protected		0.98			0.97			1.00			0.99	
Satd. Flow (prot)		1286			1225			1437			1983	
Flt Permitted		0.90			0.80			0.95			0.64	
Satd. Flow (perm)		1178			1008			1371			1285	
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)	5	0	7	140	0	77	2	350	563	141	754	0
RTOR Reduction (vph)	0	9	0	0	31	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	3	0	0	186	0	0	907	0	0	895	0
Conf. Peds. (#/hr)	180		338	338		180	356		263	263		356
Conf. Bikes (#/hr)									12			160
Heavy Vehicles (%)	0%	2%	0%	1%	0%	4%	0%	12%	1%	0%	10%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	30	30	12	30	30
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.6			18.6			50.4			50.4	
Effective Green, g (s)		19.6			19.6			53.4			51.4	
Actuated g/C Ratio		0.25			0.25			0.67			0.64	
Clearance Time (s)		5.0			5.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		288			246			915			825	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.18			0.66			c0.70	
v/c Ratio		0.01			0.76			1.18dr			1.08	
Uniform Delay, d1		22.9			28.0			13.1			14.3	
Progression Factor		1.00			1.00			1.22			2.12	
Incremental Delay, d2		0.0			12.4			27.5			40.5	
Delay (s)		22.9			40.4			43.4			70.9	
Level of Service		C			D			D			E	
Approach Delay (s)		22.9			40.4			43.4			70.9	
Approach LOS		C			D			D			E	

Intersection Summary

HCM 2000 Control Delay	55.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

Lanes, Volumes, Timings
1628: Shaw St & King St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Traffic Volume (vph)	21	676	17	0	596	103	63	226	19	128	87	116
Future Volume (vph)	21	676	17	0	596	103	63	226	19	128	87	116
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Ped Bike Factor		0.99			0.98			0.96			0.88	
Frt		0.996			0.978			0.991			0.947	
Fit Protected		0.999						0.990			0.981	
Satd. Flow (prot)	0	1815	0	0	1809	0	0	3071	0	0	2346	0
Fit Permitted		0.919						0.795			0.700	
Satd. Flow (perm)	0	1669	0	0	1809	0	0	2394	0	0	1622	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			45			10			133	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		199.1			255.2			127.7			380.6	
Travel Time (s)		14.3			18.4			11.5			34.3	
Confl. Peds. (#/hr)	90		289	289		90	239		126	126		239
Confl. Bikes (#/hr)						25						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	100%	7%	0%	100%	8%	2%	5%	1%	0%	33%	2%	7%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	24	777	20	0	685	118	72	260	22	147	100	133
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	821	0	0	803	0	0	354	0	0	380	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	1.92	2.03	1.92	1.92	2.03	1.92	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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			NA			Perm			NA	

Lanes, Volumes, Timings
1628: Shaw St & King St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	22.0	22.0		22.0	22.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		26.0	26.0		26.0	26.0	
Total Split (s)	44.0	44.0		44.0	44.0		26.0	26.0		26.0	26.0	
Total Split (%)	62.9%	62.9%		62.9%	62.9%		37.1%	37.1%		37.1%	37.1%	
Maximum Green (s)	38.0	38.0		38.0	38.0		20.0	20.0		20.0	20.0	
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)		-1.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	100	100		29	29		100	100		100	100	
Act Effct Green (s)		39.0			39.0			21.0			21.0	
Actuated g/C Ratio		0.56			0.56			0.30			0.30	
v/c Ratio		0.88			0.78			0.49			0.66	
Control Delay		27.0			18.4			22.3			19.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		27.0			18.4			22.3			19.9	
LOS		C			B			C			B	
Approach Delay		27.0			18.4			22.3			19.9	
Approach LOS		C			B			C			B	

Intersection Summary

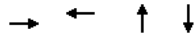
Area Type: CBD
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 22.2
 Intersection LOS: C
 Intersection Capacity Utilization 104.2%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 1628: Shaw St & King St



Queues
1628: Shaw St & King St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	821	803	354	380
v/c Ratio	0.88	0.78	0.49	0.66
Control Delay	27.0	18.4	22.3	19.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	27.0	18.4	22.3	19.9
Queue Length 50th (m)	44.5	37.4	19.2	14.2
Queue Length 95th (m)	#79.6	57.2	29.5	26.9
Internal Link Dist (m)	175.1	231.2	103.7	356.6
Turn Bay Length (m)				
Base Capacity (vph)	932	1027	725	579
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	0.88	0.78	0.49	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1628: Shaw St & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	21	676	17	0	596	103	63	226	19	128	87	116
Future Volume (vph)	21	676	17	0	596	103	63	226	19	128	87	116
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.99			0.98			0.99			0.91	
Flpb, ped/bikes		1.00			1.00			0.97			0.97	
Frt		1.00			0.98			0.99			0.95	
Flt Protected		1.00			1.00			0.99			0.98	
Satd. Flow (prot)		1814			1809			2980			2275	
Flt Permitted		0.92			1.00			0.80			0.70	
Satd. Flow (perm)		1669			1809			2393			1623	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	24	777	20	0	685	118	72	260	22	147	100	133
RTOR Reduction (vph)	0	3	0	0	20	0	0	7	0	0	93	0
Lane Group Flow (vph)	0	818	0	0	783	0	0	347	0	0	287	0
Confl. Peds. (#/hr)	90		289	289		90	239		126	126		239
Confl. Bikes (#/hr)						25						
Heavy Vehicles (%)	100%	7%	0%	100%	8%	2%	5%	1%	0%	33%	2%	7%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		38.0			38.0			20.0			20.0	
Effective Green, g (s)		39.0			39.0			21.0			21.0	
Actuated g/C Ratio		0.56			0.56			0.30			0.30	
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)		929			1007			717			486	
v/s Ratio Prot					0.43							
v/s Ratio Perm		c0.49						0.14			c0.18	
v/c Ratio		0.88			0.78			0.48			0.59	
Uniform Delay, d1		13.5			12.1			20.1			20.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		11.8			5.9			0.5			1.9	
Delay (s)		25.2			18.0			20.6			22.8	
Level of Service		C			B			C			C	
Approach Delay (s)		25.2			18.0			20.6			22.8	
Approach LOS		C			B			C			C	

Intersection Summary

HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1851: King St & Sudbury St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕↕		
Traffic Volume (vph)	0	791	5	0	681	114	0	5	0	166	0	96
Future Volume (vph)	0	791	5	0	681	114	0	5	0	166	0	96
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.98						0.90	
Frt	0.999				0.978						0.951	
Fit Protected	0.969											
Satd. Flow (prot)	0	1701	0	0	1740	0	0	1409	0	0	1350	0
Fit Permitted	0.804											
Satd. Flow (perm)	0	1701	0	0	1740	0	0	1409	0	0	1081	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	1				41						41	
Link Speed (k/h)	50				50						50	
Link Distance (m)	318.4				199.1				158.6		196.7	
Travel Time (s)	22.9				14.3				11.4		14.2	
Confl. Peds. (#/hr)	78		219	219		78	158		49	49		158
Confl. Bikes (#/hr)	16											
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	18%	0%	0%	11%	8%	0%	20%	0%	6%	0%	10%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	0	899	6	0	774	130	0	6	0	189	0	109
Shared Lane Traffic (%)	0											
Lane Group Flow (vph)	0	905	0	0	904	0	0	6	0	0	298	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	No											
Headway Factor	1.92	2.03	1.92	1.92	2.03	1.92	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel	No											
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)	28.7				28.7				28.7		28.7	
Detector 2 Size(m)	1.8				1.8				1.8		1.8	
Detector 2 Type	Cl+Ex				Cl+Ex				Cl+Ex		Cl+Ex	
Detector 2 Channel	No											
Detector 2 Extend (s)	0.0				0.0				0.0		0.0	
Turn Type	NA				NA				NA		Perm	

Lanes, Volumes, Timings
1851: King St & Sudbury St

09/30/2021

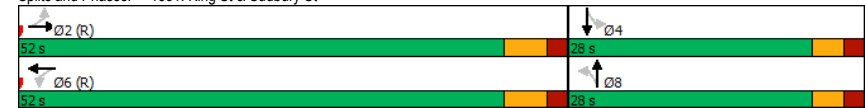


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	2				6		6		8		4	
Permitted Phases	2				6		6		8		4	
Detector Phase	2		2		6		6		8		8	
Switch Phase	No											
Minimum Initial (s)	24.0	24.0		24.0	24.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0		26.0	26.0	
Total Split (s)	52.0	52.0		52.0	52.0		28.0	28.0		28.0	28.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	46.0	46.0		46.0	46.0		23.0	23.0		23.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)			-1.0				-1.0				-1.0	
Total Lost Time (s)	5.0				5.0				4.0		4.0	
Lead/Lag	No											
Lead-Lag Optimize?	No											
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		24	24		100	100		16	16	
Act Effect Green (s)	47.5				47.5				23.5		23.5	
Actuated g/C Ratio	0.59				0.59				0.29		0.29	
v/c Ratio	0.90				0.86				0.01		0.86	
Control Delay	28.3				23.8				20.0		48.5	
Queue Delay	0.0				0.0				0.0		0.0	
Total Delay	28.3				23.8				20.0		48.5	
LOS	C				C				B		D	
Approach Delay	28.3				23.8				20.0		48.5	
Approach LOS	C				C				B		D	

Intersection Summary

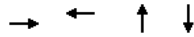
Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 29.2
 Intersection Capacity Utilization 72.2%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 1851: King St & Sudbury St



Queues
1851: King St & Sudbury St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	905	904	6	298
v/c Ratio	0.90	0.86	0.01	0.86
Control Delay	28.3	23.8	20.0	48.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	28.3	23.8	20.0	48.5
Queue Length 50th (m)	58.0	53.3	0.6	36.7
Queue Length 95th (m)	#99.8	#94.7	3.1	#76.9
Internal Link Dist (m)	294.4	175.1	134.6	172.7
Turn Bay Length (m)				
Base Capacity (vph)	1010	1049	422	353
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	0.90	0.86	0.01	0.84

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1851: King St & Sudbury St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕			↕	
Traffic Volume (vph)	0	791	5	0	681	114	0	5	0	166	0	96
Future Volume (vph)	0	791	5	0	681	114	0	5	0	166	0	96
Ideal Flow (vphpl)	1250	1250	1250	1250	1250	1250	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frbp, ped/bikes		1.00			0.98			1.00			0.93	
Flpb, ped/bikes		1.00			1.00			1.00			0.96	
Frt		1.00			0.98			1.00			0.95	
Flt Protected		1.00			1.00			1.00			0.97	
Satd. Flow (prot)		1701			1741			1409			1302	
Flt Permitted		1.00			1.00			1.00			0.80	
Satd. Flow (perm)		1701			1741			1409			1080	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	899	6	0	774	130	0	6	0	189	0	109
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	905	0	0	887	0	0	6	0	269	0	0
Confl. Peds. (#/hr)	78		219	219		78	158		49	49		158
Confl. Bikes (#/hr)						16						
Heavy Vehicles (%)	0%	18%	0%	0%	11%	8%	0%	20%	0%	6%	0%	10%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA			NA			NA		Perm		NA
Protected Phases		2			6			8				4
Permitted Phases		2			6			8				4
Actuated Green, G (s)		46.5			46.5			22.5				22.5
Effective Green, g (s)		47.5			47.5			23.5				23.5
Actuated g/C Ratio		0.59			0.59			0.29				0.29
Clearance Time (s)		6.0			6.0			5.0				5.0
Vehicle Extension (s)		3.0			3.0			3.0				3.0
Lane Grp Cap (vph)		1009			1033			413				317
v/s Ratio Prot		c0.53			0.51			0.00				
v/s Ratio Perm												c0.25
v/c Ratio		0.90			0.86			0.01				0.85
Uniform Delay, d1		14.1			13.5			20.0				26.6
Progression Factor		1.00			1.00			1.00				1.00
Incremental Delay, d2		12.2			9.3			0.0				18.6
Delay (s)		26.4			22.7			20.1				45.2
Level of Service		C			C			C				D
Approach Delay (s)		26.4			22.7			20.1				45.2
Approach LOS		C			C			C				D

Intersection Summary

HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1912: Atlantic Ave & King St

09/30/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖↗			↖↗	↖	↗
Traffic Volume (vph)	697	83	4	779	299	180
Future Volume (vph)	697	83	4	779	299	180
Ideal Flow (vphpl)	1250	1250	1250	1250	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.0	3.0
Storage Length (m)		0.0	0.0		30.0	0.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.5		7.5	
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.94			1.00	0.95	0.95
Frt	0.984					0.850
Flt Protected					0.950	
Satd. Flow (prot)	1689	0	0	1821	1458	1159
Flt Permitted				0.950	0.950	
Satd. Flow (perm)	1689	0	0	1729	1383	1099
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	29					19
Link Speed (k/h)	50			50	30	
Link Distance (m)	191.3			318.4	198.0	
Travel Time (s)	13.8			22.9	23.8	
Confl. Peds. (#/hr)		388	388		49	39
Confl. Bikes (#/hr)		10				
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	11%	6%	100%	10%	4%	17%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	810	97	5	906	348	209
Shared Lane Traffic (%)						
Lane Group Flow (vph)	907	0	0	911	348	209
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	2.03	1.92	1.92	2.03	1.25	1.25
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (m)	30.5		6.1	30.5	6.1	6.1
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)	1.8		6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+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)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		

Scenario 1 Total Future AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings
1912: Atlantic Ave & King St

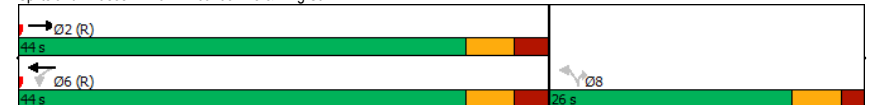
09/30/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Detector Phase	2		6	6	8	8
Switch Phase						
Minimum Initial (s)	21.0		21.0	21.0	20.0	20.0
Minimum Split (s)	28.0		28.0	28.0	26.0	26.0
Total Split (s)	44.0		44.0	44.0	26.0	26.0
Total Split (%)	62.9%		62.9%	62.9%	37.1%	37.1%
Maximum Green (s)	37.0		37.0	37.0	20.0	20.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	3.0		3.0	3.0	2.0	2.0
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0
Total Lost Time (s)	6.0			6.0	5.0	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)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	14.0		14.0	14.0	13.0	13.0
Pedestrian Calls (#/hr)	100		7	7	16	16
Act Effct Green (s)	38.0			38.0	21.0	21.0
Actuated g/C Ratio	0.54			0.54	0.30	0.30
v/c Ratio	0.98			0.97	0.84	0.61
Control Delay	41.8			41.3	43.7	27.9
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	41.8			41.3	43.7	27.9
LOS	D			D	D	C
Approach Delay	41.8			41.3	37.8	
Approach LOS	D			D	D	

Intersection Summary

Area Type: CBD
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 6 (9%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 40.7 Intersection LOS: D
 Intersection Capacity Utilization 68.7% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1912: Atlantic Ave & King St



Queues
1912: Atlantic Ave & King St

09/30/2021



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	907	911	348	209
v/c Ratio	0.98	0.97	0.84	0.61
Control Delay	41.8	41.3	43.7	27.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	41.8	41.3	43.7	27.9
Queue Length 50th (m)	54.4	55.7	42.2	21.0
Queue Length 95th (m)	#90.6	#91.1	#78.3	39.5
Internal Link Dist (m)	167.3	294.4	174.0	
Turn Bay Length (m)		30.0		
Base Capacity (vph)	930	938	414	343
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	0.98	0.97	0.84	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
1912: Atlantic Ave & King St

09/30/2021



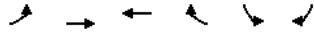
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (vph)	697	83	4	779	299	180
Future Volume (vph)	697	83	4	779	299	180
Ideal Flow (vphpl)	1250	1250	1250	1250	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.0	3.0
Total Lost time (s)				6.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	0.94			1.00	1.00	0.95
Fipb, ped/bikes	1.00			1.00	0.95	1.00
Frt	0.98			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1689			1819	1383	1099
Flt Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	1689			1729	1383	1099
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	810	97	5	906	348	209
RTOR Reduction (vph)	13	0	0	0	0	13
Lane Group Flow (vph)	894	0	0	911	348	196
Confl. Peds. (#/hr)		388	388		49	39
Confl. Bikes (#/hr)		10				
Heavy Vehicles (%)	11%	6%	100%	10%	4%	17%
Bus Blockages (#/hr)	24	24	24	24	0	0
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Actuated Green, G (s)	37.0			37.0	20.0	20.0
Effective Green, g (s)	38.0			38.0	21.0	21.0
Actuated g/C Ratio	0.54			0.54	0.30	0.30
Clearance Time (s)	7.0			7.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	916			938	414	329
v/s Ratio Prot	c0.53					
v/s Ratio Perm				0.53	c0.25	0.18
v/c Ratio	0.98			0.97	0.84	0.59
Uniform Delay, d1	15.6			15.5	22.9	20.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	24.4			23.2	14.2	2.9
Delay (s)	40.0			38.7	37.2	23.8
Level of Service	D			D	D	C
Approach Delay (s)	40.0			38.7	32.1	
Approach LOS	D			D	C	

Intersection Summary

HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	70.0	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
2081: King St & Joe Shuster Way

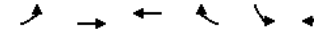
09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↔	
Traffic Volume (vph)	0	862	635	79	144	42
Future Volume (vph)	0	862	635	79	144	42
Ideal Flow (vphpl)	1250	1250	1250	1250	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			0.99		0.99	
Frt			0.983		0.969	
Fit Protected					0.963	
Satd. Flow (prot)	0	1881	1819	0	1460	0
Fit Permitted					0.963	
Satd. Flow (perm)	0	1881	1819	0	1460	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				34	17	
Link Speed (k/h)		50	50		50	
Link Distance (m)		316.7	191.3		100.8	
Travel Time (s)		22.8	13.8		7.3	
Confl. Peds. (#/hr)	43			43		23
Confl. Bikes (#/hr)				5		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	8%	3%	3%	21%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	0	980	722	90	164	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	980	812	0	212	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
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	1.92	2.03	2.03	1.92	1.16	1.16
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Perm	

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		2	6			
Permitted Phases	2				8	
Detector Phase	2	2	6		8	
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0		18.0	
Minimum Split (s)	26.0	26.0	26.0		23.0	
Total Split (s)	57.0	57.0	57.0		23.0	
Total Split (%)	71.3%	71.3%	71.3%		28.8%	
Maximum Green (s)	51.0	51.0	51.0		18.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	None		None	
Walk Time (s)	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	
Pedestrian Calls (#/hr)	100	100	13		7	
Act Effct Green (s)		52.0	52.0		19.0	
Actuated g/C Ratio		0.65	0.65		0.24	
v/c Ratio		0.80	0.68		0.59	
Control Delay		16.4	12.0		32.5	
Queue Delay		0.0	0.0		0.0	
Total Delay		16.4	12.0		32.5	
LOS		B	B		C	
Approach Delay		16.4	12.0		32.5	
Approach LOS		B	B		C	

Intersection Summary

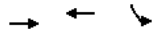
Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 16.3
 Intersection Capacity Utilization 62.7%
 Intersection LOS: B
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2081: King St & Joe Shuster Way



Queues
2081: King St & Joe Shuster Way

09/30/2021



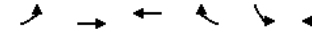
Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	980	812	212
v/c Ratio	0.80	0.68	0.59
Control Delay	16.4	12.0	32.5
Queue Delay	0.0	0.0	0.0
Total Delay	16.4	12.0	32.5
Queue Length 50th (m)	50.3	34.0	26.3
Queue Length 95th (m)	m34.1	50.9	46.3
Internal Link Dist (m)	292.7	167.3	76.8
Turn Bay Length (m)			
Base Capacity (vph)	1222	1194	359
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.80	0.68	0.59

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2081: King St & Joe Shuster Way

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↘
Traffic Volume (vph)	0	862	635	79	144	42
Future Volume (vph)	0	862	635	79	144	42
Ideal Flow (vphpl)	1250	1250	1250	1250	1900	1900
Total Lost time (s)		5.0	5.0		4.0	
Lane Util. Factor		0.95	0.95		1.00	
Frbp, ped/bikes		1.00	0.99		0.99	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.98		0.97	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		1881	1820		1460	
Flt Permitted		1.00	1.00		0.96	
Satd. Flow (perm)		1881	1820		1460	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	980	722	90	164	48
RTOR Reduction (vph)	0	0	12	0	13	0
Lane Group Flow (vph)	0	980	800	0	199	0
Confl. Peds. (#/hr)		43		43		23
Confl. Bikes (#/hr)				5		
Heavy Vehicles (%)	0%	7%	8%	3%	3%	21%
Bus Blockages (#/hr)	24	24	24	24	0	0
Turn Type		NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				8	
Actuated Green, G (s)		51.0	51.0		18.0	
Effective Green, g (s)		52.0	52.0		19.0	
Actuated g/C Ratio		0.65	0.65		0.24	
Clearance Time (s)		6.0	6.0		5.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		1222	1183		346	
v/s Ratio Prot		c0.52	0.44			
v/s Ratio Perm					c0.14	
v/c Ratio		0.80	0.68		0.58	
Uniform Delay, d1		10.2	8.7		26.9	
Progression Factor		1.43	1.00		1.00	
Incremental Delay, d2		0.5	1.5		2.3	
Delay (s)		15.1	10.3		29.2	
Level of Service		B	B		C	
Approach Delay (s)		15.1	10.3		29.2	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	14.7	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)	10.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	14	61	465	30	146	689
Future Volume (vph)	14	61	465	30	146	689
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.0	3.5	3.0	3.0	3.5
Storage Length (m)	30.0	0.0		15.0	30.0	
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			0.97	1.00		
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1560	1113	1807	1370	1276	1807
Fit Permitted	0.950				0.388	
Satd. Flow (perm)	1560	1113	1807	1326	519	1807
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		73		15		
Link Speed (k/h)	30		30			30
Link Distance (m)	148.7		265.9			191.3
Travel Time (s)	17.8		31.9			23.0
Confl. Peds. (#/hr)				8	8	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	8%	30%	4%	10%	32%	4%
Bus Blockages (#/hr)	0	10	0	0	0	0
Adj. Flow (vph)	17	73	554	36	174	820
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	73	554	36	174	820
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.0		3.0			3.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.09	1.15	1.01	1.09	1.09	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	6.1	6.1	30.5	6.1	6.1	30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	6.1	1.8	6.1	6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	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
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8

Scenario 1 Total Future AM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

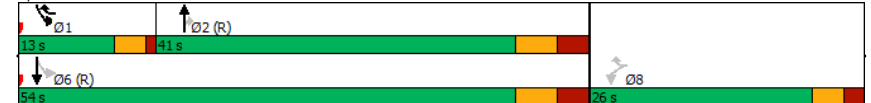
09/30/2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	21.0	6.0	27.0	27.0	6.0	27.0
Minimum Split (s)	26.0	10.0	34.0	34.0	10.0	34.0
Total Split (s)	26.0	13.0	41.0	41.0	13.0	54.0
Total Split (%)	32.5%	16.3%	51.3%	51.3%	16.3%	67.5%
Maximum Green (s)	21.0	9.0	34.0	34.0	9.0	47.0
Yellow Time (s)	3.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	1.0	3.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Walk Time (s)	7.0		7.0	7.0		0.0
Flash Dont Walk (s)	14.0		20.0	20.0		0.0
Pedestrian Calls (#/hr)	0		2	2		0
Act Effct Green (s)	22.0	13.1	57.9	57.9	71.8	73.6
Actuated g/C Ratio	0.28	0.16	0.72	0.72	0.90	0.92
v/c Ratio	0.04	0.30	0.42	0.04	0.32	0.49
Control Delay	21.7	8.4	8.7	5.7	2.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	8.4	8.7	5.7	2.6	2.6
LOS	C	A	A	A	A	A
Approach Delay	10.9		8.5			2.6
Approach LOS	B		A			A

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 15 (19%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 5.1 Intersection LOS: A
 Intersection Capacity Utilization 62.1% ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2134: British Columbia Rd/Dufferin St & Saskatchewan Rd



Queues

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	17	73	554	36	174	820
v/c Ratio	0.04	0.30	0.42	0.04	0.32	0.49
Control Delay	21.7	8.4	8.7	5.7	2.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	8.4	8.7	5.7	2.6	2.6
Queue Length 50th (m)	1.9	0.0	16.9	0.5	0.0	0.0
Queue Length 95th (m)	5.9	5.7	90.6	6.2	11.5	43.9
Internal Link Dist (m)	124.7		241.9			167.3
Turn Bay Length (m)	30.0		15.0	30.0		
Base Capacity (vph)	429	271	1306	962	560	1662
Starvation Cap Reductn	0	0	0	0	0	4
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.27	0.42	0.04	0.31	0.49
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (vph)	14	61	465	30	146	689
Future Volume (vph)	14	61	465	30	146	689
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.5	3.0	3.0	3.5
Total Lost time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.97	1.00	1.00
Ftpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1560	1113	1807	1326	1274	1807
Flt Permitted	0.95	1.00	1.00	1.00	0.39	1.00
Satd. Flow (perm)	1560	1113	1807	1326	520	1807
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	17	73	554	36	174	820
RTOR Reduction (vph)	0	61	0	5	0	0
Lane Group Flow (vph)	17	12	554	31	174	820
Confl. Peds. (#/hr)				8	8	
Confl. Bikes (#/hr)					1	
Heavy Vehicles (%)	8%	30%	4%	10%	32%	4%
Bus Blockages (#/hr)	0	10	0	0	0	0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	4.2	11.1	52.9	52.9	63.8	63.8
Effective Green, g (s)	5.2	13.1	53.9	53.9	64.8	64.8
Actuated g/C Ratio	0.07	0.16	0.67	0.67	0.81	0.81
Clearance Time (s)	5.0	4.0	7.0	7.0	4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	101	182	1217	893	495	1463
v/s Ratio Prot		0.01	0.31		0.03	c0.45
v/s Ratio Perm	c0.01	0.00		0.02	0.25	
v/c Ratio	0.17	0.07	0.46	0.03	0.35	0.56
Uniform Delay, d1	35.4	28.3	6.1	4.4	2.3	2.6
Progression Factor	1.00	1.00	1.00	1.00	0.54	0.41
Incremental Delay, d2	0.8	0.2	1.2	0.1	0.4	1.3
Delay (s)	36.1	28.4	7.4	4.4	1.6	2.4
Level of Service	D	C	A	A	A	A
Approach Delay (s)	29.9		7.2			2.3
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			5.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			62.1%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
9004: Jefferson Ave & Site B Driveway

09/30/2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Volume (vph)	16	2	128	24	0	26
Future Volume (vph)	16	2	128	24	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.986	0.979				
Fit Protected	0.957					
Satd. Flow (prot)	1738	0	1803	0	0	1842
Fit Permitted	0.957					
Satd. Flow (perm)	1738	0	1803	0	0	1842
Link Speed (k/h)	50	50		50		
Link Distance (m)	78.7	80.2		351.8		
Travel Time (s)	5.7	5.8		25.3		
Confl. Peds. (#/hr)	11	14	936		936	
Confl. Bikes (#/hr)	2		5			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	2	139	26	0	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	0	165	0	0	28
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5	0.0		0.0		
Link Offset(m)	0.0	0.0		0.0		
Crosswalk Width(m)	4.8	4.8		4.8		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	14		24	
Sign Control	Stop	Free		Free		

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	27.1% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
9004: Jefferson Ave & Site B Driveway

09/30/2021

	←		↑		→	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Volume (veh/h)	16	2	128	24	0	26
Future Volume (Veh/h)	16	2	128	24	0	26
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)	17	2	139	26	0	28
Pedestrians	936	11		14		
Lane Width (m)	3.5	3.5		3.5		
Walking Speed (m/s)	1.2	1.2		1.2		
Percent Blockage	76	1		1		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1127	1102			1101	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1127	1102			1101	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	97			100	
cM capacity (veh/h)	54	61			153	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	19	165	28
Volume Left	17	0	0
Volume Right	2	26	0
cSH	55	1700	153
Volume to Capacity	0.35	0.10	0.00
Queue Length 95th (m)	9.5	0.0	0.0
Control Delay (s)	102.0	0.0	0.0
Lane LOS	F		
Approach Delay (s)	102.0	0.0	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	9.1		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
9006: Atlantic Ave & Site B Driveway

09/30/2021

	↖	↘	↙	↗	↘	↙
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖			↗	↘	↙
Traffic Volume (vph)	28	8	25	46	178	17
Future Volume (vph)	28	8	25	46	178	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.969				0.988	
Fit Protected	0.963			0.983		
Satd. Flow (prot)	1719	0	0	1811	1820	0
Fit Permitted	0.963			0.983		
Satd. Flow (perm)	1719	0	0	1811	1820	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	78.7			22.4	217.5	
Travel Time (s)	5.7			1.6	15.7	
Confl. Peds. (#/hr)		818	234			234
Confl. Bikes (#/hr)		2				26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	9	27	50	193	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	0	0	77	211	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.5%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9006: Atlantic Ave & Site B Driveway

09/30/2021

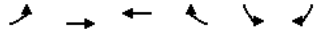
	↖	↘	↙	↗	↘	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖			↗	↘	↙
Traffic Volume (veh/h)	28	8	25	46	178	17
Future Volume (Veh/h)	28	8	25	46	178	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	9	27	50	193	18
Pedestrians	234			818		
Lane Width (m)	3.5			3.5		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	19			66		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)	77					
pX, platoon unblocked						
vC, conflicting volume	540	1254	445			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	540	1254	445			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	84	97			
cM capacity (veh/h)	395	57	904			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	77	211
Volume Left	30	27	0
Volume Right	9	0	18
cSH	167	904	1700
Volume to Capacity	0.23	0.03	0.12
Queue Length 95th (m)	6.6	0.7	0.0
Control Delay (s)	32.9	3.4	0.0
Lane LOS	D	A	
Approach Delay (s)	32.9	3.4	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
9007: New Liberty St & Hanna Ave

09/30/2021



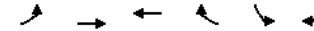
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (vph)	57	63	191	48	11	1
Future Volume (vph)	57	63	191	48	11	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Fit			0.973		0.990	
Fit Protected		0.977			0.956	
Satd. Flow (prot)	0	1800	1792	0	1743	0
Fit Permitted		0.977			0.956	
Satd. Flow (perm)	0	1800	1792	0	1743	0
Link Speed (k/h)		40	40		50	
Link Distance (m)		198.4	579.0		130.0	
Travel Time (s)		17.9	52.1		9.4	
Confl. Peds. (#/hr)	731			731		
Confl. Bikes (#/hr)				45		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	68	208	52	12	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	130	260	0	13	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
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	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.0%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
9007: New Liberty St & Hanna Ave

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (veh/h)	57	63	191	48	11	1
Future Volume (Veh/h)	57	63	191	48	11	1
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)	62	68	208	52	12	1
Pedestrians					731	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					59	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		198				
pX, platoon unblocked						
vC, conflicting volume	991				1157	965
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	991				1157	965
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	78				83	99
cM capacity (veh/h)	284				69	126

Direction, Lane #

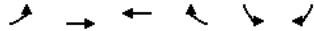
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	130	260	13
Volume Left	62	0	12
Volume Right	0	52	1
cSH	284	1700	72
Volume to Capacity	0.22	0.15	0.18
Queue Length 95th (m)	6.2	0.0	4.7
Control Delay (s)	12.6	0.0	66.0
Lane LOS	B		F
Approach Delay (s)	12.6	0.0	66.0
Approach LOS			F

Intersection Summary

Average Delay		6.2	
Intersection Capacity Utilization		35.0%	ICU Level of Service A
Analysis Period (min)		15	

Lanes, Volumes, Timings
9022: New Liberty St & Jefferson Ave

09/30/2021



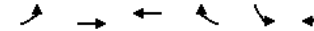
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	
Traffic Volume (vph)	198	76	174	66	0	44
Future Volume (vph)	198	76	174	66	0	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.963		0.865	
Fit Protected		0.965				
Satd. Flow (prot)	0	1778	1675	0	1593	0
Fit Permitted		0.965				
Satd. Flow (perm)	0	1778	1675	0	1593	0
Link Speed (k/h)		40	40		50	
Link Distance (m)		121.2	87.6		80.2	
Travel Time (s)		10.9	7.9		5.8	
Confl. Peds. (#/hr)	516			516		
Confl. Bikes (#/hr)				3		10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Bus Blockages (#/hr)	0	0	14	14	0	0
Adj. Flow (vph)	220	84	193	73	0	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	304	266	0	49	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
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	1.01	1.01	1.09	1.01	1.01	1.01
Turning Speed (k/h)		24		14	24	14
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	44.2%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
9022: New Liberty St & Jefferson Ave

09/30/2021



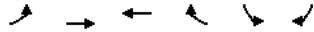
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	198	76	174	66	0	44
Future Volume (vph)	198	76	174	66	0	44
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	220	84	193	73	0	49
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	304	266	49			
Volume Left (vph)	220	0	0			
Volume Right (vph)	0	73	49			
Hadj (s)	0.18	-0.13	-0.57			
Departure Headway (s)	4.5	4.2	4.6			
Degree Utilization, x	0.38	0.31	0.06			
Capacity (veh/h)	791	829	699			
Control Delay (s)	10.1	9.1	7.9			
Approach Delay (s)	10.1	9.1	7.9			
Approach LOS	B	A	A			

Intersection Summary

Delay	9.5
Level of Service	A
Intersection Capacity Utilization	44.2%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
9023: New Liberty St & Atlantic Ave

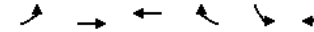
09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (vph)	40	37	122	39	83	118
Future Volume (vph)	40	37	122	39	83	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.70	0.82		0.46	
Frt			0.968		0.921	
Fit Protected		0.975			0.980	
Satd. Flow (prot)	0	1695	1462	0	1032	0
Fit Permitted		0.816			0.980	
Satd. Flow (perm)	0	994	1462	0	769	0
Right Turn on Red			Yes		Yes	
Satd. Flow (RTOR)			37			
Link Speed (k/h)		40	40		50	
Link Distance (m)		87.6	198.4		54.1	
Travel Time (s)		7.9	17.9		3.9	
Confl. Peds. (#/hr)	1229			1229	790	853
Confl. Bikes (#/hr)				10		3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Bus Blockages (#/hr)	0	14	0	0	0	0
Adj. Flow (vph)	44	41	136	43	92	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	85	179	0	223	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
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	1.01	1.09	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	6			

Lanes, Volumes, Timings
9023: New Liberty St & Atlantic Ave

09/30/2021

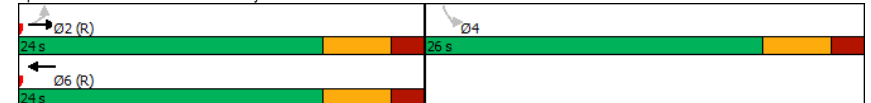


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2				4	
Detector Phase	2	2	6		4	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0		7.0	
Minimum Split (s)	24.0	24.0	24.0		24.0	
Total Split (s)	24.0	24.0	24.0		26.0	
Total Split (%)	48.0%	48.0%	48.0%		52.0%	
Maximum Green (s)	18.0	18.0	18.0		20.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	C-Max		None	
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)	100	100	100		100	
Act Effct Green (s)	21.7	21.7	21.7		18.3	
Actuated g/C Ratio	0.43	0.43	0.43		0.37	
v/c Ratio	0.20	0.27	0.27		0.79	
Control Delay	11.9	9.8	9.8		36.4	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	11.9	9.8	9.8		36.4	
LOS		B	A		D	
Approach Delay	11.9	9.8	9.8		36.4	
Approach LOS		B	A		D	

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 22.4
 Intersection LOS: C
 Intersection Capacity Utilization 52.0%
 ICU Level of Service A
 Analysis Period (min) 15

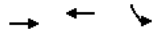
Splits and Phases: 9023: New Liberty St & Atlantic Ave



Queues

9023: New Liberty St & Atlantic Ave

09/30/2021



Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	85	179	223
v/c Ratio	0.20	0.27	0.79
Control Delay	11.9	9.8	36.4
Queue Delay	0.0	0.0	0.0
Total Delay	11.9	9.8	36.4
Queue Length 50th (m)	4.9	8.3	15.3
Queue Length 95th (m)	12.7	19.3	#44.1
Internal Link Dist (m)	63.6	174.4	30.1
Turn Bay Length (m)			
Base Capacity (vph)	430	654	322
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.20	0.27	0.69

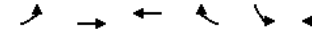
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9023: New Liberty St & Atlantic Ave

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (vph)	40	37	122	39	83	118
Future Volume (vph)	40	37	122	39	83	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	
Lane Util. Factor		1.00	1.00		1.00	
Frbp, ped/bikes		1.00	0.82		0.62	
Flpb, ped/bikes		0.70	1.00		0.74	
Frt		1.00	0.97		0.92	
Flt Protected		0.97	1.00		0.98	
Satd. Flow (prot)		1188	1462		768	
Flt Permitted		0.82	1.00		0.98	
Satd. Flow (perm)		994	1462		768	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	41	136	43	92	131
RTOR Reduction (vph)	0	0	21	0	0	0
Lane Group Flow (vph)	0	85	158	0	223	0
Confl. Peds. (#/hr)	1229			1229	790	853
Confl. Bikes (#/hr)				10		3
Bus Blockages (#/hr)	0	14	0	0	0	0
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				4	
Actuated Green, G (s)		20.7	20.7		17.3	
Effective Green, g (s)		21.7	21.7		18.3	
Actuated g/C Ratio		0.43	0.43		0.37	
Clearance Time (s)		6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		431	634		281	
v/s Ratio Prot			c0.11			
v/s Ratio Perm		0.09			c0.29	
v/c Ratio		0.20	0.25		0.79	
Uniform Delay, d1		8.8	9.0		14.2	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		1.0	0.9		14.2	
Delay (s)		9.8	9.9		28.4	
Level of Service		A	A		C	
Approach Delay (s)		9.8	9.9		28.4	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Traffic Volume (vph)	185	75	392	150	47	669
Future Volume (vph)	185	75	392	150	47	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	0.0	0.0		
Storage Lanes	1	1		0	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		0.60	0.99		1.00	
Frt		0.850	0.963			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1750	1566	1763	0	1750	1842
Flt Permitted	0.950				0.375	
Satd. Flow (perm)	1750	937	1763	0	690	1842
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		83	48			
Link Speed (k/h)	40		30		30	
Link Distance (m)	107.6		191.3		74.7	
Travel Time (s)	9.7		23.0		9.0	
Conf. Peds. (#/hr)		170		1	1	
Conf. Bikes (#/hr)		12		1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	83	436	167	52	743
Shared Lane Traffic (%)						
Lane Group Flow (vph)	206	83	603	0	52	743
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5		3.5	
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	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
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)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+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)			28.7		28.7	
Detector 2 Size(m)			1.8		1.8	
Detector 2 Type			CI+Ex		CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)			0.0		0.0	

Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0		7.0	7.0
Minimum Split (s)	24.0	24.0	24.0		24.0	24.0
Total Split (s)	24.0	24.0	56.0		56.0	56.0
Total Split (%)	30.0%	30.0%	70.0%		70.0%	70.0%
Maximum Green (s)	18.0	18.0	50.0		50.0	50.0
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)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	15.2	15.2	54.8		54.8	54.8
Actuated g/C Ratio	0.19	0.19	0.68		0.68	0.68
v/c Ratio	0.62	0.34	0.49		0.11	0.59
Control Delay	37.8	10.5	12.2		3.4	5.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	37.8	10.5	12.2		3.4	5.7
LOS	D	B	B		A	A
Approach Delay	29.9		12.2			5.5
Approach LOS	C		B			A
Intersection Summary						
Area Type:	Other					
Cycle Length:	80					
Actuated Cycle Length:	80					
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green					
Natural Cycle:	60					
Control Type:	Actuated-Coordinated					
Maximum v/c Ratio:	0.62					
Intersection Signal Delay:	12.1			Intersection LOS: B		
Intersection Capacity Utilization:	62.4%			ICU Level of Service B		
Analysis Period (min):	15					
Splits and Phases:	9024: Dufferin St & New Liberty St					



Queues
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	206	83	603	52	743
v/c Ratio	0.62	0.34	0.49	0.11	0.59
Control Delay	37.8	10.5	12.2	3.4	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.8	10.5	12.2	3.4	5.7
Queue Length 50th (m)	28.8	0.0	34.1	1.2	34.8
Queue Length 95th (m)	46.8	10.6	125.8	m2.0	m54.0
Internal Link Dist (m)	83.6		167.3		50.7
Turn Bay Length (m)	15.0				
Base Capacity (vph)	415	285	1223	473	1262
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	0.50	0.29	0.49	0.11	0.59

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑		↖	↗
Traffic Volume (vph)	185	75	392	150	47	669
Future Volume (vph)	185	75	392	150	47	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	0.60	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	932	1762		1749	1842
Fit Permitted	0.95	1.00	1.00		0.38	1.00
Satd. Flow (perm)	1750	932	1762		691	1842
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	83	436	167	52	743
RTOR Reduction (vph)	0	67	15	0	0	0
Lane Group Flow (vph)	206	16	588	0	52	743
Confl. Peds. (#/hr)		170		1	1	
Confl. Bikes (#/hr)		12		1		
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Actuated Green, G (s)	14.2	14.2	53.8		53.8	53.8
Effective Green, g (s)	15.2	15.2	54.8		54.8	54.8
Actuated g/C Ratio	0.19	0.19	0.68		0.68	0.68
Clearance Time (s)	6.0	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)	332	177	1206		473	1261
v/s Ratio Prot			0.33			c0.40
v/s Ratio Perm	c0.12	0.02			0.08	
v/c Ratio	0.62	0.09	0.49		0.11	0.59
Uniform Delay, d1	29.8	26.7	6.0		4.3	6.7
Progression Factor	1.00	1.00	1.74		0.62	0.72
Incremental Delay, d2	3.6	0.2	1.3		0.0	0.2
Delay (s)	33.3	26.9	11.7		2.7	4.9
Level of Service	C	C	B		A	A
Approach Delay (s)	31.5		11.7			4.8
Approach LOS	C		B			A

Intersection Summary

HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9025: Strachan Ave & New Liberty St

09/30/2021

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (vph)	0	95	0	571	372	135
Future Volume (vph)	0	95	0	571	372	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	15.0			0.0
Storage Lanes	1	1	1			0
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			0.964	
Flt Protected						
Satd. Flow (prot)	1842	1566	1842	1842	1776	0
Flt Permitted						
Satd. Flow (perm)	1842	1566	1842	1842	1776	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	579.0			241.4	424.1	
Travel Time (s)	52.1			21.7	38.2	
Confl. Peds. (#/hr)			9			9
Confl. Bikes (#/hr)		4				76
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	106	0	634	413	150
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	106	0	634	563	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
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	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.6%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9025: Strachan Ave & New Liberty St

09/30/2021

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	↔	↔	↔	↕	↕	↔
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (veh/h)	0	95	0	571	372	135
Future Volume (Veh/h)	0	95	0	571	372	135
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	106	0	634	413	150
Pedestrians	9					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				241		
pX, platoon unblocked	0.83					
vC, conflicting volume	1131	497	572			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1057	497	572			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	81	100			
cM capacity (veh/h)	206	569	993			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	0	106	0	634	563
Volume Left	0	0	0	0	0
Volume Right	0	106	0	0	150
cSH	1700	569	1700	1700	1700
Volume to Capacity	0.00	0.19	0.00	0.37	0.33
Queue Length 95th (m)	0.0	5.2	0.0	0.0	0.0
Control Delay (s)	0.0	12.8	0.0	0.0	0.0
Lane LOS	A	B			
Approach Delay (s)	12.8		0.0		0.0
Approach LOS	B				

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
9029: Atlantic Ave

09/30/2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T		T		T	T
Traffic Volume (vph)	14	4	47	24	6	40
Future Volume (vph)	14	4	47	24	6	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.973	0.954				
Fit Protected	0.962					0.993
Satd. Flow (prot)	1724	0	1757	0	0	1829
Fit Permitted	0.962					0.993
Satd. Flow (perm)	1724	0	1757	0	0	1829
Link Speed (k/h)	50	50		50		
Link Distance (m)	47.7	54.1		22.4		
Travel Time (s)	3.4	3.9		1.6		
Confl. Peds. (#/hr)	54	1	360		360	
Confl. Bikes (#/hr)	2		6			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	16	4	52	27	7	44
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	79	0	0	51
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5	0.0		0.0		
Link Offset(m)	0.0	0.0		0.0		
Crosswalk Width(m)	4.8	4.8		4.8		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	14		24	
Sign Control	Stop	Free		Free		

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.7%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
9029: Atlantic Ave

09/30/2021

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T		T		T	T
Traffic Volume (veh/h)	14	4	47	24	6	40
Future Volume (Veh/h)	14	4	47	24	6	40
Sign Control	Stop	Free		Free		
Grade	0%	0%		0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	4	52	27	7	44
Pedestrians	360	54		1		
Lane Width (m)	3.5	3.5		3.5		
Walking Speed (m/s)	1.2	1.2		1.2		
Percent Blockage	29	4		0		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	54					
pX, platoon unblocked						
vC, conflicting volume	538	426			439	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	538	426			439	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	99			99	
cM capacity (veh/h)	339	444			794	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	20	79	51
Volume Left	16	0	7
Volume Right	4	27	0
cSH	356	1700	794
Volume to Capacity	0.06	0.05	0.01
Queue Length 95th (m)	1.4	0.0	0.2
Control Delay (s)	15.7	0.0	1.4
Lane LOS	C	A	
Approach Delay (s)	15.7	0.0	1.4
Approach LOS	C		

Intersection Summary

Average Delay	2.6	
Intersection Capacity Utilization	23.7%	ICU Level of Service A
Analysis Period (min)	15	

Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔		↔	↔		↔	↔
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	30.0		0.0	20.0		20.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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				0.97
Frt						0.850						0.865
Fit Protected	0.950			0.950				0.957				
Satd. Flow (prot)	1685	1824	0	1685	1756	1507	0	1798	0	0	1574	0
Fit Permitted	0.555			0.494								
Satd. Flow (perm)	984	1824	0	874	1756	1507	0	1860	0	0	1574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						45						514
Link Speed (k/h)		30			30			30				30
Link Distance (m)		164.9			265.9			92.0				121.3
Travel Time (s)		19.8			31.9			11.0				14.6
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
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 (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	470	0	1	342	1	8	1	0	0	0	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	29	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)		3.0			3.0			0.0				0.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	1.09	1.01	1.01	1.09	1.01	1.09	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	

Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

97: Yukon Place & British Columbia Rd

09/30/2021

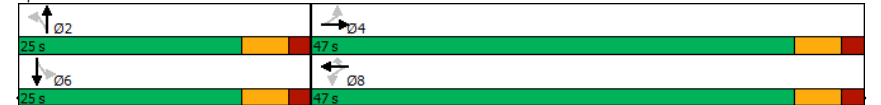


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				NA
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2				6	
Detector Phase	4	4		8	8	8	2	2			6	6
Switch Phase												
Minimum Initial (s)	33.0	33.0		33.0	33.0	33.0	7.0	7.0			7.0	7.0
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	24.0	24.0			24.0	24.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0	25.0	25.0			25.0	25.0
Total Split (%)	65.3%	65.3%		65.3%	65.3%	65.3%	34.7%	34.7%			34.7%	34.7%
Maximum Green (s)	41.0	41.0		41.0	41.0	41.0	19.0	19.0			19.0	19.0
Yellow Time (s)	4.0	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	2.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0			-1.0	-1.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	Max	Max		Max	Max	Max	None	None			None	None
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	9.0	9.0		9.0	9.0	9.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	0
Act Effct Green (s)	58.5	58.5		58.5	58.5	58.5	8.0	8.0			8.0	8.0
Actuated g/C Ratio	0.90	0.90		0.90	0.90	0.90	0.12	0.12			0.12	0.12
v/c Ratio	0.00	0.29		0.00	0.22	0.00	0.04	0.05			0.05	0.05
Control Delay	2.0	2.3		2.0	2.1	0.0	27.0	0.1			27.0	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	2.0	2.3		2.0	2.1	0.0	27.0	0.1			27.0	0.1
LOS	A	A		A	A	A	C	A			C	A
Approach Delay		2.3			2.1		27.0	0.1				
Approach LOS		A			A		C	A				

Intersection Summary

Area Type:	Other
Cycle Length:	72
Actuated Cycle Length:	65.2
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.29
Intersection Signal Delay:	2.4
Intersection LOS:	A
Intersection Capacity Utilization:	73.3%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 97: Yukon Place & British Columbia Rd



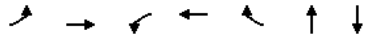
Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

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Queues

97: Yukon Place & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	1	470	1	342	1	9	29
v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.04	0.05
Control Delay	2.0	2.3	2.0	2.1	0.0	27.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.0	2.3	2.0	2.1	0.0	27.0	0.1
Queue Length 50th (m)	0.0	0.0	0.0	0.0	0.0	0.9	0.0
Queue Length 95th (m)	0.3	26.4	0.3	18.3	0.0	4.5	0.0
Internal Link Dist (m)		140.9		241.9		68.0	97.3
Turn Bay Length (m)	30.0		20.0		20.0		
Base Capacity (vph)	882	1635	783	1574	1356	574	840
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.29	0.00	0.22	0.00	0.02	0.03

Intersection Summary

HCM Signalized Intersection Capacity Analysis

97: Yukon Place & British Columbia Rd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔		↔	↔		↔	↔
Traffic Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Future Volume (vph)	1	423	0	1	308	1	7	1	0	0	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0		5.0				5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00				0.97
Fipb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99				1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00				0.86
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96				1.00
Satd. Flow (prot)	1685	1824		1681	1756	1507		1781				1574
Flt Permitted	0.56	1.00		0.49	1.00	1.00		1.00				1.00
Satd. Flow (perm)	985	1824		873	1756	1507		1860				1574
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)	1	470	0	1	342	1	8	1	0	0	0	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	27
Lane Group Flow (vph)	1	470	0	1	342	1	0	9	0	0	2	0
Confl. Peds. (#/hr)			2	2			6					6
Confl. Bikes (#/hr)								1				
Heavy Vehicles (%)	0%	3%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				NA
Protected Phases		4			8		8		2		6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	54.3	54.3		54.3	54.3	54.3		2.6				2.6
Effective Green, g (s)	55.3	55.3		55.3	55.3	55.3		3.6				3.6
Actuated g/C Ratio	0.80	0.80		0.80	0.80	0.80		0.05				0.05
Clearance Time (s)	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
Lane Grp Cap (vph)	790	1463		700	1409	1209		97				82
v/s Ratio Prot		0.26			0.19							0.00
v/s Ratio Perm	0.00			0.00		0.00		0.00				0.02
v/c Ratio	0.00	0.32		0.00	0.24	0.00		0.09				0.02
Uniform Delay, d1	1.3	1.8		1.3	1.7	1.3		31.1				31.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00				1.00
Incremental Delay, d2	0.0	0.6		0.0	0.4	0.0		0.4				0.1
Delay (s)	1.3	2.4		1.3	2.1	1.3		31.5				31.1
Level of Service	A	A		A	A	A		C				C
Approach Delay (s)		2.4			2.1			31.5				31.1
Approach LOS		A			A			C				C

Intersection Summary

HCM 2000 Control Delay	3.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	68.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔			↔		↔	↔	↔
Traffic Volume (vph)	523	1621	3	12	2476	0	0	16	0	538	49	404
Future Volume (vph)	523	1621	3	12	2476	0	0	16	0	538	49	404
Ideal Flow (vphpl)	2150	1900	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Storage Length (m)	60.0		0.0	60.0		50.0	0.0		0.0	140.0		50.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.91	0.91	1.00	*0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00		1.00								0.92
Frt												0.850
Fit Protected	0.950			0.950						0.950	0.960	
Satd. Flow (prot)	1816	4794	0	1685	5883	0	0	1879	0	1585	1699	1507
Fit Permitted	0.072			0.096						0.746	0.750	
Satd. Flow (perm)	138	4794	0	170	5883	0	0	1879	0	1244	1328	1382
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												230
Link Speed (k/h)		60			60			40			40	
Link Distance (m)		310.3			196.6			116.5			205.6	
Travel Time (s)		18.6			11.8			10.5			18.5	
Confl. Peds. (#/hr)	5		8	8		5	46					46
Confl. Bikes (#/hr)								16				38
Peak Hour Factor	0.90	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	7%	0%	0%	3%	0%	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	581	1706	3	13	2606	0	0	17	0	566	52	425
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	581	1709	0	13	2606	0	0	17	0	306	312	425
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)		3.0			3.0			3.0			3.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.93	1.01	1.01	1.09	0.86	1.09	1.01	1.01	1.01	1.09	1.01	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

222: Lakeshore Blvd & Strachan Ave

09/30/2021

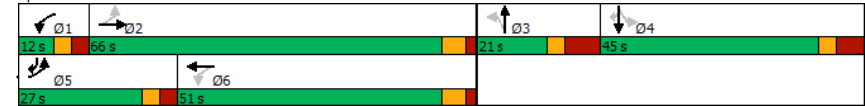


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA			NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6			3		4	4	5
Permitted Phases	2			6								4
Detector Phase	5	2		1	6			3	3		4	4
Switch Phase												
Minimum Initial (s)	6.0	29.0		6.0	30.0			12.0	12.0		10.0	10.0
Minimum Split (s)	12.0	35.0		12.0	36.0			21.0	21.0		45.0	45.0
Total Split (s)	27.0	66.0		12.0	51.0			21.0	21.0		45.0	45.0
Total Split (%)	18.8%	45.8%		8.3%	35.4%			14.6%	14.6%		31.3%	31.3%
Maximum Green (s)	21.0	60.0		6.0	45.0			12.0	12.0		37.0	37.0
Yellow Time (s)	3.0	4.0		3.0	4.0			3.0	3.0		3.0	3.0
All-Red Time (s)	3.0	2.0		3.0	2.0			6.0	6.0		5.0	5.0
Lost Time Adjust (s)	-3.0	-1.0		-1.0	-3.0			-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	3.0	5.0		5.0	3.0			8.0	8.0		7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag			Lead	Lead		Lag	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	Max		None	Max			None	None		None	None
Walk Time (s)		7.0			7.0						7.0	7.0
Flash Dont Walk (s)		22.0			22.0						30.0	30.0
Pedestrian Calls (#/hr)		3			2						0	0
Act Effct Green (s)	75.6	69.3		53.5	48.4			13.1			36.2	36.2
Actuated g/C Ratio	0.58	0.54		0.41	0.37			0.10			0.28	0.28
v/c Ratio	1.47	0.67		0.09	1.19			0.09			0.88	0.84
Control Delay	258.8	26.8		19.0	124.8			59.0			71.8	65.7
Queue Delay	0.0	0.0		0.0	0.2			0.0			0.0	0.0
Total Delay	258.8	26.8		19.0	125.1			59.0			71.8	65.7
LOS	F	C		B	F			E			E	B
Approach Delay		85.6			124.5			59.0				46.0
Approach LOS		F			F			E				D

Intersection Summary

Area Type:	Other
Cycle Length:	144
Actuated Cycle Length:	129.5
Natural Cycle:	145
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.47
Intersection Signal Delay:	95.7
Intersection LOS:	F
Intersection Capacity Utilization:	109.5%
ICU Level of Service:	H
Analysis Period (min):	15
* User Entered Value	

Splits and Phases: 222: Lakeshore Blvd & Strachan Ave



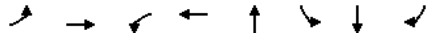
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Queues

222: Lakeshore Blvd & Strachan Ave

09/30/2021



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	581	1709	13	2606	17	306	312	425
v/c Ratio	1.47	0.67	0.09	1.19	0.09	0.88	0.84	0.54
Control Delay	258.8	26.8	19.0	124.8	59.0	71.8	65.7	12.9
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	258.8	26.8	19.0	125.1	59.0	71.8	65.7	12.9
Queue Length 50th (m)	~175.2	90.3	1.2	~257.1	3.8	71.2	71.6	24.6
Queue Length 95th (m)	#298.7	178.4	5.5	#361.5	12.5	#149.8	#146.7	66.7
Internal Link Dist (m)		286.3		172.6	92.5		181.6	
Turn Bay Length (m)	60.0		60.0			140.0		50.0
Base Capacity (vph)	394	2565	152	2199	190	368	393	789
Starvation Cap Reductn	0	0	0	186	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	1.47	0.67	0.09	1.29	0.09	0.83	0.79	0.54

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.

HCM Signalized Intersection Capacity Analysis

222: Lakeshore Blvd & Strachan Ave

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔			↔	↔	↔	↔	↔
Traffic Volume (vph)	523	1621	3	12	2476	0	0	16	0	538	49	404
Future Volume (vph)	523	1621	3	12	2476	0	0	16	0	538	49	404
Ideal Flow (vphpl)	2150	1900	1900	1900	2150	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.0
Total Lost time (s)	3.0	5.0		5.0	3.0			8.0		7.0	7.0	5.0
Lane Util. Factor	1.00	0.91		1.00	*0.95			1.00		0.95	0.95	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	0.95
Frbp, 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	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	0.96	1.00
Satd. Flow (prot)	1816	4793		1685	5883			1879		1585	1699	1431
Flt Permitted	0.07	1.00		0.10	1.00			1.00		0.75	0.75	1.00
Satd. Flow (perm)	138	4793		170	5883			1879		1245	1327	1431
Peak-hour factor, PHF	0.90	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	581	1706	3	13	2606	0	0	17	0	566	52	425
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	133
Lane Group Flow (vph)	581	1709	0	13	2606	0	0	17	0	306	312	292
Confl. Peds. (#/hr)	5		8	8		5	46					46
Confl. Bikes (#/hr)									16			38
Heavy Vehicles (%)	5%	7%	0%	0%	3%	0%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA			NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6			3			4	5
Permitted Phases	2			6			3			4		4
Actuated Green, G (s)	76.5	68.3		51.5	49.3			4.3		35.2	35.2	56.4
Effective Green, g (s)	79.5	69.3		53.5	52.3			5.3		36.2	36.2	58.4
Actuated g/C Ratio	0.57	0.50		0.38	0.38			0.04		0.26	0.26	0.42
Clearance Time (s)	6.0	6.0		6.0	6.0			9.0		8.0	8.0	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)	371	2389		100	2213			71		324	345	601
v/s Ratio Prot	c0.27	0.36		0.00	0.44			c0.01				0.08
v/s Ratio Perm	c0.62			0.05						c0.25	0.24	0.13
v/c Ratio	1.57	0.72		0.13	1.18			0.24		0.94	0.90	0.49
Uniform Delay, d1	46.5	27.2		27.2	43.4			64.9		50.4	49.7	29.4
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	267.5	1.9		0.6	85.0			1.7		35.4	25.9	0.6
Delay (s)	314.0	29.0		27.8	128.3			66.6		85.8	75.6	30.0
Level of Service	F	C		C	F			E		F	E	C
Approach Delay (s)		101.3			127.8			66.6				60.0
Approach LOS		F			F			E				E

Intersection Summary

HCM 2000 Control Delay	105.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	139.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	109.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
538: Strachan Ave & King St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕		↕	↕	
Traffic Volume (vph)	0	472	100	4	845	68	275	358	169	27	236	27
Future Volume (vph)	0	472	100	4	845	68	275	358	169	27	236	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	0.0	0.0	0.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Storage Lanes	0	0	0	0	0	1	0	1	0	1	0	0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93		0.99		0.88	0.96		0.97	0.98		
Frt		0.974		0.989		0.952		0.952		0.984		
Fit Protected					0.950			0.950		0.950		
Satd. Flow (prot)	0	2566	0	0	2866	0	1486	1536	0	1516	1614	0
Fit Permitted				0.953		0.541		0.276				
Satd. Flow (perm)	0	2566	0	0	2729	0	743	1536	0	427	1614	0
Right Turn on Red			Yes		Yes		Yes			Yes		Yes
Satd. Flow (RTOR)		38			13			40			10	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		255.2			358.6			424.1			379.9	
Travel Time (s)		18.4			25.8			38.2			34.2	
Confl. Peds. (#/hr)	83		194	194		83	170		89	89		170
Confl. Bikes (#/hr)			9			7			26			6
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	6%	17%	100%	4%	0%	2%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	24	24	24	24	24	0	0	0	0	0	0	0
Adj. Flow (vph)	0	502	106	4	899	72	293	381	180	29	251	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	608	0	0	975	0	293	561	0	29	280	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			3.0			3.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.16	1.23	1.16	1.16	1.23	1.16	1.25	1.16	1.16	1.25	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	

Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings
538: Strachan Ave & King St

09/30/2021

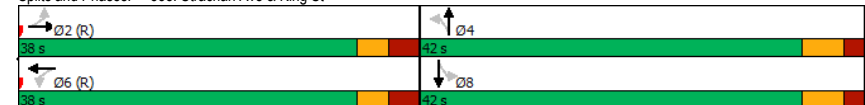


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases		2			6			4			8	
Detector Phase		2			6			4			8	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		27.0	27.0		27.0	27.0	
Total Split (s)	38.0	38.0		38.0	38.0		42.0	42.0		42.0	42.0	
Total Split (%)	47.5%	47.5%		47.5%	47.5%		52.5%	52.5%		52.5%	52.5%	
Maximum Green (s)	32.0	32.0		32.0	32.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
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	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		25	25		27	27		100	100	
Act Effct Green (s)		33.0			33.0			37.0			37.0	
Actuated g/C Ratio		0.41			0.41			0.46			0.46	
v/c Ratio		0.56			0.86			0.85			0.77	
Control Delay		19.2			20.3			45.2			25.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		19.2			20.3			45.2			25.3	
LOS		B			C			D			C	
Approach Delay		19.2			20.3			32.1			23.8	
Approach LOS		B			C			C			C	

Intersection Summary

Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 50 (63%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 24.1 Intersection LOS: C
 Intersection Capacity Utilization 96.1% ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 538: Strachan Ave & King St



Queues
538: Strachan Ave & King St

09/30/2021



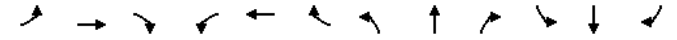
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	608	975	293	561	29	280
v/c Ratio	0.56	0.86	0.85	0.77	0.15	0.37
Control Delay	19.2	20.3	45.2	25.3	22.5	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	20.3	45.2	25.3	22.5	23.9
Queue Length 50th (m)	33.7	44.5	37.8	63.4	3.6	37.9
Queue Length 95th (m)	49.3	#71.0	#84.2	#107.3	m7.6	m57.3
Internal Link Dist (m)	231.2	334.6		400.1		355.9
Turn Bay Length (m)			25.0		25.0	
Base Capacity (vph)	1080	1133	343	731	197	751
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	0.56	0.86	0.85	0.77	0.15	0.37

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
538: Strachan Ave & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕		↕	↕		↕	↕	
Traffic Volume (vph)	0	472	100	4	845	68	275	358	169	27	236	27
Future Volume (vph)	0	472	100	4	845	68	275	358	169	27	236	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
Total Lost time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.93			0.99		1.00	0.96		1.00	0.98	
Fipb, ped/bikes		1.00			1.00		0.88	1.00		0.97	1.00	
Frt		0.97			0.99		1.00	0.95		1.00	0.98	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2565			2863		1304	1536		1470	1615	
Flt Permitted		1.00			0.95		0.54	1.00		0.28	1.00	
Satd. Flow (perm)		2565			2728		743	1536		428	1615	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	502	106	4	899	72	293	381	180	29	251	29
RTOR Reduction (vph)	0	22	0	0	8	0	22	0	0	0	5	0
Lane Group Flow (vph)	0	586	0	0	967	0	293	540	0	29	275	0
Confl. Peds. (#/hr)	83		194	194		83	170		89	89		170
Confl. Bikes (#/hr)			9			7			26			6
Heavy Vehicles (%)	0%	6%	17%	100%	4%	0%	2%	1%	0%	0%	1%	0%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		32.0			32.0		36.0	36.0		36.0	36.0	
Effective Green, g (s)		33.0			33.0		37.0	37.0		37.0	37.0	
Actuated g/C Ratio		0.41			0.41		0.46	0.46		0.46	0.46	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1058			1125		343	710		197	746	
v/s Ratio Prot		0.23						0.35			0.17	
v/s Ratio Perm					c0.35		c0.39			0.07		
v/c Ratio		0.55			0.86		0.85	0.76		0.15	0.37	
Uniform Delay, d1		17.9			21.4		19.1	17.8		12.4	13.9	
Progression Factor		1.00			0.50		1.00	1.00		1.59	1.64	
Incremental Delay, d2		2.1			8.5		22.8	7.5		1.4	1.3	
Delay (s)		20.0			19.2		41.9	25.3		21.1	24.1	
Level of Service		B			B		D	C		C	C	
Approach Delay (s)		20.0			19.2			31.0			23.8	
Approach LOS		B			B			C			C	

Intersection Summary

HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
539: Dufferin St & King St

09/30/2021

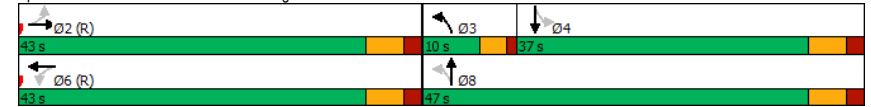
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕			↕↕			↕↕			↕↕		
Traffic Volume (vph)	81	464	54	33	805	104	54	638	42	113	329	74
Future Volume (vph)	81	464	54	33	805	104	54	638	42	113	329	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Ped Bike Factor	0.97			0.96			0.97			0.93		
Frt	0.986			0.983			0.991			0.978		
Fit Protected	0.993			0.998			0.996			0.989		
Satd. Flow (prot)	0	2874	0	0	2821	0	0	2684	0	0	2591	0
Fit Permitted	0.570			0.904			0.820			0.634		
Satd. Flow (perm)	0	1650	0	0	2546	0	0	2193	0	0	1626	0
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)	14			18			9			24		
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	291.1			316.7			212.5			385.1		
Travel Time (s)	21.0			22.8			15.3			27.7		
Confl. Peds. (#/hr)	296		328	328		296	331		287	287		331
Confl. Bikes (#/hr)			7			80			128			12
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	6%	3%	4%	2%	2%	4%	7%	9%	5%	13%	5%	5%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	30	30	0	18	18
Adj. Flow (vph)	93	533	62	38	925	120	62	733	48	130	378	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	688	0	0	1083	0	0	843	0	0	593	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)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	1.16	1.20	1.16	1.16	1.23	1.16	1.16	1.25	1.16	1.16	1.22	1.16
Turning Speed (k/h)	24		14		24		14		24		14	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	2			6			3		8			4
Permitted Phases	2			6			8			4		
Minimum Split (s)	27.0	27.0		27.0	27.0		10.0	27.0		27.0	27.0	
Total Split (s)	43.0	43.0		43.0	43.0		10.0	47.0		37.0	37.0	
Total Split (%)	47.8%	47.8%		47.8%	47.8%		11.1%	52.2%		41.1%	41.1%	
Maximum Green (s)	37.0	37.0		37.0	37.0		6.0	41.0		31.0	31.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0			-1.0			-1.0			-2.0		
Total Lost Time (s)	5.0			5.0			5.0			4.0		
Lead/Lag												
Lead-Lag Optimize?							Yes			Yes	Yes	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0		7.0	7.0		7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		14.0		14.0	14.0		14.0
Pedestrian Calls (#/hr)	100	100		100	100		100		100	100		100
Act Effct Green (s)	38.0			38.0			42.0			33.0		

Lanes, Volumes, Timings
539: Dufferin St & King St

09/30/2021

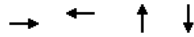
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.42			0.42			0.47			0.37		
v/c Ratio	1.04dl			1.00			0.80			0.97		
Control Delay	55.7			53.8			26.8			58.6		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	55.7			53.8			26.8			58.6		
LOS	E			D			C			E		
Approach Delay	55.7			53.8			26.8			58.6		
Approach LOS	E			D			C			E		
Intersection Summary												
Area Type:	CBD											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green											
Natural Cycle:	90											
Control Type:	Pretimed											
Maximum v/c Ratio:	1.00											
Intersection Signal Delay:	48.0						Intersection LOS: D					
Intersection Capacity Utilization:	106.8%						ICU Level of Service G					
Analysis Period (min)	15											
dl	Defacto Left Lane. Recode with 1 though lane as a left lane.											

Splits and Phases: 539: Dufferin St & King St



Queues
539: Dufferin St & King St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	688	1083	843	593
v/c Ratio	1.04dl	1.00	0.80	0.97
Control Delay	55.7	53.8	26.8	58.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	55.7	53.8	26.8	58.6
Queue Length 50th (m)	59.0	94.5	56.6	50.5
Queue Length 95th (m)	#92.2	#133.0	73.1	#81.3
Internal Link Dist (m)	267.1	292.7	188.5	361.1
Turn Bay Length (m)				
Base Capacity (vph)	704	1085	1055	611
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	0.98	1.00	0.80	0.97

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

HCM Signalized Intersection Capacity Analysis
539: Dufferin St & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	81	464	54	33	805	104	54	638	42	113	329	74
Future Volume (vph)	81	464	54	33	805	104	54	638	42	113	329	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			4.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.97			0.96			0.98			0.95	
Flpb, ped/bikes		1.00			1.00			0.99			0.98	
Flt		0.99			0.98			0.99			0.98	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		2876			2812			2669			2538	
Flt Permitted		0.57			0.90			0.82			0.63	
Satd. Flow (perm)		1651			2547			2196			1626	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	93	533	62	38	925	120	62	733	48	130	378	85
RTOR Reduction (vph)	0	8	0	0	10	0	0	5	0	0	15	0
Lane Group Flow (vph)	0	680	0	0	1073	0	0	838	0	0	578	0
Confl. Peds. (#/hr)	296		328	328		296	331		287	287		331
Confl. Bikes (#/hr)			7			80			128			12
Heavy Vehicles (%)	6%	3%	4%	2%	2%	4%	7%	9%	9%	5%	13%	5%
Bus Blockages (#/hr)	12	12	12	24	24	24	12	30	30	0	18	18
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		37.0			37.0			41.0			31.0	
Effective Green, g (s)		38.0			38.0			42.0			33.0	
Actuated g/C Ratio		0.42			0.42			0.47			0.37	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		697			1075			1061			596	
v/s Ratio Prot								c0.06				
v/s Ratio Perm		0.41			c0.42			0.31			c0.36	
v/c Ratio		1.04dl			1.00			0.79			0.97	
Uniform Delay, d1		25.5			26.0			20.3			28.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		28.6			26.9			6.0			30.1	
Delay (s)		54.1			52.9			26.3			58.1	
Level of Service		D			D			C			E	
Approach Delay (s)		54.1			52.9			26.3			58.1	
Approach LOS		D			D			C			E	

Intersection Summary

HCM 2000 Control Delay 47.1 HCM 2000 Level of Service D

HCM 2000 Volume to Capacity ratio 0.97

Actuated Cycle Length (s) 90.0 Sum of lost time (s) 12.0

Intersection Capacity Utilization 106.8% ICU Level of Service G

Analysis Period (min) 15

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔			↔	↔	↔	↔		↔	↔	
Traffic Volume (vph)	139	7	208	77	88	61	125	486	87	89	725	67
Future Volume (vph)	139	7	208	77	88	61	125	486	87	89	725	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
Storage Length (m)	25.0		0.0	0.0		50.0	30.0		0.0	25.0		0.0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
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	0.78	0.85			0.96	0.68		0.98		0.98	0.99	
Frt		0.855				0.850		0.977			0.987	
Fit Protected	0.950				0.977		0.950			0.950		
Satd. Flow (prot)	1589	1287	0	0	1605	1507	1652	1683	0	1574	1708	0
Fit Permitted	0.559				0.561		0.069			0.324		
Satd. Flow (perm)	732	1287	0	0	888	1019	120	1683	0	524	1708	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)		219				191		7			3	
Link Speed (k/h)		30			50			40			40	
Link Distance (m)		143.4			229.0			205.6			241.4	
Travel Time (s)		17.2			16.5			18.5			21.7	
Confl. Peds. (#/hr)	129		55	55		129	40		37	37		40
Confl. Bikes (#/hr)			3						4			3
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 (%)	6%	12%	6%	1%	26%	0%	2%	8%	2%	7%	8%	1%
Adj. Flow (vph)	146	7	219	81	93	64	132	512	92	94	763	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	146	226	0	0	174	64	132	604	0	94	834	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)		3.0			3.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.09	1.01	1.01	1.01	1.01	1.09	1.09	1.01	1.01	1.09	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2			1	2	1	1	2		1	2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	2.0	2.0	30.5		2.0	30.5	
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)	6.1	1.8		6.1	1.8	2.0	2.0	1.8		2.0	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

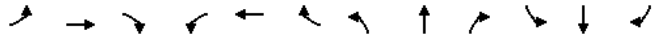
09/30/2021

Lane Group	Ø10	Ø12	Ø14	Ø16
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (m)				
Storage Length (m)				
Storage Lanes				
Taper Length (m)				
Lane Util. Factor				
Ped Bike Factor				
Frt				
Fit Protected				
Satd. Flow (prot)				
Fit Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (k/h)				
Link Distance (m)				
Travel Time (s)				
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Peak Hour Factor				
Heavy Vehicles (%)				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(m)				
Link Offset(m)				
Crosswalk Width(m)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (k/h)				
Number of Detectors				
Detector Template				
Leading Detector (m)				
Trailing Detector (m)				
Detector 1 Position(m)				
Detector 1 Size(m)				
Detector 1 Type				
Detector 1 Channel				
Detector 1 Extend (s)				
Detector 1 Queue (s)				
Detector 1 Delay (s)				
Detector 2 Position(m)				
Detector 2 Size(m)				
Detector 2 Type				

Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		6	6	
Switch Phase												
Minimum Initial (s)	32.0	32.0		32.0	32.0	32.0	7.0	29.0		29.0	29.0	
Minimum Split (s)	39.0	39.0		39.0	39.0	39.0	14.0	36.0		36.0	36.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	14.0	71.0		57.0	57.0	
Total Split (%)	25.3%	25.3%		25.3%	25.3%	25.3%	9.1%	46.1%		37.0%	37.0%	
Maximum Green (s)	32.0	32.0		32.0	32.0	32.0	7.0	64.0		50.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	3.0		3.0	3.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lag	Lag	
Lead-Lag Optimize?							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	Max	Max		Max	Max	Max	None	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0	25.0	25.0		22.0		22.0	22.0	
Pedestrian Calls (#/hr)	18	18		100	100	100		11		12	12	
Act Effct Green (s)	33.5	33.5		33.5	33.5	65.9	65.9	51.7		51.7	51.7	
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.54	0.54	0.42		0.42	0.42	
v/c Ratio	0.73	0.44		0.72	0.15	0.80	0.66	0.43		1.15	1.15	
Control Delay	65.4	9.0		60.7	0.8	56.8	27.3	36.6		116.2	116.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	1.3	0.0		0.0	0.0	
Total Delay	65.4	9.0		60.7	0.8	56.8	28.5	36.6		116.2	116.2	
LOS	E	A		E	A	E	C	D		F	F	
Approach Delay		31.1			44.6		33.6			108.1		
Approach LOS		C			D		C			F		

Intersection Summary

Area Type: Other

Cycle Length: 154

Actuated Cycle Length: 122

Natural Cycle: 145

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 64.8

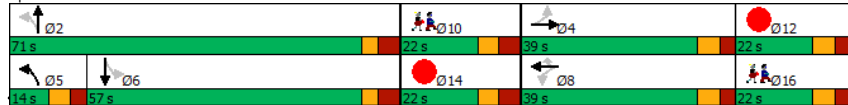
Intersection LOS: E

Intersection Capacity Utilization 128.8%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 571: Strachan Ave & Canada Blvd/Fleet St



Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements

HDR Corporation

Synchro 11 Report

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Lanes, Volumes, Timings

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021

Lane Group	Ø10	Ø12	Ø14	Ø16
Detector 2 Channel				
Detector 2 Extend (s)				
Turn Type				
Protected Phases	10	12	14	16
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	22.0	22.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	22.0
Total Split (%)	14%	14%	14%	14%
Maximum Green (s)	14.0	14.0	14.0	14.0
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	4.0	4.0	4.0	4.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None
Walk Time (s)	0.0	0.0	0.0	0.0
Flash Dont Walk (s)	0.0	0.0	0.0	0.0
Pedestrian Calls (#/hr)	16	16	16	16
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary

Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements

HDR Corporation

Synchro 11 Report

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Queues

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	146	226	174	64	132	604	94	834
v/c Ratio	0.73	0.44	0.72	0.15	0.80	0.66	0.43	1.15
Control Delay	65.4	9.0	60.7	0.8	56.8	27.3	36.6	116.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
Total Delay	65.4	9.0	60.7	0.8	56.8	28.5	36.6	116.2
Queue Length 50th (m)	27.3	1.1	32.5	0.0	13.4	76.6	12.8	~195.8
Queue Length 95th (m)	#78.0	23.7	#86.9	0.0	#62.7	185.1	39.6	#379.1
Internal Link Dist (m)		119.4	205.0			181.6		217.4
Turn Bay Length (m)	25.0			50.0	30.0		25.0	
Base Capacity (vph)	200	511	243	418	166	912	221	725
Starvation Cap Reductn	0	0	0	0	0	138	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	0.73	0.44	0.72	0.15	0.80	0.78	0.43	1.15

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.

HCM Signalized Intersection Capacity Analysis

571: Strachan Ave & Canada Blvd/Fleet St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	7	208	77	88	61	125	486	87	89	725	67
Future Volume (vph)	139	7	208	77	88	61	125	486	87	89	725	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.0	3.0	3.5	3.5	3.0	3.5	3.5
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	
Frbp, ped/bikes	1.00	0.87			1.00	0.72	1.00	0.98		1.00	0.99	
Fipb, ped/bikes	0.81	1.00			0.97	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	0.85			1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1281	1314			1551	1084	1652	1687		1530	1711	
Flt Permitted	0.56	1.00			0.56	1.00	0.07	1.00		0.32	1.00	
Satd. Flow (perm)	753	1314			891	1084	120	1687		522	1711	
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)	146	7	219	81	93	64	132	512	92	94	763	71
RTOR Reduction (vph)	0	164	0	0	0	48	0	4	0	0	2	0
Lane Group Flow (vph)	146	62	0	0	174	16	132	600	0	94	832	0
Confl. Peds. (#/hr)	129		55	55		129	40		37	37		40
Confl. Bikes (#/hr)			3						4			3
Heavy Vehicles (%)	6%	12%	6%	1%	26%	0%	2%	8%	2%	7%	8%	1%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	32.4	32.4			32.4	32.4	64.9	64.9		50.8	50.8	
Effective Green, g (s)	33.4	33.4			33.4	33.4	65.9	65.9		51.8	51.8	
Actuated g/C Ratio	0.25	0.25			0.25	0.25	0.50	0.50		0.39	0.39	
Clearance Time (s)	7.0	7.0			7.0	7.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	190	332			225	274	153	841		204	670	
v/s Ratio Prot		0.05					0.05	c0.36			c0.49	
v/s Ratio Perm	0.19				c0.20	0.01	0.37			0.18		
v/c Ratio	0.77	0.19			0.77	0.06	0.86	0.71		0.46	1.24	
Uniform Delay, d1	45.8	38.7			45.8	37.4	32.7	25.8		29.8	40.1	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	25.3	1.2			22.4	0.4	36.2	5.1		7.3	121.3	
Delay (s)	71.1	40.0			68.2	37.8	68.9	30.9		37.1	161.5	
Level of Service	E	D			E	D	E	C		D	F	
Approach Delay (s)		52.2			60.0		37.7				148.9	
Approach LOS		D			E		D				F	

Intersection Summary

HCM 2000 Control Delay	87.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	132.1	Sum of lost time (s)	34.0
Intersection Capacity Utilization	128.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔				↔	↔	↔				
Traffic Volume (vph)	54	526	0	0	0	596	0	2888	4	0	0	0
Future Volume (vph)	54	526	0	0	0	596	0	2888	4	0	0	0
Ideal Flow (vphpl)	1900	2000	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Storage Length (m)	15.0		0.0	0.0		80.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor						0.98						
Frt						0.850						
Fit Protected	0.950											
Satd. Flow (prot)	1652	1939	0	0	0	2756	0	5029	0	0	0	0
Fit Permitted	0.950											
Satd. Flow (perm)	1652	1939	0	0	0	2705	0	5029	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	76					425						
Link Speed (k/h)		60			30			60			60	
Link Distance (m)		411.9			164.9			800.6			492.6	
Travel Time (s)		24.7			19.8			48.0			29.6	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			2			5						
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
Adj. Flow (vph)	57	554	0	0	0	627	0	3040	4	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	554	0	0	0	627	0	3044	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)		3.0			3.0			3.0			3.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.09	0.95	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2				1			2			
Detector Template	Left	Thru				Right			Thru			
Leading Detector (m)	6.1	30.5				6.1			30.5			
Trailing Detector (m)	0.0	0.0				0.0			0.0			
Detector 1 Position(m)	0.0	0.0				0.0			0.0			
Detector 1 Size(m)	6.1	1.8				6.1			1.8			
Detector 1 Type	CI+Ex	CI+Ex				CI+Ex			CI+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0				0.0			0.0			
Detector 1 Queue (s)	0.0	0.0				0.0			0.0			
Detector 1 Delay (s)	0.0	0.0				0.0			0.0			
Detector 2 Position(m)		28.7							28.7			
Detector 2 Size(m)		1.8							1.8			
Detector 2 Type		CI+Ex							CI+Ex			
Detector 2 Channel												

Lanes, Volumes, Timings

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0										0.0
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					9						
Detector Phase	4	4				9		2				
Switch Phase												
Minimum Initial (s)	7.0	7.0				7.0		22.0				
Minimum Split (s)	13.0	13.0				30.0		29.0				
Total Split (s)	37.0	37.0				30.0		77.0				
Total Split (%)	25.7%	25.7%				20.8%		53.5%				
Maximum Green (s)	31.0	31.0				24.0		70.0				
Yellow Time (s)	4.0	4.0				4.0		4.0				
All-Red Time (s)	2.0	2.0				2.0		3.0				
Lost Time Adjust (s)	-1.0	-3.0				-1.0		-1.0				
Total Lost Time (s)	5.0	3.0				5.0		6.0				
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Recall Mode	None	None				None		None				
Walk Time (s)	0.0	0.0				7.0		7.0				
Flash Dont Walk (s)	0.0	0.0				15.0		15.0				
Pedestrian Calls (#/hr)	0	0				0		0				
Act Effect Green (s)	32.1	34.1				17.8		71.1				
Actuated g/C Ratio	0.23	0.25				0.13		0.52				
v/c Ratio	0.13	1.15				0.87		1.17				
Control Delay	5.3	135.1				31.8		110.7				
Queue Delay	0.0	0.0				0.0		0.0				
Total Delay	5.3	135.1				31.8		110.7				
LOS	A	F				C		F				
Approach Delay		123.0						31.8				110.7
Approach LOS		F						C				F

Intersection Summary

Area Type: Other
 Cycle Length: 144
 Actuated Cycle Length: 137
 Natural Cycle: 150
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.17
 Intersection Signal Delay: 100.9
 Intersection Capacity Utilization 95.9%
 Analysis Period (min) 15
 Intersection LOS: F
 ICU Level of Service F

Splits and Phases: 1344: Lakeshore Blvd & British Columbia Rd



Queues

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Lane Group	EBL	EBT	WBR	NBT
Lane Group Flow (vph)	57	554	627	3044
v/c Ratio	0.13	1.15	0.87	1.17
Control Delay	5.3	135.1	31.8	110.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	5.3	135.1	31.8	110.7
Queue Length 50th (m)	0.0	~177.0	31.6	~360.0
Queue Length 95th (m)	7.1	#262.6	56.7	#413.3
Internal Link Dist (m)		387.9		776.6
Turn Bay Length (m)	15.0		80.0	
Base Capacity (vph)	444	481	841	2611
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	0.13	1.15	0.75	1.17

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.

HCM Signalized Intersection Capacity Analysis

1344: Lakeshore Blvd & British Columbia Rd

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↶				↶↷		↶↷				
Traffic Volume (vph)	54	526	0	0	0	596	0	2888	4	0	0	0
Future Volume (vph)	54	526	0	0	0	596	0	2888	4	0	0	0
Ideal Flow (vphpl)	1900	2000	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	5.0	3.0				5.0		6.0				
Lane Util. Factor	1.00	1.00				0.88		0.91				
Frbp, ped/bikes	1.00	1.00				0.98		1.00				
Ftpb, ped/bikes	1.00	1.00				1.00		1.00				
Frt	1.00	1.00				0.85		1.00				
Flt Protected	0.95	1.00				1.00		1.00				
Satd. Flow (prot)	1652	1939				2699		5028				
Flt Permitted	0.95	1.00				1.00		1.00				
Satd. Flow (perm)	1652	1939				2699		5028				
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)	57	554	0	0	0	627	0	3040	4	0	0	0
RTOR Reduction (vph)	44	0	0	0	0	370	0	0	0	0	0	0
Lane Group Flow (vph)	13	554	0	0	0	257	0	3044	0	0	0	0
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)			2			5						
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					9						
Actuated Green, G (s)	31.1	31.1				16.8		70.1				
Effective Green, g (s)	32.1	34.1				17.8		71.1				
Actuated g/C Ratio	0.23	0.25				0.13		0.52				
Clearance Time (s)	6.0	6.0				6.0		7.0				
Vehicle Extension (s)	3.0	3.0				3.0		3.0				
Lane Grp Cap (vph)	387	482				350		2609				
v/s Ratio Prot		c0.29						c0.61				
v/s Ratio Perm	0.01					c0.10						
v/c Ratio	0.03	1.15				0.73		1.17				
Uniform Delay, d1	40.5	51.5				57.3		33.0				
Progression Factor	1.00	1.00				1.00		1.00				
Incremental Delay, d2	0.0	88.9				7.8		79.6				
Delay (s)	40.5	140.4				65.1		112.5				
Level of Service	D	F				E		F				
Approach Delay (s)		131.1			65.1			112.5			0.0	
Approach LOS		F			E			F			A	
Intersection Summary												
HCM 2000 Control Delay			108.2			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			137.0			Sum of lost time (s)		15.0				
Intersection Capacity Utilization			95.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	5	4	2	236	0	189	0	632	194	91	434	0
Future Volume (vph)	5	4	2	236	0	189	0	632	194	91	434	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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.96			0.88			0.87			0.98	
Frt		0.979			0.940			0.965				
Fit Protected		0.977			0.973						0.991	
Satd. Flow (prot)	0	1761	0	0	1600	0	0	2754	0	0	3298	0
Fit Permitted		0.866			0.820						0.624	
Satd. Flow (perm)	0	1534	0	0	1260	0	0	2754	0	0	2044	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			41			66				
Link Speed (k/h)		50			40			50			50	
Link Distance (m)		106.6			106.9			249.2			212.5	
Travel Time (s)		7.7			9.6			17.9			15.3	
Confl. Peds. (#/hr)	86		90	90		86	128		231	231		128
Confl. Bikes (#/hr)									128	231		12
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	2%	0%	1%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	30	30	12	30	30
Adj. Flow (vph)	6	5	2	268	0	215	0	718	220	103	493	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	483	0	0	938	0	0	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)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.10	1.01	1.01	1.10	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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		Perm	NA		NA	Perm		NA	Perm	NA

Lanes, Volumes, Timings

1449: Dufferin St & Dwy/Liberty St

09/30/2021

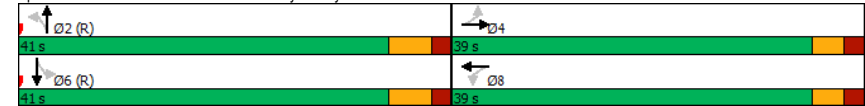


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		18.0	18.0		18.0	18.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		25.0	25.0		25.0	25.0	
Total Split (s)	39.0	39.0		39.0	39.0		41.0	41.0		41.0	41.0	
Total Split (%)	48.8%	48.8%		48.8%	48.8%		51.3%	51.3%		51.3%	51.3%	
Maximum Green (s)	34.0	34.0		34.0	34.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		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)		-1.0			-2.0			-1.0			-1.0	
Total Lost Time (s)		4.0			3.0			5.0			5.0	
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		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	30	30		29	29		100	100		100	100	
Act Effect Green (s)		32.2			33.2			38.8			38.8	
Actuated g/C Ratio		0.40			0.42			0.48			0.48	
v/c Ratio		0.02			0.88			0.69			0.60	
Control Delay		12.0			38.9			18.7			19.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.0			38.9			18.7			19.2	
LOS		B			D			B			B	
Approach Delay		12.0			38.9			18.7			19.2	
Approach LOS		B			D			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Offset:	79 (99%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	50
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	23.6
Intersection Capacity Utilization:	86.0%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	E

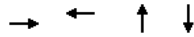
Splits and Phases: 1449: Dufferin St & Dwy/Liberty St



Queues

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	13	483	938	596
v/c Ratio	0.02	0.88	0.69	0.60
Control Delay	12.0	38.9	18.7	19.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.0	38.9	18.7	19.2
Queue Length 50th (m)	0.9	56.7	55.3	35.5
Queue Length 95th (m)	3.8	#107.1	74.6	51.2
Internal Link Dist (m)	82.6	82.9	225.2	188.5
Turn Bay Length (m)				
Base Capacity (vph)	672	589	1368	990
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	0.02	0.82	0.69	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

1449: Dufferin St & Dwy/Liberty St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕↕			↕↕	
Traffic Volume (vph)	5	4	2	236	0	189	0	632	194	91	434	0
Future Volume (vph)	5	4	2	236	0	189	0	632	194	91	434	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			3.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.98			0.94			0.87			1.00	
Flpb, ped/bikes		0.98			0.93			1.00			0.98	
Frt		0.98			0.94			0.96			1.00	
Flt Protected		0.98			0.97			1.00			0.99	
Satd. Flow (prot)		1733			1495			2756			3245	
Flt Permitted		0.87			0.82			1.00			0.62	
Satd. Flow (perm)		1536			1261			2756			2042	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	6	5	2	268	0	215	0	718	220	103	493	0
RTOR Reduction (vph)	0	1	0	0	24	0	0	34	0	0	0	0
Lane Group Flow (vph)	0	12	0	0	459	0	0	904	0	0	596	0
Confl. Peds. (#/hr)	86		90	90		86	128		231	231		128
Confl. Bikes (#/hr)									128			12
Heavy Vehicles (%)	0%	0%	0%	1%	0%	2%	0%	2%	2%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	12	30	30	12	30	30
Turn Type	Perm	NA		Perm	NA		NA		Perm	NA		NA
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.2			31.2			37.8			37.8	
Effective Green, g (s)		32.2			33.2			38.8			38.8	
Actuated g/C Ratio		0.40			0.42			0.48			0.48	
Clearance Time (s)		5.0			5.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		618			523			1336			990	
v/s Ratio Prot								c0.33				
v/s Ratio Perm		0.01			c0.36						0.29	
v/c Ratio		0.02			0.88			0.68			0.60	
Uniform Delay, d1		14.4			21.5			15.8			15.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.0			15.3			2.8			2.7	
Delay (s)		14.4			36.8			18.6			17.7	
Level of Service		B			D			B			B	
Approach Delay (s)		14.4			36.8			18.6			17.7	
Approach LOS		B			D			B			B	

Intersection Summary

HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1628: Shaw St & King St

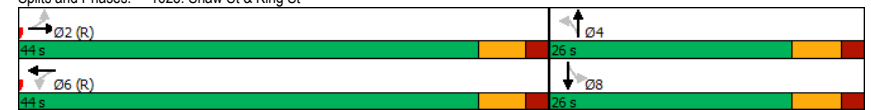
09/30/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔			↔↔			↔↔			↔↔		
Traffic Volume (vph)	15	511	34	0	902	211	84	251	7	94	164	111
Future Volume (vph)	15	511	34	0	902	211	84	251	7	94	164	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Ped Bike Factor	0.99			0.97			0.98			0.94		
Frt	0.991			0.972			0.997			0.955		
Fit Protected	0.999						0.988			0.987		
Satd. Flow (prot)	0	2778	0	0	2797	0	0	3132	0	0	2696	0
Fit Permitted	0.901						0.707			0.721		
Satd. Flow (perm)	0	2505	0	0	2797	0	0	2210	0	0	1928	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	15			65			3			44		
Link Speed (k/h)	50			50			40			40		
Link Distance (m)	199.1			255.2			127.7			380.6		
Travel Time (s)	14.3			18.4			11.5			34.3		
Confl. Peds. (#/hr)	132		116	116		132	104		145	145		104
Confl. Bikes (#/hr)					49							
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	100%	6%	0%	100%	4%	0%	1%	0%	19%	3%	7%	
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	18	601	40	0	1061	248	99	295	8	111	193	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	659	0	0	1309	0	0	402	0	0	435	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)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	1.16	1.23	1.16	1.16	1.23	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14		24		14		24		14	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
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		NA	Perm		NA	Perm		NA	Perm	NA

Lanes, Volumes, Timings
1628: Shaw St & King St

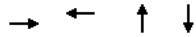
09/30/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	2			6			4			8		
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	22.0	22.0		22.0	22.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		26.0	26.0		26.0	26.0	
Total Split (s)	44.0	44.0		44.0	44.0		26.0	26.0		26.0	26.0	
Total Split (%)	62.9%	62.9%		62.9%	62.9%		37.1%	37.1%		37.1%	37.1%	
Maximum Green (s)	38.0	38.0		38.0	38.0		20.0	20.0		20.0	20.0	
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)			-1.0			-1.0			-1.0			-1.0
Total Lost Time (s)	5.0			5.0			5.0			5.0		
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		13.0	13.0		13.0	13.0	
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	
Act Effct Green (s)	39.0			39.0			21.0			21.0		
Actuated g/C Ratio	0.56			0.56			0.30			0.30		
v/c Ratio	0.47			0.82			0.60			0.71		
Control Delay	10.4			17.8			25.4			27.4		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	10.4			17.8			25.4			27.4		
LOS	B			B			C			C		
Approach Delay	10.4			17.8			25.4			27.4		
Approach LOS	B			B			C			C		
Intersection Summary												
Area Type:	CBD											
Cycle Length:	70											
Actuated Cycle Length:	70											
Offset:	1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st 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:	82.3%						ICU Level of Service E					
Analysis Period (min):	15											
Splits and Phases:	1628: Shaw St & King St											



Queues
1628: Shaw St & King St

09/30/2021



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	659	1309	402	435
v/c Ratio	0.47	0.82	0.60	0.71
Control Delay	10.4	17.8	25.4	27.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.4	17.8	25.4	27.4
Queue Length 50th (m)	24.2	64.3	23.3	23.7
Queue Length 95th (m)	33.0	82.3	34.2	36.1
Internal Link Dist (m)	175.1	231.2	103.7	356.6
Turn Bay Length (m)				
Base Capacity (vph)	1402	1587	665	609
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	0.47	0.82	0.60	0.71
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
1628: Shaw St & King St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	15	511	34	0	902	211	84	251	7	94	164	111
Future Volume (vph)	15	511	34	0	902	211	84	251	7	94	164	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frbp, ped/bikes		0.99			0.97			1.00			0.96	
Flpb, ped/bikes		1.00			1.00			0.99			0.98	
Frt		0.99			0.97			1.00			0.95	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		2776			2796			3088			2639	
Flt Permitted		0.90			1.00			0.71			0.72	
Satd. Flow (perm)		2505			2796			2209			1928	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	18	601	40	0	1061	248	99	295	8	111	193	131
RTOR Reduction (vph)	0	7	0	0	29	0	0	2	0	0	31	0
Lane Group Flow (vph)	0	652	0	0	1280	0	0	400	0	0	404	0
Confl. Peds. (#/hr)	132		116	116		132	104		145	145		104
Confl. Bikes (#/hr)						49						
Heavy Vehicles (%)	100%	6%	0%	100%	4%	0%	0%	1%	0%	19%	3%	7%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type	Perm	NA			NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		38.0			38.0			20.0			20.0	
Effective Green, g (s)		39.0			39.0			21.0			21.0	
Actuated g/C Ratio		0.56			0.56			0.30			0.30	
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)		1395			1557			662			578	
v/s Ratio Prot					c0.46							
v/s Ratio Perm		0.26						0.18			c0.21	
v/c Ratio		0.47			0.82			0.60			0.70	
Uniform Delay, d1		9.3			12.7			20.9			21.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			5.0			1.6			3.7	
Delay (s)		10.4			17.7			22.5			25.4	
Level of Service		B			B			C			C	
Approach Delay (s)		10.4			17.7			22.5			25.4	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1851: King St & Sudbury St

09/30/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	0	705	0	0	767	119	0	0	0	99	0	75
Future Volume (vph)	0	705	0	0	767	119	0	0	0	99	0	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.98						0.91	
Frt					0.980						0.942	
Fit Protected											0.972	
Satd. Flow (prot)	0	2707	0	0	2580	0	0	1691	0	0	1263	0
Fit Permitted											0.832	
Satd. Flow (perm)	0	2707	0	0	2580	0	0	1691	0	0	1040	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					35						50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		318.4			199.1			158.6			196.7	
Travel Time (s)		22.9			14.3			11.4			14.2	
Confl. Peds. (#/hr)	81		183	183		81	91		59	59		91
Confl. Bikes (#/hr)						7						
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 (%)	0%	13%	0%	0%	14%	12%	0%	0%	0%	17%	0%	16%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Adj. Flow (vph)	0	727	0	0	791	123	0	0	0	102	0	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	727	0	0	914	0	0	0	0	0	179	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.16	1.23	1.16	1.16	1.23	1.16	1.16	1.16	1.16	1.16	1.16	1.16
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
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)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
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)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
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		NA			NA					Perm		NA

Lanes, Volumes, Timings
1851: King St & Sudbury St

09/30/2021

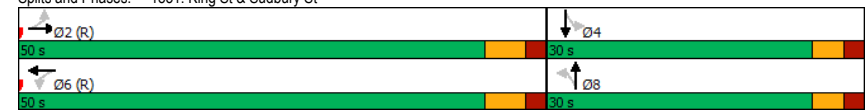


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2			6			8			4	4
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	24.0	24.0		24.0	24.0		21.0	21.0		21.0	21.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		26.0	26.0		26.0	26.0	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Maximum Green (s)	44.0	44.0		44.0	44.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-1.0			-1.0			-1.0			-1.0	
Total Lost Time (s)		5.0			5.0			4.0			4.0	
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	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	100	100		25	25		30	30		19	19	
Act Effect Green (s)		48.3			48.3						22.7	
Actuated g/C Ratio		0.60			0.60						0.28	
v/c Ratio		0.44			0.58						0.54	
Control Delay		9.8			11.3						23.9	
Queue Delay		0.0			0.0						0.0	
Total Delay		9.8			11.3						23.9	
LOS		A			B						C	
Approach Delay		9.8			11.3						23.9	
Approach LOS		A			B						C	

Intersection Summary

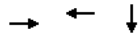
Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 12.0
 Intersection Capacity Utilization 53.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1851: King St & Sudbury St



Queues
1851: King St & Sudbury St

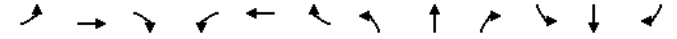
09/30/2021



Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	727	914	179
v/c Ratio	0.44	0.58	0.54
Control Delay	9.8	11.3	23.9
Queue Delay	0.0	0.0	0.0
Total Delay	9.8	11.3	23.9
Queue Length 50th (m)	27.5	37.5	16.4
Queue Length 95th (m)	44.1	60.3	34.0
Internal Link Dist (m)	294.4	175.1	172.7
Turn Bay Length (m)			
Base Capacity (vph)	1635	1571	371
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.44	0.58	0.48
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
1851: King St & Sudbury St

09/30/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Traffic Volume (vph)	0	705	0	0	767	119	0	0	0	99	0	75
Future Volume (vph)	0	705	0	0	767	119	0	0	0	99	0	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0							4.0
Lane Util. Factor		0.95			0.95							1.00
Frbp, ped/bikes		1.00			0.98							0.95
Flpb, ped/bikes		1.00			1.00							0.96
Frt		1.00			0.98							0.94
Flt Protected		1.00			1.00							0.97
Satd. Flow (prot)		2707			2580							1215
Flt Permitted		1.00			1.00							0.83
Satd. Flow (perm)		2707			2580							1040
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)	0	727	0	0	791	123	0	0	0	102	0	77
RTOR Reduction (vph)	0	0	0	0	14	0	0	0	0	0	36	0
Lane Group Flow (vph)	0	727	0	0	900	0	0	0	0	0	143	0
Confl. Peds. (#/hr)	81		183	183		81	91		59	59		91
Confl. Bikes (#/hr)						7						
Heavy Vehicles (%)	0%	13%	0%	0%	14%	12%	0%	0%	0%	17%	0%	16%
Bus Blockages (#/hr)	24	24	24	24	24	24	0	0	0	0	0	0
Turn Type		NA			NA					Perm		NA
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		47.3			47.3							21.7
Effective Green, g (s)		48.3			48.3							22.7
Actuated g/C Ratio		0.60			0.60							0.28
Clearance Time (s)		6.0			6.0							5.0
Vehicle Extension (s)		3.0			3.0							3.0
Lane Grp Cap (vph)		1634			1557							295
v/s Ratio Prot		0.27			0.35							
v/s Ratio Perm												0.14
v/c Ratio		0.44			0.58							0.49
Uniform Delay, d1		8.6			9.6							23.8
Progression Factor		1.00			1.00							1.00
Incremental Delay, d2		0.9			1.6							1.3
Delay (s)		9.5			11.2							25.1
Level of Service		A			B							C
Approach Delay (s)		9.5			11.2			0.0				25.1
Approach LOS		A			B			A				C
Intersection Summary												
HCM 2000 Control Delay					11.9							B
HCM 2000 Volume to Capacity ratio					0.55							
Actuated Cycle Length (s)					80.0							9.0
Intersection Capacity Utilization					53.5%							A
Analysis Period (min)					15							

Intersection Summary												
HCM 2000 Control Delay					11.9							B
HCM 2000 Volume to Capacity ratio					0.55							
Actuated Cycle Length (s)					80.0							9.0
Intersection Capacity Utilization					53.5%							A
Analysis Period (min)					15							

Lanes, Volumes, Timings
1912: Atlantic Ave & King St

09/30/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	↔
Traffic Volume (vph)	453	291	2	624	261	270
Future Volume (vph)	453	291	2	624	261	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.5	3.5	3.0	3.0
Storage Length (m)		0.0	0.0		30.0	0.0
Storage Lanes		0	0		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.79			1.00	0.91	0.92
Frt	0.941					0.850
Fit Protected					0.950	
Satd. Flow (prot)	2182	0	0	2774	1486	1233
Fit Permitted				0.953	0.950	
Satd. Flow (perm)	2182	0	0	2643	1354	1136
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	280					33
Link Speed (k/h)	50			50	30	
Link Distance (m)	191.3			318.4	198.0	
Travel Time (s)	13.8			22.9	23.8	
Confl. Peds. (#/hr)		341	341		85	65
Confl. Bikes (#/hr)		5				
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	6%	3%	100%	10%	2%	10%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	521	334	2	717	300	310
Shared Lane Traffic (%)						
Lane Group Flow (vph)	855	0	0	719	300	310
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.23	1.16	1.16	1.23	1.25	1.25
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (m)	30.5		6.1	30.5	6.1	6.1
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)	1.8		6.1	1.8	6.1	6.1
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+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)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		

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HDR Corporation

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Lanes, Volumes, Timings
1912: Atlantic Ave & King St

09/30/2021

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Detector Phase	2		6	6	8	8
Switch Phase						
Minimum Initial (s)	21.0		21.0	21.0	20.0	20.0
Minimum Split (s)	28.0		28.0	28.0	26.0	26.0
Total Split (s)	39.0		39.0	39.0	31.0	31.0
Total Split (%)	55.7%		55.7%	55.7%	44.3%	44.3%
Maximum Green (s)	32.0		32.0	32.0	25.0	25.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	3.0		3.0	3.0	2.0	2.0
Lost Time Adjust (s)	-1.0			-1.0	-1.0	-1.0
Total Lost Time (s)	6.0			6.0	5.0	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)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	14.0		14.0	14.0	13.0	13.0
Pedestrian Calls (#/hr)	100		8	8	28	28
Act Effct Green (s)	35.4		35.4	23.6	23.6	
Actuated g/C Ratio	0.51			0.51	0.34	0.34
v/c Ratio	0.69			0.54	0.66	0.77
Control Delay	12.4			14.1	27.2	32.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	12.4			14.1	27.2	32.3
LOS	B			B	C	C
Approach Delay	12.4			14.1	29.8	
Approach LOS	B			B	C	

Intersection Summary

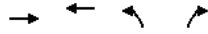
Area Type: CBD
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 6 (9%), Referenced to phase 2:EBT and 6:WBLT, Start of 1st Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 17.8 Intersection LOS: B
 Intersection Capacity Utilization 60.2% ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1912: Atlantic Ave & King St



Queues
1912: Atlantic Ave & King St

09/30/2021



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	855	719	300	310
v/c Ratio	0.69	0.54	0.66	0.77
Control Delay	12.4	14.1	27.2	32.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.4	14.1	27.2	32.3
Queue Length 50th (m)	27.4	31.8	32.5	31.7
Queue Length 95th (m)	47.0	47.0	52.0	#57.1
Internal Link Dist (m)	167.3	294.4	174.0	
Turn Bay Length (m)		30.0		
Base Capacity (vph)	1241	1336	502	442
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	0.54	0.60	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
1912: Atlantic Ave & King St

09/30/2021



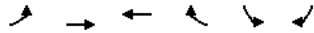
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (vph)	453	291	2	624	261	270
Future Volume (vph)	453	291	2	624	261	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.0	3.0
Total Lost time (s)	6.0			6.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	0.79			1.00	1.00	0.92
Ftbp, ped/bikes	1.00			1.00	0.91	1.00
Frt	0.94			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	2183			2773	1354	1136
Flt Permitted	1.00			0.95	0.95	1.00
Satd. Flow (perm)	2183			2643	1354	1136
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	521	334	2	717	300	310
RTOR Reduction (vph)	138	0	0	0	0	22
Lane Group Flow (vph)	717	0	0	719	300	288
Confl. Peds. (#/hr)		341	341		85	65
Confl. Bikes (#/hr)		5				
Heavy Vehicles (%)	6%	3%	100%	10%	2%	10%
Bus Blockages (#/hr)	24	24	24	24	0	0
Turn Type	NA		Perm	NA	Perm	Perm
Protected Phases	2			6		
Permitted Phases			6		8	8
Actuated Green, G (s)	34.4			34.4	22.6	22.6
Effective Green, g (s)	35.4			35.4	23.6	23.6
Actuated g/C Ratio	0.51			0.51	0.34	0.34
Clearance Time (s)	7.0			7.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1103			1336	456	382
v/s Ratio Prot	c0.33					
v/s Ratio Perm				0.27	0.22	c0.25
v/c Ratio	0.65			0.54	0.66	0.75
Uniform Delay, d1	12.7			11.7	19.8	20.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	3.0			1.6	3.4	8.2
Delay (s)	15.7			13.3	23.2	28.8
Level of Service	B			B	C	C
Approach Delay (s)	15.7			13.3	26.1	
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	0.70		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

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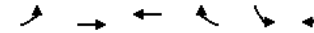
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↔	
Traffic Volume (vph)	0	653	919	131	93	23
Future Volume (vph)	0	653	919	131	93	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			0.98		0.99	
Frt			0.981		0.973	
Fit Protected					0.962	
Satd. Flow (prot)	0	2941	2855	0	1459	0
Fit Permitted					0.962	
Satd. Flow (perm)	0	2941	2855	0	1459	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				37	15	
Link Speed (k/h)		50	50		50	
Link Distance (m)		316.7	191.3		100.8	
Travel Time (s)		22.8	13.8		7.3	
Confl. Peds. (#/hr)	45			45		15
Confl. Bikes (#/hr)				26		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	4%	4%	0%	0%	39%
Bus Blockages (#/hr)	24	24	24	24	0	0
Adj. Flow (vph)	0	734	1033	147	104	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	734	1180	0	130	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.16	1.23	1.23	1.16	1.16	1.16
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA		Perm	

Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements
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Lanes, Volumes, Timings
2081: King St & Joe Shuster Way

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		2	6			
Permitted Phases	2				8	
Detector Phase	2	2	6		8	
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0		18.0	
Minimum Split (s)	26.0	26.0	26.0		23.0	
Total Split (s)	55.0	55.0	55.0		25.0	
Total Split (%)	68.8%	68.8%	68.8%		31.3%	
Maximum Green (s)	49.0	49.0	49.0		20.0	
Yellow Time (s)	4.0	4.0	4.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		4.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	None		None	
Walk Time (s)	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)	13.0	13.0	13.0		11.0	
Pedestrian Calls (#/hr)	100	100	14		5	
Act Effct Green (s)		57.6	57.6		19.0	
Actuated g/C Ratio		0.72	0.72		0.24	
v/c Ratio		0.35	0.57		0.36	
Control Delay		6.3	8.4		25.9	
Queue Delay		0.0	0.0		0.0	
Total Delay		6.3	8.4		25.9	
LOS		A	A		C	
Approach Delay		6.3	8.4		25.9	
Approach LOS		A	A		C	

Intersection Summary

Area Type: CBD
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 1 (1%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 8.8
 Intersection Capacity Utilization 55.8%
 Intersection LOS: A
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2081: King St & Joe Shuster Way

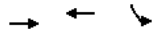


Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Queues
2081: King St & Joe Shuster Way

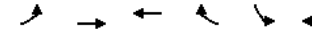
09/30/2021



Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	734	1180	130
v/c Ratio	0.35	0.57	0.36
Control Delay	6.3	8.4	25.9
Queue Delay	0.0	0.0	0.0
Total Delay	6.3	8.4	25.9
Queue Length 50th (m)	23.9	47.3	14.5
Queue Length 95th (m)	32.7	63.8	29.1
Internal Link Dist (m)	292.7	167.3	76.8
Turn Bay Length (m)			
Base Capacity (vph)	2117	2065	394
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.35	0.57	0.33
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
2081: King St & Joe Shuster Way

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↓	↓
Traffic Volume (vph)	0	653	919	131	93	23
Future Volume (vph)	0	653	919	131	93	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	
Lane Util. Factor		0.95	0.95		1.00	
Frbp, ped/bikes		1.00	0.98		0.99	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.98		0.97	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		2941	2856		1458	
Flt Permitted		1.00	1.00		0.96	
Satd. Flow (perm)		2941	2856		1458	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	734	1033	147	104	26
RTOR Reduction (vph)	0	0	11	0	12	0
Lane Group Flow (vph)	0	734	1169	0	118	0
Confl. Peds. (#/hr)		45		45		15
Confl. Bikes (#/hr)				26		
Heavy Vehicles (%)	0%	4%	4%	0%	0%	39%
Bus Blockages (#/hr)	24	24	24	24	0	0
Turn Type		NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				8	
Actuated Green, G (s)		54.6	54.6		14.4	
Effective Green, g (s)		55.6	55.6		15.4	
Actuated g/C Ratio		0.70	0.70		0.19	
Clearance Time (s)		6.0	6.0		5.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		2043	1984		280	
v/s Ratio Prot		0.25	c0.41			
v/s Ratio Perm					c0.08	
v/c Ratio		0.36	0.59		0.42	
Uniform Delay, d1		5.0	6.3		28.4	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		0.5	0.5		1.0	
Delay (s)		5.5	6.8		29.4	
Level of Service		A	A		C	
Approach Delay (s)		5.5	6.8		29.4	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑	↗	↘	↓
Traffic Volume (vph)	56	227	741	21	86	849
Future Volume (vph)	56	227	741	21	86	849
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.0	3.5	3.0	3.0	3.5
Storage Length (m)	30.0	0.0		15.0	30.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.86		0.94		
Frt		0.850		0.850		
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1685	1304	1842	1507	1478	1842
Fit Permitted	0.950				0.152	
Satd. Flow (perm)	1685	1122	1842	1413	236	1842
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		90		7		
Link Speed (k/h)	30		30			30
Link Distance (m)	148.7		265.9			191.3
Travel Time (s)	17.8		31.9			23.0
Confl. Peds. (#/hr)				28	28	
Confl. Bikes (#/hr)		117		3		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	11%	2%	0%	14%	2%
Bus Blockages (#/hr)	0	10	0	0	0	0
Adj. Flow (vph)	63	255	833	24	97	954
Shared Lane Traffic (%)						
Lane Group Flow (vph)	63	255	833	24	97	954
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.0		3.0			3.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.09	1.15	1.01	1.09	1.09	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	6.1	6.1	30.5	6.1	6.1	30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	6.1	1.8	6.1	6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	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
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8

Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

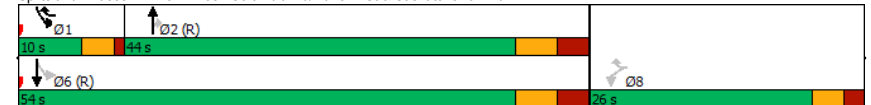
09/30/2021

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	21.0	6.0	27.0	27.0	6.0	27.0
Minimum Split (s)	26.0	10.0	34.0	34.0	10.0	34.0
Total Split (s)	26.0	10.0	44.0	44.0	10.0	54.0
Total Split (%)	32.5%	12.5%	55.0%	55.0%	12.5%	67.5%
Maximum Green (s)	21.0	6.0	37.0	37.0	6.0	47.0
Yellow Time (s)	3.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.0	1.0	3.0	3.0	1.0	3.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	None	C-Max
Walk Time (s)	7.0		7.0	7.0		0.0
Flash Dont Walk (s)	14.0		20.0	20.0		0.0
Pedestrian Calls (#/hr)	0		9	9		0
Act Effct Green (s)	22.0	22.3	46.9	46.9	61.4	60.8
Actuated g/C Ratio	0.28	0.28	0.59	0.59	0.77	0.76
v/c Ratio	0.14	0.64	0.77	0.03	0.31	0.68
Control Delay	22.9	20.9	23.4	9.1	7.5	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	22.9	20.9	23.4	9.1	7.5	14.0
LOS	C	C	C	A	A	B
Approach Delay	21.3		23.0			13.4
Approach LOS	C		C			B

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 31 (39%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 18.2 Intersection LOS: B
 Intersection Capacity Utilization 73.2% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 2134: British Columbia Rd/Dufferin St & Saskatchewan Rd



Queues

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	63	255	833	24	97	954
v/c Ratio	0.14	0.64	0.77	0.03	0.31	0.68
Control Delay	22.9	20.9	23.4	9.1	7.5	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	22.9	20.9	23.4	9.1	7.5	14.0
Queue Length 50th (m)	7.2	16.4	115.6	1.3	5.1	108.9
Queue Length 95th (m)	16.0	34.5	#188.3	4.9	10.2	#192.8
Internal Link Dist (m)	124.7		241.9			167.3
Turn Bay Length (m)	30.0		15.0	30.0		
Base Capacity (vph)	463	397	1078	830	313	1400
Starvation Cap Reductn	0	0	0	0	0	50
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.64	0.77	0.03	0.31	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

2134: British Columbia Rd/Dufferin St & Saskatchewan Rd

09/30/2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (vph)	56	227	741	21	86	849
Future Volume (vph)	56	227	741	21	86	849
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.0	3.5	3.0	3.0	3.5
Total Lost time (s)	4.0	3.0	6.0	6.0	3.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.89	1.00	0.94	1.00	1.00
Fpfb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1685	1162	1842	1413	1478	1842
Flt Permitted	0.95	1.00	1.00	1.00	0.15	1.00
Satd. Flow (perm)	1685	1162	1842	1413	236	1842
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	63	255	833	24	97	954
RTOR Reduction (vph)	0	65	0	3	0	0
Lane Group Flow (vph)	63	190	833	21	97	954
Confl. Peds. (#/hr)			28	28		
Confl. Bikes (#/hr)		117		3		
Heavy Vehicles (%)	0%	11%	2%	0%	14%	2%
Bus Blockages (#/hr)	0	10	0	0	0	0
Turn Type	Perm	pm+ov	NA	Perm	pm+pt	NA
Protected Phases		1	2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	12.6	20.1	43.9	43.9	55.4	55.4
Effective Green, g (s)	13.6	22.1	44.9	44.9	56.4	56.4
Actuated g/C Ratio	0.17	0.28	0.56	0.56	0.70	0.70
Clearance Time (s)	5.0	4.0	7.0	7.0	4.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	321	1033	793	298	1298
v/s Ratio Prot		c0.06	c0.45		0.03	c0.52
v/s Ratio Perm	0.04	0.10		0.01	0.19	
v/c Ratio	0.22	0.59	0.81	0.03	0.33	0.73
Uniform Delay, d1	28.6	25.0	14.1	7.8	9.4	7.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	2.9	6.7	0.1	0.6	3.7
Delay (s)	29.0	28.0	20.8	7.9	10.0	11.0
Level of Service	C	C	C	A	A	B
Approach Delay (s)	28.2		20.4			10.9
Approach LOS	C		C			B


Intersection Summary

HCM 2000 Control Delay	17.0	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)	14.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

9004: Jefferson Ave & Site B Driveway

09/30/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T	T	T	T	T	T
Traffic Volume (vph)	30	4	174	15	0	117
Future Volume (vph)	30	4	174	15	0	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.985	0.989				
Fit Protected	0.957					
Satd. Flow (prot)	1736	0	1822	0	0	1842
Fit Permitted	0.957					
Satd. Flow (perm)	1736	0	1822	0	0	1842
Link Speed (k/h)	50	50		50		
Link Distance (m)	78.7	80.2		351.8		
Travel Time (s)	5.7	5.8		25.3		
Confl. Peds. (#/hr)	5	11	882		882	
Confl. Bikes (#/hr)	4		14			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	4	189	16	0	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	37	0	205	0	0	127
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5	0.0		0.0		
Link Offset(m)	0.0	0.0		0.0		
Crosswalk Width(m)	1.6	1.6		1.6		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	14		24	
Sign Control	Stop	Free		Free		


Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.4%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis

9004: Jefferson Ave & Site B Driveway

09/30/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T	T	T	T	T	T
Traffic Volume (veh/h)	30	4	174	15	0	117
Future Volume (Veh/h)	30	4	174	15	0	117
Sign Control	Stop	Free		Free		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	4	189	16	0	127
Pedestrians	882	5		11		
Lane Width (m)	3.5	3.5		3.5		
Walking Speed (m/s)	1.2	1.2		1.2		
Percent Blockage	71	0		1		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1211	1090			1087	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1211	1090			1087	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	42	95			100	
cM capacity (veh/h)	57	74			183	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	37	205	127
Volume Left	33	0	0
Volume Right	4	16	0
cSH	59	1700	183
Volume to Capacity	0.63	0.12	0.00
Queue Length 95th (m)	19.8	0.0	0.0
Control Delay (s)	139.2	0.0	0.0
Lane LOS	F		
Approach Delay (s)	139.2	0.0	0.0
Approach LOS	F		

Intersection Summary

Average Delay	14.0
Intersection Capacity Utilization	26.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
9006: Atlantic Ave & Site B Driveway

09/30/2021

	↖	↗	↙	↘	↕	↔
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖			↘	↖	↗
Traffic Volume (vph)	39	11	20	107	162	14
Future Volume (vph)	39	11	20	107	162	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.970					0.989
Fit Protected	0.963					0.992
Satd. Flow (prot)	1721	0	0	1827	1822	0
Fit Permitted	0.963					0.992
Satd. Flow (perm)	1721	0	0	1827	1822	0
Link Speed (k/h)	50					50
Link Distance (m)	78.7			34.0	217.5	
Travel Time (s)	5.7			2.4	15.7	
Confl. Peds. (#/hr)		820	223			223
Confl. Bikes (#/hr)		1				13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	12	22	116	176	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	0	138	191	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5					0.0
Link Offset(m)	0.0					0.0
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	42.7%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9006: Atlantic Ave & Site B Driveway

09/30/2021

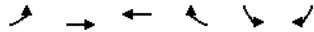
	↖	↗	↙	↘	↕	↔
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖			↘	↖	↗
Traffic Volume (veh/h)	39	11	20	107	162	14
Future Volume (Veh/h)	39	11	20	107	162	14
Sign Control	Stop			Free	Free	
Grade	0%					0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	12	22	116	176	15
Pedestrians				820		
Lane Width (m)				3.5		
Walking Speed (m/s)				1.2		
Percent Blockage				18	66	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)	77					
pX, platoon unblocked						
vC, conflicting volume	566	1226	414			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	566	1226	414			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	80	98			
cM capacity (veh/h)	388	60	938			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	54	138	191
Volume Left	42	22	0
Volume Right	12	0	15
cSH	175	938	1700
Volume to Capacity	0.31	0.02	0.11
Queue Length 95th (m)	9.4	0.5	0.0
Control Delay (s)	34.5	1.6	0.0
Lane LOS	D	A	
Approach Delay (s)	34.5	1.6	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
9007: New Liberty St & Hanna Ave

09/30/2021



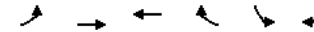
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (vph)	64	200	75	15	32	3
Future Volume (vph)	64	200	75	15	32	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.978		0.989	
Fit Protected		0.988			0.956	
Satd. Flow (prot)	0	1820	1802	0	1742	0
Fit Permitted		0.988			0.956	
Satd. Flow (perm)	0	1820	1802	0	1742	0
Link Speed (k/h)		40	40		50	
Link Distance (m)		198.4	579.0		130.0	
Travel Time (s)		17.9	52.1		9.4	
Confl. Peds. (#/hr)	727			727		
Confl. Bikes (#/hr)				24		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	217	82	16	35	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	287	98	0	38	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.7%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
9007: New Liberty St & Hanna Ave

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (veh/h)	64	200	75	15	32	3
Future Volume (Veh/h)	64	200	75	15	32	3
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)	70	217	82	16	35	3
Pedestrians					727	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.2	
Percent Blockage					59	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		198				
pX, platoon unblocked						
vC, conflicting volume	825				1174	817
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	825				1174	817
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				49	98
cM capacity (veh/h)	331				69	155

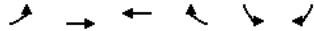
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	287	98	38
Volume Left	70	0	35
Volume Right	0	16	3
cSH	331	1700	72
Volume to Capacity	0.21	0.06	0.53
Queue Length 95th (m)	6.0	0.0	16.8
Control Delay (s)	8.0	0.0	101.3
Lane LOS	A		F
Approach Delay (s)	8.0	0.0	101.3
Approach LOS			F

Intersection Summary

Average Delay		14.5	
Intersection Capacity Utilization	30.7%		ICU Level of Service A
Analysis Period (min)		15	

Lanes, Volumes, Timings
9022: New Liberty St & Jefferson Ave

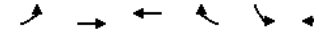
09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (vph)	161	135	102	43	44	160
Future Volume (vph)	161	135	102	43	44	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.960		0.894		
Fit Protected		0.974		0.989		
Satd. Flow (prot)	0	1794	1669	0	1629	0
Fit Permitted		0.974		0.989		
Satd. Flow (perm)	0	1794	1669	0	1629	0
Link Speed (k/h)		40	40		50	
Link Distance (m)		121.2	87.6		80.2	
Travel Time (s)		10.9	7.9		5.8	
Confl. Peds. (#/hr)	498			498		
Confl. Bikes (#/hr)				5		62
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Bus Blockages (#/hr)	0	0	14	14	0	0
Adj. Flow (vph)	179	150	113	48	49	178
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	329	161	0	227	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.09	1.01	1.01	1.01
Turning Speed (k/h)		24		14	24	14
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	51.6%					
Analysis Period (min)	15					
	ICU Level of Service A					

HCM Unsignalized Intersection Capacity Analysis
9022: New Liberty St & Jefferson Ave

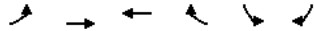
09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	161	135	102	43	44	160
Future Volume (vph)	161	135	102	43	44	160
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	179	150	113	48	49	178
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	329	161	227			
Volume Left (vph)	179	0	49			
Volume Right (vph)	0	48	178			
Hadj (s)	0.14	-0.14	-0.39			
Departure Headway (s)	4.8	4.7	4.7			
Degree Utilization, x	0.44	0.21	0.30			
Capacity (veh/h)	713	710	711			
Control Delay (s)	11.6	9.0	9.6			
Approach Delay (s)	11.6	9.0	9.6			
Approach LOS	B	A	A			
Intersection Summary						
Delay	10.4					
Level of Service	B					
Intersection Capacity Utilization	51.6%		ICU Level of Service		A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
9023: New Liberty St & Atlantic Ave

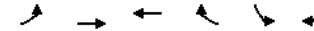
09/30/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↓	↓
Traffic Volume (vph)	19	159	42	35	104	103
Future Volume (vph)	19	159	42	35	104	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93	0.66		0.60	
Frt			0.939		0.933	
Fit Protected		0.995			0.975	
Satd. Flow (prot)	0	1730	1141	0	1430	0
Fit Permitted		0.971			0.975	
Satd. Flow (perm)	0	1571	1141	0	1007	0
Right Turn on Red			Yes		Yes	
Satd. Flow (RTOR)			39			
Link Speed (k/h)		40	40		50	
Link Distance (m)		87.6	198.4		42.4	
Travel Time (s)		7.9	17.9		3.1	
Confl. Peds. (#/hr)	1226			1226	671	200
Confl. Bikes (#/hr)				19		5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Bus Blockages (#/hr)	0	14	0	0	0	0
Adj. Flow (vph)	21	177	47	39	116	114
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	198	86	0	230	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.09	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	6.1	30.5	30.5		6.1	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	6.1	1.8	1.8		6.1	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	6			

Lanes, Volumes, Timings
9023: New Liberty St & Atlantic Ave

09/30/2021

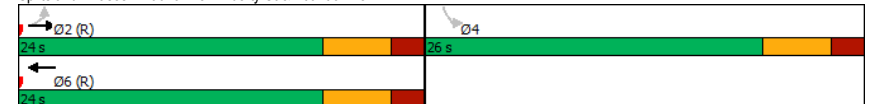


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2					4
Detector Phase	2	2	6		4	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0		7.0	
Minimum Split (s)	24.0	24.0	24.0		24.0	
Total Split (s)	24.0	24.0	24.0		26.0	
Total Split (%)	48.0%	48.0%	48.0%		52.0%	
Maximum Green (s)	18.0	18.0	18.0		20.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)		-1.0	-1.0		-1.0	
Total Lost Time (s)		5.0	5.0		5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	C-Max	C-Max	C-Max		None	
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)	100	100	100		100	
Act Effct Green (s)	23.1	23.1	23.1		16.9	
Actuated g/C Ratio	0.46	0.46	0.46		0.34	
v/c Ratio	0.27	0.16	0.16		0.68	
Control Delay	11.2	7.3	7.3		24.0	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	11.2	7.3	7.3		24.0	
LOS		B	A		C	
Approach Delay	11.2	7.3	7.3		24.0	
Approach LOS		B	A		C	

Intersection Summary

Area Type: Other
 Cycle Length: 50
 Actuated Cycle Length: 50
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 16.3
 Intersection Capacity Utilization 40.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

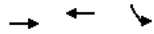
Splits and Phases: 9023: New Liberty St & Atlantic Ave



Queues

9023: New Liberty St & Atlantic Ave

09/30/2021

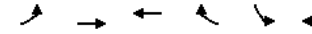


Lane Group	EBT	WBT	SBL
Lane Group Flow (vph)	198	86	230
v/c Ratio	0.27	0.16	0.68
Control Delay	11.2	7.3	24.0
Queue Delay	0.0	0.0	0.0
Total Delay	11.2	7.3	24.0
Queue Length 50th (m)	11.0	2.4	15.8
Queue Length 95th (m)	24.3	9.5	32.0
Internal Link Dist (m)	63.6	174.4	18.4
Turn Bay Length (m)			
Base Capacity (vph)	726	548	422
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.27	0.16	0.55
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

9023: New Liberty St & Atlantic Ave

09/30/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Volume (vph)	19	159	42	35	104	103
Future Volume (vph)	19	159	42	35	104	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	
Lane Util. Factor		1.00	1.00		1.00	
Frbp, ped/bikes		1.00	0.66		0.85	
Flpb, ped/bikes		0.93	1.00		0.70	
Frt		1.00	0.94		0.93	
Flt Protected		0.99	1.00		0.98	
Satd. Flow (prot)		1609	1141		1007	
Flt Permitted		0.97	1.00		0.98	
Satd. Flow (perm)		1570	1141		1007	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	177	47	39	116	114
RTOR Reduction (vph)	0	0	21	0	0	0
Lane Group Flow (vph)	0	198	65	0	230	0
Confl. Peds. (#/hr)	1226			1226	671	200
Confl. Bikes (#/hr)				19		5
Bus Blockages (#/hr)	0	14	0	0	0	0
Turn Type	Perm	NA	NA		Perm	
Protected Phases		2	6			
Permitted Phases	2				4	
Actuated Green, G (s)		22.1	22.1		15.9	
Effective Green, g (s)		23.1	23.1		16.9	
Actuated g/C Ratio		0.46	0.46		0.34	
Clearance Time (s)		6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0		3.0	
Lane Grp Cap (vph)		725	527		340	
v/s Ratio Prot			0.06			
v/s Ratio Perm		c0.13			c0.23	
v/c Ratio		0.27	0.12		0.68	
Uniform Delay, d1		8.3	7.7		14.2	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		0.9	0.5		5.3	
Delay (s)		9.2	8.2		19.5	
Level of Service		A	A		B	
Approach Delay (s)		9.2	8.2		19.5	
Approach LOS		A	A		B	
Intersection Summary						
HCM 2000 Control Delay		13.6			HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio		0.45				
Actuated Cycle Length (s)		50.0			Sum of lost time (s)	11.0
Intersection Capacity Utilization		40.4%			ICU Level of Service	A
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Traffic Volume (vph)	187	84	828	167	28	768
Future Volume (vph)	187	84	828	167	28	768
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0		0.0	0.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.61	0.99			
Frt		0.850	0.977			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1750	1566	1773	0	1750	1842
Flt Permitted	0.950				0.116	
Satd. Flow (perm)	1750	953	1773	0	214	1842
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		93	25			
Link Speed (k/h)	40		30		30	
Link Distance (m)	107.6		191.3		74.7	
Travel Time (s)	9.7		23.0		9.0	
Conf. Peds. (#/hr)		146		1	1	
Conf. Bikes (#/hr)		12		119		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	208	93	920	186	31	853
Shared Lane Traffic (%)						
Lane Group Flow (vph)	208	93	1106	0	31	853
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5		3.5	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	6.1	6.1	30.5		6.1	30.5
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)	6.1	6.1	1.8		6.1	1.8
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+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)			28.7		28.7	
Detector 2 Size(m)			1.8		1.8	
Detector 2 Type			CI+Ex		CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)			0.0		0.0	

Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Lanes, Volumes, Timings
9024: Dufferin St & New Liberty St

09/30/2021

	←		↑		→	
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0		7.0	7.0
Minimum Split (s)	24.0	24.0	24.0		24.0	24.0
Total Split (s)	24.0	24.0	66.0		66.0	66.0
Total Split (%)	26.7%	26.7%	73.3%		73.3%	73.3%
Maximum Green (s)	18.0	18.0	60.0		60.0	60.0
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)	-1.0	-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	C-Max		C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	16.1	16.1	63.9		63.9	63.9
Actuated g/C Ratio	0.18	0.18	0.71		0.71	0.71
v/c Ratio	0.67	0.38	0.87		0.20	0.65
Control Delay	44.9	11.5	20.6		9.1	10.6
Queue Delay	0.0	0.0	5.1		0.0	0.0
Total Delay	44.9	11.5	25.8		9.1	10.6
LOS	D	B	C		A	B
Approach Delay	34.6		25.8			10.6
Approach LOS	C		C			B

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 21.1 Intersection LOS: C
 Intersection Capacity Utilization 77.1% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 9024: Dufferin St & New Liberty St



Scenario 1 Total Future PM 11:59 pm 05/05/2014 No Improvements
HDR Corporation

Synchro 11 Report
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Queues
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	208	93	1106	31	853
v/c Ratio	0.67	0.38	0.87	0.20	0.65
Control Delay	44.9	11.5	20.6	9.1	10.6
Queue Delay	0.0	0.0	5.1	0.0	0.0
Total Delay	44.9	11.5	25.8	9.1	10.6
Queue Length 50th (m)	33.5	0.0	125.7	1.6	70.0
Queue Length 95th (m)	54.2	12.2	#254.4	6.2	116.4
Internal Link Dist (m)	83.6		167.3		50.7
Turn Bay Length (m)	15.0				
Base Capacity (vph)	369	274	1266	152	1308
Starvation Cap Reductn	0	0	115	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.56	0.34	0.96	0.20	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
9024: Dufferin St & New Liberty St

09/30/2021

	←	↖	↑	↗	↓	
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑		↖	↗
Traffic Volume (vph)	187	84	828	167	28	768
Future Volume (vph)	187	84	828	167	28	768
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00	0.61	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Fit Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1750	950	1775		1750	1842
Fit Permitted	0.95	1.00	1.00		0.12	1.00
Satd. Flow (perm)	1750	950	1775		214	1842
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	208	93	920	186	31	853
RTOR Reduction (vph)	0	76	7	0	0	0
Lane Group Flow (vph)	208	17	1099	0	31	853
Confl. Peds. (#/hr)		146		1	1	
Confl. Bikes (#/hr)		12		119		
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Actuated Green, G (s)	15.1	15.1	62.9		62.9	62.9
Effective Green, g (s)	16.1	16.1	63.9		63.9	63.9
Actuated g/C Ratio	0.18	0.18	0.71		0.71	0.71
Clearance Time (s)	6.0	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)	313	169	1260		151	1307
v/s Ratio Prot			c0.62			0.46
v/s Ratio Perm	c0.12	0.02			0.14	
v/c Ratio	0.66	0.10	0.87		0.21	0.65
Uniform Delay, d1	34.4	30.9	9.9		4.4	7.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.2	0.3	8.5		3.1	2.5
Delay (s)	39.7	31.1	18.4		7.5	9.6
Level of Service	D	C	B		A	A
Approach Delay (s)	37.0		18.4			9.5
Approach LOS	D		B			A

Intersection Summary

HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
9025: Strachan Ave & New Liberty St

09/30/2021

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (vph)	0	248	0	733	670	74
Future Volume (vph)	0	248	0	733	670	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	15.0	0.0	15.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.987	
Flt Protected						
Satd. Flow (prot)	1842	1566	1842	1842	1818	0
Flt Permitted						
Satd. Flow (perm)	1842	1566	1842	1842	1818	0
Link Speed (k/h)	40			40	40	
Link Distance (m)	579.0			241.4	424.1	
Travel Time (s)	52.1			21.7	38.2	
Confl. Peds. (#/hr)			9			9
Confl. Bikes (#/hr)		1				26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	276	0	814	744	82
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	276	0	814	826	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	61.9%		ICU Level of Service B			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
9025: Strachan Ave & New Liberty St

09/30/2021


	EBL	EBR	NBL	NBT	SBT	SBR
Movement	↔	↔	↔	↑	↑	↔
Lane Configurations	↔	↔	↔	↑	↑	↔
Traffic Volume (veh/h)	0	248	0	733	670	74
Future Volume (Veh/h)	0	248	0	733	670	74
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	276	0	814	744	82
Pedestrians	9					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				241		
pX, platoon unblocked	0.71					
vC, conflicting volume	1608	794	835			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1652	794	835			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	28	100			
cM capacity (veh/h)	77	385	793			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	0	276	0	814	826
Volume Left	0	0	0	0	0
Volume Right	0	276	0	0	82
cSH	1700	385	1700	1700	1700
Volume to Capacity	0.00	0.72	0.00	0.48	0.49
Queue Length 95th (m)	0.0	41.2	0.0	0.0	0.0
Control Delay (s)	0.0	34.7	0.0	0.0	0.0
Lane LOS	A	D			
Approach Delay (s)	34.7		0.0		0.0
Approach LOS	D				

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

Lanes, Volumes, Timings
9029: Atlantic Ave

09/30/2021


						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (vph)	25	6	30	10	4	72
Future Volume (vph)	25	6	30	10	4	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.973	0.966				
Fit Protected	0.962				0.998	
Satd. Flow (prot)	1724	0	1779	0	0	1838
Fit Permitted	0.962				0.998	
Satd. Flow (perm)	1724	0	1779	0	0	1838
Link Speed (k/h)	50	50		50		
Link Distance (m)	66.8	42.4		34.0		
Travel Time (s)	4.8	3.1		2.4		
Confl. Peds. (#/hr)	53	2	245		245	
Confl. Bikes (#/hr)	3		8			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	7	33	11	4	80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	44	0	0	84
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5	0.0		0.0		
Link Offset(m)	0.0	0.0		0.0		
Crosswalk Width(m)	1.6	1.6		1.6		
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14	14		24	
Sign Control	Stop	Free		Free		

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 24.0% ICU Level of Service A
 Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
9029: Atlantic Ave

09/30/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↔	↔	↑
Traffic Volume (veh/h)	25	6	30	10	4	72
Future Volume (Veh/h)	25	6	30	10	4	72
Sign Control	Stop	Free		Free		
Grade	0%	0%		0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	28	7	33	11	4	80
Pedestrians	245	53		2		
Lane Width (m)	3.5	3.5		3.5		
Walking Speed (m/s)	1.2	1.2		1.2		
Percent Blockage	20	4		0		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	42					
pX, platoon unblocked						
vC, conflicting volume	424	286			289	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	424	286			289	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	99			100	
cM capacity (veh/h)	448	603			1020	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	35	44	84
Volume Left	28	0	4
Volume Right	7	11	0
cSH	472	1700	1020
Volume to Capacity	0.07	0.03	0.00
Queue Length 95th (m)	1.8	0.0	0.1
Control Delay (s)	13.2	0.0	0.4
Lane LOS	B	A	
Approach Delay (s)	13.2	0.0	0.4
Approach LOS	B		

Intersection Summary

Average Delay 3.1
 Intersection Capacity Utilization 24.0% ICU Level of Service A
 Analysis Period (min) 15



Appendix E: Transportation Tomorrow Survey Queries

GO Rail Station Access and Egress Mode Splits

Mon Dec 14 2020 23:14:57 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Transit - 2016 v1.1

Field: Access mode to transit - mode_accs

Filters:

GO rail boarding station - go_on In GS11,
and

Route used on link #1 - route_1 In GT01,GT02,GT03,GT05
and

Start time of trip - start_time In 0630-0930

Table: Tran 2016

Row:

Cycle

Auto driver

Walk

Total:

Count: Expanded:

5 55

1 14

10 139

16 208

Mode	Trips	Share
Transit	0	0%
Cycle	55	26%
Auto driver	14	7%
Auto passenger	0	0%
Taxi	0	0%
Walk	139	67%
Other	0	0%
Total	208	

GO Rail Station Access and Egress Mode Splits

Mon Dec 14 2020 23:25:05 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Transit - 2016 v1.1

Field: Access mode to transit - mode_accs

Filters:

GO rail boarding station - go_on In GS11,
and

Route used on link #1 - route_1 In GT01,GT02,GT03,GT05
and

Start time of trip - start_time In 1530-1830

Table: Tran 2016

Row:

Cycle

Auto passenger

Taxi passenger

Paid rideshare

Walk

Total:

Count: Expanded:

1 11

1 7

1 23

1 11

65 1305

69 1358

Assumed equal to Access Mode
for PM

Mode	Trips	Share
Transit	0	0%
Cycle	11	1%
Auto driver	0	0%
Auto passenger	7	1%
Taxi	34	3%
Walk	1305	96%
Other	0	0%
Total	1357	

GO Rail Station Access and Egress Mode Splits

Mon Dec 14 2020 23:25:05 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Transit - 2016 v1.1

Field: Access mode to transit - mode_accs

Filters:

GO rail boarding station - go_on In GS11,
and

Route used on link #1 - route_1 In GT01,GT02,GT03,GT05
and

Start time of trip - start_time In 1530-1830

Table: Tran 2016

Row:	Count:	Expanded:
Cycle	1	11
Auto passenger	1	7
Taxi passenger	1	23
Paid rideshare	1	11
Walk	65	1305
Total:	69	1358

Mode	Trips	Share
Transit	0	0%
Cycle	11	1%
Auto driver	0	0%
Auto passenger	7	1%
Taxi	34	3%
Walk	1305	96%
Other	0	0%
Total	1357	

GO Rail Station Access and Egress Mode Splits

Mon Dec 14 2020 23:14:57 GMT-0500 (Eastern Standard Time)

Frequency Distribution Query Form - Transit - 2016 v1.1

Field: Access mode to transit - mode_accs

Filters:

GO rail boarding station - go_on In GS11,
and

Route used on link #1 - route_1 In GT01,GT02,GT03,GT05
and

Start time of trip - start_time In 0630-0930

Table: Tran 2016

Row:

Cycle

Auto driver

Walk

Total:

Count Expanded:

5 55

1 14

10 139

16 208

Assumed equal to Access
Mode for AM

Mode	Trips	Share
Transit	0	0%
Cycle	55	26%
Auto driver	14	7%
Auto passenger	0	0%
Taxi	0	0%
Walk	139	67%
Other	0	0%
Total	208	

TTS Trip Distribution Summary

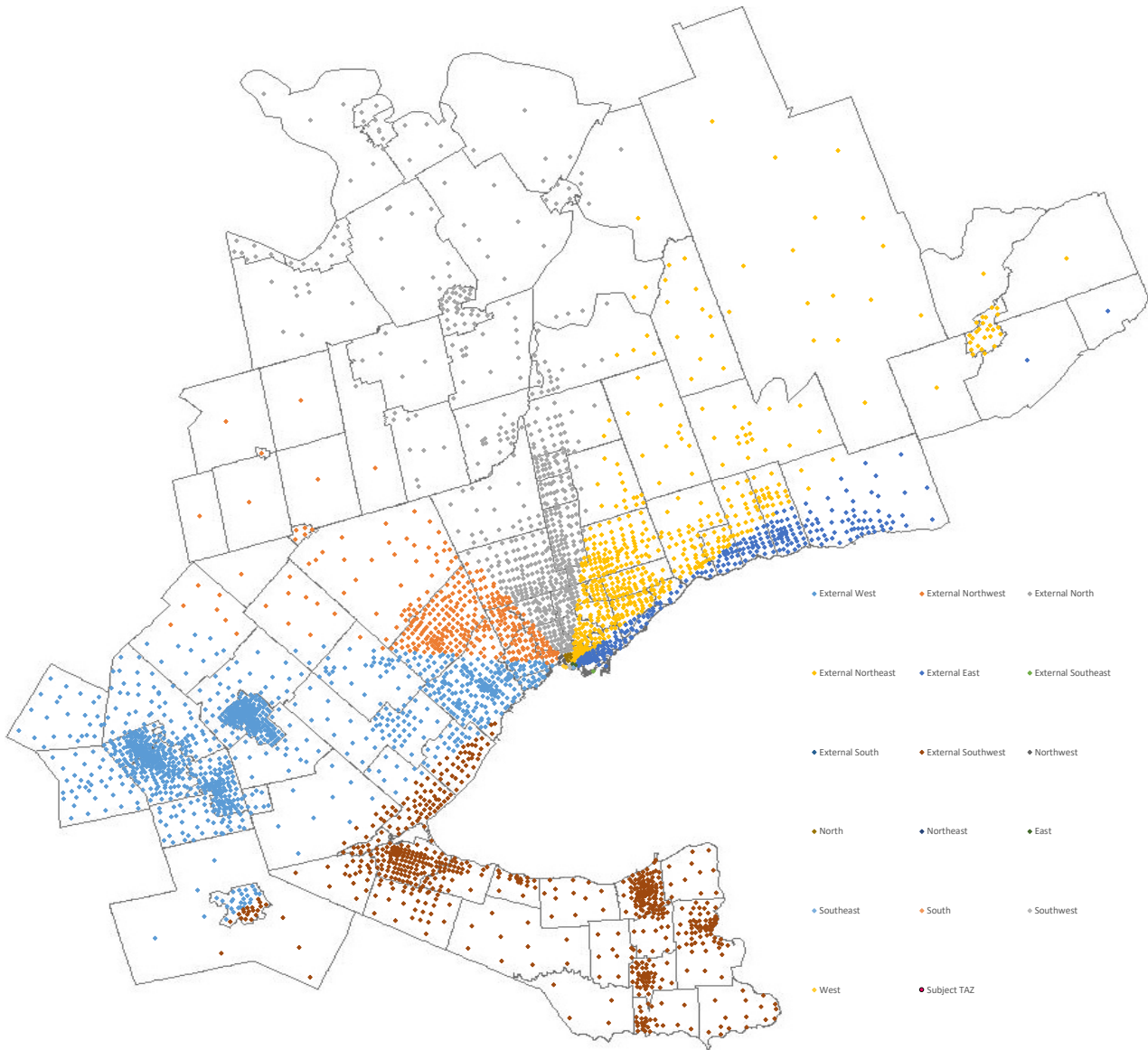
In order to inform the trip assignment stage of the analysis, information about the general trip distribution is required to inform the analysis. The distribution represents the proportion of trips to and away from the site in any given direction. The following pages summarize the general trip distribution results, which were calculated using Transportation Tomorrow Survey (TTS) 2016 trip origin and destination data. Trips were grouped under cardinal directions based on the relative angle between trip origin and destination, and appropriate adjustments were made to the calculation to conform to local geography and street grid.

The "TTS Directional Distribution Summary" on the next page presents a summary of the calculations described above, along with notes on any details specific to the analysis in this report. The table shows the total number of trips to and from the subject site categorized into general directions (North, Northeast, East etc.) and the percentage share of trips in each general direction in all directions.

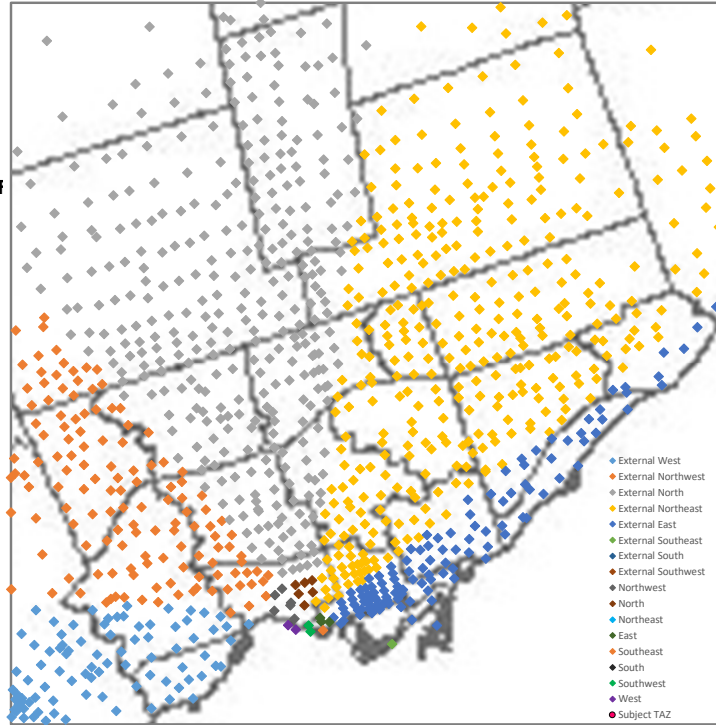
The pages after show graphical illustrations of the categorizations for all Traffic Analysis Zones (TAZ) in the TTS survey area. Note that the latest survey zones were last updated in 2006.

These results are used as reference information for the trip assignment. They do not directly determine the trip assignment on the study network. The final trip assignments are completed based on a combination of local context, engineering experience, and engineering judgement, with the trip distribution information presented here to illustrate general travel behaviour.

TAZ Directional Categorisation Visualisation (Complete TTS Survey Area)



TAZ Directional Categorisation Visualisation (City of Toronto)



Outputs: PM (OUT)	Internal										External								Totals
	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	External	External	External	External	External	External	External	External	
Direction	I	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W		
Trips	0	783	480	0	320	11	0	18	0	0	0	0	0	0	0	0	0	1612	
%	0.00%	48.57%	29.78%	0.00%	19.85%	0.68%	0.00%	1.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	
% w/o trips in subject TAZ	0.00%	48.57%	29.78%	0.00%	19.85%	0.68%	0.00%	1.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	

Input Area

Format

Sum	Direction	Finalized Direction	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include
Include			Mon Dec 14 2020 21:11:13 GMT-0500 (Eastern Standard Time) - Run Time: 2417															
Include			Cross Tabulation Query Form - Trip - 2016 v1.1															
Include			Row: 2006 GTA zone of destination - gta06_dest															
Include			Column: Planning district of origin - pd_orig															
Include			Filters:															
Include			Planning district of origin 6															
Include			and															
Include			Start time of trip - start_time In 1530-1830															
Include			Trip 2016															
Include			Table:															
Include			PD 5 of 1PD 6 of Toronto															
Include	40 E	E	85	0	40													
Include	11 SE	SE	86	11	0													
Include	14 SW	SW	87	0	14													
Include	4 SW	SW	88	0	4													
Include	280 E	E	89	138	142													
Include	36 N	N	96	17	19													
Include	51 N	N	97	15	36													
Include	192 N	N	99	113	79													
Include	56 N	N	100	20	36													
Include	118 N	N	101	29	89													
Include	27 N	N	102	11	16													
Include	226 NW	NW	107	64	162													
Include	35 NW	NW	108	8	27													
Include	63 NW	NW	109	0	63													
Include	329 NW	NW	110	144	185													
Include	93 NW	NW	113	49	44													
Include	37 NW	NW	114	30	7													
Include			9032	7	0													
Include			9998	0	37													

TTS Raw Data: PM (OUT)

Trip Distribution for OL PPUDO trips

Trips beyond 3.1km from station are excluded

Outputs: PM (IN)	Internal										External								Totals	
	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	External	External	External	External	External	External	External	External		
Direction	I	NW	N	NE	E	SE	S	SW	W	W	NW	N	NE	E	SE	S	SW	W		
Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	22
%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	24.14%	0.00%	0.00%	0.00%	0.00%	0.00%	75.86%
% w/o trips in subject TAZ	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	24.14%	0.00%	0.00%	0.00%	0.00%	0.00%	75.86%

Input Area			Format																	
Sum	Direction	Finalized Direction	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include
			Fri Mar 12 2021 20:06:17 GMT-0500 (Eastern Standard Time) - Run Time: 2368ms																	
			Cross Tabulation Query Form - Trip - 2016 v1.1																	
			TTS Raw Data: PM (IN)																	
			Row: 2006 GTA zone of origin - gta06_orig																	
			Column: 2006 GTA zone of destination - gta06_dest																	
			Trip Distribution for existing Exhibition GO station																	
			Filters:																	
			2006 GTA zone of destin 88 89																	
			and																	
			Start time of trip - start_time In 1630-1930																	
			and																	
			Trip purpose of destination - purp_dest In F																	
			Trip 2016																	
			Table:																	
			89																	
	7 XNE	XNE	234 7																	
	5 XW	XW	309 5																	
	17 XW	XW	313 17																	

Outputs: PM (OUT)	Internal										External								Totals	
	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	External	External	External	External	External	External	External	External		
Direction	I	NW	N	NE	E	SE	S	SW	W	W	NW	N	NE	E	SE	S	SW	W		
Trips	0	0	0	5	36	17	0	0	0	0	0	0	0	0	0	0	0	0	0	58
%	0.00%	0.00%		8.62%	62.07%	29.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
% w/o trips in subject TAZ	0.00%	0.00%		8.62%	62.07%	29.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%

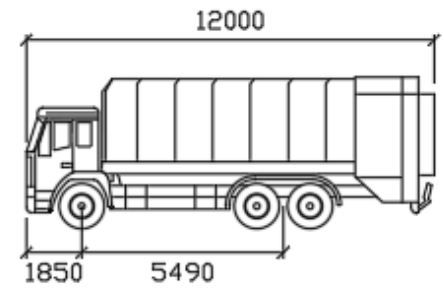
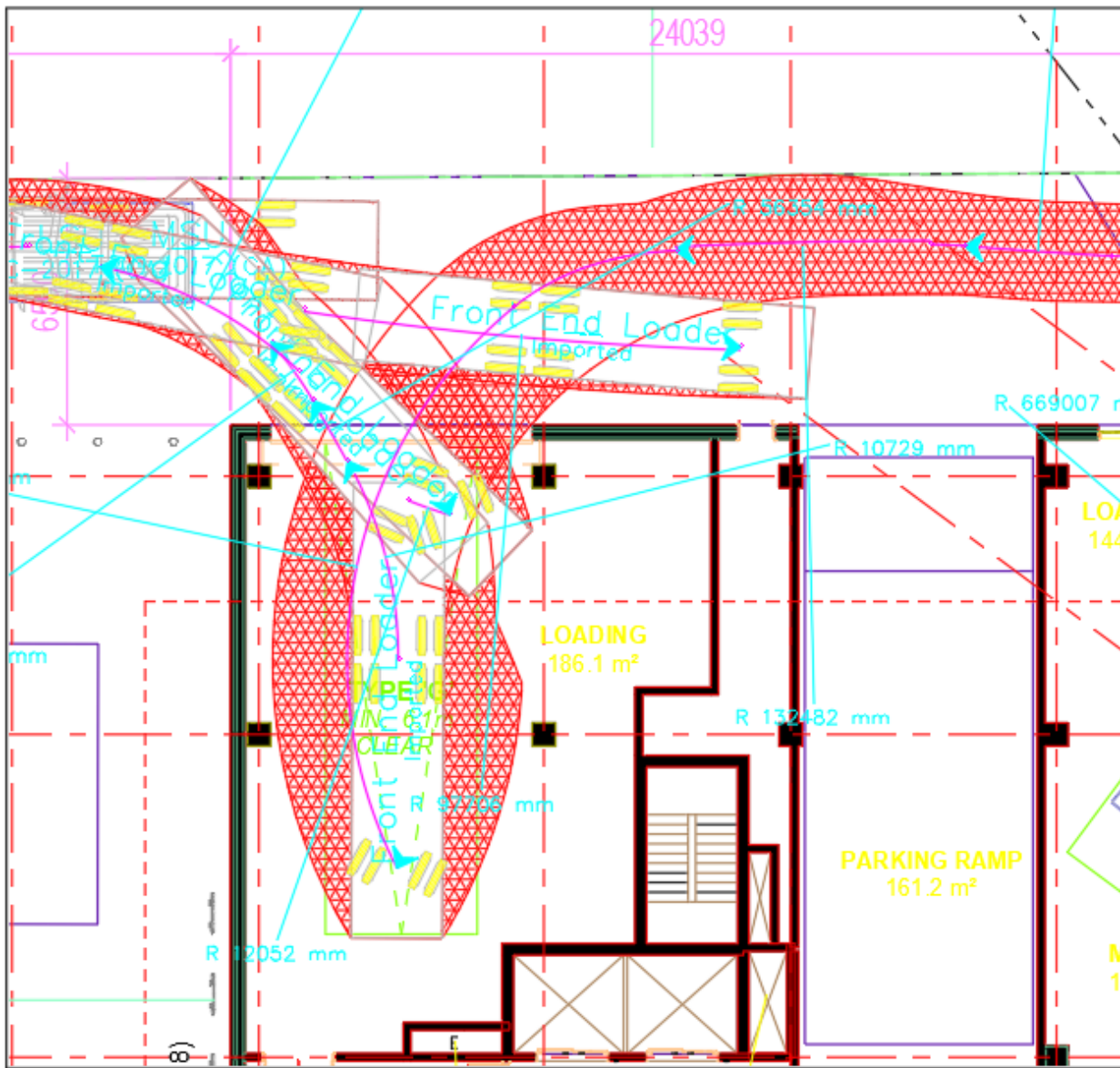
Input Area			Format																	
Sum	Direction	Finalized Direction	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include	Include
			Fri Mar 12 2021 19:56:00 GMT-0500 (Eastern Standard Time) - Run Time: 6139ms																	
			Cross Tabulation Query Form - Trip - 2016 v1.1																	
			TTS Raw Data: PM (OUT)																	
			Row: 2006 GTA zone of destination - gta06_dest																	
			Column: 2006 GTA zone of origin - gta06_orig																	
			Trip Distribution for existing Exhibition GO station																	
			Filters:																	
			2006 GTA zone of origin 88 89																	
			and																	
			Start time of trip - start_time In 1630-1930																	
			and																	
			Trip purpose of origin - purp_orig In F																	
			Trip 2016																	
			Table:																	
			89																	
	17 E	E	34 17																	
	31 NE	NE	72 31																	
	5 NE	NE	90 5																	
	5 N	N	100 5																	



Appendix F: Exhibition Station Trip Transfer Matrix



Appendix G: AutoTURN Turning Templates

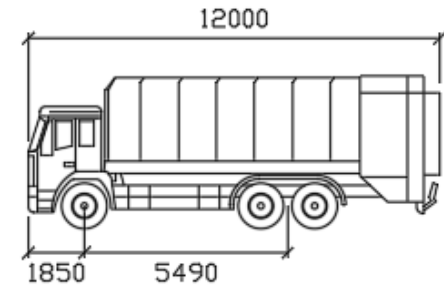
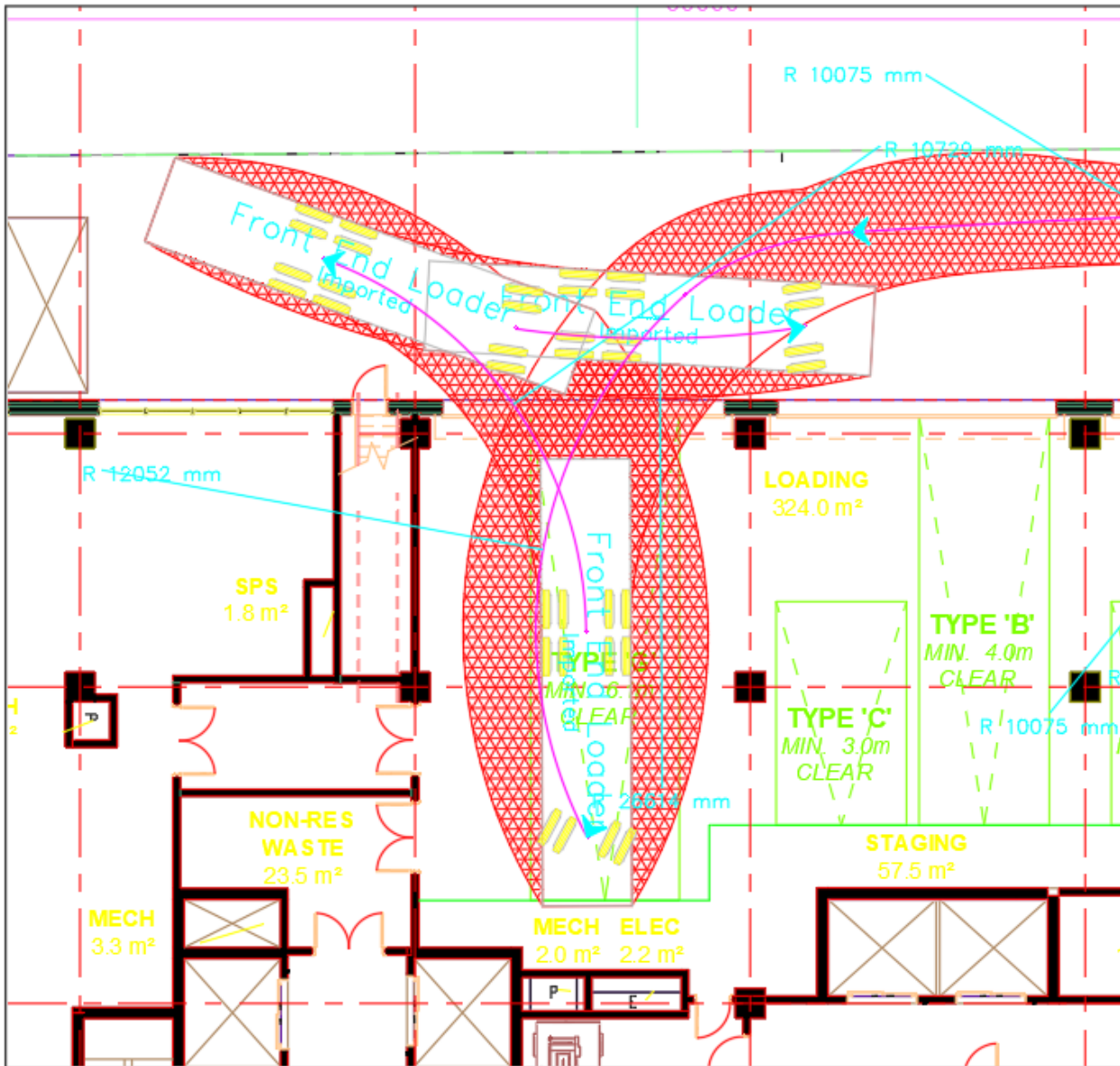


Front End Loader

	mm
Width	: 2400
Track	: 2400
Lock to Lock Time	: 6.0
Steering Angle	: 27.1

Not to scale

Site A East Building Type G Loading Space

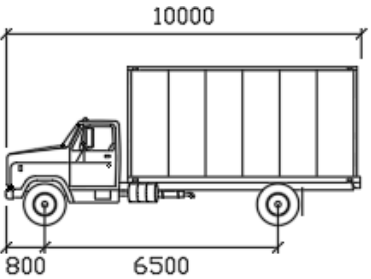
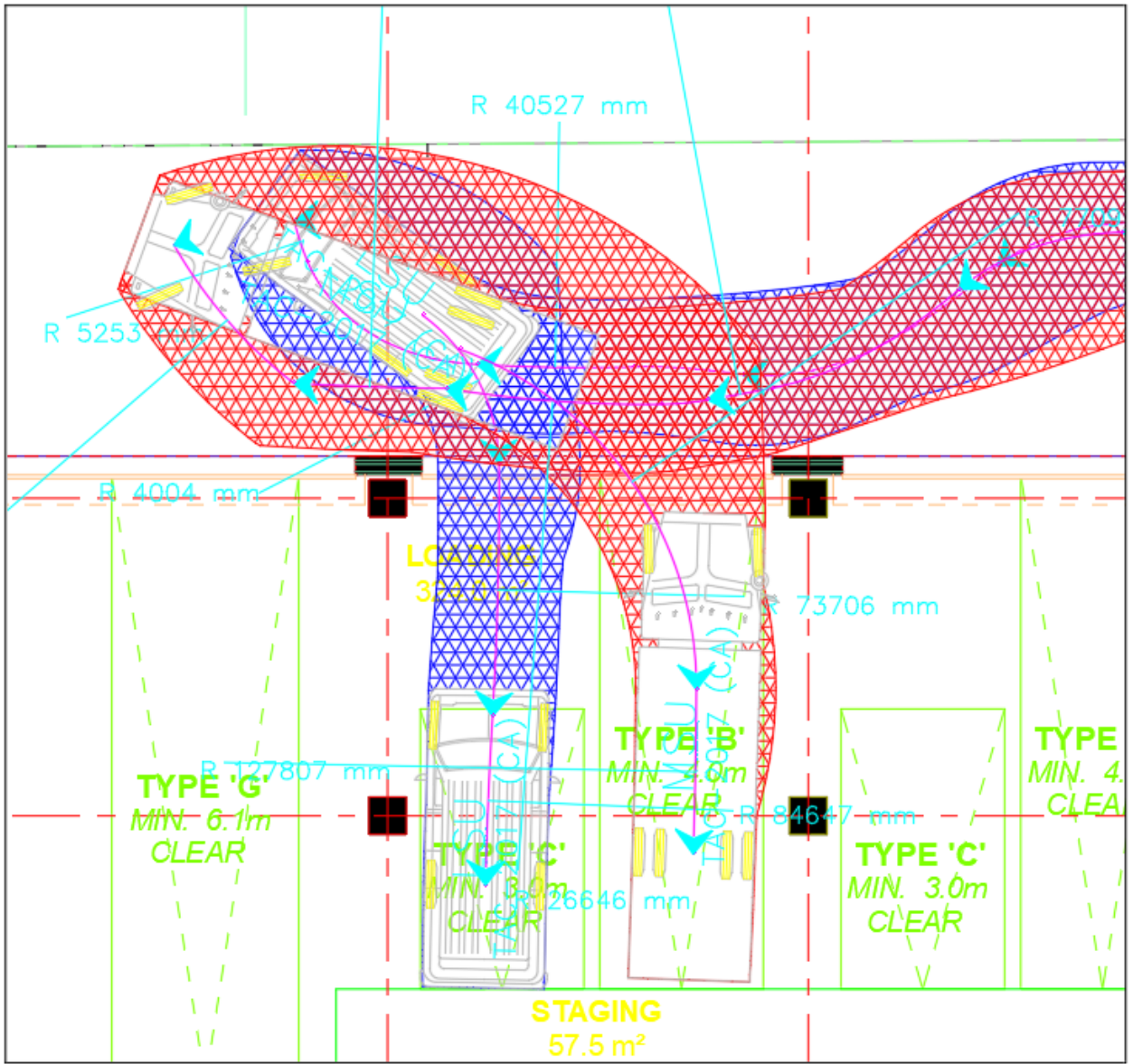


Front End Loader

	mm
Width	: 2400
Track	: 2400
Lock to Lock Time	: 6.0
Steering Angle	: 27.1

Not to scale

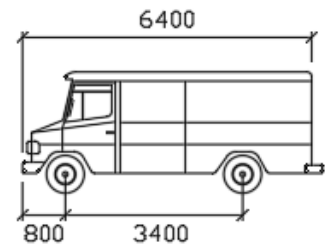
Site A West Building Type G Loading Space



MSU

mm

Width : 2600
 Track : 2600
 Lock to Lock Time : 6.0
 Steering Angle : 40.2



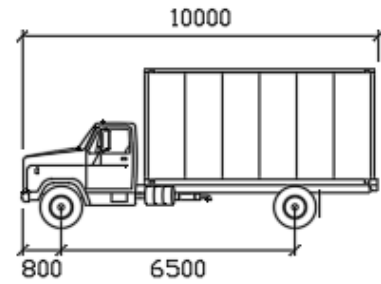
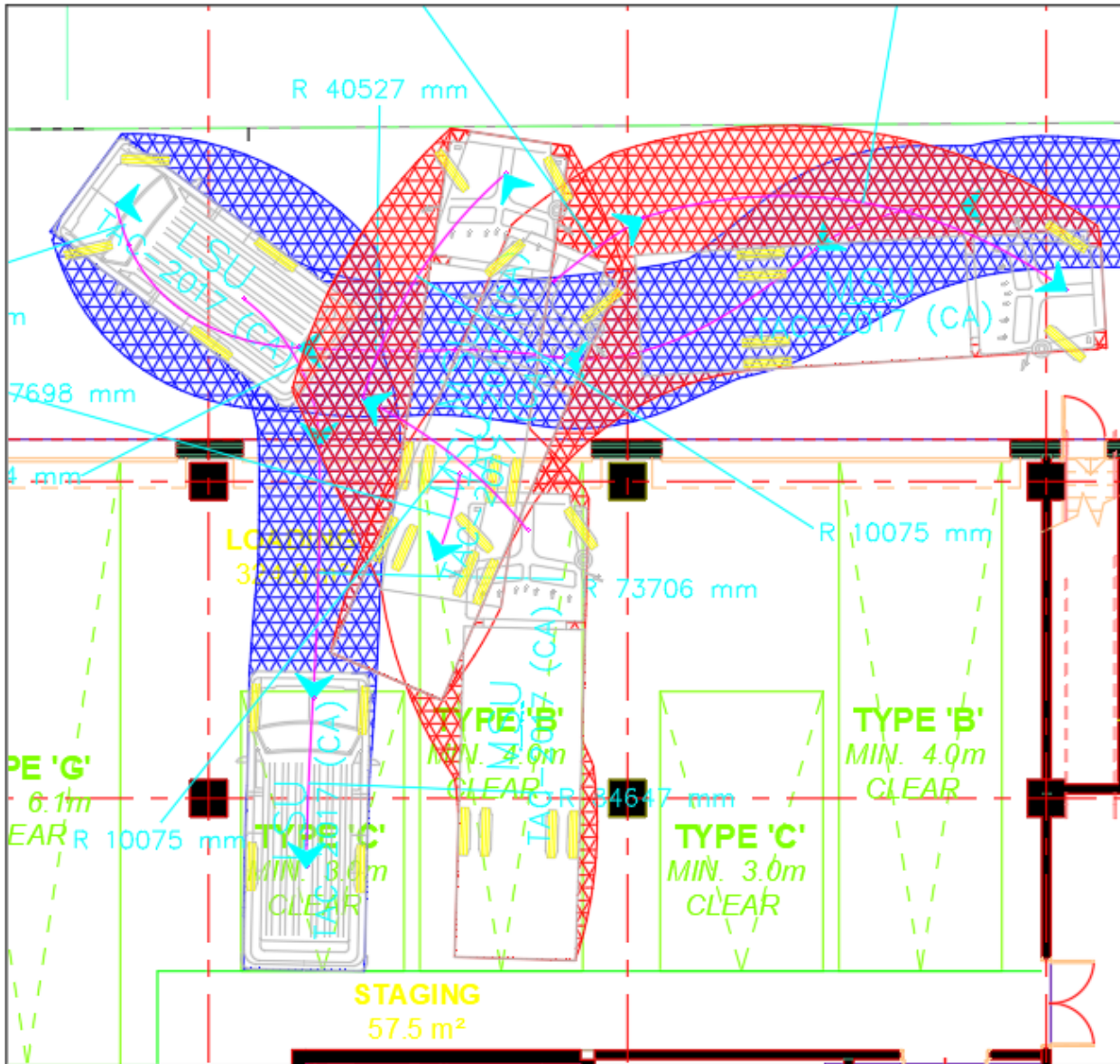
LSU

mm

Width : 2600
 Track : 2600
 Lock to Lock Time : 6.0
 Steering Angle : 40.3

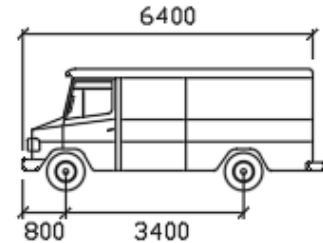
Not to scale

Site A West Building Type B Loading Space 1 Inbound



MSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.2

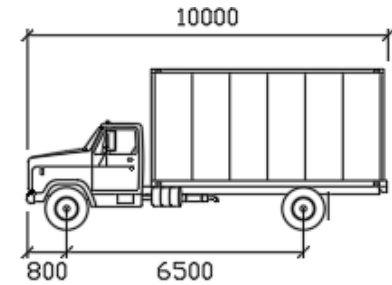
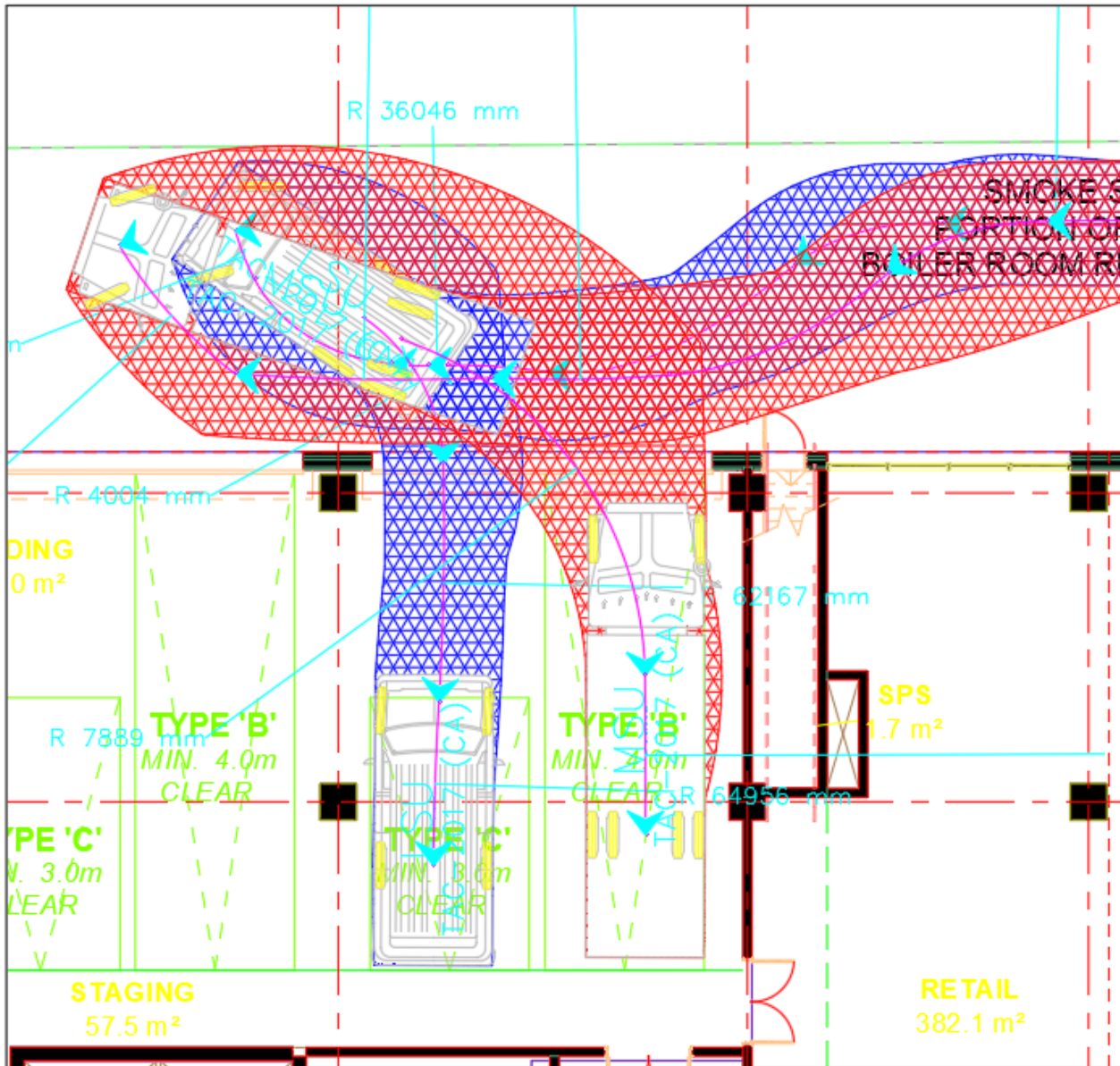


LSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.3

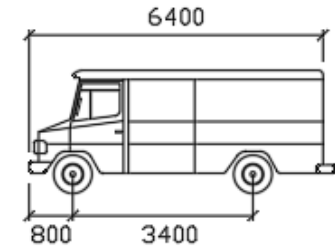
Not to scale

Site A West Building Type B Loading Space 1 Outbound



MSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	6.0
Steering Angle	: 40.2

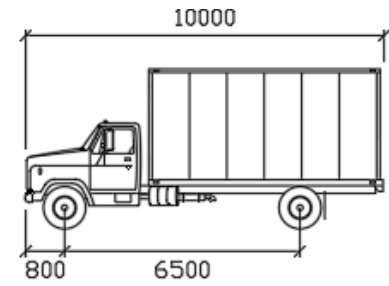
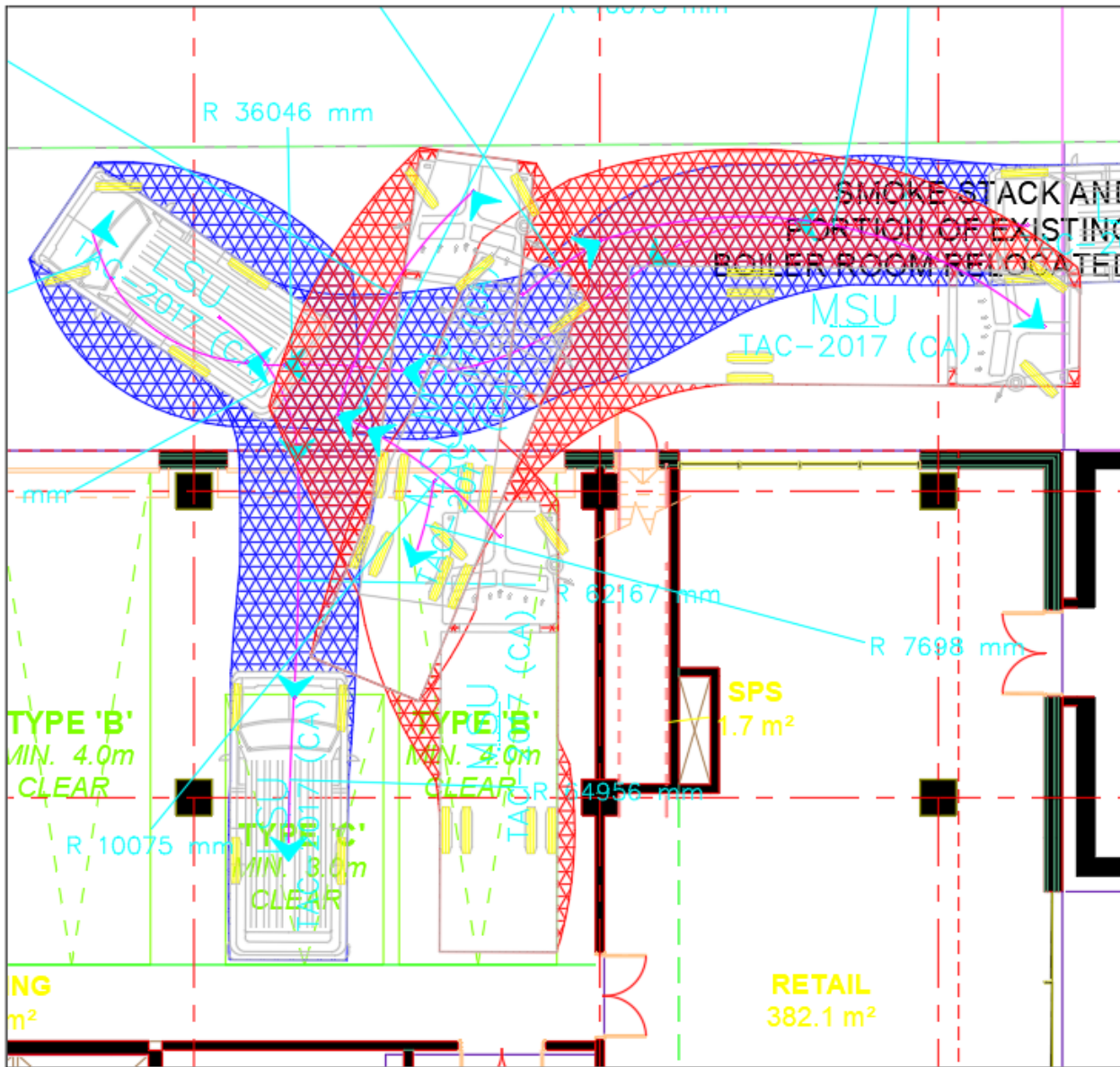


LSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	6.0
Steering Angle	: 40.3

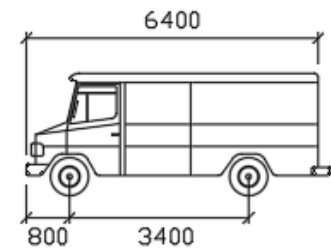
Not to scale

Site A West Building Type B Loading Space 2 Inbound



MSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.2

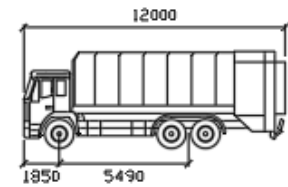
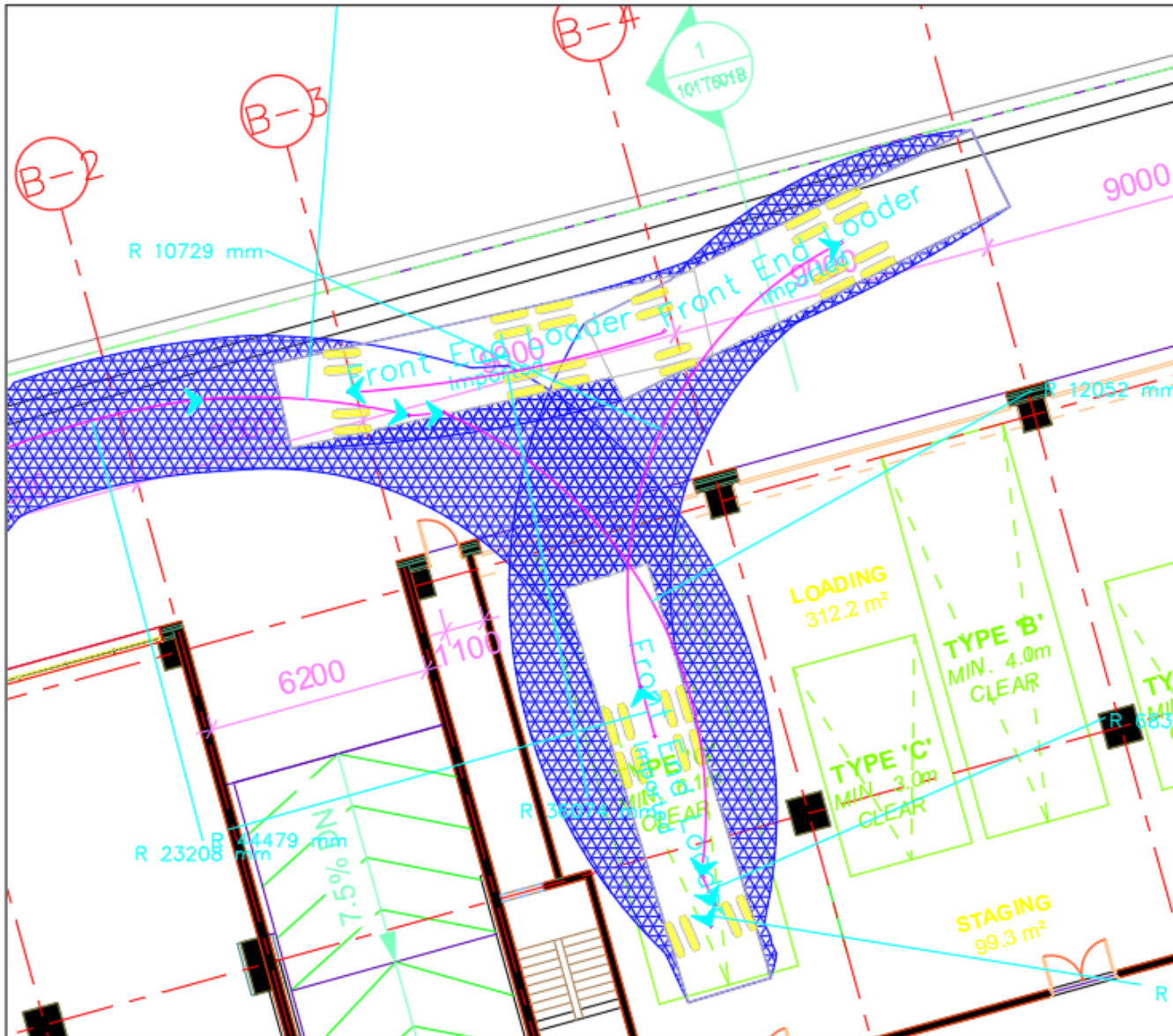


LSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.3

Not to scale

Site A West Building Type B Loading Space 2 Outbound

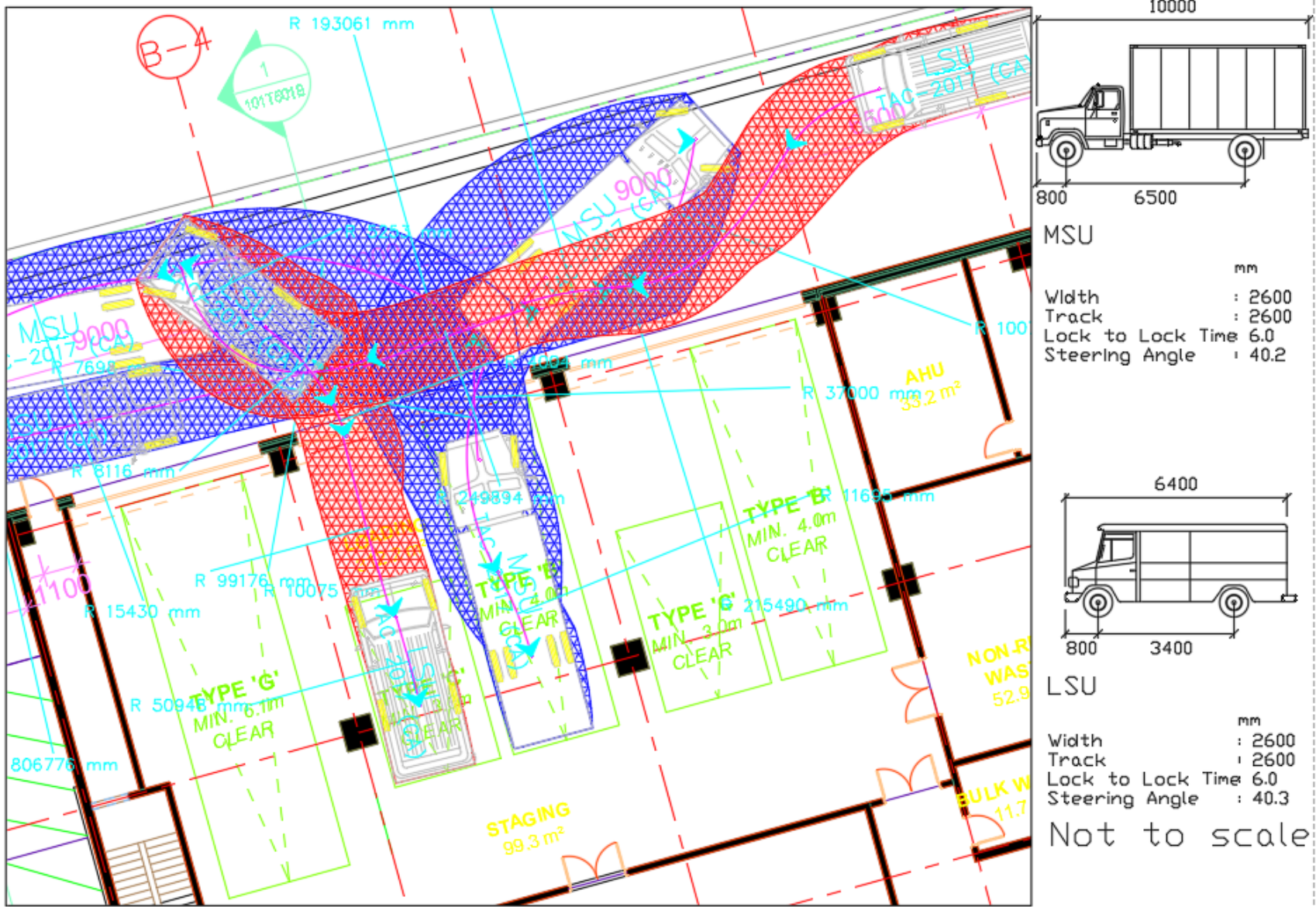


Front End Loader

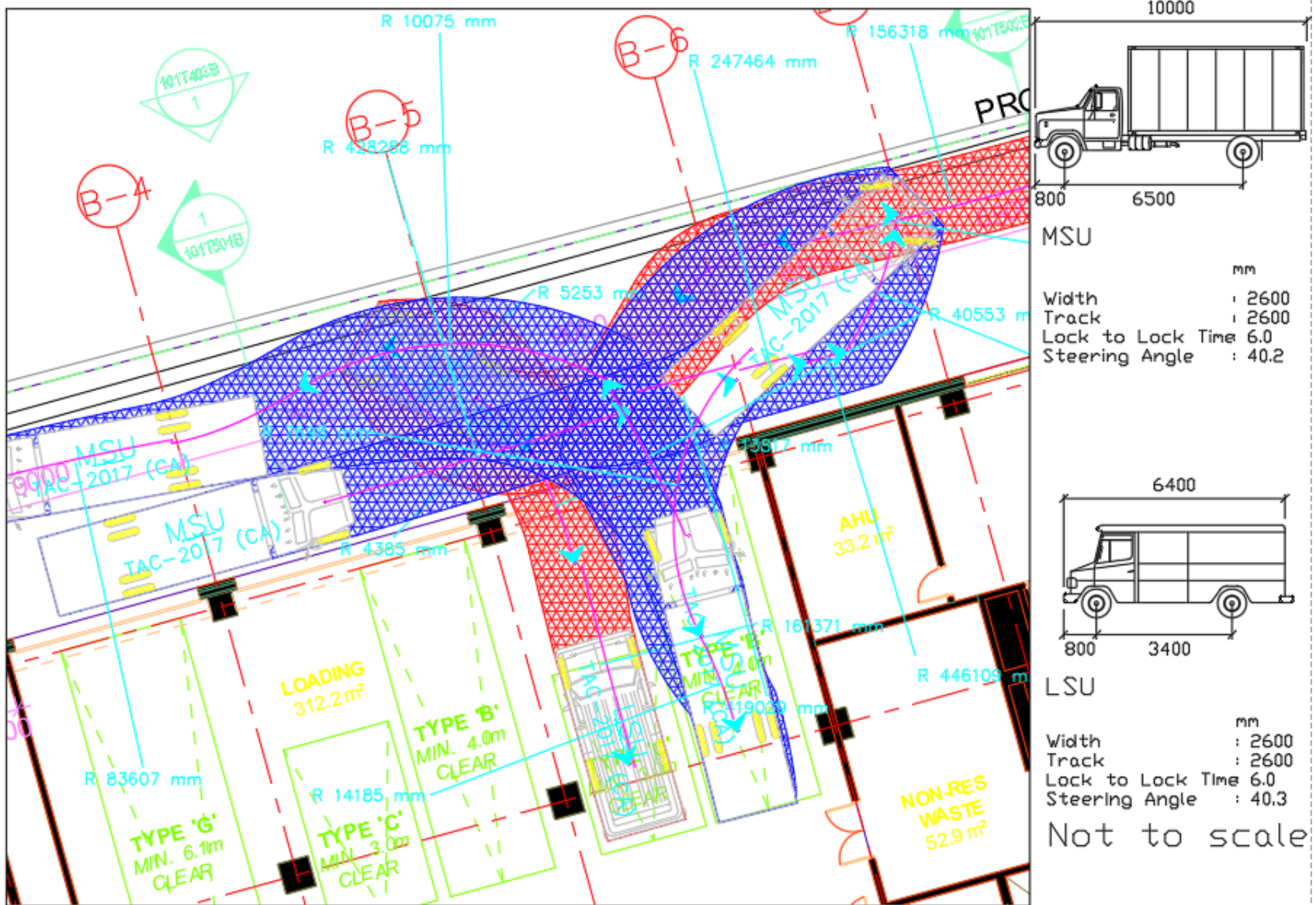
	mm
Width	: 2400
Track	: 2400
Lock to Lock Time	: 6.0
Steering Angle	: 27.1

Not to scale

Site B Type G Loading Space



Site B Type B Loading Space 1



Site B Type B Loading Space 2