GREENWIN CORP.

24 ELIZBETH STREET / 33 GEORGE STREET NORTH, CITY OF BRAMPTON

TRAFFIC IMPACT STUDY ADDENDUM

MAY 9, 2022

100 COMMERCE VALLEY DRIVE WEST
THORNHILL, ON, CANADA L3T 0A1

wsp.com

May 9, 2022

GREENWIN CORP.
Mark Zaky, MBA, MREI
Development Manager
19 Lesmill Road
Toronto, ON M3B 2T3

Dear Mr. Zaky

Subject: **Traffic Impact Study Addendum**
24 Elizabeth Street / 33 George Street North, Brampton, Ontario

WSP Canada Inc. (WSP) is pleased to present our Transportation Impact Study (TIS) Addendum for the ZBA resubmission of your proposed mixed-use development located at 24 Elizabeth Street / 33 George Street North in the City of Brampton.

By way of background, WSP had submitted the original TIS dated October 15, 2021. Since then, the City of Brampton and Region of Peel comments have been received. The purpose of this addendum is to respond to these comments and incorporate the updated site plan. The sections of the original TIS that are still applicable and not commented on will not be repeated.

Yours sincerely,

Peter Yu., P.Eng., PMP
Project Manager,
Transportation Planning and Science

WSP ref.: 20M-00937-00

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APPENDICES

1 INTRODUCTION

WSP was retained by Greenwin Corp. to prepare a Traffic Impact Study (TIS) Addendum for the 24 Elizabeth Street / 33 George Street North mixed-use development. The subject site is bounded by George Street North to the east, Elizabeth Street North to the west, Nelson Street to the north, and mixed use residential developments to the south. The site plan is shown in **Figure 1-1**.

By way of background, WSP had completed the original TIS for the site dated October 15, 2021 (herein referred to as the October 2021 TIS). Sections of the TIS that are still applicable and were not commented on by the City or the Region will not be repeated in this TIS Addendum.

The development proposal has changed since the original TIS and the land uses proposed is summarized in **Table 1.1** for reference. As noted in Section 4.2 of this addendum, the auto trip generation between the current package of uses is very similar to the package of use proposed in the October 2021 TIS, with the difference of only 9 trips during the peak hour.

Table 1.1: Land Use Comparison

Land Use	October 2021 TIS	Current Submission	Difference
Residential	756 units	928 units	Increase of 172 units
Hotel	205 rooms	146 rooms	Reduction of 59 rooms
Retail	7,537 sq.ft.	8,503 sq.ft.	Increase of 966 sq.ft.

Figure 1-1

Proposed Site Plan

2 COMMENT RESPONSE

City Comments: WSP and the project team met with City of Brampton Transportation staff on February 23 and May 4, 2022to discuss the City comments below.

Comment 1: Depict the proper daylighting to ensure the proposed development will not be impacted. A 5.0 metre daylight rounding at the corner of Elizabeth Street North and Nelson Street West, and a 7.5 metre by 7.5 metre daylight triangle at the corner of Nelson Street West at George Street North are required.

WSP Response: Please refer to the architectural set of plans for the proposed daylight rounding. WSP understands that these items are subject to further review as part of the subsequent SPA submission.

Comment 2: Access to Nelson Street West is not permitted.

WSP Response: Noted, no vehicular access onto Nelson street is proposed.

Comment 3: Please note the following required road conveyances that shall be depicted on the drawings:

a. Approximately 2.0 metres along the entire Nelson Street West frontage (10m from centreline).
b. Approximately 4.5 metres along the entire Elizabeth Street North frontage (11.5m from centerline).

WSP Response: The City's request is noted and a meeting was held on May 4 with City staff to discuss the substantial impacts these new conveyance requests would have on the proposed development – both from a buildable area and underground structure perspective. During the meeting, the City noted that the need for a minimum ROW along both Nelson Street West and Elizabeth Street North stems primarily from the City's Official Plan – suggesting that public roads require a minimum ROW of 20m. However, based on the project team's review of Schedule B1 (**Figure 2.1**) from the City's Official Plan, it notes that "*Minor collector or local roads and Regional roads are shown for orientation purposes only and are not Official Plan designation of this plan*." Since both Nelson Street West and Elizbeth Street North are not labeled as a 20m road and are local roads, there is merit to examine the context of both streets to determine what a reasonable ROW would be (i.e., less than 20m).

During the meeting with the City, staff noted that the ROW along Elizbeth Street could be narrowed from 23m if layby parking can be accommodated within the easterly boulevard. Based on WSP's experience with ROW, road hierarchy, and road functionality for all users, there are opportunities to optimize the design of a ROW less than 20m. By way of background, several major municipalities such as City of Markham, City of Vaughan, City of Toronto and Town of Oakville all have local road ROW designs in the 17.5 to 18.5m range while providing sidewalks on both sides and sufficient pavement width for the purpose of a local road. Moreover, many municipalities note that a pavement width of 8m to 8.5m is wide enough to accommodate 2 lanes of traffic plus on-street parking. Presently the pavement width of Elizabeth Street North mid-block is 8.5m and along Nelson Street West where there is on-street parking the pavement width is approximately 10m wide. Therefore, WSP believes that the pavement width curb to curb is sufficient to accommodate two lanes of traffic plus on-street parking. Any attempt to widen the pavement width would involve impacts to the utility poles and mature tree(s) along the east side of Elizabeth Street North.

City staff indicated during the meeting that it is trying to anticipate where bus routes may be designated. Staff noted that based on the current pavement width and on-street parking configuration on Elizabeth Street, buses cannot be accommodated on this local road. However, typically bus routes are not permanently assigned along local roads. Even if there is 1 property along Elizabeth Street North or Nelson Street West that do not redevelop and convey lands, then that would mean the City would not be able to widen the road/ROW to allow transit to operate with on-street parking in place for an indefinite period. For example, the Christ Church Brampton south of the site has steps and building aspects right up against the easterly road ROW limit. Therefore, unless the church redevelops, there would not be an opportunity to widen Elizabeth Street North. Given the planning for near to mid-term bus routes, this is likely not a reasonable design principle for a permanent route. Based on

WSP's review of the Official Plan Schedule C Transit Network map as shown in **Figure 2.2**, all of the transit routes (whether primary, secondary, regional) are all along collector or arterial roads and not relying on local roads.

City staff noted that it would like to maintain the on-street parking on the east side of Elizabeth Street. Based on Google Map streetview review, there are currently only 12 marked on-street parking spaces on Elizabeth Street between Queen Street and Nelson Street. In contrast, there would be substantial to the underground parking supply of the subject development amounting to the loss of approximately 248 parking spaces, which is well beyond 12 spaces. In addition, there would be a residential unit count loss of approximately 378 units as a result of the City's request for a 20m ROW. Rather than sacrificing 12 on-street parking spaces and the broad range of negative impacts, there may be an opportunity to provide publicly accessible commercial parking spaces within the site to more than make up the 12 on-street parking spaces. It is not uncommon in a downtown environment for parking to be provided underground. The same analogy applies to Nelson Street North where there is only 3 on-street parking spaces near the intersection with Main Street. Therefore, WSP believes that the ROW optimization of both local streets involves a cross-section without the on-street parking, which will better accommodate transit and allow for a better streetscape without substantial impact to surrounding uses, trees, utility and development proposals.

For these reasons and other specific context to Elizabeth Street and Nelson Street West, WSP believes that a sub-20m ROW (i.e., 16.5m ROW) is worth exploring. In the subsequent SPA submission, WSP and the project team will develop different mid-block cross-sections for both local streets and meet with the City for further discussion.

Comment 4: Ensure that the parking rate provided complies with the Comprehensive Zoning By-law.

WSP Response: Noted, the updated parking assessment is documented in Section 6 of this addendum and continues to show that the proposed vehicular and bicycle parking arrangements comply with the Comprehensive Zoning By-law.

Comment 5: The traffic impact study is not acceptable at this time. The study referring to intersections failing based on background traffic only without the proposed development is not acceptable. A development of this size will impact the road network. The study needs to identify road improvements that will improve service levels for the surrounding network. Signal timings alone is not an acceptable solution.

WSP Response: based on the discussion with the City's transportation staff in February 2022, it was confirmed that the Synchro traffic assessment approach applied in the October 2021 TIS is very conservative and that the incremental impact is in fact minimal. Moreover, in a downtown setting, the emphasis is on the transit, walk and cycle modes of transportation rather than the widening of roads. As is typical with most downtowns, vehicular traffic will move slower and self regulate. If a roadway improvement was implemented, the available capacity would be quickly taken up by diverting traffic. The updated Synchro traffic assessment for the future background and future total conditions are presented in Sections 3 and 5 of this addendum and the results continue to show that the traffic generated by the development can be adequately accommodated by the boundary road network.

<u>Region Comments</u>

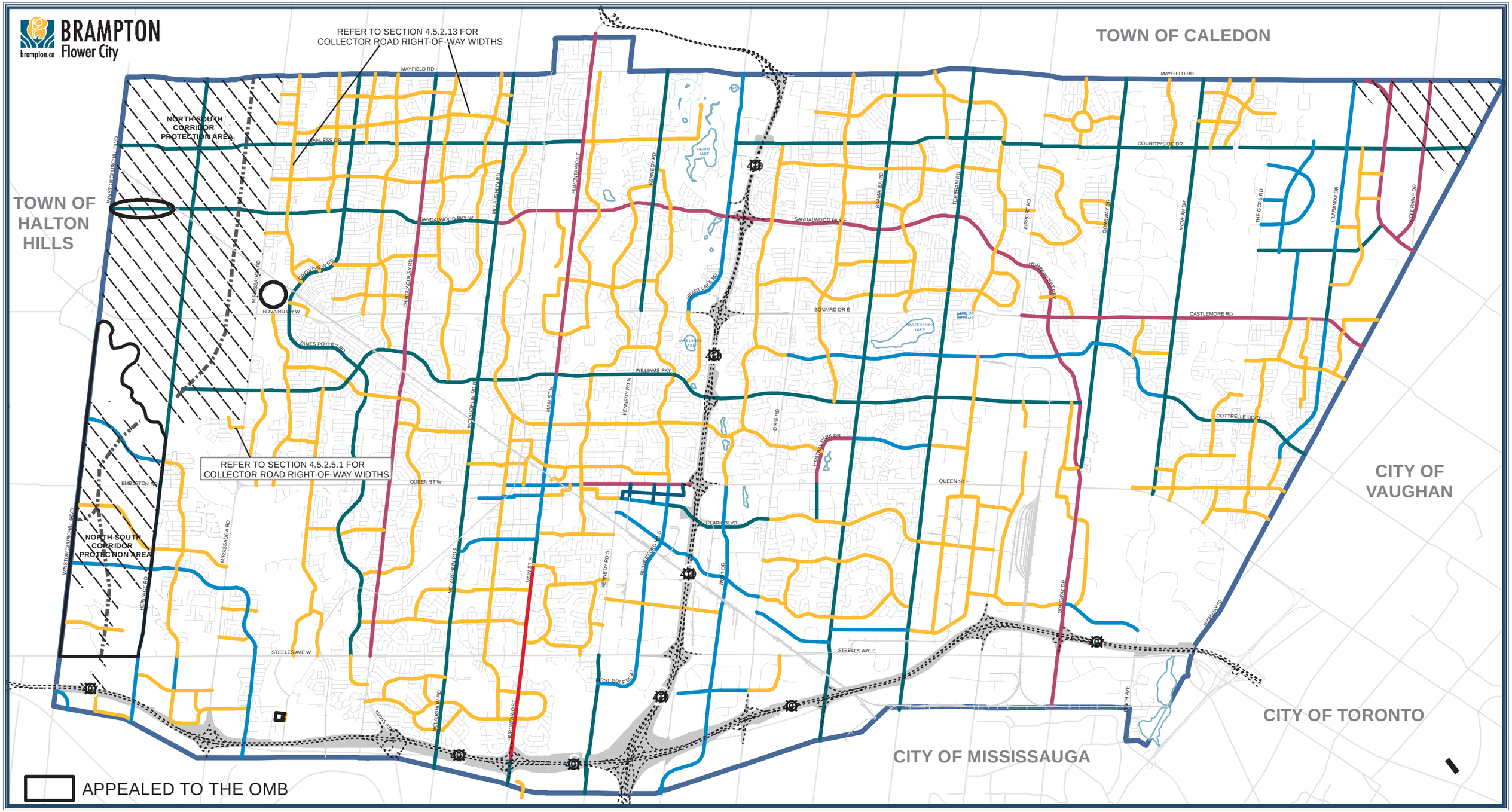
Comment: A Waste Management Plan is required that demonstrate:

1. Collection vehicle access route requirements can be met a) TIS depicts the proposed waste collection access route requires the collection vehicle to enter the site twice while collecting from 2 collection points fronting each other. Please provide a waste collection vehicle maneuvering diagram throughout the site outlining turning movements and radii to demonstrate meeting the access route requirements. Please show where the collection vehicle is proposed to turn when it is exiting the site and comes back to collect from the second collection point.

2. Collection point has overhead clearance and can hold all waste bins of the larger stream

3. Waste storage room is large enough for all required bins

WSP Response: Please see the site plan review of the updated site plan and waste collection vehicle manoeuvres in Section 8 of this addendum.



20 METRES (65.6 FEET)
23-26 METRES (76-86 FEET)
26-30 METRES (86-100 FEET)
36 METRES (120 FEET)
40-100 METRES (131-328 FEET)
40-45 METRES (130-150 FEET)
50-55 METRES (164-180 FEET)
CORRIDOR PROTECTION AREA
PROPOSED LOCAL ROAD
LOCAL ROAD
PROVINCIAL HIGHWAY

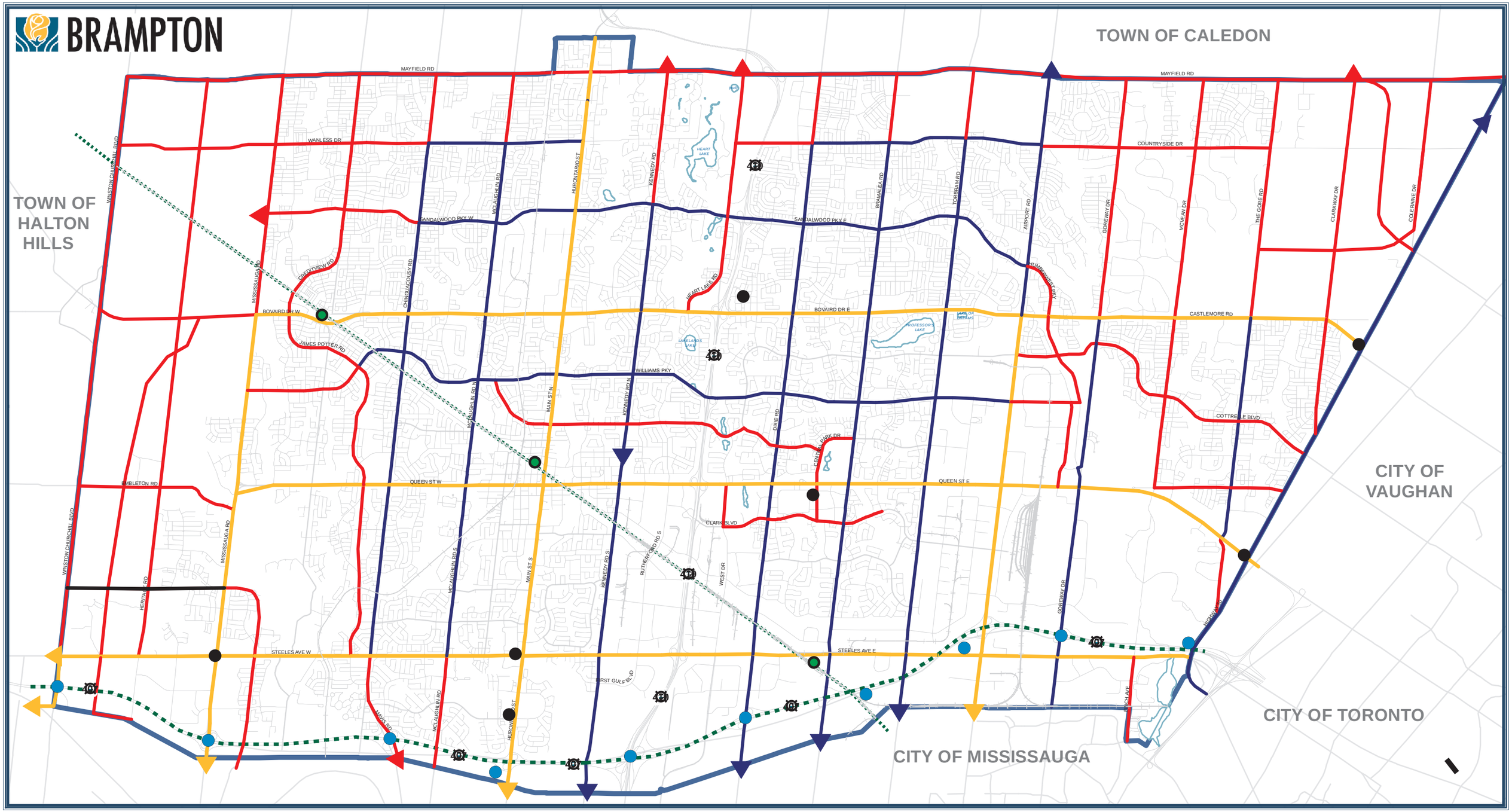
Figure 2.1

Right-of-Way in excess of that shown in this schedule may be required in certain locations in accordance with the policies of this plan. The boundaries and alignments are approximate and not intended to be scaled, and are subject to an approval process as appropriate. This map forms part of the Official Plan of the City of Brampton, and must be read in conjunction with the text, other schedules and secondary plans. Minor collector or local roads and Regional roads are shown for orientation purposes only and are not Official Plan designations of this plan.

SCHEDULE B1 CITY ROAD RIGHT-OF-WAY WIDTHS

Date: 2022/03/03
Last Amended Date - Aug 17th, 2020
Planning, Building and Economic Development
City of Brampton 2006 Official Plan September 2020 Office Consolidation.

BRAMPTON



BRT CORRIDORS
PRIMARY TRANSIT CORRIDORS
SECONDARY TRANSIT CORRIDORS
407 TRANSITWAY
GO RAIL
GO RAIL STATIONS
407 TRANSITWAY STATIONS
MAJOR TRANSIT NODES
APPEALED TO THE OMB/LPAT

Figure 2.2

Designated Transit Corridors represent an aggregation of transit services or segments of transit routes, not specific transit routes, and must be interpreted in conjunction with the policies of this plan. Establishment of transit facilities and services in these corridors is subject to further operational planning, including EA studies where required.

SCHEDULE C TRANSIT NETWORK

Date: 2020/10/28
Last Amended Date - Nov 1st, 2013
Planning, Building and Economic Development
City of Brampton 2006 Official Plan September 2020 Office Consolidation.

3 FUTURE BACKGROUND EVALUATION

3.1 HORIZON YEARS

As per the October 2021 TIS, the following three horizon years have been evaluated in this addendum. It should be noted that the future background volumes developed in the October 2021 TIS have been maintained and used in this TIS since there were no comments from the Region nor City on that aspect.

- **2027:** Opening year of proposed development – Future Background volumes shown in **Figure 3.1**.
- **2032:** 5-years post build out and 11-year horizon – Future Background volumes shown in **Figure 3.2**.
- **2041:** 20-year horizon – Future Background volumes shown in **Figure 3.3**.

3.2 SYNCHRO PARAMETERS

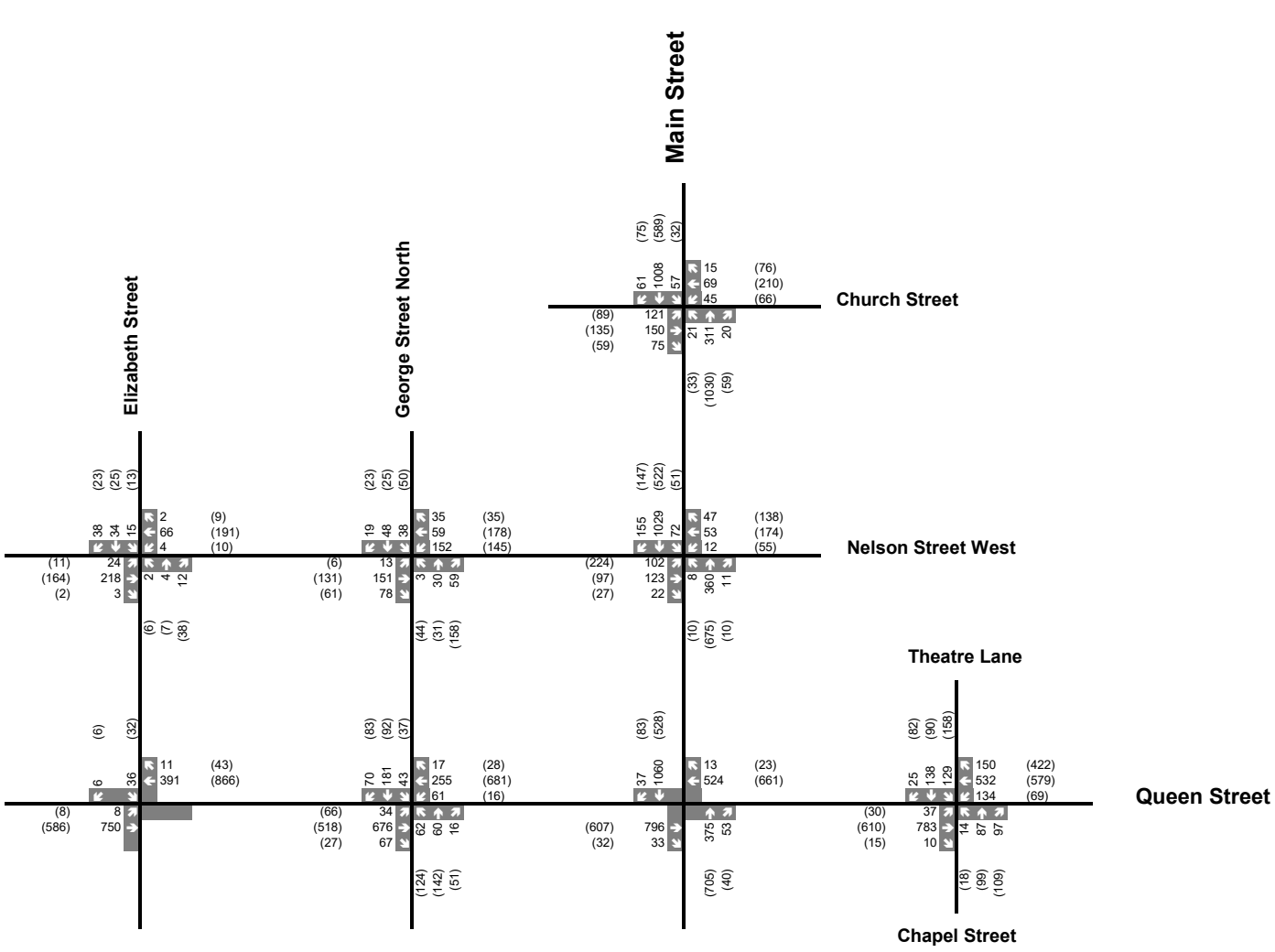
The evaluations of study intersections that are under the jurisdiction of the Region of Peel has been updated to follow the Region of Peel Regional Guidelines for Using Synchro (December 2010). As per the Region's guideline, intersections along Main Street and Queen Street require the peak hour factor (PHF) to be coded as 1.0 for all movements and for all approaches. In addition, the lane width has been coded as 3.7m for all through lanes and 3.5m for the auxiliary turn lanes of all Regional approaches. The relevant excerpt of the Region guideline is shown below. For the remaining study intersections under the City's jurisdiction, the same base Synchro default parameters used in the October 2021 TIS have been maintained.

LANE WINDOW

1. Lanes and Sharing (#RL) – Manipulate as required for lane designation.
2. Traffic Volume (vph) – Region approved volumes shall be used.
3. Street Name – Verify that the correct spelling is used for the respective municipality (e.g. Lakeshore Road as opposed to Lake Shore Boulevard)
4. Links Speed (km/h) – Shall be the posted speed for the respective road segment.
5. Ideal Satd. Flow (vphpl) – Saturation flow rates used for the Region of Peel will be the ideal saturation flow rate of 1900 vphpl (default) for all movements.
6. Lane Width (m) – Shall be 3.7m for all through lanes and 3.5m for auxiliary turn lanes on all approaches at Regional intersections unless otherwise noted by the Regional Technical Analyst.

3.3 INTERSECTION OPERATIONS

The future background conditions were assessed for horizon years 2027, 2032, and 2041. The results of the assessments are detailed in this section. The intersections where splits needed to be optimized but cycle length maintained have been identified.



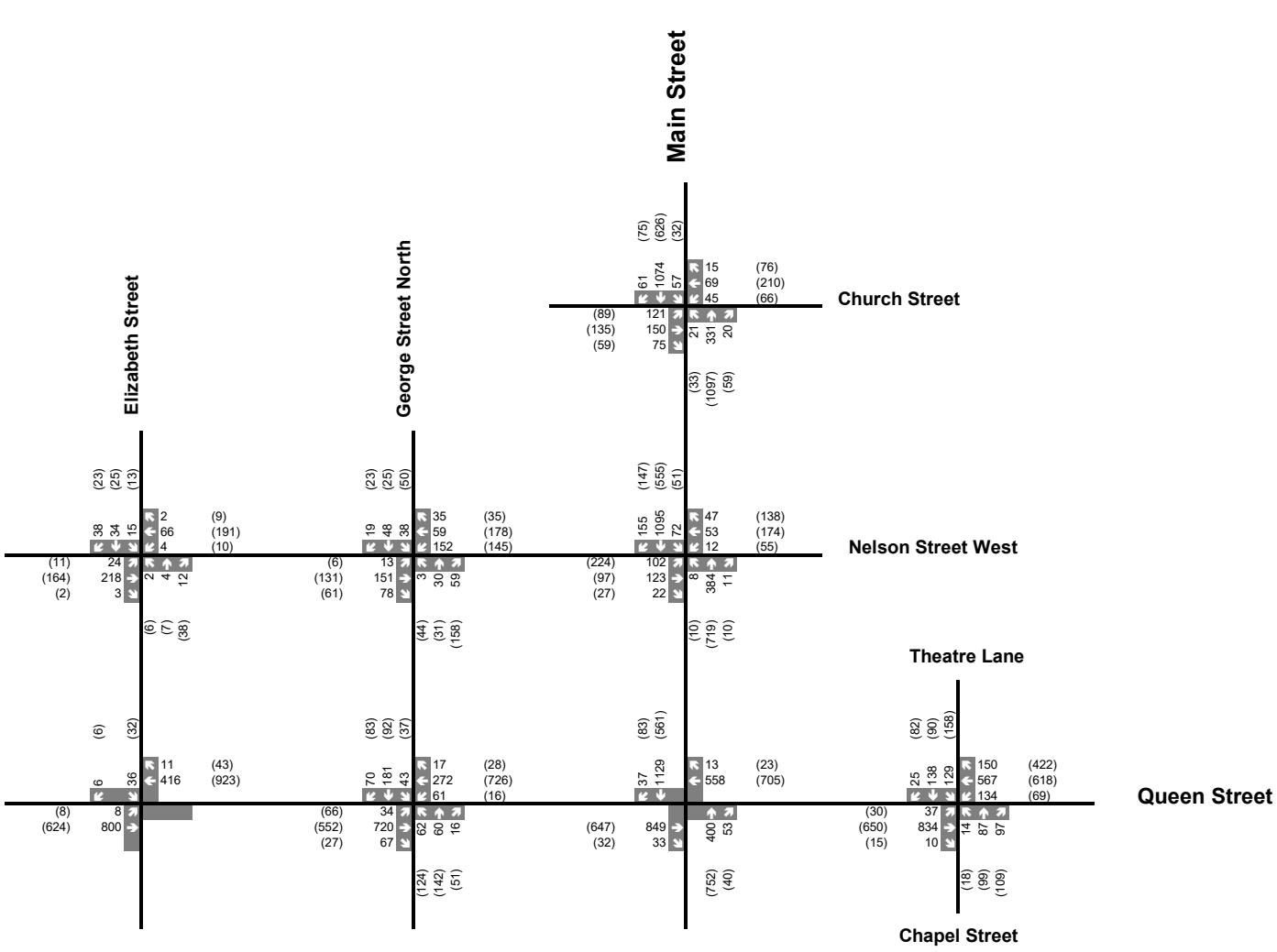
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-1

2027 Future Background Traffic Volumes



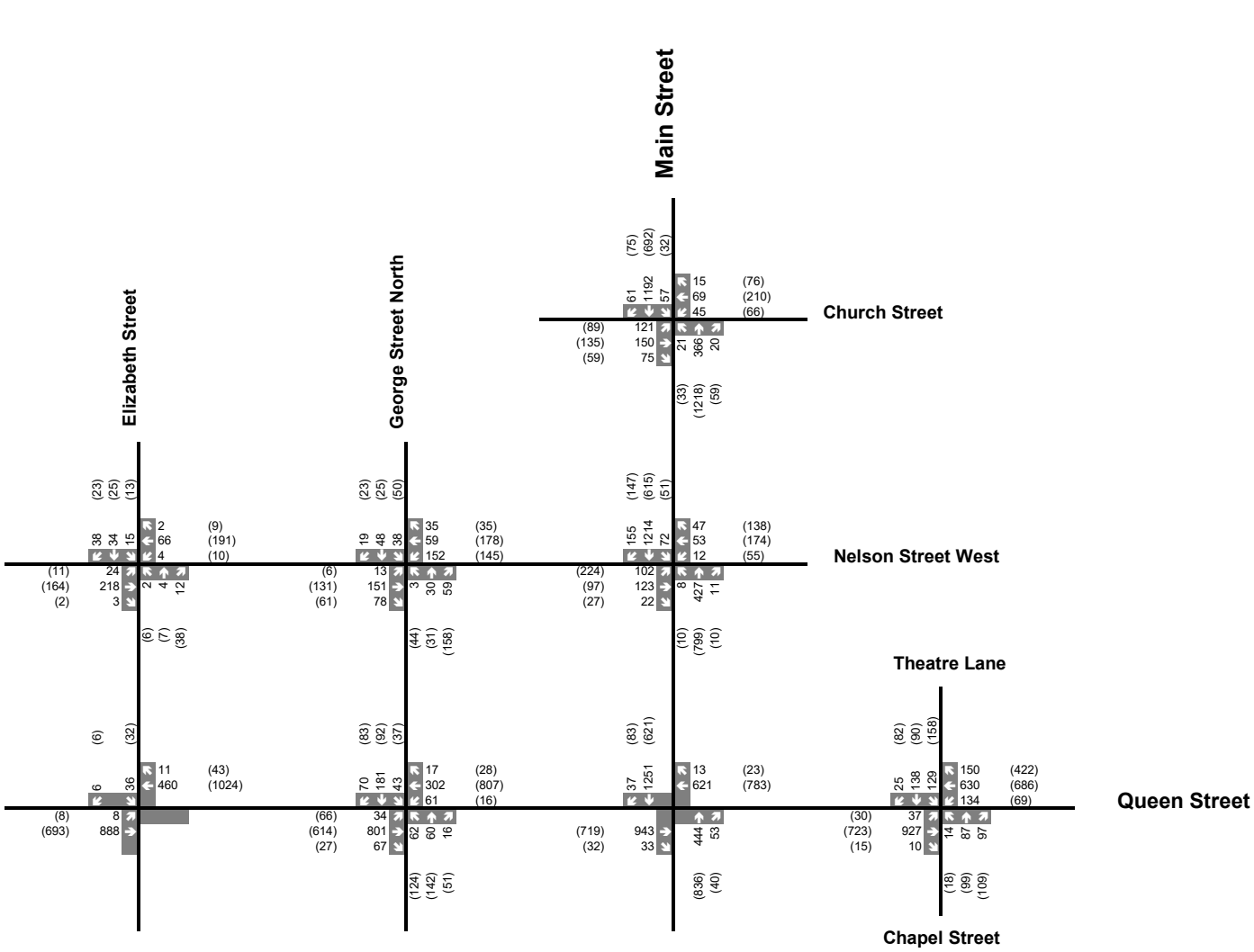
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-2

2032 Future Background Traffic Volumes



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xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-3

2041 Future Background Traffic Volumes

3.3.1 2027 FUTURE BACKGROUND

Based on the 2027 future background volumes in Figure 3.1, the resulting levels of service are outlined in **Table 3-1** and the details related to intersection operations provided in **Appendix A**. It should be noted that the cycle lengths at all of the signalized intersections are maintained from existing conditions.

Table 3-1: 2027 Future Background Intersection Operations

Intersection	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)
Signalized Intersections				
Main Street South at Queen Street East	C (31)	--	C (27)	--
George Street & Queen Street West	C (25)	--	C (23)	--
George Street North at Nelson Street West	C (29)	--	C (25)	--
Main Street North at Nelson Street West	B (17)	--	C (21)	--
Church Street East at Main Street North	B (15)	--	C (23)	--
Chapel Street at Queen Street East	C (24)	--	C (24)	--
Unsignalized Intersections				
Elizabeth Street North & Nelson Street West	A (9)	--	A (9)	--
Elizabeth Street North at Queen Street West	SB-LR C (16)	--	SB-LR D (27)	--

1 For signalized intersections, the level of service is based on the overall delay of the intersection. As per Brampton's TIS guidelines, critical v/c ratios are only listed for through or shared through/turning movements with values over 0.90. Critical v/c ratios are only listed for exclusive movements with values of 1.00.

2 For stop-controlled intersections, the level of service is based on the movement with the highest delay. Critical v/c ratios are only listed for movements with values over 0.90.

The results indicate that all of the study intersections are forecast to operate at an acceptable LOS D or better with no critical movements that operate near or at capacity. This forms the baseline of evaluating the incremental impact of the 2027 future total conditions when the site-generated traffic are added. Given the number of study intersections and how well the study intersections operate, the queuing information are not reported for this horizon but are available in Appendix A. **Overall the results indicate that no roadway or intersection improvements are required to support the general growth and background development volumes that will take place by 2027.**

3.3.2 2032 FUTURE BACKGROUND

Based on the 2032 future background volumes in Figure 3.2, the resulting levels of service are outlined in **Table 3-2** and the details related to intersection operations provided in **Appendix B**. It should be noted that the signal timing phasing are maintained from the 2027 future background conditions for "Apples to Apples" comparison. The cycle lengths at all of the signalized intersections are maintained from existing conditions.

Table 3-2: 2032 Future Background Intersection Operations

Intersection	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)
Signalized Intersections				
Main Street South at Queen Street East	C (33)	--	C (28)	--
George Street & Queen Street West	C (25)	--	C (24)	--
George Street North at Nelson Street West	C (29)	--	C (25)	--
Main Street North at Nelson Street West	B (18)	--	C (22)	--
Church Street East at Main Street North	B (15)	--	C (23)	--
Chapel Street at Queen Street East	C (25)	--	C (25)	--
Unsignalized Intersections				
Elizabeth Street North & Nelson Street West	A (9)	--	A (9)	--
Elizabeth Street North at Queen Street West	SB-LR C (17)	--	SB-LR D (31)	--

1 For signalized intersections, the level of service is based on the overall delay of the intersection. As per Brampton's TIS guidelines, critical v/c ratios are only listed for through or shared through/turning movements with values over 0.90. Critical v/c ratios are only listed for exclusive movements with values of 1.00.

2 For stop controlled intersections, the level of service is based on the movement with the highest delay. Critical v/c ratios are only listed for movements with values over 0.90.

The results indicate that the 2032 future background conditions are slightly deteriorated from the 2027 future background conditions as a result of the further general growth applied beyond 2027. However, all of the study intersections continue to operate at an acceptable LOS D or better with no critical movements that operate at or near capacity. These are the baseline results that will be used to evaluate the impact of the site-generated traffic addition to the study area. **Overall the results indicate that no roadway or intersection improvements are required to support the general growth and background development volumes that will take place by 2032.**

3.3.3 2041 FUTURE BACKGROUND

Based on the 2041 future background volumes in Figure 3.3, the resulting levels of service are outlined in **Table 3-3** and the details related to intersection operations provided in **Appendix C**. It should be noted that the signal timing phasing are maintained from the 2027 and 2032 future background conditions for "Apples to Apples" comparison. The cycle lengths at all of the signalized intersections are maintained from existing conditions.

Table 3-3: 2041 Future Background Intersection Operations

Intersection	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)
Signalized Intersections				
Main Street South at Queen Street East	D (40)	EB-T (0.94) SB-TR (0.95)	C (30)	--
George Street & Queen Street West	C (26)	--	C (25)	--
George Street North at Nelson Street West	C (29)	--	C (25)	--
Main Street North at Nelson Street West	B (20)	--	C (22)	--
Church Street East at Main Street North	B (15)	--	C (23)	--
Chapel Street at Queen Street East	C (28)	--	C (25)	--
Unsignalized Intersections				
Elizabeth Street North & Nelson Street West	A (9)	--	A (9)	--
Elizabeth Street North at Queen Street West	SB-LR C (19)	--	SB-LR E (38)	--

1 For signalized intersections, the level of service is based on the overall delay of the intersection. As per Brampton's TIS guidelines, critical v/c ratios are only listed for through or shared through/turning movements with values over 0.90. Critical v/c ratios are only listed for exclusive movements with values of 1.00.

2 For stop-controlled intersections, the level of service is based on the movement with the highest delay. Critical v/c ratios are only listed for movements with values over 0.90.

The results indicate that the 2041 future background conditions have deteriorated from the 2032 future background conditions as a result of the further application of general growth. Almost all of the study intersections continue to operate at an acceptable LOS D or better with no critical movements that operate at or over capacity. The southbound left-right movement at the unsignalized intersection of Elizabeth Street North at Queen Street West experiences LOS E during the weekday p.m. peak hour. However, this movement is operating well within capacity and this level of minor-street delay (38 seconds) is common in a downtown setting. **Overall the results indicate that no roadway or intersection improvements are required to support the general growth and background development volumes that will take place by 2041.**

The 95th percentile queues of the critical movements identified as part of he 2041 future background conditions are listed in **Table 3-4.** Detailed queuing results for all of the study intersections are provided in **Appendix C**.

Table 3-4: 2041 Future Background Intersection Queue Lengths

Intersection	Lane Movement	Available Storage (m)	95th Percentile Queues (m) [50th Percentile Queues (m)]	
			A.M. Peak Hour	P.M. Peak Hour
Main Street South at Queen Street East	EB-T	97	291 [200]	177 [129]
	SB-TR	175	199 [153]	84 [66]
Elizabeth Street at Queen Street East	SB-LR	170	4	8

The queueing analysis indicates that some of the 95th percentile and 50th percentile queues for the critical movements are forecast to exceed the available storage lengths during both a.m. and p.m. peak hours. It should be noted that the critical queues presented in **Table 3-4** are the through movements along Queen Street and Main Street where the conservative simple growth rates have been applied for 20 years (despite the negative growth trend observed and the planned implementation of higher order transit in the study area which would encourage a modal shift from auto reliance to transit). Therefore, the results can be regarded as the worst-case scenario.

It is important to note that these queuing conditions are not related to the proposed development, but rather conservative application of general growth. These results will be the basis for comparing the incremental increases resulting from the addition of the site-generated traffic. Moreover, in a downtown environment, traffic progression may be metered by upstream or downstream intersections. It should be noted that the 95th percentile queues are theoretical and as noted in the Synchro 11 user guide, is strictly theoretical and may not materialize as shown in the excerpt below. The emphasis in a downtown environment with proximity to Regional and local transit is to encourage walking, cycling and transit use rather than building more roads or widening roads to accommodate more motorists.

Queue Lengths

Timing Settings

The Queue Length rows show the 50th percentile and 95th percentile maximum queue lengths. The 50th percentile maximum queue is the maximum back of queue on a typical cycle and the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes (also see **Queue Length Calculation**, page 20-23).

NOTE: The queue length reported is the one for the lane with the highest queue (feet or meters) in the lane group. The total queue length is divided by the number of lanes and the lane utilization factor.

In many cases, the 95th percentile queue will not be experienced due to upstream metering. If the upstream intersection is at or near capacity, the 50th percentile queue represents the maximum queue experienced.

Similarly, if the upstream intersection has a v/c ratio over 0.8; the maximum queue is approximately equal to the 50th percentile queue divided by the upstream v/c ratio. For example, if the 50th percentile queue is 150ft, and the v/c ratio upstream is 0.90; the maximum possible queue would therefore be 150 / 0.90 = 167ft.

4 SITE-GENERATED TRAFFIC

4.1 SITE ACCESS

The vehicular access and egress for the proposed development continues to be via a stop-controlled full-moves driveway connecting to Elizabeth Street North as shown on **Figure 1.2**. **Figure 4.1** illustrates the future total lane configurations with the proposed driveway in place.

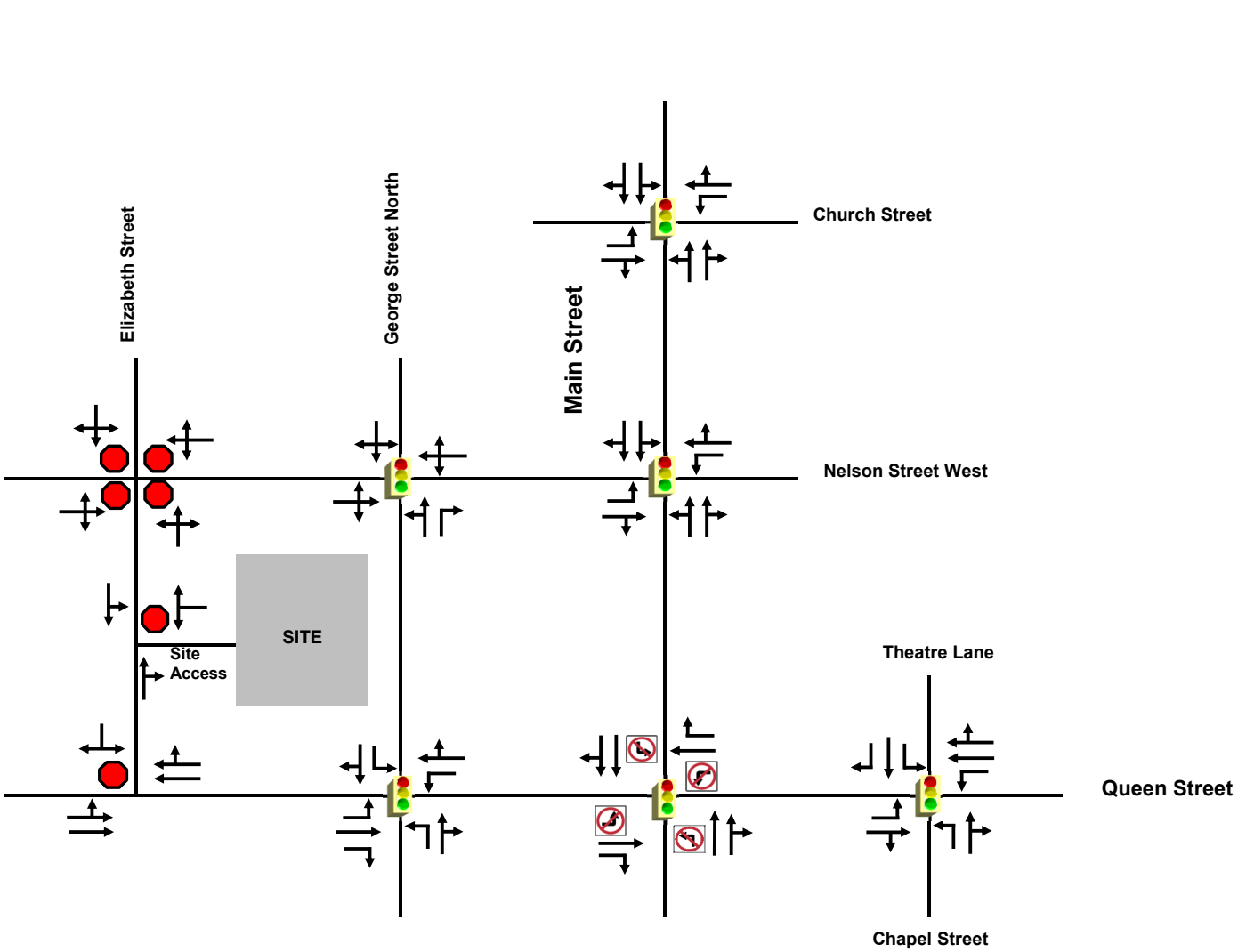
4.2 TRIP GENERATION

The vehicle trips generated by the proposed mixed-use development during the weekday a.m. and p.m. peak hours were estimated using the trip generation rates outlined in the *ITE Trip Generation Manual, 10th Edition*. The trip generation approach and adjustments applied are consistent with the October 2021 TIS to achieve "Apples to Apples" comparison and the results are summarized in **Table 4-1**. The application of the ITE rates are conservative considering the reduced auto parking proposed as aligned with the City's parking policy for the downtown area where transit and active transportation modes are encouraged.

Table 4-1: Site-Generated Vehicle Trips

Land Use (ITE Code)	Basis/Parameter	Vehicle Trips			
		A.M. Peak Hour		P.M. Peak Hour	
		In	Out	In	Out
Multifamily Housing (High-Rise)- General Urban/ Suburban (222) 928 units	ITE Rates X = units	T = 0.28 X + 12.86		T = 0.34 X + 8.56	
	ITE Splits	24 %	76 %	61 %	39 %
	Total Trips	65	207	198	126
	Internal Trip Reduction	(0)	(1)	(4)	(5)
	Non-Auto Trip Reduction	(3)	(54)	(39)	(8)
	Total Auto Trips	**62**	**153**	**155**	**113**
Shopping Centre (820) 8,503 sq.ft. GFA	ITE Rates X = 1000 sq.ft.	T = 0.94 X		T = 3.81 X	
	ITE Splits	62%	38%	48%	52%
	Total Trips	5	3	16	17
	Internal Trip Reduction	(1)	(0)	(2)	(5)
	Non-Auto Trip Reduction	(0)	(0)	(0)	(0)
	Total Auto Trips	**4**	**3**	**14**	**12**
Hotel (310) 146 Rooms	ITE Rates X = Hotel Rooms	T = 0.5 X – 5.34		T = 0.75 X – 26.02	
	ITE Splits	59%	41%	51%	49%
	Total Trips	40	28	43	41
	Internal Trip Reduction	(0)	(0)	(5)	(0)
	Non-Auto Trip Reduction	(0)	(0)	(0)	(0)
	Total Auto Trips	**40**	**28**	**38**	**41**

The proposed development is forecast to generate a total of 289 vehicle trips during the a.m. peak hour and 371 auto trips during the p.m. peak hour. To be conservative, the trips generated by the existing uses, which would be displaced by the proposed development, have not been considered. The proposed uses contemplated in the October 2021 TIS was forecast to generate 280 and 366 auto trips during the weekday a.m. and p.m. peak hours, respectively. **Therefore, the updated suite of uses generates a very similar level of traffic: 9 and 5 additional trips during the weekday morning and afternoon peak hours, respectively.**



Legend

Signalized Intersection

Stop Control

Left Turn Restriction

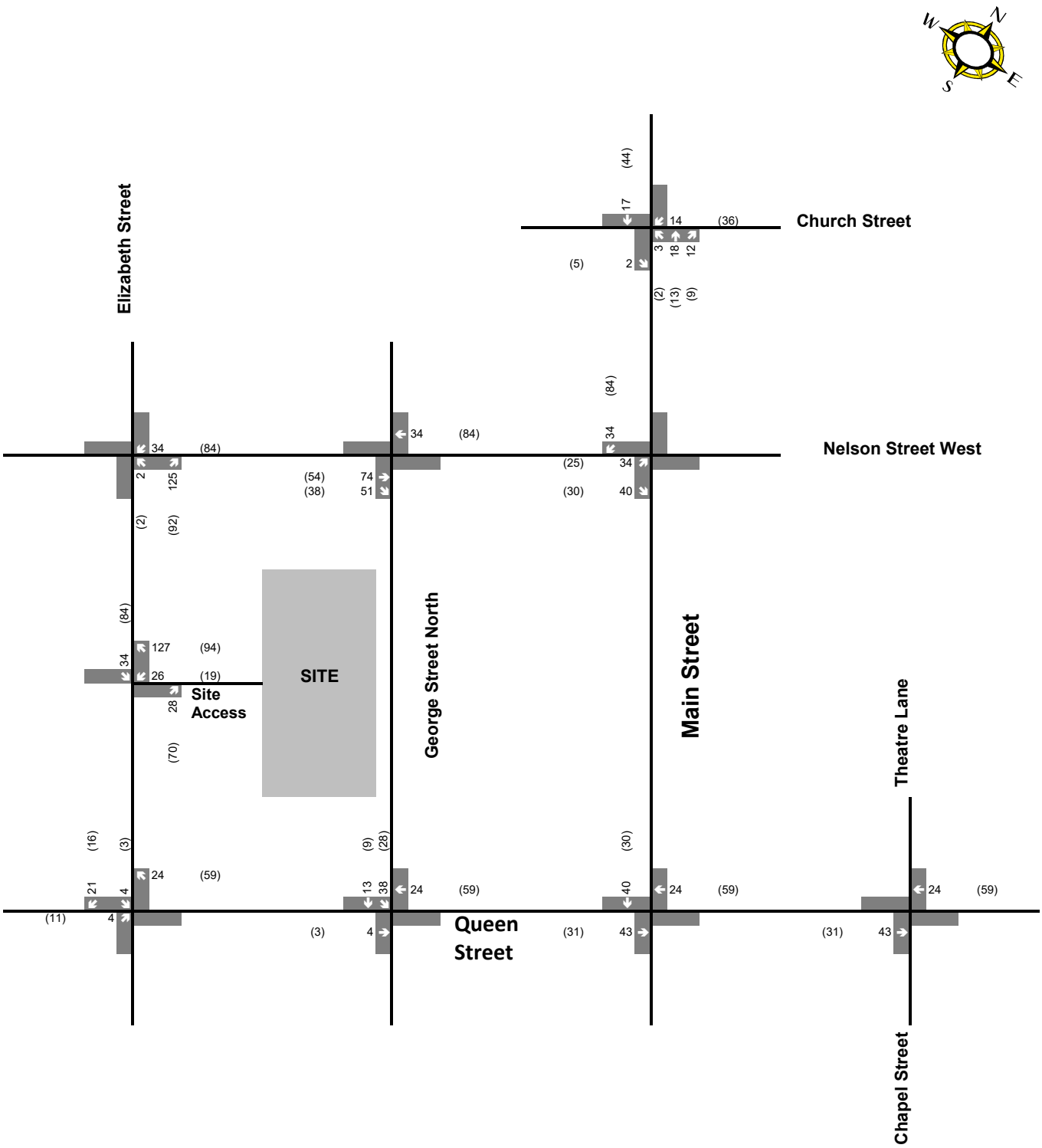
Figure 4-1

Future Buildout Lane Configurations

4.3 TRIP DISTRIBUTION AND ASSIGNMENT

The site-generated trips were assigned to the study road network using the same approach as the October 2021 TIS and reflects the trip distribution patterns in the study area. **Figure 4.2** illustrates the resulting traffic assignment for the residential trips to the boundary road network, while **Figure 4.3** and **Figure 4.4** illustrate the traffic assignment for the hotel and retail trips, respectively.

Figure 4.5 illustrates the total site-generated trips of all of the proposed uses. Since these trip generations were developed without considering the future higher-order transit facilities in proximity of the development (Hurontario LRT and Queen Street BRT), these trip generations can be regarded as the worst-case scenario.



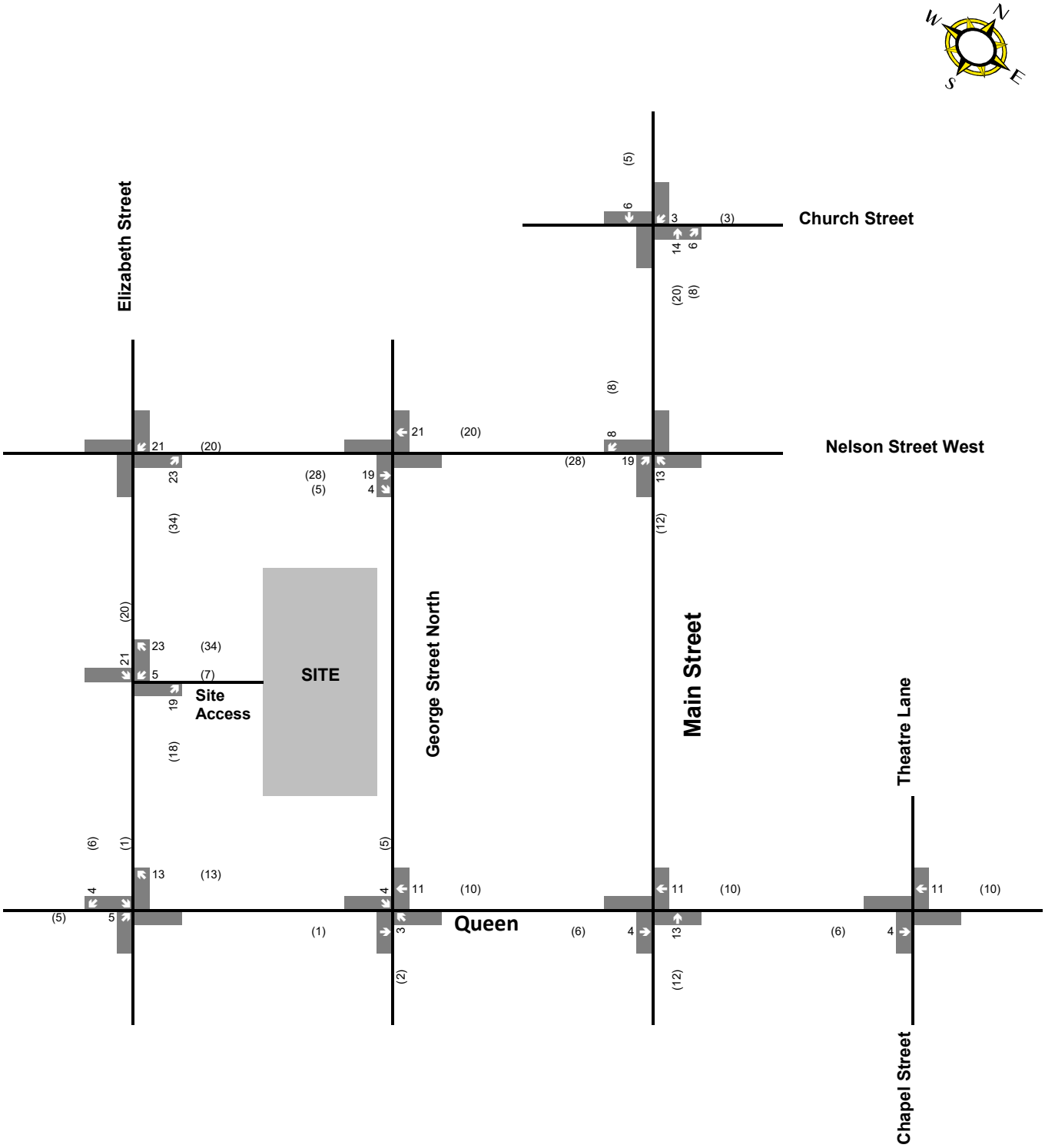
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 4-2

Site Traffic Volumes – Residential



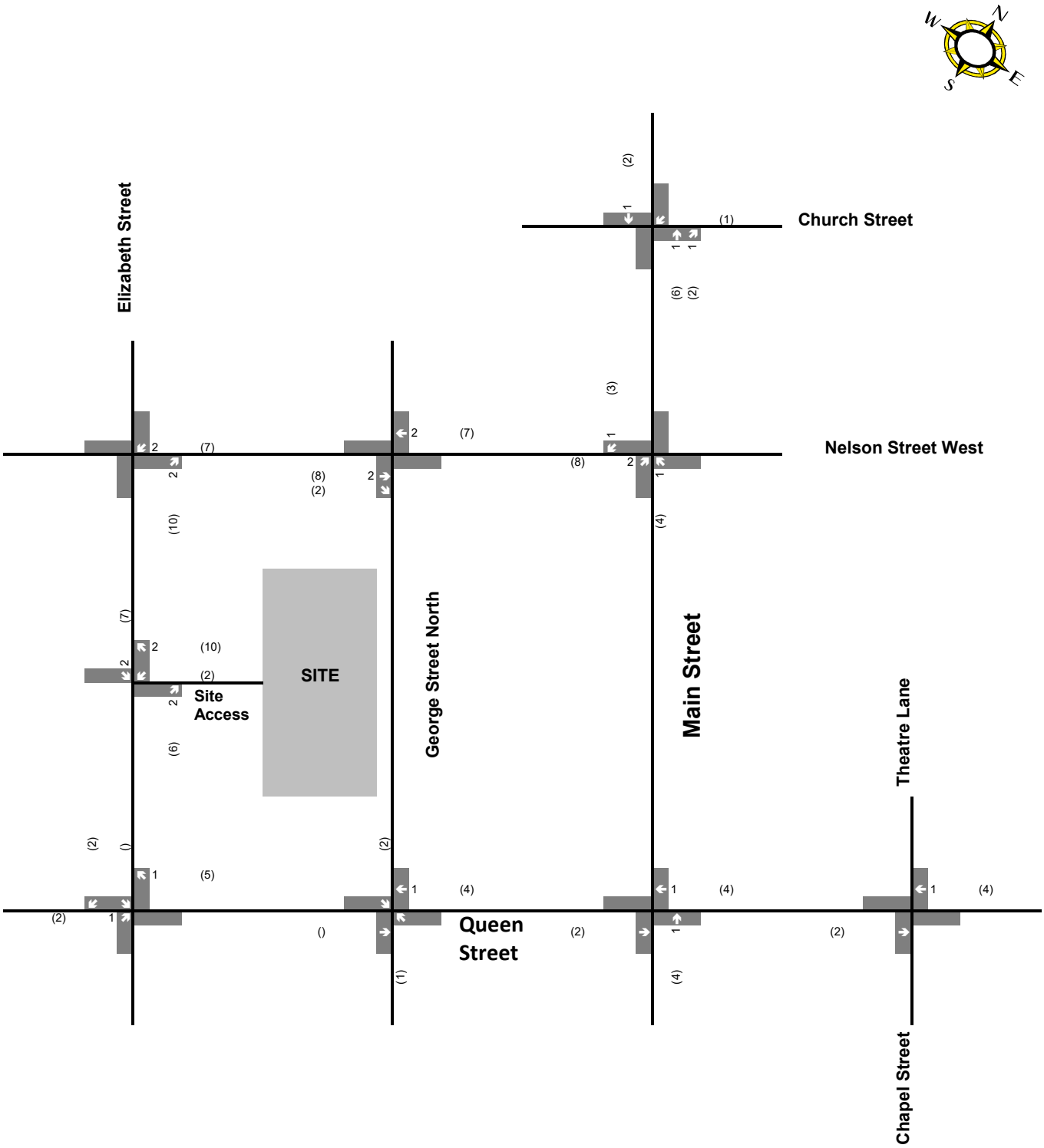
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 4-3

Site Traffic Volumes – Hotel



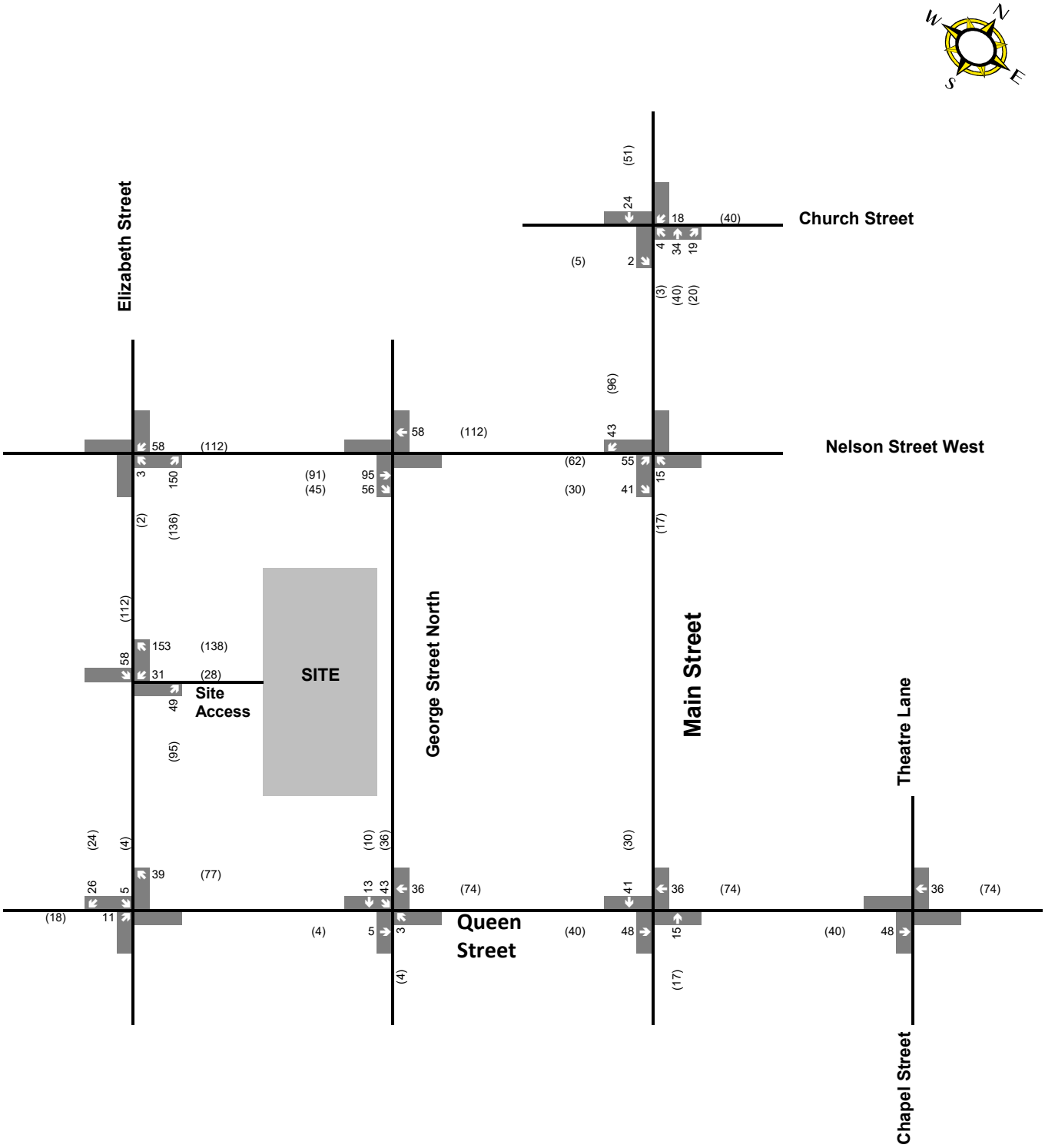
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 4-4

Site Traffic Volumes – Retail



Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 4-5

Total Site Traffic Volumes

5 FUTURE TOTAL TRAFFIC CONDITIONS

5.1 BASIS OF ASSESSMENT

The future total traffic volumes for the horizon years evaluated were developed by aggregating the site-generated traffic volumes illustrated in Figure 4.5 onto the respective future background traffic volumes shown in Figures 3.1, 3.2 and 3.3. The resulting 2027, 2032 and 2041 future total volumes are shown in **Figures 5.1**, **5.2** and **5.3**, respectively.

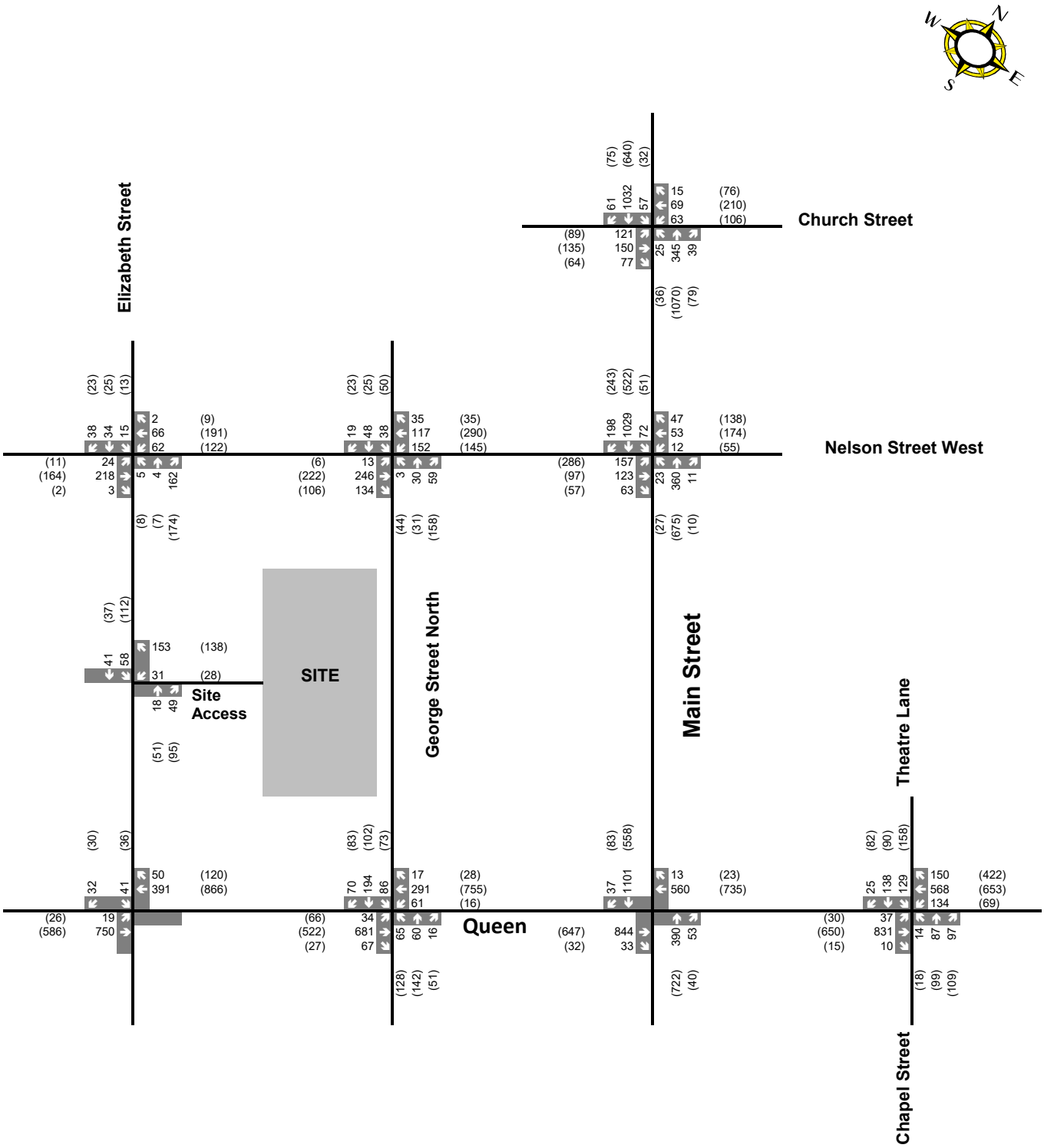
5.2 2027 FUTURE TOTAL INTERSECTION OPERATIONS

The 2027 future total levels of service at the study intersections are outlined in **Table 5.1**. Detailed Synchro worksheets are available in **Appendix D**. To allow an "Apples to Apples" comparison, the signal timing cycle and splits evaluated in the 2027 future background conditions have been maintained for the 2027 future total assessment.

Table 5.1: 2027 Future Total Intersection Operations

Intersection	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)
Signalized Intersections				
Main Street South at Queen Street East	C (32)	--	C (28)	--
George Street & Queen Street West	C (26)	--	C (25)	--
George Street North at Nelson Street West	C (34)	--	C (32)	--
Main Street North at Nelson Street West	B (19)	--	C (23)	--
Church Street East at Main Street North	B (15)	--	C (23)	--
Chapel Street at Queen Street East	C (25)	--	C (24)	--
Unsignalized Intersections				
Elizabeth Street North & Nelson Street West	A (9)	--	B (11)	--
Elizabeth Street North at Queen Street West	SB-LR C (16)	--	SB-LR D (27)	--
Elizabeth Street North at Site Driveway	WB-LR A (9)	--	WB-LR B (10)	--

The results indicate that all of the study intersections are forecast to operate at an acceptable LOS D or better with no critical movements that operate near or at capacity. The results are very similar to the 2027 future background conditions. For context, the average increase in intersection delay is 1.5 seconds per vehicle at all of the study intersections. Moreover, the LOS has not changed and no new critical movements arise as a result of the addition of the site-generated traffic. The proposed driveway onto Elizabeth Street N. is also forecast to serve the site well. Therefore, **these results indicate that the site-generated traffic volumes can be readily accommodated by the boundary road network at buildout without the need for roadway, intersection or signal timing improvements.**



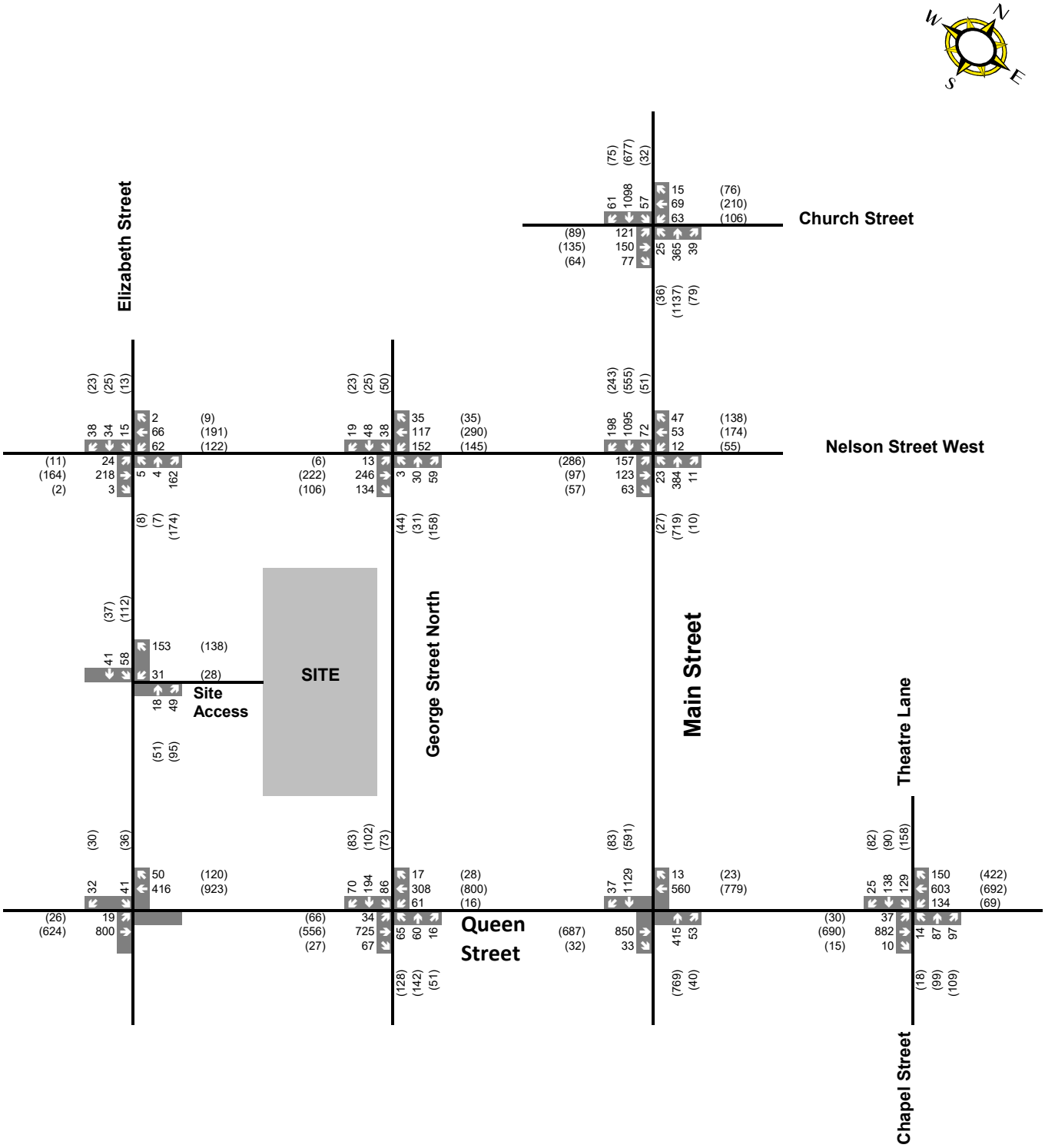
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 5-1

2027 Future Total Traffic Volumes



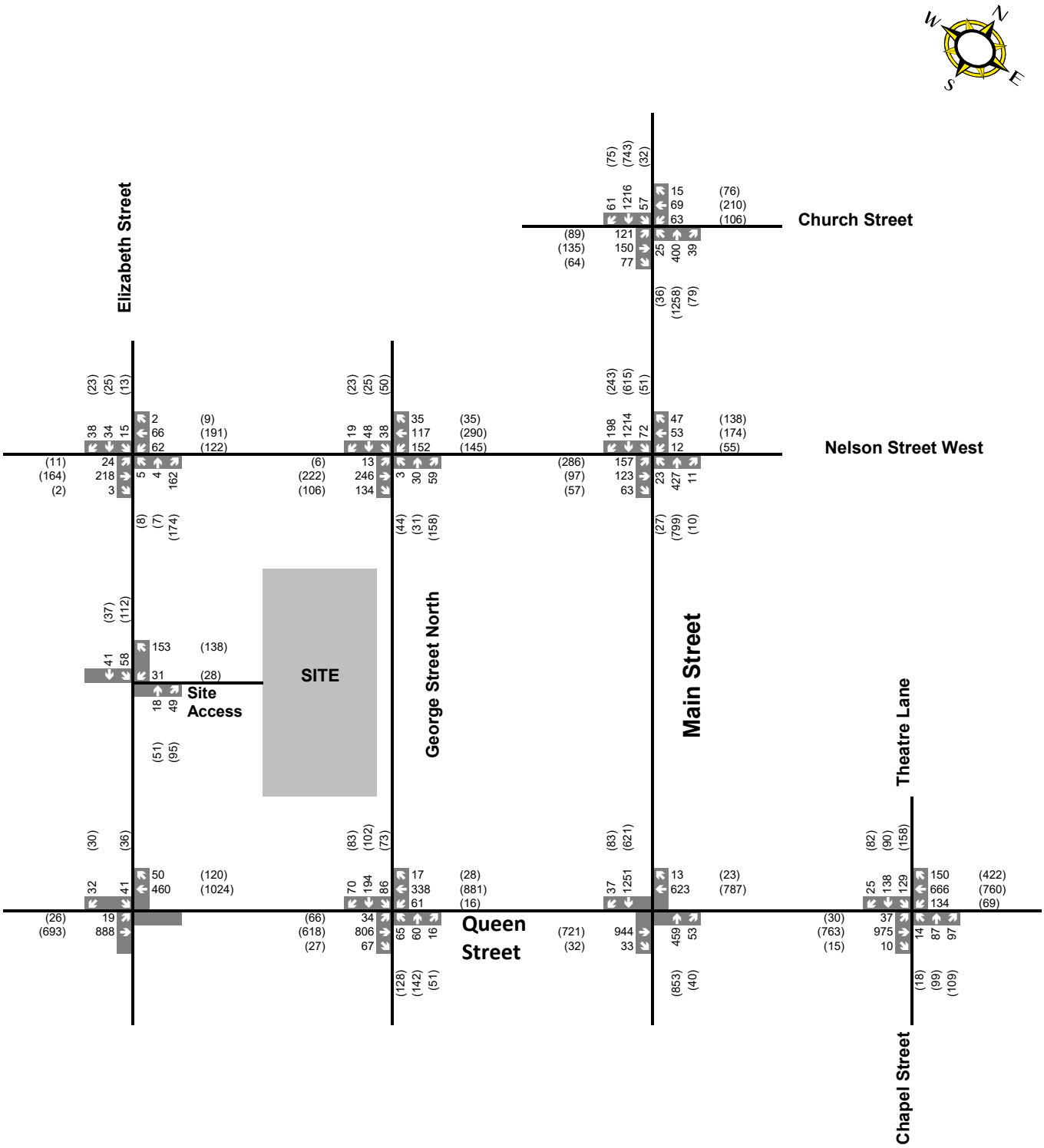
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 5-2

2032 Future Total Traffic Volumes



Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 5-3

2041 Future Total Traffic Volumes

5.3 2032 FUTURE TOTAL INTERSECTION OPERATIONS

The 2032 future total levels of service at the study intersections are outlined in **Table 5.2**. Detailed Synchro worksheets are available in **Appendix E**. To allow an "Apples to Apples" comparison, the signal timing cycle and splits evaluated in the 2032 future background conditions have been maintained for the 2032 future total assessment.

Table 5.2: 2032 Future Total Intersection Operations

Intersection	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)
Signalized Intersections				
Main Street South at Queen Street East	C (33)	--	C (29)	--
George Street & Queen Street West	C (26)	--	C (26)	--
George Street North at Nelson Street West	C (34)	--	C (32)	--
Main Street North at Nelson Street West	C (20)	--	C (23)	--
Church Street East at Main Street North	B (15)	--	C (23)	--
Chapel Street at Queen Street East	C (26)	--	C (25)	--
Unsignalized Intersections				
Elizabeth Street North & Nelson Street West	A (9)	--	B (11)	--
Elizabeth Street North at Queen Street West	SB-LR C (16)	--	SB-LR D (31)	--
Elizabeth Street North at Site Driveway	WB-LR A (9)	--	WB-LR B (10)	--

The results indicate that all of the study intersections are forecast to operate at an acceptable LOS D or better with no critical movements that operate near or at capacity. The results are very similar to the 2032 future background conditions. For context, the average increase in intersection delay is 1.4 seconds per vehicle at all of the study intersections. Moreover, no new critical movements arise as a result of the addition of the site-generated traffic. The proposed driveway onto Elizabeth Street N. is also forecast to serve the site well. Therefore, **these results indicate that the site-generated traffic volumes can be readily accommodated by the boundary road network 5 years beyond buildout without the need for roadway, intersection or signal timing improvements.**

5.4 2041 FUTURE TOTAL INTERSECTION OPERATIONS

The 2041 future total levels of service at the study intersections are outlined in **Table 5.3**. Detailed Synchro worksheets are available in **Appendix F**. To allow an "Apples to Apples" comparison, the signal timing cycle and splits evaluated in the 2041 future background conditions have been maintained for the 2041 future total assessment.

Table 5.3: 2041 Future Total Intersection Operations

Intersection	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)	Overall LOS (Delay in Seconds)	Critical Movement (Volume/Capacity Ratio)
Signalized Intersections				
Main Street South at Queen Street East	D (40)	EB-T (0.94) SB-TR (0.95)	C (30)	--
George Street & Queen Street West	C (27)	--	C (28)	--
George Street North at Nelson Street West	C (34)	--	C (32)	--
Main Street North at Nelson Street West	C (23)	--	C (24)	--
Church Street East at Main Street North	B (16)	--	C (24)	--
Chapel Street at Queen Street East	C (30)	--	C (25)	--
Unsignalized Intersections				
Elizabeth Street North & Nelson Street West	A (9)	--	B (11)	--
Elizabeth Street North at Queen Street West	SB-LR C (18)	--	SB-LR E (39)	--
Elizabeth Street North at Site Driveway	WB-LR A (9)	--	WB-LR B (10)	--

The results indicate that almost all of the study intersections are forecast to operate at an acceptable LOS D or better with no critical movements that operate near or at capacity. The results are very similar to the 2041 future background conditions. For context, the average increase in intersection delay is 1.7 seconds per vehicle at all of the study intersections. Moreover, no new critical movements arise as a result of the addition of the site-generated traffic. At the busiest signalized intersection of Main/Queen, there is no change in intersection delay nor v/c ratio of the busier movements. At the busiest unsignalized intersection of Elizabeth/Queen, the increase in delay is only 1 second per vehicle for the southbound approach. These findings suggest the site-generated traffic will have minimal impact on the operation of the boundary study intersections.

The proposed driveway onto Elizabeth Street N. is also forecast to serve the site well. Therefore, **these results indicate that the site-generated traffic volumes can be readily accommodated by the boundary road network by 2041 without the need for roadway, intersection or signal timing improvements.** These results are also very conservative since it assumes positive general growth on the boundary roads and no influence in trip generation modal split despite the planned higher order transit in the study area.

For comparison purposes, the 95th percentile queues of the critical movements identified as part of he 2041 future total conditions are listed in **Table 5-4.** Detailed queuing results for all of the study intersections are provided in **Appendix F**.

Table 5-4: 2041 Future Total Intersection Queue Lengths

Intersection	Lane Movement	Available Storage (m)	95th Percentile Queues (m) [50th Percentile Queues (m)]	
			A.M. Peak Hour	P.M. Peak Hour
Main Street South at Queen Street East	EB-T	97	291 [200]	178 [129]
	SB-TR	175	199 [153]	84 [66]
Elizabeth Street at Queen Street East	SB-LR	170	6	13

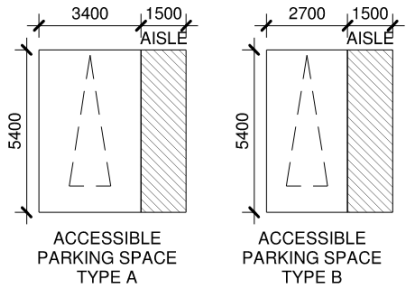
The queuing forecasts are virtually the same as the 2041 Future Background conditions reported in Table 3-4. For context, the **maximum increase in the 50th or 95th percentile queues at the Main/Queen intersection is 1m**. These results are consistent with the intersection operation findings, which indicate the site-generated traffic will have minimal impact on the auto mode. At the unsignalized intersection, The queueing analysis indicates a 95th percentile queue increase of a few metres. However, the queues are still 1 to 2 vehicle length long and can be readily accommodated within the storage available along Elizabeth Street North. Once again, in a downtown setting, longer queues is to be anticipated as traffic chooses to enter the downtown and the emphasis is on encouraging people to walk, cycle and take transit. As noted earlier, the forecast of the site-generated trips is very conservative since it is based on the ITE trip generation rates and the TTS mode split from pre-2016. In reality, the proposed development features notably less auto parking for residents and non-residential uses than other existing uses in the area. Therefore, the non-auto modal split will be even higher for the subject site. Therefore, the future total assessments presented through Section 5 may be considered the worst-case scenario.

6 PARKING SUPPLY ASSESSMENT

6.1 VEHICLE PARKING BY-LAW REQUIREMENT

The City of Brampton recently enacted an amendment to Zoning By-law 270-2004 in March 2021 (By-law 45-2021) whereby there is no minimum parking requirements for the residential, retail or hotel uses proposed. This is not uncommon for municipalities for downtown areas where robust transit and live-work-entertainment opportunities are available within walking distance. Requiring a pre-set amount of minimum parking impacts affordability and the sustainability of a neighbourhood. The only parking requirement for the site is a residential visitor parking at a rate of 0.20 spaces/unit and accessible parking as per the following Bylaw clause (based on 657 parking supply).

(d) Two parking spaces for the use of persons with disabilities and an additional two per cent of parking spaces for the use of persons with disabilities, where there are between 201 and 1,000 parking spaces must be parking spaces for the use of persons with disabilities in accordance with the ratio in subsections (b) (i) and (ii), rounding up to the nearest whole number.



Based on the visitor parking requirement and the 928 residential units proposed, a minimum of 186 residential visitor spaces are required onsite. In addition, a total 16 accessible parking spaces – 8 Type A and 8 Type B spaces are required. The dimensions of the accessible spaces need to comply with the above specifications.

6.2 VEHICLE PARKING ASSESSMENT

Residential and Residential Visitor Parking

A total of 657 auto parking spaces (221 visitor and 436 residential spaces) are proposed on-site as part of the development. In addition, the parking supply includes 16 accessible parking spaces with 6 Type A and 6 Type B spaces as per the Bylaw dimensions noted above.

The proposed residential visitor parking supply of 221 spaces satisfies the City's minimum requirement of 0.20 spaces/unit. Even though no minimum parking is required for residential uses, a total of 436 residential parking spaces are proposed which is equivalent to a supply rate of 0.47 spaces per unit to meet the market needs. The overall parking supply rate is 0.70 spaces/unit. The following rationale support this residential supply rate:

1) The development is located in a downtown setting where various uses are available within walking or cycling distance. Given the high costs of owning and maintain a vehicle, this would cater to the segment of the market that is not heavily auto dependent.

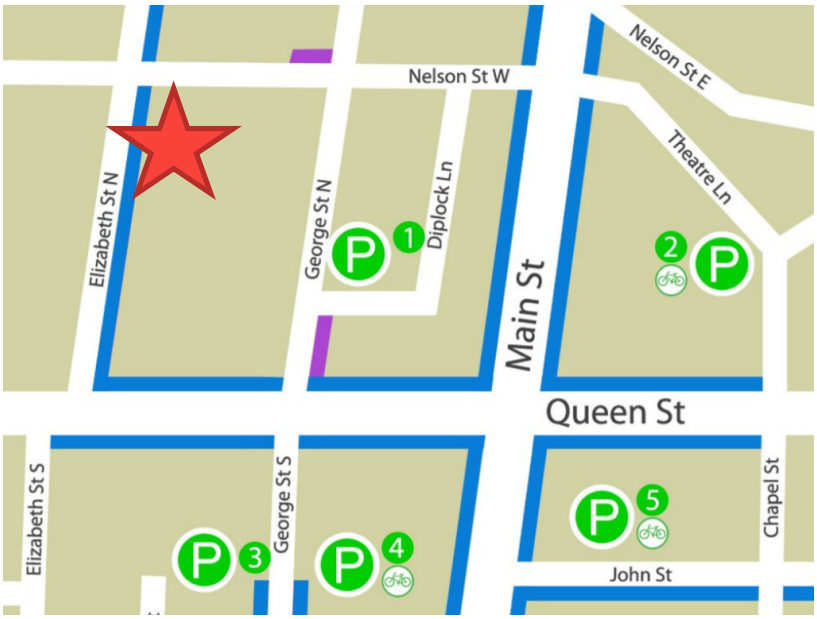
2) The subject site is in proximity of 6 bus routes and within walking distance of the Brampton GO station and Downtown Brampton Terminal & Main Street Zum stations. As a mobility hub that connects to various locations and municipalities, residents do not need to rely on cars to get around the City and the GTA. Moreover, the planned Hurontario LRT and Queen BRT both of which are very close to the site. Providing a moderate amount of auto parking is a critical way of supporting the use of transit.

3) Section 7 of this TIS Addendum details the proposed Transportation Demand Management (TDM) strategies to support the use of active transportation and transit to reduce the use of auto modes. Amongst these are the proposed carpool spaces for visitors as well as participating in Smart Commute and unbundling of parking from unit.

On these basis, the proposed residential, and residential visitor parking arrangement is adequate for the site context.

Non-residential Parking

No non-residential parking for the hotel and retail uses is proposed on-site. Parking demands for these non-residential uses will be accommodated off-site at one of the public parking lots in the downtown area. In particular, there is the Nelson Square public parking garage that is within a 100m walk of the proposed development (red star) as shown below located at 2 Diplock Lane. There are 2 other parking facilities as well further south that is well within walking distance.



The Nelson Square garage has a capacity of 274 spaces and the parking arrangement is as follows:

- Free for the first hour and free parking weekdays after 7pm, Saturday, Sunday and Holidays
- $1.00 per 30 minutes or part thereafter (daily max. $9.00)
- Permit: $308.00 per year, $44.00 per month

The above fee structure is very compatible for the use of the proposed hotel and retail uses. This is because retail parking demands are typically the highest during evening and weekend periods when people are off work. During this period, most public garages in a downtown setting will have minimal office-related parking needs (hence why the garage becomes free during non-office peak hours). For the hotel use, the key is for the parking to be easy to access and to have a visual cue. Given the Nelson Square garage is situated in a prominent spot, is 5 storeys tall, within a 100m walk from the site and well documented in the City's public parking directory, directing hotel parking needs to the garage is a reasonable arrangement. Beyond the parking availability of the Nelson Garage to serve the hotel and retail uses, visitors will be encouraged to use one of the many local and regional transit routes that exist and those that are planned (BRT and LRT). In addition to the above considerations, more and more people are using private shared transportation modes such as Uber and Lyft to travel rather than renting or owning a car. A layby has been designed internal to the site as shown in the site plan to facilitate these type of trips.

On these basis, the proposed hotel and retail parking arrangement is adequate for the site context.

Auto Parking Conclusion: Based on the above parking justification and the City of Brampton's update of the parking requirements for the downtown area by removing minimum parking requirements for residential and non-residential uses, the proposed parking arrangement for the development is adequate.

6.3 ON-STREET PARKING ALONG ELIZABETH STREET

As noted by the City, the on-street parking along the east side of Elizabeth Street need to be maintained where possible. The change proposed along Elizabeth Street relates to the removal of the existing private driveways and the introduction of one consolidated driveway. Based on streetview, there are currently 9 on-street parking spaces on the east side of Elizabeth Street along the subject site frontage (north of 18 Elizabeth Street to Nelson Street). Each of the marked on-street parking spaces are approximately 7.5m long. Based on the consolidation of the driveway into only 1 driveway onto Elizabeth Street, the available frontage for on-street parking is approximately 80m (while staying away from the driveway/intersection curb returns). Therefore, there would be sufficient room for 10 on-street parking spaces, which is 1 more than the existing supply. As a result, the proposed development will not negatively impact the on-street parking arrangement on Elizabeth Street.

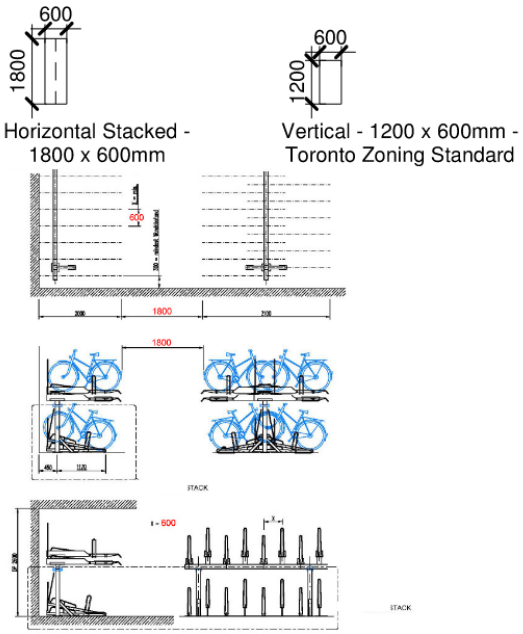
6.4 BIKE PARKING REQUIREMENTS

As per the City's sustainability requirement, bicycle parking is required at a rate of 0.60 long-term spaces per residential unit and 0.10 short-term spaces per residential unit. Therefore, for 928 residential units, 557 long-term spaces and 93 short-term spaces are required onsite. Accordingly, a total of 650 bicycle parking spaces (557 long-term and 93 short-term) are proposed as part of the development. Given the proximity of the site to the Brampton GO station and bus terminal, it would be very convenient to cycle as a first mile and last mile means of accessing the mobility hub. In the future when the higher order transit facilities are introduced along Main Street and Queen Street, there will be opportunities to ride to the stop and pack the bicycle onto the transit vehicle to continue the trip. The bicycle parking proposed have also been designed with consideration of the following requirements:

BICYCLE PARKING SPACE MIN. REQUIREMENT DIMENSIONS:

HORIZONTAL	*VERTICAL*
WIDTH: MIN. 0.6m	WIDTH: 0.5m
LENGTH: MIN. 1.8m	LENGTH (HEIGHT): 1.6
VERTICAL CLEARANCE: 1.9m	HORIZONTAL CLEARANCE: 1.2m

TYPE: HORIZONTAL SINGLE STACK
PRODUCT: SINGLE PARKER BY JOSTA OR EQUIV.



7 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a general concept that includes various strategies that increase transportation system efficiency by managing the demand for travel. TDM treats mobility as a means to an end, rather than an end in itself, and emphasizes the movement of people and goods rather than motor vehicles. Generally speaking, **TDM initiatives discourage single-occupant vehicle travel and encourage more efficient modes such as walking, cycling, ridesharing, public transit and teleworking** particularly when the means to these alternatives are available such as in a downtown setting. TDM elements are an essential part of any progressive transportation and traffic plan for a proposed development.

The objective of the proposed TDM strategy is to inform, encourage and facilitate the utilization of the non-automobile travel opportunities within the study area. In order to achieve this, it is recommended that the marketing strategy for the proposed residential component highlight key characteristics based on the below items via knowledgeable sales staff and visually attractive information packages to ensure that residents and tenants are aware of the various opportunities and incentives available to them, so as maximize the success of these TDM strategies and minimize the need for automobile use.

ON-SITE MOBILITY ALTERNATIVES INFORMATION AND INCENTIVES

Information regarding transit availability, schedule, arrival time, available cycling facilities and connections, as well as other non-auto travel options will be available on-site in a convenient and logical location (i.e., lobby or elevator), and/or be included as part of the welcome package to residents of the development to inform them of the alternatives available to them. This will be important particularly during inclement weather when residents and visitors will know before leaving the building when the next arrival of bus will be or which higher order transit routes are available within walking distance.

ENCOURAGING THE USE OF ACTIVE TRANSPORTATION

Residents will have access to ample of bicycle parking, as well as a bike room on the ground level of the building. An on-site bike repair station is also proposed near the long-term bicycle parking on the ground floor mezzanine to promote the mode of cycling. Given the growing prominence of the cycling mode as a first mile and last mile solution to transit and other uses, a bicycle repair station will be proposed on site in an easily accessible location. Providing a repair station will be located in a designated and secure location with bicycle maintenance tools and supplies that could be used for emergency repair or maintenance. These tools and supplies include a bicycle tire pump, wrenches, chain tool, lubricants, hex keys, Allen wrenches, torx keys, screw drivers, etc.

In addition, there are other cycling facilities in proximity of the subject site. Copies of the City's Bikeway and Trails Map and Cyclist Handbook should be distributed to residents and tenants and displayed at prominent locations to maximize the utilization of these facilities and minimize the use of automobiles. Tenants can also be provided information of City bike events, as well as information about camps and "CAN-Bike" education classes.

As noted earlier, there are sidewalks on both sides of the study road network. This ensures that residents and visitors have a suitable walking environment to the surrounding commercial uses and transit facilities. Based on the magnitude of the proposed development, the site-generated pedestrian volumes can be readily accommodated within the existing sidewalk and crosswalk infrastructure.

UNBUNDLING PARKING SALES FROM UNIT SALES & STRATEGIC PARKING PRICING

Unbundled spaces will be sold separately from a unit sale at market-rate. This allows residents who do not need a vehicular parking space to reduce costs and invest the savings in other modes of transportation. Parking pricing must be determined at the start of the sales program so that the price of the parking is reflective of the supply and the fact that there will be a cost to car ownership and driving to and from the site. This way, residents are aware of this aspect from the start. This measure is particularly effective when implemented with a reduced auto parking supply.

CARPOOLING PRIORITY

The subject development proposes to include up to 28 carpooling spaces for visitors at the site, which will be situated in more convenient locations to give priority. These help encourage those who are visiting residents in the building to carpool rather than to drive interpedently and can also be advertised to the tenants and visitors.

SMART COMMUTE

The retail and hotel components within the subject site can consider joining Smart Commute – a division of Metrolinx, to work with them to develop and implement employer-based TDM programs where appropriate. This will provide the development with all the benefits of a Smart Commute membership, including access to the CarpoolZone website, resources on implementing TDM measures and possible participation on the Smart Commute Advisory Committee. Additional strategies could include the implementation of emergency ride home programs and priority. Collaboration with Smart Commute would also enhance the effectiveness of initiatives such as the provision of an information board for non-SOV modes and the implementation of car share programs. At this time, Smart Commute is not live yet in Brampton but there based on preliminary discussions with representatives of Smart Commute, there is intent to implement it within the development to further support the reduced auto parking arrangement. Based on correspondences with Smart Commute representatives, the steps that would take place in the future include:

1. Sending Smart Commute the architectural plans for their review. Smart Commute will then recommend what measures we can put into the development to help residents, hotel guests, staff, employees, etc depend less on having to drive on their own, and adopt more sustainable modes of transportation. Among these options, the owner can select the measures that are deemed feasible and compatible to implement.
2. Smart Commute will then work with the owner to develop a customized tool (exclusive domain website) that residents, hotel guests, staff, employees, etc can log into in order to get advice on travel to and from the development, as well as around the neighbouring community without having to drive their cars.

8 SITE PLAN REVIEW

The site layout has been reviewed from a transportation perspective through AutoTURN vehicle swept path analysis. The vehicles tested are a garbage truck, heavy single unit truck (HSU), Light Single Unit delivery truck, passenger vehicles, and a small passenger vehicle (2017 Honda Civic).

8.1 SITE ACCESS, LOADING & PARKING LAYOUT REVIEW

A site assessment was completed using the AutoTURN 11.0 software package to ensure adequate maneuverability for vehicles accessing and egressing the property. Both the City of Brampton Zoning Bylaw (Section 6.17.2) and the Region of Peel Waste Collection Design Standards Manual (2020) require a driveway that is at least 6 meters wide. Accordingly, the site's driveway onto Elizabeth Street is proposed as 6 meters wide.

The larger loading bays comply with the minimum requirement of 3.5 meters in width and 9 meters in length as per Section 6.20.2 of the City's Zoning By-law for waste collection. Additional loading bays are proposed in the loading area as well to cater to the operational needs of the various uses proposed in the development.

All of the proposed parking spaces are 2.7 meters wide and 5.4 meters long as required by the City's Zoning Bylaw Section 6.17.1-a. Driving aisles, where 90 degrees parking spaces are located, width are designed as 6.6 meters, per Section 6.17.2-d and otherwise noted as 6 metre in non-parking conditions.

8.1.1 WASTE COLLECTION TRUCKS

Waste Collection Trucks was tested entering the site from the site driveway along Elizabeth Street. As required by the Region of Peel Waste Collection Design Standards Manual, the trucks entering the loading spaces are done so in a forward motion. An 18.0 meters head-on approach is provided as well as 13.0 meters turning radius and labelled in the manoeuvring diagrams. To exit, trucks would reverse no more than 15.0 meters and leave the site via Elizabeth Street in a forward motion. The inbound and outbound maneuvers work well without conflict as illustrated in **Figure 8-1**. The centreline radius of the turns being made by the waste collection vehicle has also been labelled The tests demonstrate that even if the adjacent smaller loading bays are occupied by a delivery truck a garbage truck can still access and egress the 2 larger loading bays without issue. Convex mirrors and signage will be implemented in the loading area to enhance visibility and awareness.

8.1.2 HEAVY AND MEDIUM SINGLE-UNIT TRUCK

A heavy single-unit (HSU) and medium single-unit (MSU) trucks were tested entering site driveway then reverse into the loading dock and exiting the space in a forward motion before leaving back onto Elizabeth Street. Both the inbound and outbound maneuvers can be adequately accommodated as illustrated in **Figures 8-2** and **8-3**.

8.1.3 LIGHT SINGLE-UNIT COMMERCIAL VEHICLES

A light single-unit (LSU) truck was tested accessing and egressing one of the two proposed small loading spaces. The manoeuvres work well as shown in **Figure 8-4**. The other smaller space was not tested since it is even easier to access and egress.

8.1.4 PASSENGER VEHICLES

WSP simulated TAC standard passenger vehicles (P-TAC) accessing the underground and above-grade parking levels via the site driveway and the ramps, along with tests of the critical parking spaces. It should be noted that a P-TAC vehicle is in fact representative of a large truck (F150), which is not representative of the average vehicle size. Therefore, the AutoTURN assessments presented herein with this vehicle template represent a conservative approach.

Ground Floor Assessment

As demonstrated in **Figures 8-5**, a P-TAC can readily enter and exit the proposed underground parking facility with inbound and outbound movements performed adequately without any conflicts. This is not surprising given the drive aisles have been designed to satisfy the City's design requirements as noted earlier. To enhance motorist visibility and awareness, a convex mirror is recommended at the top and bottom of the ramp.

Parking Level Assessment

Circulation of a P-TAC vehicle template in the parking levels was tested and the maneuvers work well as shown in **Figures 8-6 to 8-9**. Convex mirrors are proposed at the corners of the driveways in all of the parking levels of the parking lot. The review of the potentially critical parking spaces are shown in **Figures 8-10** to **8-16**. All of the parking spaces work adequately.

8.1.5 FIRE TRUCK

A fire truck was not tested for the proposed development since the fire route is anticipated to be along the boundary roads. As per Ontario Regulation 332/12: Building Code Section 3.2.5.5. fire trucks need to get to a distance of fewer than 15 m from the principal entrances of the buildings. The lobbies' entrances are located along the Elizabeth Street North and Nelson Street for the two buildings and within the 15m distance.

C:\Users\CAMY075367\Desktop\Projects\On-going\31-33 George Street\2022-05-04\CAD

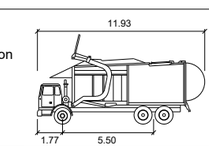
Source: AZ205.dwg Received May 4, 2022

Scale: 1:350

Figure 8-1
Region of Peel Waste Collection Site Circulation
31 & 33 George Street, Brampton

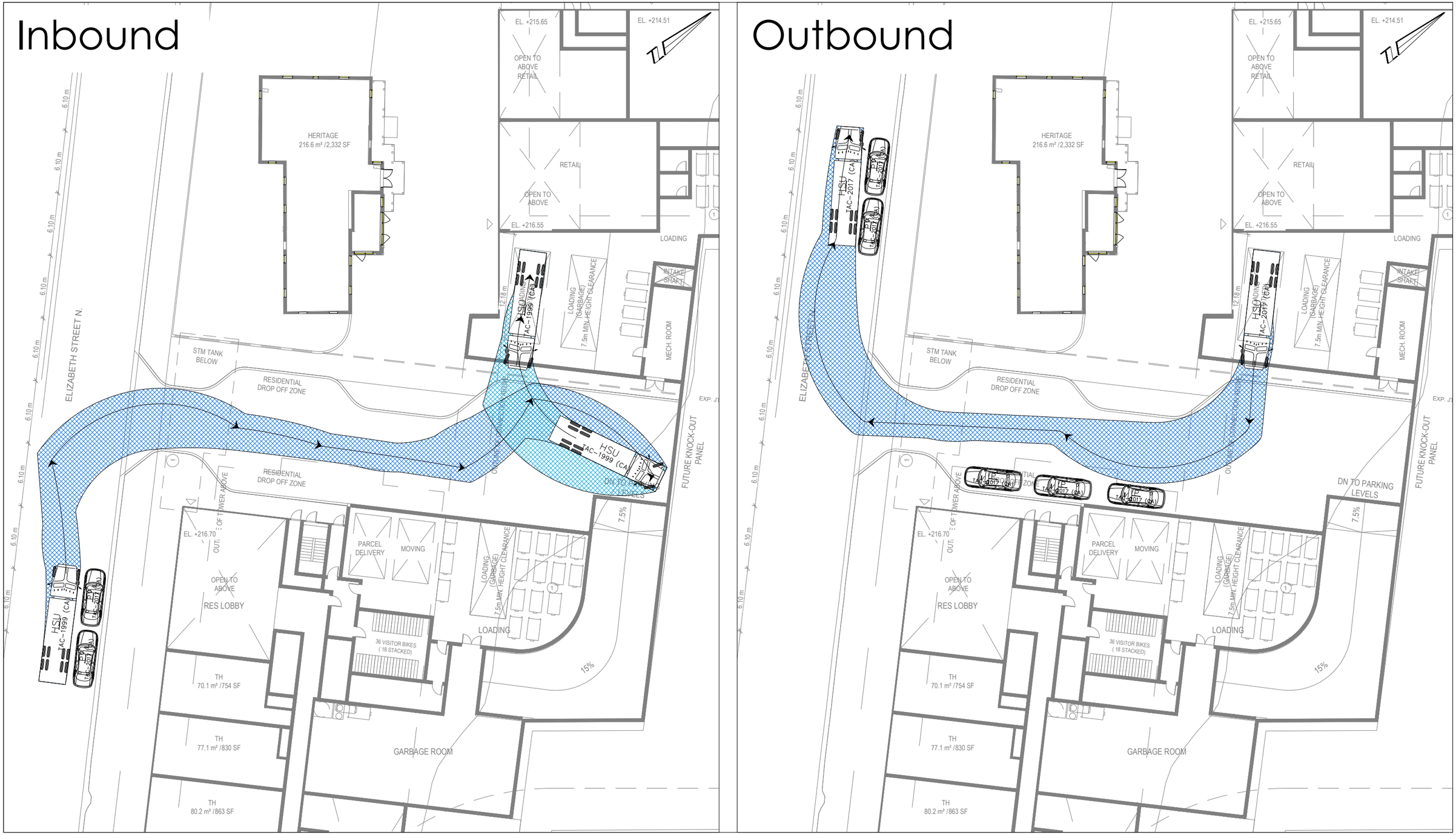
Region of Peel - Waste Collection

	meters
Width	: 2.77
Track	: 2.77
Lock to Lock Time	: 6.0
Steering Angle	: 25.0



WSP - 31-33 George Street - Ground Floor.dwg_8-1

Modified: 5/9/2022 9:36 AM By: CAMY075367 Plot Date: 2022/05/09



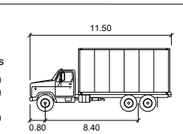
Source: AZ205.dwg Received May 4, 2022

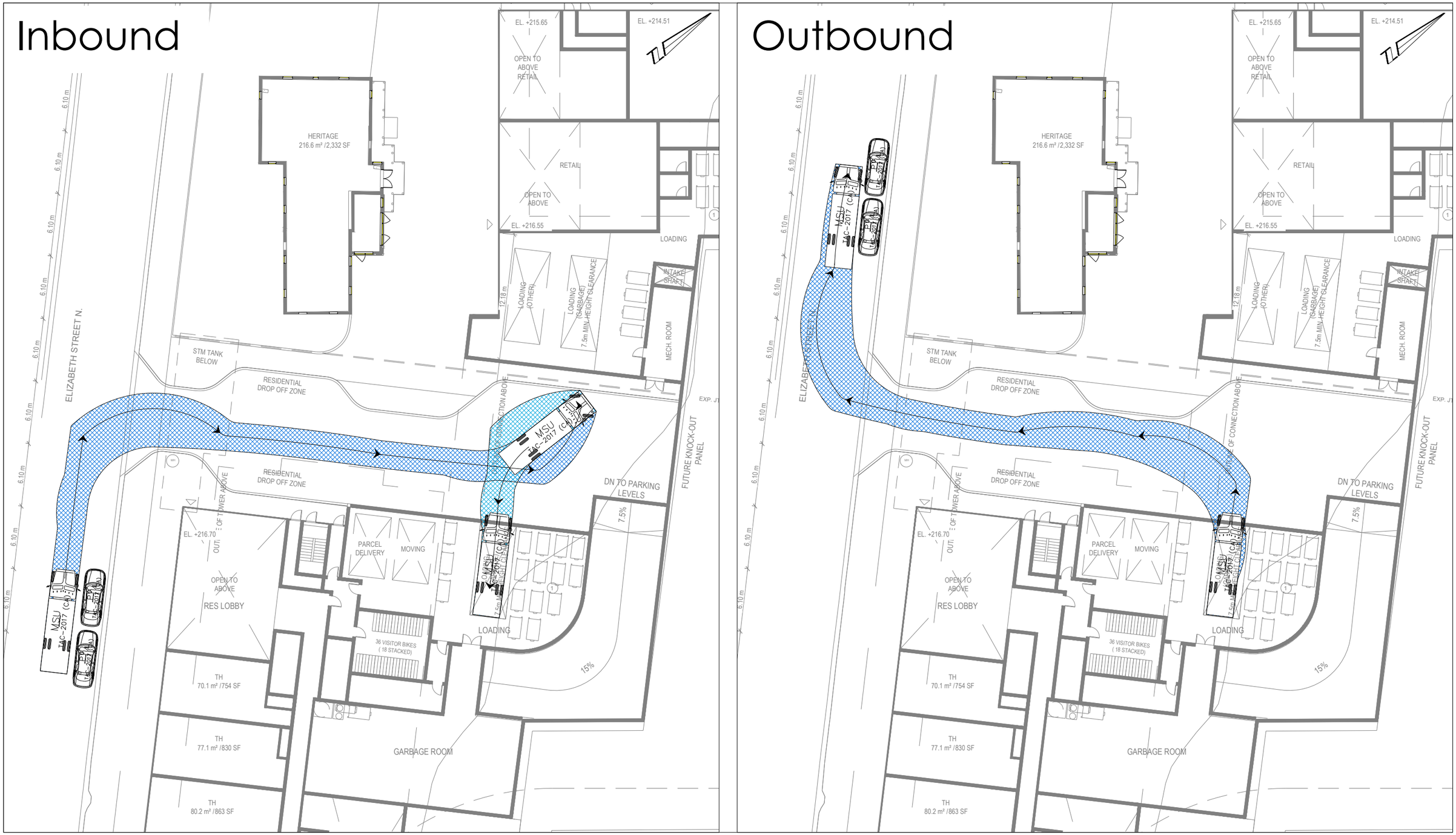
Scale: 1:350

Figure 8-2
Large Delivery Truck Site Circulation, Proposed North Loading Bay
31 & 33 George Street, Brampton

HSU

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.0





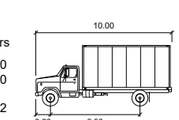
Source: AZ205.dwg Received May 4, 2022

Scale: 1:350

Figure 8-3
Mediim Delivery Truck Site Circulation, Proposed South Loading Bay
31 & 33 George Street, Brampton

MSU

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.2



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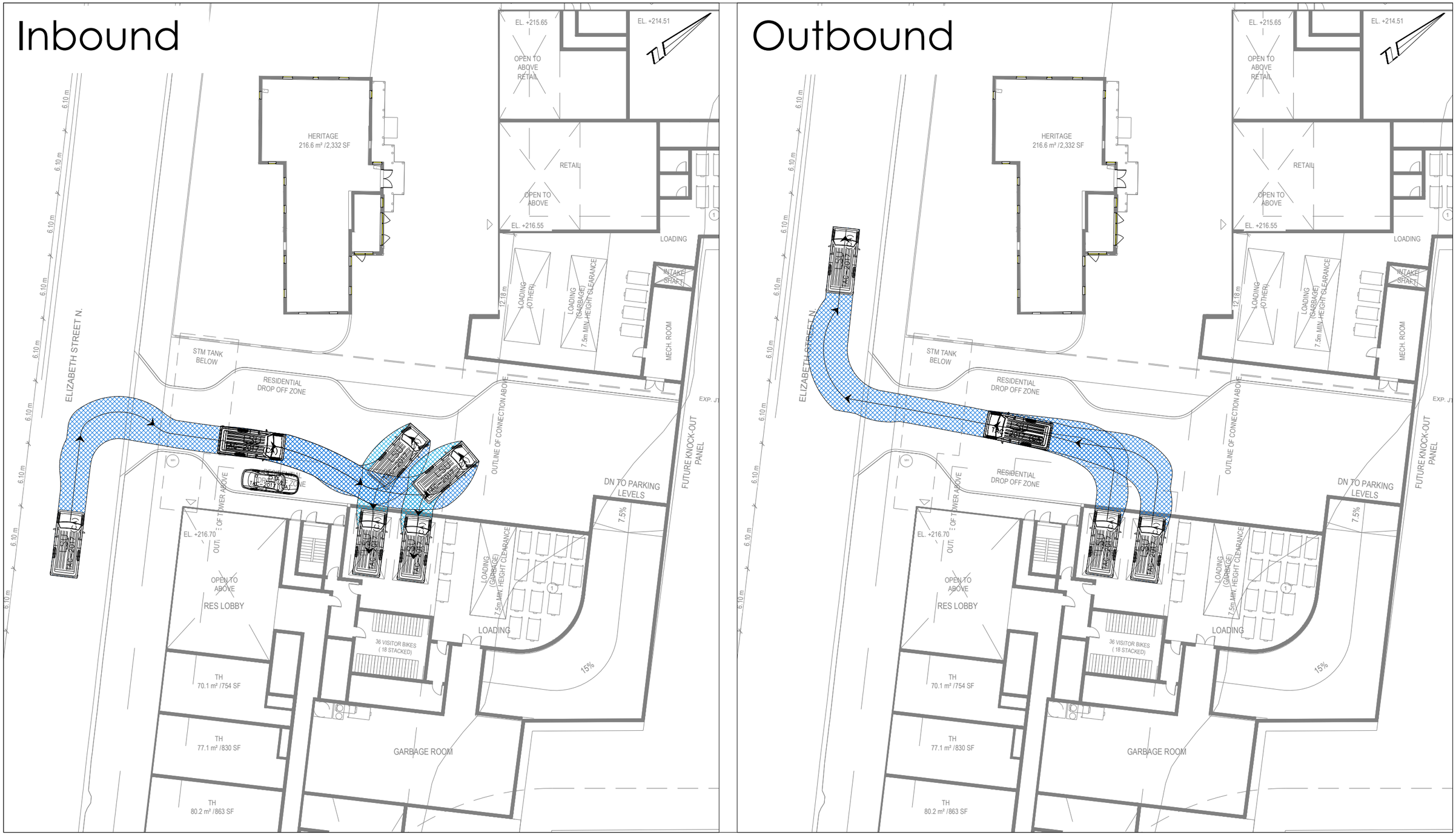

Source: AZ205.dwg Received May 4, 2022

Scale: 1:350

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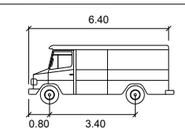
Figure 8-4
Small Delivery Truck Site Circulation, Proposed South Loading Bay
31 & 33 George Street, Brampton

LSU

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.3



WSP - 31-33 George Street - Ground Floor.dwg_8-4

Modified: 5/9/2022 9:36 AM By: CAMY075367 Plot Date: 2022/05/09

C:\Users\CAMY075367\Desktop\Projects\On-going\31-33 George Street\2022-05-04\CAD

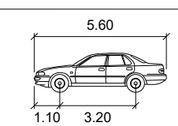
Source: AZ205.dwg Received May 4, 2022

Scale: 1:350

Figure 8-5
Passenger Vehicle Site Circulation
31 & 33 George Street, Brampton

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9



WSP - 31-33 George Street - Ground Floor.dwg_8-5

Modified: 5/9/2022 9:36 AM By: CAMY075367 Plot Date: 2022/05/09

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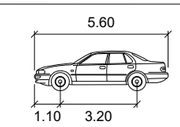
Source: AZ204.dwg Received May 4, 2022

Scale: 1:300

Figure 8-6
Passenger Vehicle Site Circulation, P1
31 & 33 George Street, Brampton

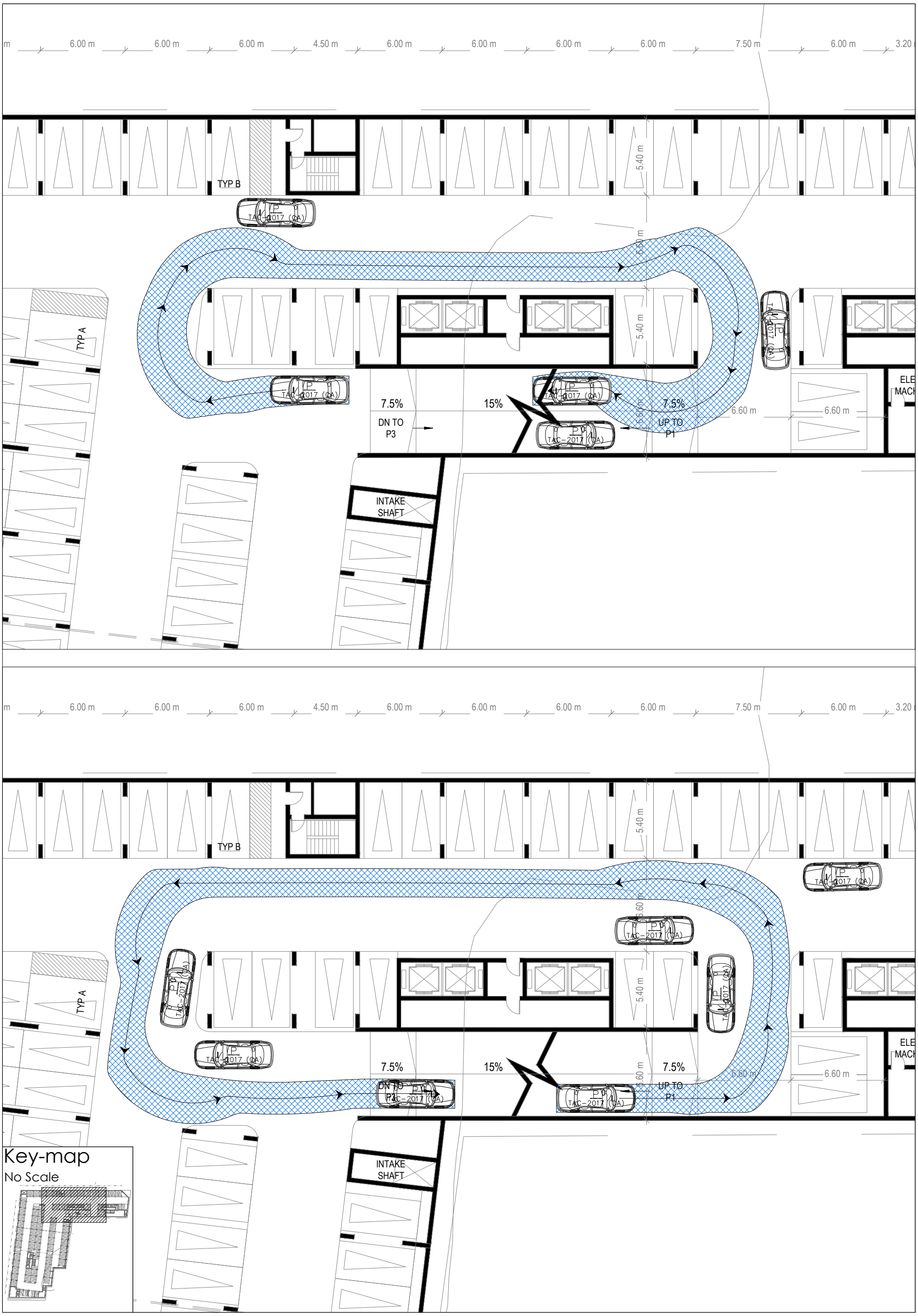
P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9



WSP - 31-33 George Street - P1.dwg_8-6

Modified: 5/9/2022 10:19 AM By: CAMY075367 Plot Date: 2022/05/09



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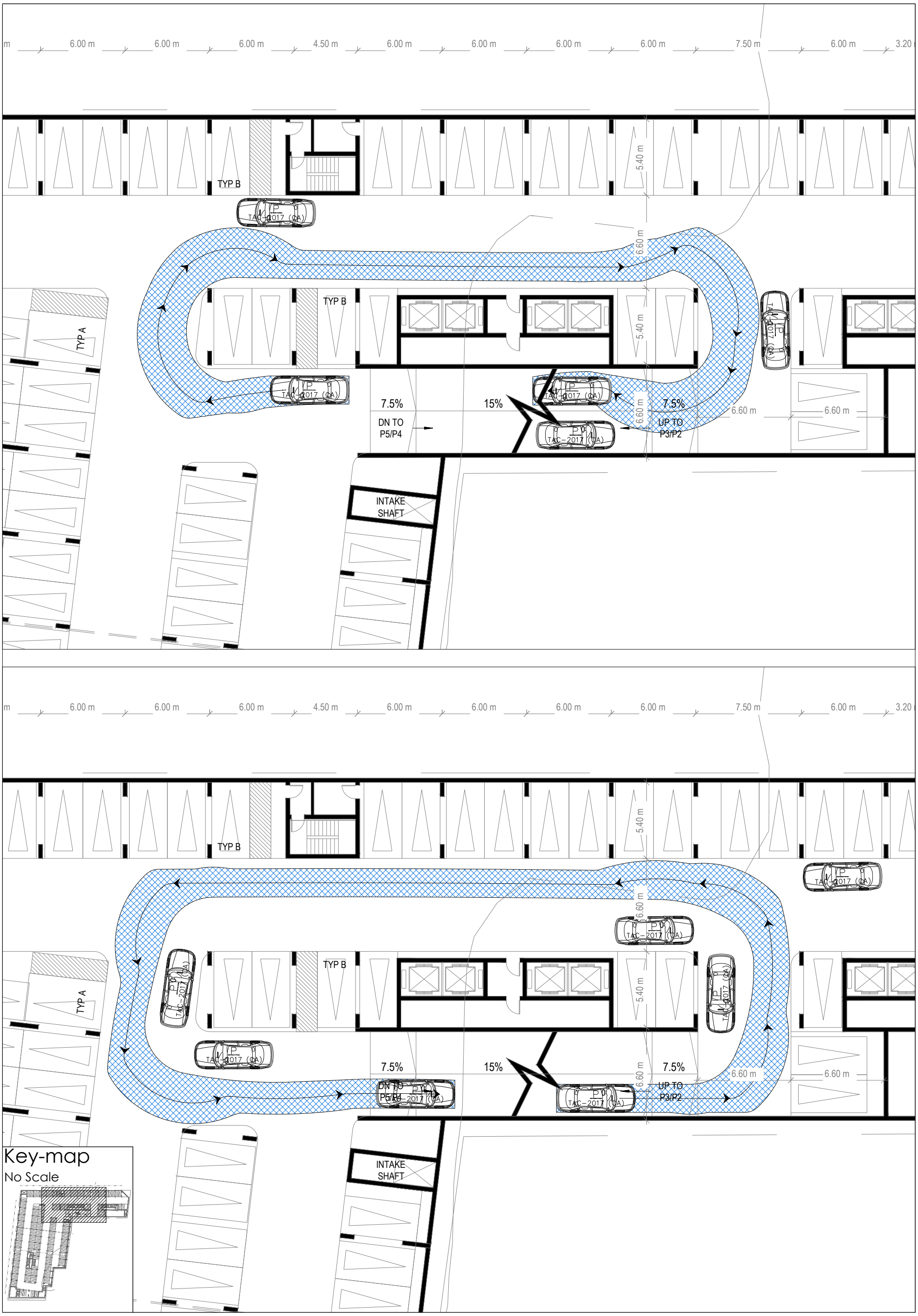
Source: AZ203.dwg Received May 4, 2022

Scale: 1:250

Figure 8-7
Passenger Vehicle Site Circulation, P2
31 & 33 George Street, Brampton



Source: AZ202.dwg Received May 4, 2022

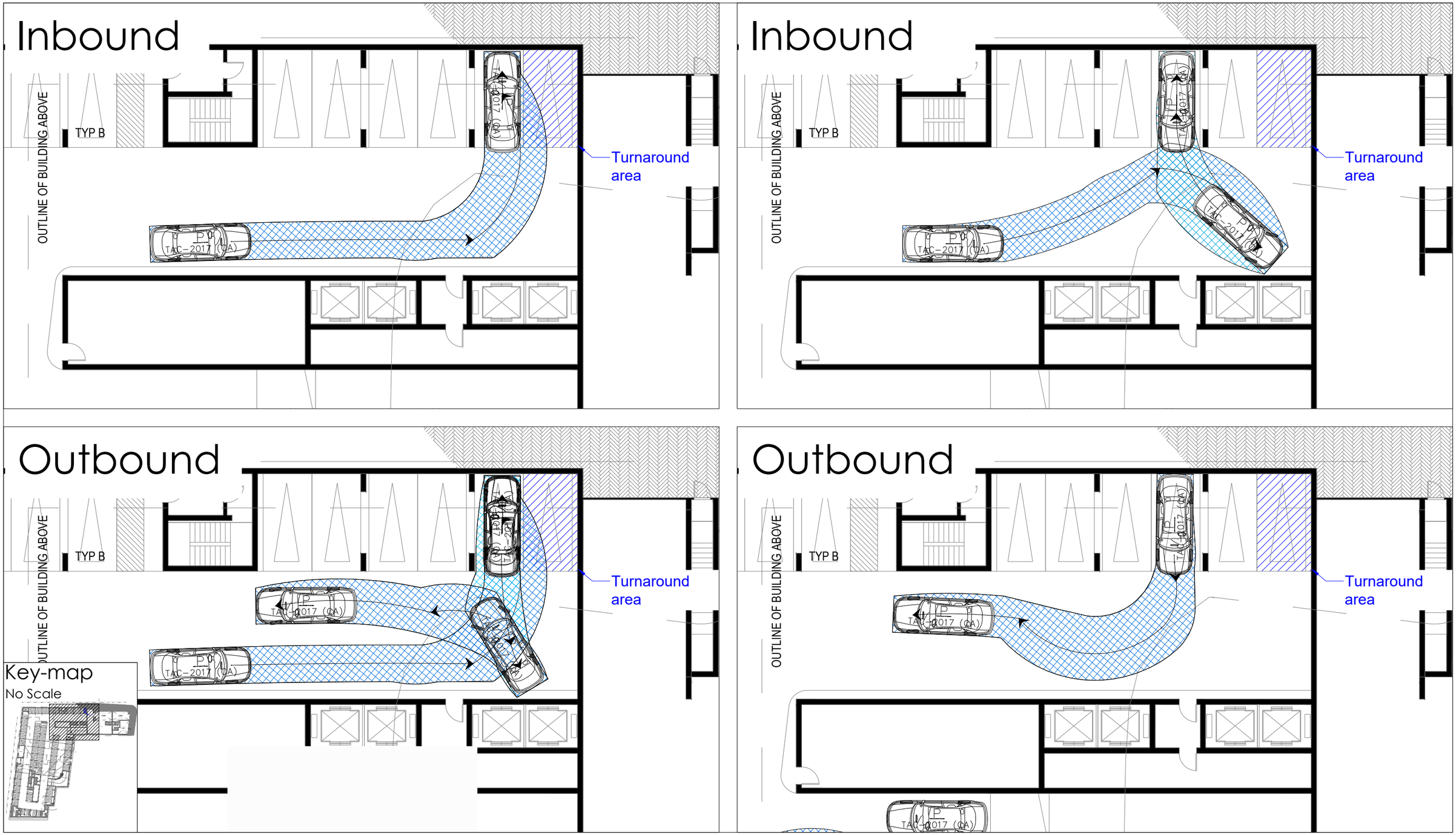
Scale: 1:250

Figure 8-8
Passenger Vehicle Site Circulation, P3 & P4
31 & 33 George Street, Brampton

Source: AZ201.dwg Received May 4, 2022

Scale: 1:250

Figure 8-9
Passenger Vehicle Site Circulation, P5
31 & 33 George Street, Brampton



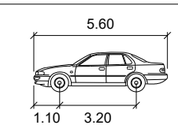
Source: AZ204.dwg Received May 4, 2022

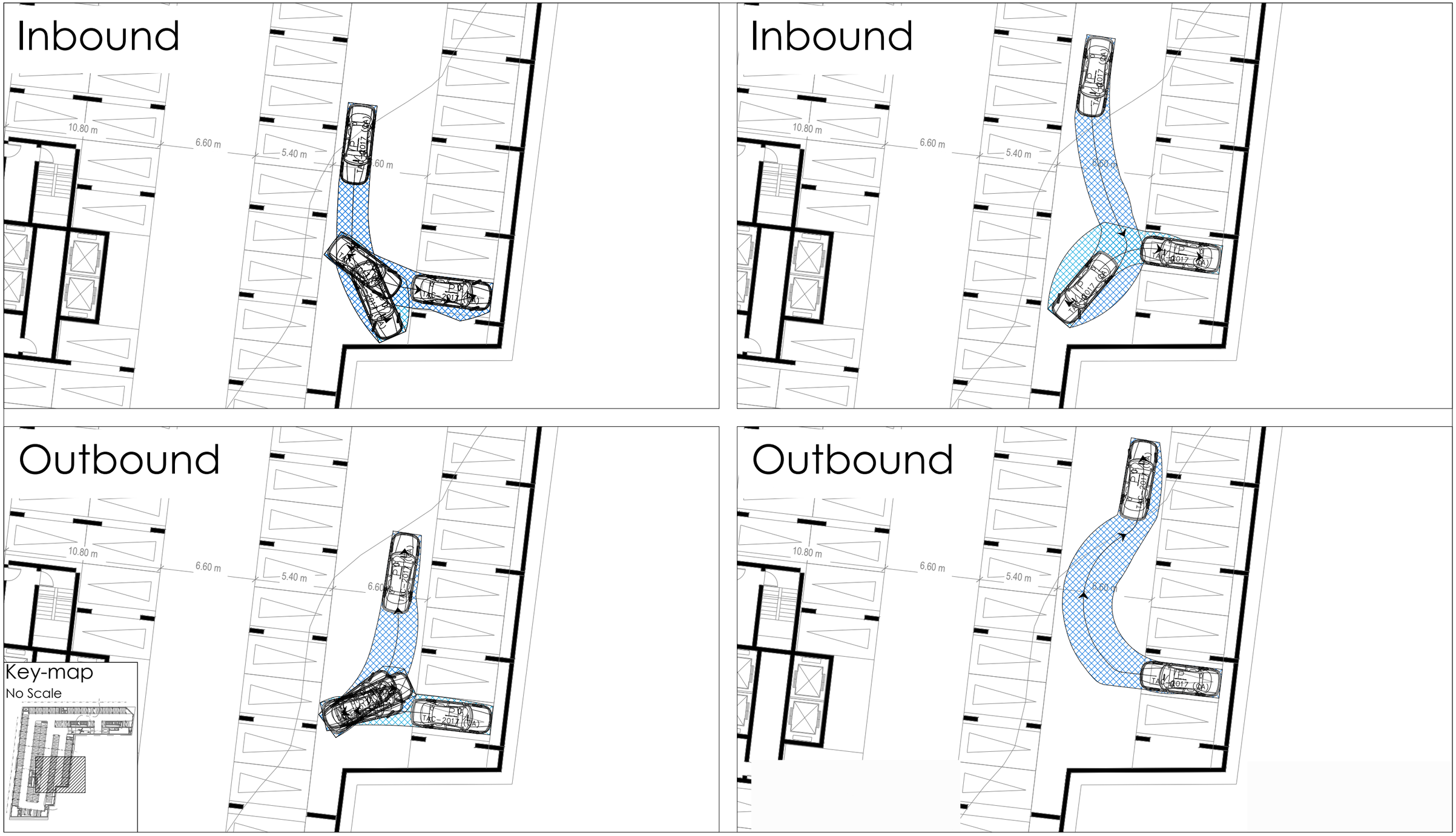
Scale: 1:xxx

Figure 8-10
Passenger Vehicle Dead-End Spaces Tests, P1
31 & 33 George Street, Brampton

P

		meters
Width	:	2.00
Track	:	2.00
Lock to Lock Time	:	6.0
Steering Angle	:	35.9





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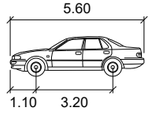
Source: AZ203.dwg Received May 4, 2022

Scale: 1:250

Figure 8-11
Passenger Vehicle Dead-End Spaces Tests, P2
31 & 33 George Street, Brampton

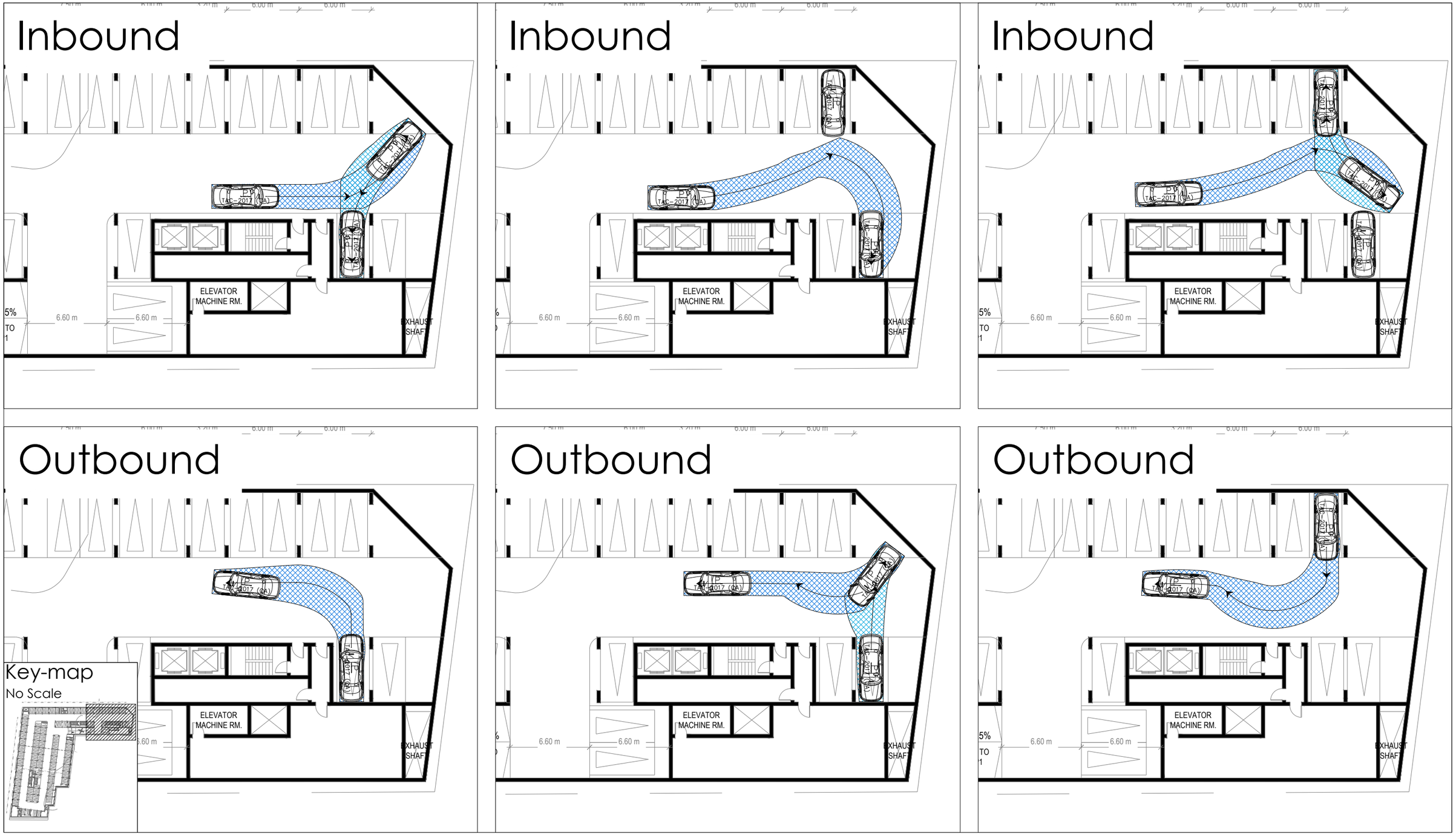
P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9



WSP - 31-33 George Street - P2.dwg_8-11

Modified: 5/6/2022 10:14 AM By: CAMY075367 Plot Date: 2022/05/09



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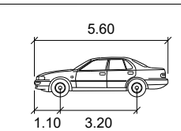
Source: AZ203.dwg Received May 4, 2022

Scale: 1:300

Figure 8-12
Passenger Vehicle Dead-End Spaces Tests, P2
31 & 33 George Street, Brampton

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9



WSP - 31-33 George Street - P2.dwg_8-12

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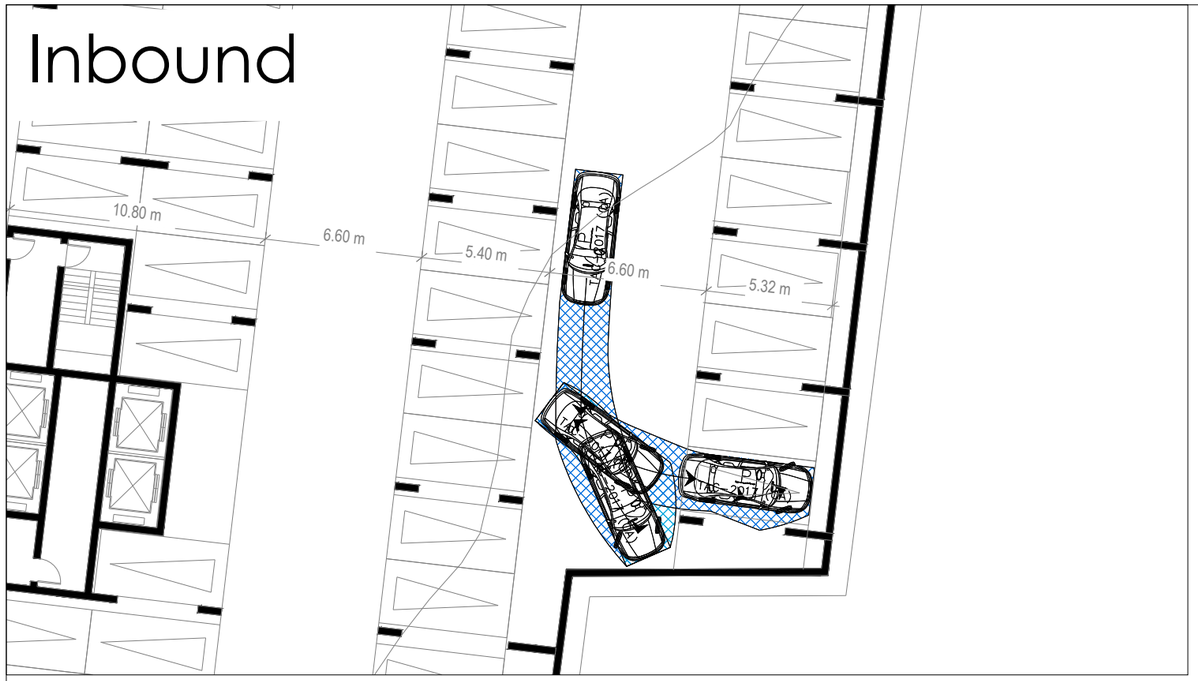
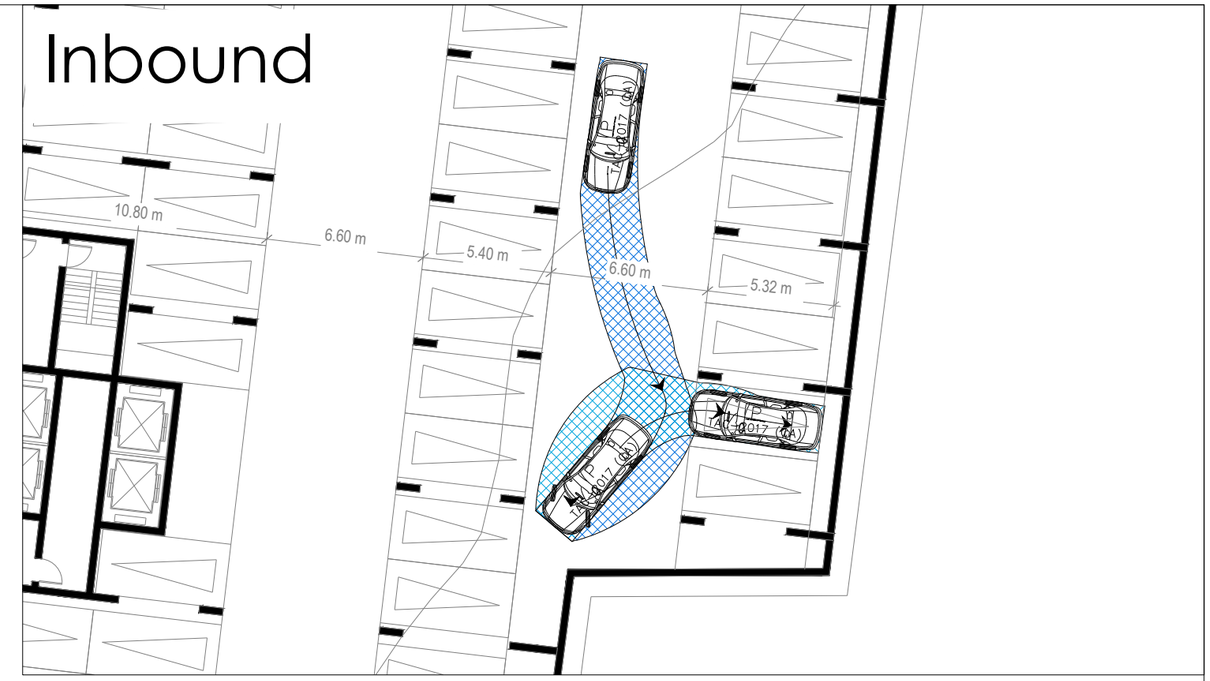
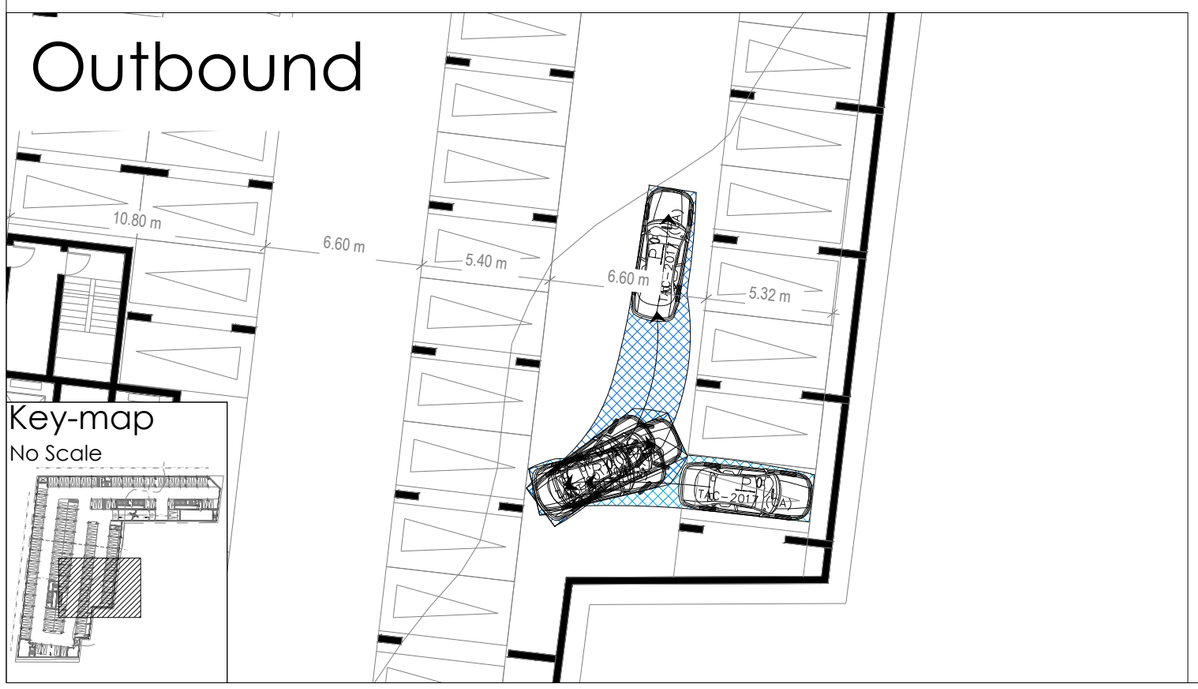
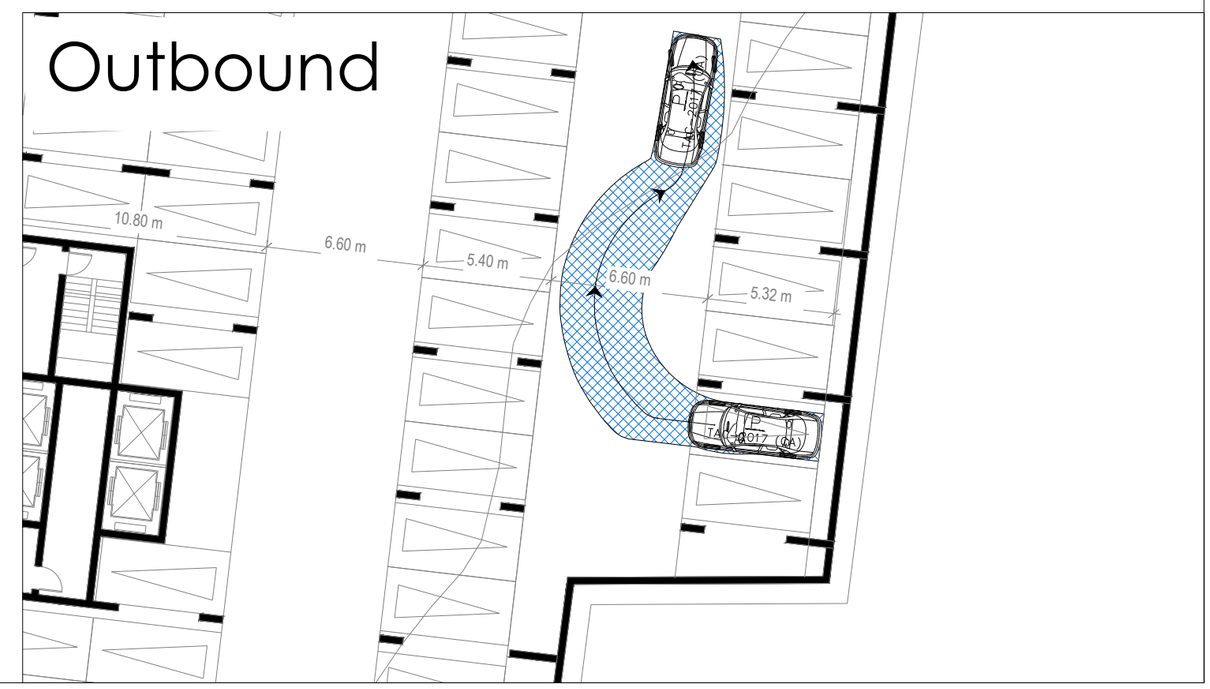








C:\Users\CAMY075367\Desktop\Projects\On-going\31-33 George Street\2022-05-04\CAD

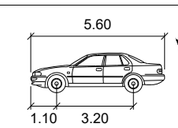
Source: AZ202.dwg Received May 4, 2022

Scale: 1:250

Figure 8-13
Passenger Vehicle Dead-End Spaces Tests, P3 & P4
31 & 33 George Street, Brampton

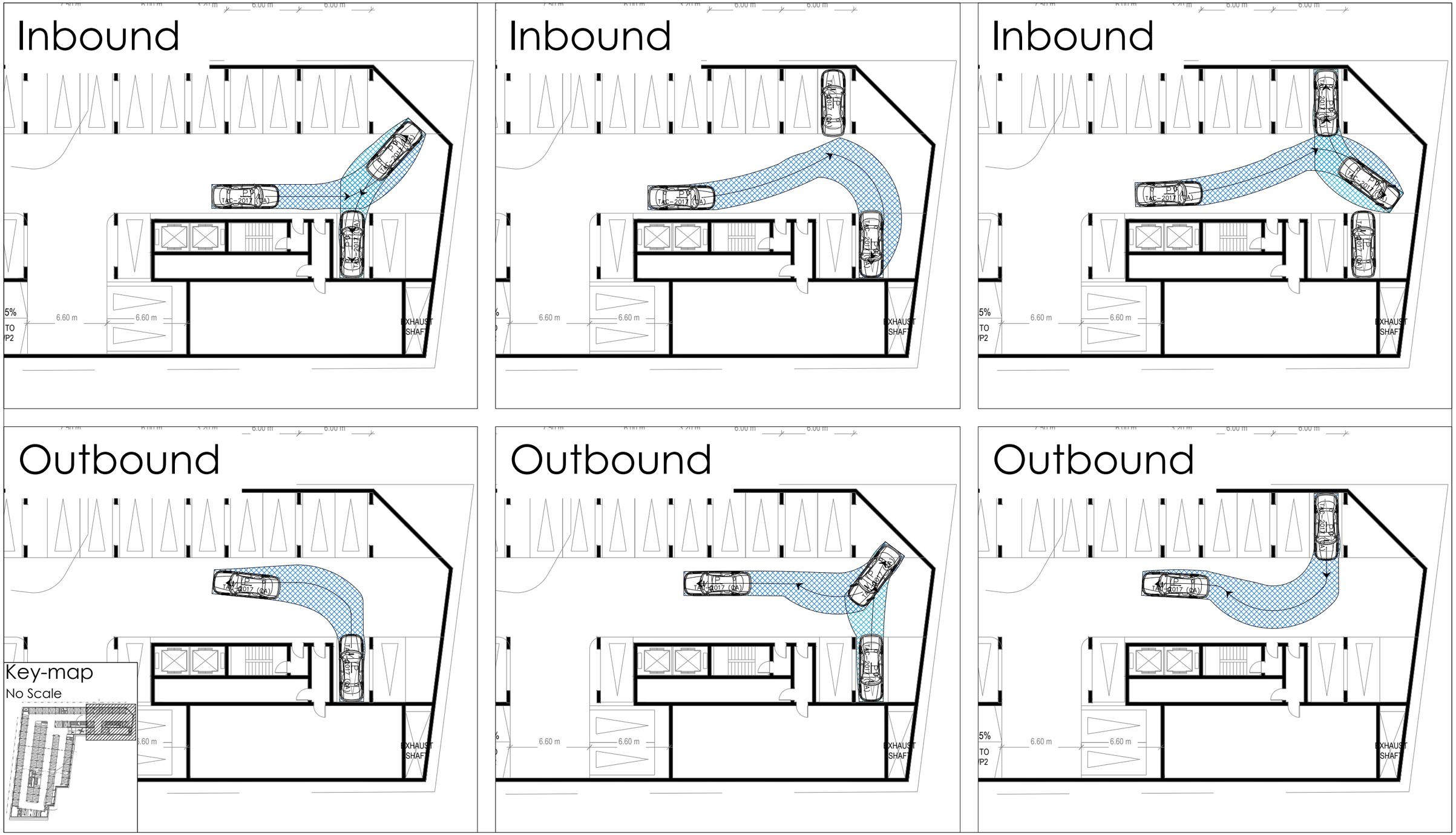
P

		meters
Width	:	2.00
Track	:	2.00
Lock to Lock Time	:	6.0
Steering Angle	:	35.9



WSP - 31-33 George Street - P3 & P4.dwg_8-13

Modified: 5/6/2022 10:15 AM By: CAMY075367 Plot Date: 2022/05/09



C:\Users\CAMY075367\Desktop\Projects\On-going\31-33 George Street\2022-05-04\CAD

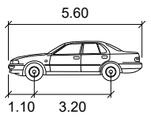
Source: AZ202.dwg Received May 4, 2022

Scale: 1:300

Figure 8-14
Passenger Vehicle Dead-End Spaces Tests, P3 & P4
31 & 33 George Street, Brampton

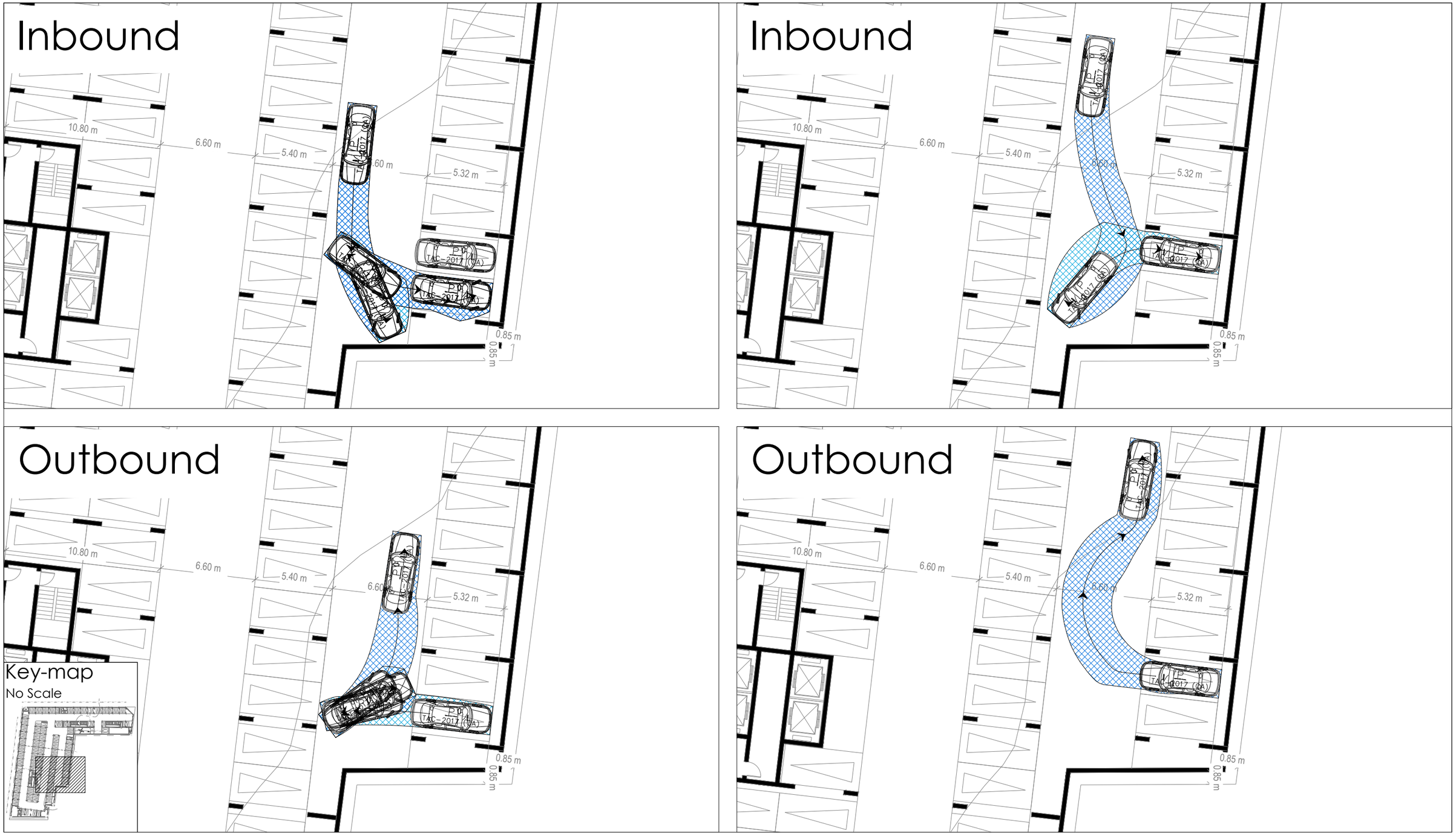
P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9



WSP - 31-33 George Street - P3 & P4.dwg_8-14

Modified: 5/6/2022 10:15 AM By: CAMY075367 Plot Date: 2022/05/09



Source: AZ201.dwg Received May 4, 2022

Scale: 1:300

Figure 8-15
Passenger Vehicle Dead-End Spaces Tests, P5
31 & 33 George Street, Brampton

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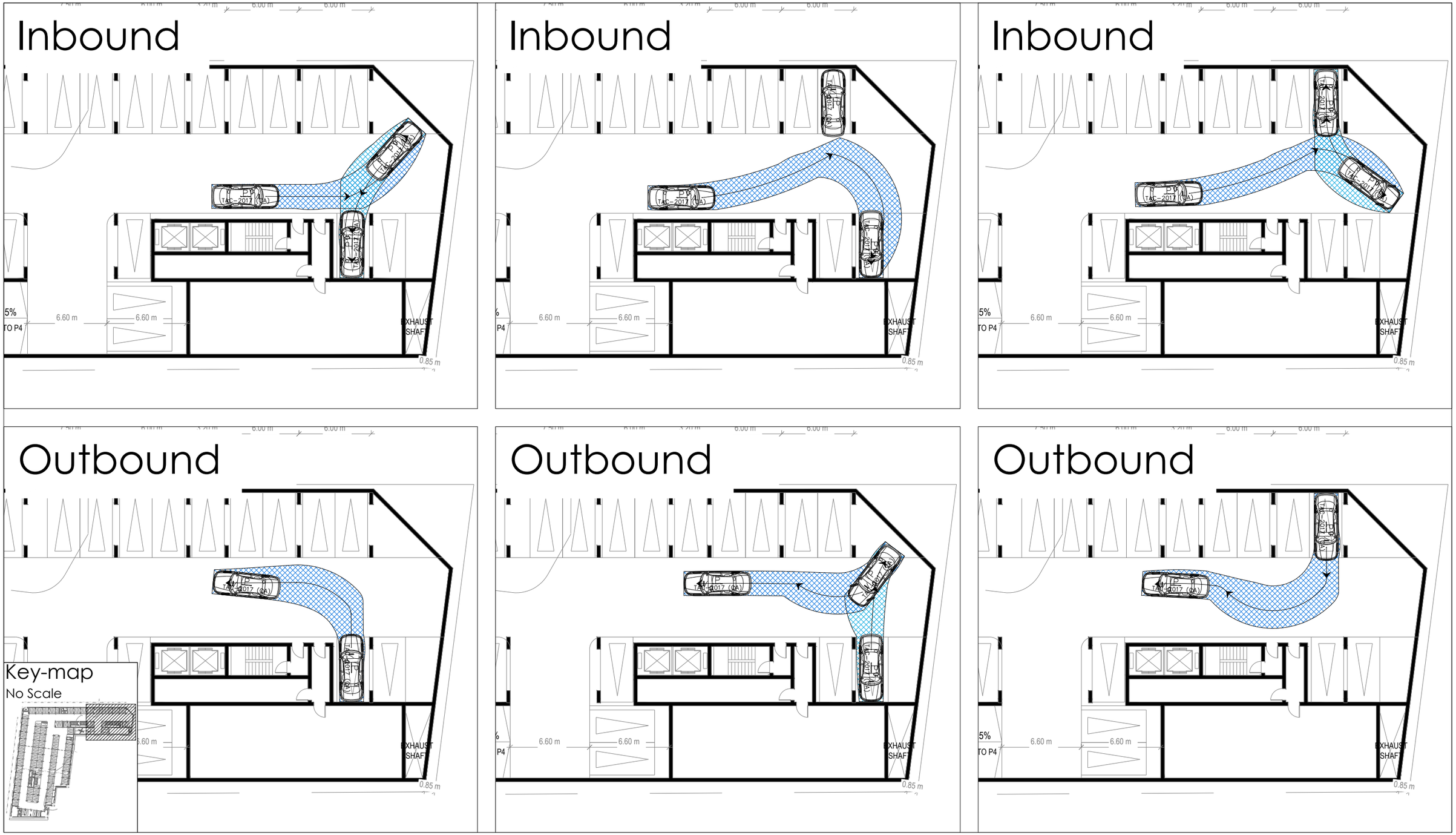


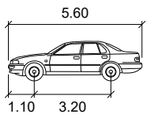
Source: AZ201.dwg Received May 4, 2022

Scale: 1:300

Figure 8-16
Passenger Vehicle Dead-End Spaces Tests, P5
31 & 33 George Street, Brampton

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9



9 CONCLUSIONS

This TIS Addendum has evaluated the impact of the proposed mixed-use development located at 24 Elizabeth Street / 33 George Street North. Comments received from the Peel Region and City of Brampton transportation staff regarding the October 2021 TIS have been responded to and addressed in this addendum in support of the ZBA resubmission. The matter of road conveyance along Elizabeth Street North and Nelson Street West will be further explored and presented in the subsequent SPA submission.

The proposed updated package of land uses result in very similar auto trip generation: 289 and 371 two-way trips during the a.m. and p.m. peak hours, respectively. These trip generation are only 9 and 5 trips higher during the peak hours when compared to the October 2021 TIS.

Based on the future background and future total evaluations, the incremental increases in delay and v/c ratios relative to the future background conditions as a result of the addition of the site-generated traffic are minimal. Under all three horizons evaluated (2027, 2032 and 2041), the site-generated traffic can be readily accommodated in the boundary road network despite the conservative assumption that there will continue to be positive general traffic growth even when the planned LRT is completed in the site proximity.

A total of 650 bicycle parking spaces are proposed, which satisfies the stipulated By-law requirement. The proposed auto parking supply is suitable for the site's context and fulfills the City's downtown parking policy.

The site plan review of the ground and underground parking levels indicate that the various design vehicles can be adequately accommodated.

APPENDIX

A 2027 FB

Phasings
1: Main St S/Main St N & Queen St W/Queen St E

05-07-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	69.0	69.0	69.0	69.0	51.0	51.0
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%
Maximum Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	43	43	85	85	69	62
90th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 28 (23%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues
1: Main St S/Main St N & Queen St W/Queen St E

05-07-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	796	33	524	13	428	1097
v/c Ratio	0.79	0.04	0.52	0.02	0.32	0.81
Control Delay	30.2	6.2	20.9	2.0	26.5	39.2
Queue Delay	50.8	0.0	2.5	0.0	0.0	0.0
Total Delay	81.0	6.2	23.4	2.0	26.5	39.2
Queue Length 50th (m)	146.5	0.7	77.6	0.0	35.9	120.3
Queue Length 95th (m)	200.4	5.6	107.6	1.5	48.8	147.2
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	1008	807	1008	792	1325	1357
Starvation Cap Reductn	357	0	348	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	1.22	0.04	0.79	0.02	0.32	0.81

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Main St S/Main St N & Queen St W/Queen St E

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	796	33	0	524	13	0	375	53	0	1060	37
Future Volume (vph)	0	796	33	0	524	13	0	375	53	0	1060	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.95		1.00	0.93		0.98			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			0.99	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1921	1514		1921	1486		3511			3614	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1921	1514		1921	1486		3511			3614	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	796	33	0	524	13	0	375	53	0	1060	37
RTOR Reduction (vph)	0	0	13	0	0	6	0	9	0	0	2	0
Lane Group Flow (vph)	0	796	20	0	524	7	0	419	0	0	1095	0
Confl. Peds. (#/hr)	65		43	43		62	62		69	69		62
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	2%	0%	0%	2%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Effective Green, g (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		1008	794		1008	780		1316			1355	
v/s Ratio Prot		c0.41			0.27			0.12			c0.30	
v/s Ratio Perm			0.01			0.00						
v/c Ratio		0.79	0.03		0.52	0.01		0.32			0.81	
Uniform Delay, d1		23.1	13.7		18.6	13.6		26.6			33.6	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		6.3	0.1		1.9	0.0		0.6			5.3	
Delay (s)		29.4	13.8		20.5	13.6		27.2			38.9	
Level of Service		C	B		C	B		C			D	
Approach Delay (s)		28.8			20.4			27.2			38.9	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
2: George St S/George St N & Queen St W

05-07-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	8.0	25.0	25.0	8.0	25.0	9.5	28.0	28.0	28.0
Total Split (s)	8.0	70.0	70.0	8.0	70.0	10.0	42.0	32.0	32.0
Total Split (%)	6.7%	58.3%	58.3%	6.7%	58.3%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		31	31		8		22	25	25
90th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
90th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Max	Max
70th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	35.8	25.8	25.8
70th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Gap	Gap
50th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	32.0	22.0	22.0
50th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Gap	Gap
30th %ile Green (s)	0.0	64.0	64.0	5.0	72.0	5.5	28.3	18.3	18.3
30th %ile Term Code	Skip	MaxR	MaxR	Max	Hold	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	64.0	64.0	0.0	64.0	0.0	12.1	12.1	12.1
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Skip	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 111.2
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 119.8
50th %ile Actuated Cycle: 116
30th %ile Actuated Cycle: 112.3
10th %ile Actuated Cycle: 88.1

Queues
2: George St S/George St N & Queen St W

05-07-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	676	67	61	272	62	76	43	251
v/c Ratio	0.06	0.61	0.08	0.16	0.24	0.32	0.17	0.20	0.80
Control Delay	8.5	20.4	1.4	9.2	13.3	34.6	28.3	41.8	60.7
Queue Delay	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
Total Delay	8.5	20.4	1.4	9.2	14.0	34.6	28.3	41.8	60.7
Queue Length 50th (m)	2.6	101.8	0.0	4.7	30.4	10.4	11.1	8.3	51.5
Queue Length 95th (m)	6.8	151.9	3.5	10.4	49.5	20.8	23.0	18.6	80.5
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	574	1109	839	378	1125	195	563	270	399
Starvation Cap Reductn	0	0	0	0	549	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.61	0.08	0.16	0.47	0.32	0.13	0.16	0.63

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: George St S/George St N & Queen St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	676	67	61	255	17	62	60	16	43	181	70
Future Volume (vph)	34	676	67	61	255	17	62	60	16	43	181	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1404	1902	1379	1785	1880		1742	1697		1540	1639	
Flt Permitted	0.58	1.00	1.00	0.26	1.00		0.28	1.00		0.71	1.00	
Satd. Flow (perm)	857	1902	1379	491	1880		506	1697		1147	1639	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	676	67	61	255	17	62	60	16	43	181	70
RTOR Reduction (vph)	0	0	28	0	2	0	0	8	0	0	12	0
Lane Group Flow (vph)	34	676	39	61	270	0	62	68	0	43	239	0
Confl. Peds. (#/hr)	8		31	31		8	25		22	22		25
Heavy Vehicles (%)	26%	1%	3%	0%	1%	0%	2%	7%	0%	10%	3%	22%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	68.3	65.5	65.5	70.3	66.5		29.2	29.2		20.5	20.5	
Effective Green, g (s)	68.3	65.5	65.5	70.3	66.5		29.2	29.2		20.5	20.5	
Actuated g/C Ratio	0.60	0.58	0.58	0.62	0.59		0.26	0.26		0.18	0.18	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	529	1097	795	347	1101		175	436		207	296	
v/s Ratio Prot	0.00	c0.36		c0.01	0.14		c0.01	0.04			c0.15	
v/s Ratio Perm	0.04		0.03	0.10			0.08			0.04		
v/c Ratio	0.06	0.62	0.05	0.18	0.25		0.35	0.16		0.21	0.81	
Uniform Delay, d1	9.2	15.8	10.4	11.2	11.4		33.3	32.6		39.6	44.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.6	0.1	0.2	0.5		1.2	0.2		0.5	14.7	
Delay (s)	9.3	18.3	10.6	11.5	11.9		34.6	32.8		40.1	59.3	
Level of Service	A	B	B	B	B		C	C		D	E	
Approach Delay (s)		17.3			11.8			33.6			56.5	
Approach LOS		B			B			C			E	

Intersection Summary

HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	113.5	Sum of lost time (s)	19.5
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phasings
3: George St N & Nelson St W

05-07-2022

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	24.2	25.8	22.0	22.0	25.8	22.0	22.0	0.0	0.0
90th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	20.5	29.5	22.0	22.0	29.5	22.0	22.0	0.0	0.0
70th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	17.8	41.7	12.5	12.5	41.7	12.5	12.5	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	15.0	46.9	10.1	10.1	46.9	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	11.0	67.0	0.0	0.0	67.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Queues
3: George St N & Nelson St W

05-07-2022

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	263	267	36	64	114
v/c Ratio	0.73	0.36	0.15	0.07	0.53
Control Delay	41.7	21.4	30.4	2.3	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	21.4	30.4	2.3	37.7
Queue Length 50th (m)	38.7	27.7	5.6	0.0	16.8
Queue Length 95th (m)	58.7	63.0	12.3	4.6	29.6
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	467	736	365	894	320
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	0.56	0.36	0.10	0.07	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	151	78	152	59	35	3	30	59	38	48	19
Future Volume (vph)	13	151	78	152	59	35	3	30	59	38	48	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99			0.99			1.00	0.98		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		0.98	
Frt		0.96			0.98			1.00	0.85		0.98	
Flt Protected		1.00			0.97			1.00	1.00		0.98	
Satd. Flow (prot)		1737			1561			1529	1410		1448	
Flt Permitted		1.00			0.97			0.97	1.00		0.87	
Satd. Flow (perm)		1737			1561			1495	1410		1277	
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)	14	164	85	165	64	38	3	33	64	41	52	21
RTOR Reduction (vph)	0	21	0	0	5	0	0	0	25	0	10	0
Lane Group Flow (vph)	0	242	0	0	262	0	0	36	39	0	104	0
Confl. Peds. (#/hr)	21		9	9		21	22		28	28		22
Heavy Vehicles (%)	0%	3%	0%	15%	2%	26%	0%	24%	11%	48%	7%	0%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		17.7			41.0			13.3	54.3		13.3	
Effective Green, g (s)		17.7			41.0			13.3	54.3		13.3	
Actuated g/C Ratio		0.20			0.46			0.15	0.60		0.15	
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)		341			711			220	944		188	
v/s Ratio Prot		c0.14			c0.17				0.02			
v/s Ratio Perm								0.02	0.01		c0.08	
v/c Ratio		0.71			0.37			0.16	0.04		0.55	
Uniform Delay, d1		33.8			16.0			33.5	7.3		35.6	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		6.8			1.5			0.4	0.0		3.5	
Delay (s)		40.6			17.5			33.8	7.3		39.1	
Level of Service		D			B			C	A		D	
Approach Delay (s)		40.6			17.5			16.8			39.1	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	218	3	4	66	2	2	4	12	15	34	38
Future Volume (vph)	24	218	3	4	66	2	2	4	12	15	34	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	237	3	4	72	2	2	4	13	16	37	41

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	266	78	19	94
Volume Left (vph)	26	4	2	16
Volume Right (vph)	3	2	13	41
Hadj (s)	0.01	-0.01	-0.39	-0.23
Departure Headway (s)	4.3	4.4	4.4	4.5
Degree Utilization, x	0.32	0.10	0.02	0.12
Capacity (veh/h)	823	769	746	742
Control Delay (s)	9.2	7.9	7.5	8.1
Approach Delay (s)	9.2	7.9	7.5	8.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
5: Main St N & Nelson St W/Theatre Lane

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	10.0	35.0	25.0	25.0	55.0	55.0	55.0	55.0
Total Split (%)	11.1%	38.9%	27.8%	27.8%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
70th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
50th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	0.0	19.0	19.0	19.0	58.9	58.9	58.9	58.9
10th %ile Term Code	Skip	Hold	Ped	Ped	Dwell	Dwell	Dwell	Dwell

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 90
30th %ile Actuated Cycle: 90
10th %ile Actuated Cycle: 89.9

Queues
5: Main St N & Nelson St W/Theatre Lane

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	102	145	12	100	379	1256
v/c Ratio	0.29	0.29	0.05	0.33	0.21	0.72
Control Delay	22.7	23.2	29.2	21.3	10.4	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.8
Total Delay	22.7	23.2	29.2	21.3	10.4	18.2
Queue Length 50th (m)	11.9	17.0	1.7	7.9	16.5	80.6
Queue Length 95th (m)	23.0	31.6	6.1	21.7	24.2	106.4
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	351	530	238	300	1782	1751
Starvation Cap Reductn	0	0	0	0	0	219
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.27	0.05	0.33	0.21	0.82

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Main St N & Nelson St W/Theatre Lane

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	123	22	12	53	47	8	360	11	72	1029	155
Future Volume (vph)	102	123	22	12	53	47	8	360	11	72	1029	155
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.89			1.00			0.99	
Flpb, ped/bikes	0.89	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.93			1.00			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1502	1623		1613	1256			3389			3419	
Flt Permitted	0.60	1.00		0.66	1.00			0.93			0.90	
Satd. Flow (perm)	946	1623		1128	1256			3140			3072	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	102	123	22	12	53	47	8	360	11	72	1029	155
RTOR Reduction (vph)	0	8	0	0	36	0	0	2	0	0	12	0
Lane Group Flow (vph)	102	137	0	12	64	0	0	377	0	0	1244	0
Confl. Peds. (#/hr)	163		13	13		163	38		39	39		38
Heavy Vehicles (%)	6%	14%	5%	9%	29%	17%	13%	7%	0%	0%	3%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.6	27.6		19.0	19.0			51.0			51.0	
Effective Green, g (s)	27.6	27.6		19.0	19.0			51.0			51.0	
Actuated g/C Ratio	0.30	0.30		0.21	0.21			0.56			0.56	
Clearance Time (s)	3.0	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)	322	494		236	263			1767			1729	
v/s Ratio Prot	c0.02	0.08			0.05							
v/s Ratio Perm	c0.08			0.01				0.12			c0.40	
v/c Ratio	0.32	0.28		0.05	0.25			0.21			0.72	
Uniform Delay, d1	23.6	23.9		28.6	29.8			9.8			14.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.3		0.1	0.5			0.3			2.6	
Delay (s)	24.1	24.2		28.7	30.3			10.1			17.2	
Level of Service	C	C		C	C			B			B	
Approach Delay (s)		24.2			30.1			10.1			17.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Queen St W & Elizabeth St N

05-07-2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	750	391	11	36	6
Future Volume (Veh/h)	8	750	391	11	36	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	750	391	11	36	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	402				788	201
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	402				788	201
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				89	99
cM capacity (veh/h)	1153				326	806

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	258	500	261	141	42
Volume Left	8	0	0	0	36
Volume Right	0	0	0	11	6
cSH	1153	1700	1700	1700	357
Volume to Capacity	0.01	0.29	0.15	0.08	0.12
Queue Length 95th (m)	0.2	0.0	0.0	0.0	3.0
Control Delay (s)	0.3	0.0	0.0	0.0	16.4
Lane LOS	A				C
Approach Delay (s)	0.1		0.0		16.4
Approach LOS					C

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Main St N & Nelson St E

05-07-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	15	468	0	0	1066
Future Volume (Veh/h)	35	15	468	0	0	1066
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	35	15	468	0	0	1066
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.86	0.96			0.96	
vC, conflicting volume	1001	234			468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	456	106			350	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	98			100	
cM capacity (veh/h)	461	887			1152	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	50	312	156	355	711
Volume Left	35	0	0	0	0
Volume Right	15	0	0	0	0
cSH	538	1700	1700	1152	1700
Volume to Capacity	0.09	0.18	0.09	0.00	0.42
Queue Length 95th (m)	2.3	0.0	0.0	0.0	0.0
Control Delay (s)	12.4	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.4	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
8: Main St N & Church St W/Church St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	55.0	45.0	45.0	65.0	65.0	65.0	65.0
Total Split (%)	8.3%	45.8%	37.5%	37.5%	54.2%	54.2%	54.2%	54.2%
Maximum Green (s)	7.0	49.0	39.0	39.0	59.0	59.0	59.0	59.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	None	None
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		12	13	13	35	35	34	34
90th %ile Green (s)	7.0	32.0	22.0	22.0	59.0	59.0	59.0	59.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	Hold	Hold
70th %ile Green (s)	7.0	20.7	10.7	10.7	59.0	59.0	59.0	59.0
70th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
50th %ile Green (s)	7.0	19.2	9.2	9.2	59.0	59.0	59.0	59.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
30th %ile Green (s)	7.0	17.9	7.9	7.9	59.0	59.0	59.0	59.0
30th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
10th %ile Green (s)	12.8	9.8	0.0	0.0	59.0	59.0	59.0	59.0
10th %ile Term Code	Hold	Gap	Skip	Skip	MaxR	MaxR	Hold	Hold

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 90.9
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 103
70th %ile Actuated Cycle: 91.7
50th %ile Actuated Cycle: 90.2
30th %ile Actuated Cycle: 88.9
10th %ile Actuated Cycle: 80.8

Queues
8: Main St N & Church St W/Church St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	121	225	45	84	352	1126
v/c Ratio	0.38	0.57	0.34	0.38	0.19	0.55
Control Delay	30.3	33.5	43.6	37.4	7.4	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	33.5	43.6	37.4	7.4	10.8
Queue Length 50th (m)	17.0	31.1	7.4	12.2	11.0	48.7
Queue Length 95th (m)	30.3	52.0	17.2	25.2	24.0	93.6
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	317	962	478	780	1879	2062
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	0.38	0.23	0.09	0.11	0.19	0.55

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Main St N & Church St W/Church St E

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	150	75	45	69	15	21	311	20	57	1008	61
Future Volume (vph)	121	150	75	45	69	15	21	311	20	57	1008	61
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1774	1757		1712	1797			3324			3463	
Flt Permitted	0.53	1.00		0.62	1.00			0.86			0.91	
Satd. Flow (perm)	997	1757		1114	1797			2881			3161	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	121	150	75	45	69	15	21	311	20	57	1008	61
RTOR Reduction (vph)	0	19	0	0	9	0	0	2	0	0	2	0
Lane Group Flow (vph)	121	206	0	45	75	0	0	350	0	0	1124	0
Confl. Peds. (#/hr)	12		13	13		12	34		35	35		34
Heavy Vehicles (%)	0%	0%	2%	3%	0%	7%	0%	9%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.8	20.8		9.5	9.5			59.4			59.4	
Effective Green, g (s)	20.8	20.8		9.5	9.5			59.4			59.4	
Actuated g/C Ratio	0.23	0.23		0.10	0.10			0.64			0.64	
Clearance Time (s)	3.0	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)	294	396		114	185			1856			2036	
v/s Ratio Prot	0.04	c0.12			0.04							
v/s Ratio Perm	0.06			0.04				0.12			c0.36	
v/c Ratio	0.41	0.52		0.39	0.41			0.19			0.55	
Uniform Delay, d1	29.7	31.3		38.7	38.7			6.6			9.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	1.2		2.2	1.5			0.2			0.3	
Delay (s)	30.7	32.5		40.9	40.2			6.9			9.4	
Level of Service	C	C		D	D			A			A	
Approach Delay (s)		31.8			40.4			6.9			9.4	
Approach LOS		C			D			A			A	

Intersection Summary

HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phasings
9: Chapel St/Theatre Lane & Queen St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.0	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	9.0	72.0	12.0	75.0	75.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	7.5%	60.0%	10.0%	62.5%	62.5%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		4		16	16	11	11		9	9
90th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	18.7	18.7	7.0	28.7	28.7
70th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
50th %ile Green (s)	6.0	66.7	8.3	69.0	69.0	15.6	15.6	7.0	25.6	25.6
50th %ile Term Code	Max	Hold	Gap	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
30th %ile Green (s)	0.0	66.0	7.4	76.4	76.4	12.6	12.6	7.0	22.6	22.6
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	66.0	6.3	75.3	75.3	8.7	8.7	7.0	18.7	18.7
10th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 118.7
50th %ile Actuated Cycle: 115.6
30th %ile Actuated Cycle: 111
10th %ile Actuated Cycle: 106

Queues
9: Chapel St/Theatre Lane & Queen St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	37	793	134	532	150	14	184	129	138	25
v/c Ratio	0.07	0.73	0.39	0.45	0.18	0.09	0.74	0.67	0.34	0.07
Control Delay	6.5	23.7	9.5	13.8	2.3	44.2	54.7	54.5	39.9	1.6
Queue Delay	0.0	16.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	40.1	9.5	13.8	2.3	44.2	54.7	54.5	39.9	1.6
Queue Length 50th (m)	2.3	125.0	8.8	63.6	0.0	2.8	31.6	24.1	26.4	0.0
Queue Length 95th (m)	6.1	193.1	17.0	98.1	8.6	8.9	55.3	#41.9	44.2	1.4
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	525	1080	353	1186	847	215	322	192	494	425
Starvation Cap Reductn	0	288	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	1.00	0.38	0.45	0.18	0.07	0.57	0.67	0.28	0.06

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	783	10	134	532	150	14	87	97	129	138	25
Future Volume (vph)	37	783	10	134	532	150	14	87	97	129	138	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	0.97		1.00	1.00	0.95
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	0.98	1.00		0.99	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1674	1862		1767	1883	1259	1747	1651		1517	1879	1466
Flt Permitted	0.41	1.00		0.19	1.00	1.00	0.67	1.00		0.34	1.00	1.00
Satd. Flow (perm)	727	1862		345	1883	1259	1230	1651		544	1879	1466
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	783	10	134	532	150	14	87	97	129	138	25
RTOR Reduction (vph)	0	0	0	0	0	56	0	35	0	0	0	20
Lane Group Flow (vph)	37	793	0	134	532	94	14	149	0	129	138	5
Confl. Peds. (#/hr)	16		4	4		16	9		11	11		9
Heavy Vehicles (%)	6%	3%	0%	1%	2%	15%	0%	2%	2%	17%	0%	4%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	71.0	67.5		78.5	72.0	72.0	15.0	15.0		25.0	25.0	25.0
Effective Green, g (s)	71.0	67.5		78.5	72.0	72.0	15.0	15.0		25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.58		0.68	0.62	0.62	0.13	0.13		0.22	0.22	0.22
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	475	1088		332	1173	784	159	214		176	406	317
v/s Ratio Prot	0.00	c0.43		c0.03	0.28			0.09		c0.04	0.07	
v/s Ratio Perm	0.05			0.25		0.07	0.01			c0.11		0.00
v/c Ratio	0.08	0.73		0.40	0.45	0.12	0.09	0.70		0.73	0.34	0.02
Uniform Delay, d1	9.0	17.4		12.9	11.4	8.8	44.2	48.1		40.4	38.3	35.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	4.3		0.8	1.3	0.3	0.2	9.5		14.6	0.5	0.0
Delay (s)	9.1	21.7		13.7	12.7	9.2	44.5	57.6		55.0	38.8	35.6
Level of Service	A	C		B	B	A	D	E		D	D	D
Approach Delay (s)		21.1			12.2			56.6			45.7	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	131	61	145	178	35	44	31	158	50	25	23
Future Volume (vph)	6	131	61	145	178	35	44	31	158	50	25	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			0.99			1.00	0.96		0.97	
Flpb, ped/bikes		1.00			1.00			0.94	1.00		0.94	
Frt		0.96			0.99			1.00	0.85		0.97	
Flt Protected		1.00			0.98			0.97	1.00		0.98	
Satd. Flow (prot)		1734			1666			1589	1459		1320	
Flt Permitted		1.00			0.98			0.79	1.00		0.80	
Satd. Flow (perm)		1734			1666			1285	1459		1078	
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)	7	142	66	158	193	38	48	34	172	54	27	25
RTOR Reduction (vph)	0	20	0	0	3	0	0	0	64	0	14	0
Lane Group Flow (vph)	0	195	0	0	386	0	0	82	108	0	92	0
Confl. Peds. (#/hr)	41		44	44		41	59		69	69		59
Heavy Vehicles (%)	0%	0%	0%	12%	1%	26%	0%	20%	5%	0%	0%	92%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		15.4			43.2			13.4	56.6		13.4	
Effective Green, g (s)		15.4			43.2			13.4	56.6		13.4	
Actuated g/C Ratio		0.17			0.48			0.15	0.63		0.15	
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)		296			799			191	1014		160	
v/s Ratio Prot		c0.11			c0.23				0.05			
v/s Ratio Perm								0.06	0.02		c0.09	
v/c Ratio		0.66			0.48			0.43	0.11		0.58	
Uniform Delay, d1		34.8			15.8			34.8	6.6		35.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.2			2.1			1.6	0.0		5.0	
Delay (s)		40.1			17.9			36.4	6.7		40.6	
Level of Service		D			B			D	A		D	
Approach Delay (s)		40.1			17.9			16.3			40.6	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	164	2	10	191	9	6	7	38	13	25	23
Future Volume (vph)	11	164	2	10	191	9	6	7	38	13	25	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	178	2	11	208	10	7	8	41	14	27	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	192	229	56	66
Volume Left (vph)	12	11	7	14
Volume Right (vph)	2	10	41	25
Hadj (s)	0.01	-0.02	-0.41	-0.18
Departure Headway (s)	4.5	4.4	4.5	4.7
Degree Utilization, x	0.24	0.28	0.07	0.09
Capacity (veh/h)	778	785	717	685
Control Delay (s)	8.8	9.1	7.9	8.2
Approach Delay (s)	8.8	9.1	7.9	8.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX

B

2032 FB

Phasings

1: Main St S/Main St N & Queen St W/Queen St E

05-07-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	69.0	69.0	69.0	69.0	51.0	51.0
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%
Maximum Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	43	43	85	85	69	62
90th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 28 (23%), Referenced to phase 2:NBTL, Start of Green

Control Type: Pretimed

Queues

1: Main St S/Main St N & Queen St W/Queen St E

05-07-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	849	33	558	13	453	1166
v/c Ratio	0.84	0.04	0.55	0.02	0.34	0.86
Control Delay	33.7	6.2	21.7	2.0	26.9	42.2
Queue Delay	49.8	0.0	3.2	0.0	0.0	0.0
Total Delay	83.5	6.2	24.9	2.0	26.9	42.2
Queue Length 50th (m)	163.9	0.7	84.8	0.0	38.5	131.6
Queue Length 95th (m)	225.2	5.6	117.0	1.5	51.9	160.5
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	1008	807	1008	792	1327	1357
Starvation Cap Reductn	339	0	338	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	1.27	0.04	0.83	0.02	0.34	0.86

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Main St S/Main St N & Queen St W/Queen St E

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	849	33	0	558	13	0	400	53	0	1129	37
Future Volume (vph)	0	849	33	0	558	13	0	400	53	0	1129	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.95		1.00	0.93		0.98			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			1.00	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1921	1514		1921	1486		3519			3616	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1921	1514		1921	1486		3519			3616	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	849	33	0	558	13	0	400	53	0	1129	37
RTOR Reduction (vph)	0	0	13	0	0	6	0	9	0	0	2	0
Lane Group Flow (vph)	0	849	20	0	558	7	0	444	0	0	1164	0
Confl. Peds. (#/hr)	65		43	43		62	62		69	69		62
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	2%	0%	0%	2%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Effective Green, g (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		1008	794		1008	780		1319			1356	
v/s Ratio Prot		c0.44			0.29			0.13			c0.32	
v/s Ratio Perm			0.01			0.00						
v/c Ratio		0.84	0.03		0.55	0.01		0.34			0.86	
Uniform Delay, d1		24.3	13.7		19.1	13.6		26.8			34.6	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		8.5	0.1		2.2	0.0		0.7			7.2	
Delay (s)		32.8	13.8		21.3	13.6		27.5			41.8	
Level of Service		C	B		C	B		C			D	
Approach Delay (s)		32.1			21.1			27.5			41.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
2: George St S/George St N & Queen St W

05-07-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	8.0	25.0	25.0	8.0	25.0	9.5	28.0	28.0	28.0
Total Split (s)	8.0	70.0	70.0	8.0	70.0	10.0	42.0	32.0	32.0
Total Split (%)	6.7%	58.3%	58.3%	6.7%	58.3%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		31	31		8		22	25	25
90th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
90th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Max	Max
70th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	35.8	25.8	25.8
70th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Gap	Gap
50th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	32.0	22.0	22.0
50th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Gap	Gap
30th %ile Green (s)	0.0	64.0	64.0	5.0	72.0	5.5	28.3	18.3	18.3
30th %ile Term Code	Skip	MaxR	MaxR	Max	Hold	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	64.0	64.0	0.0	64.0	0.0	12.1	12.1	12.1
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Skip	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 111.2
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 119.8
50th %ile Actuated Cycle: 116
30th %ile Actuated Cycle: 112.3
10th %ile Actuated Cycle: 88.1

Queues
2: George St S/George St N & Queen St W

05-07-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	720	67	61	289	62	76	43	251
v/c Ratio	0.06	0.65	0.08	0.18	0.26	0.32	0.17	0.20	0.80
Control Delay	8.6	21.5	1.4	9.4	13.5	34.6	28.3	41.8	60.7
Queue Delay	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
Total Delay	8.6	21.5	1.4	9.4	14.2	34.6	28.3	41.8	60.7
Queue Length 50th (m)	2.6	112.6	0.0	4.7	32.7	10.4	11.1	8.3	51.5
Queue Length 95th (m)	6.8	168.1	3.5	10.4	52.7	20.8	23.0	18.6	80.5
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	561	1109	839	345	1125	195	563	270	399
Starvation Cap Reductn	0	0	0	0	543	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.65	0.08	0.18	0.50	0.32	0.13	0.16	0.63

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: George St S/George St N & Queen St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	720	67	61	272	17	62	60	16	43	181	70
Future Volume (vph)	34	720	67	61	272	17	62	60	16	43	181	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1405	1902	1379	1785	1882		1742	1697		1540	1639	
Flt Permitted	0.57	1.00	1.00	0.23	1.00		0.28	1.00		0.71	1.00	
Satd. Flow (perm)	836	1902	1379	437	1882		506	1697		1147	1639	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	720	67	61	272	17	62	60	16	43	181	70
RTOR Reduction (vph)	0	0	28	0	2	0	0	8	0	0	12	0
Lane Group Flow (vph)	34	720	39	61	287	0	62	68	0	43	239	0
Confl. Peds. (#/hr)	8		31	31		8	25		22	22		25
Heavy Vehicles (%)	26%	1%	3%	0%	1%	0%	2%	7%	0%	10%	3%	22%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	68.3	65.5	65.5	70.3	66.5		29.2	29.2		20.5	20.5	
Effective Green, g (s)	68.3	65.5	65.5	70.3	66.5		29.2	29.2		20.5	20.5	
Actuated g/C Ratio	0.60	0.58	0.58	0.62	0.59		0.26	0.26		0.18	0.18	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	517	1097	795	315	1102		175	436		207	296	
v/s Ratio Prot	0.00	c0.38		c0.01	0.15		c0.01	0.04			c0.15	
v/s Ratio Perm	0.04		0.03	0.11			0.08			0.04		
v/c Ratio	0.07	0.66	0.05	0.19	0.26		0.35	0.16		0.21	0.81	
Uniform Delay, d1	9.2	16.3	10.4	12.0	11.5		33.3	32.6		39.6	44.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.1	0.1	0.3	0.6		1.2	0.2		0.5	14.7	
Delay (s)	9.3	19.4	10.6	12.3	12.1		34.6	32.8		40.1	59.3	
Level of Service	A	B	B	B	B		C	C		D	E	
Approach Delay (s)		18.3			12.1			33.6			56.5	
Approach LOS		B			B			C			E	

Intersection Summary

HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	113.5	Sum of lost time (s)	19.5
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phasings
3: George St N & Nelson St W

05-07-2022

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	24.2	25.8	22.0	22.0	25.8	22.0	22.0	0.0	0.0
90th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	20.5	29.5	22.0	22.0	29.5	22.0	22.0	0.0	0.0
70th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	17.8	41.7	12.5	12.5	41.7	12.5	12.5	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	15.0	46.9	10.1	10.1	46.9	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	11.0	67.0	0.0	0.0	67.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Queues
3: George St N & Nelson St W

05-07-2022

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	263	267	36	64	114
v/c Ratio	0.73	0.36	0.15	0.07	0.53
Control Delay	41.7	21.4	30.4	2.3	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	21.4	30.4	2.3	37.7
Queue Length 50th (m)	38.7	27.7	5.6	0.0	16.8
Queue Length 95th (m)	58.7	63.0	12.3	4.6	29.6
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	467	736	365	894	320
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	0.56	0.36	0.10	0.07	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	151	78	152	59	35	3	30	59	38	48	19
Future Volume (vph)	13	151	78	152	59	35	3	30	59	38	48	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99			0.99			1.00	0.98		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		0.98	
Frt		0.96			0.98			1.00	0.85		0.98	
Flt Protected		1.00			0.97			1.00	1.00		0.98	
Satd. Flow (prot)		1737			1561			1529	1410		1448	
Flt Permitted		1.00			0.97			0.97	1.00		0.87	
Satd. Flow (perm)		1737			1561			1495	1410		1277	
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)	14	164	85	165	64	38	3	33	64	41	52	21
RTOR Reduction (vph)	0	21	0	0	5	0	0	0	25	0	10	0
Lane Group Flow (vph)	0	242	0	0	262	0	0	36	39	0	104	0
Confl. Peds. (#/hr)	21		9	9		21	22		28	28		22
Heavy Vehicles (%)	0%	3%	0%	15%	2%	26%	0%	24%	11%	48%	7%	0%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		17.7			41.0			13.3	54.3		13.3	
Effective Green, g (s)		17.7			41.0			13.3	54.3		13.3	
Actuated g/C Ratio		0.20			0.46			0.15	0.60		0.15	
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)		341			711			220	944		188	
v/s Ratio Prot		c0.14			c0.17				0.02			
v/s Ratio Perm								0.02	0.01		c0.08	
v/c Ratio		0.71			0.37			0.16	0.04		0.55	
Uniform Delay, d1		33.8			16.0			33.5	7.3		35.6	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		6.8			1.5			0.4	0.0		3.5	
Delay (s)		40.6			17.5			33.8	7.3		39.1	
Level of Service		D			B			C	A		D	
Approach Delay (s)		40.6			17.5			16.8			39.1	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	218	3	4	66	2	2	4	12	15	34	38
Future Volume (vph)	24	218	3	4	66	2	2	4	12	15	34	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	237	3	4	72	2	2	4	13	16	37	41

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	266	78	19	94
Volume Left (vph)	26	4	2	16
Volume Right (vph)	3	2	13	41
Hadj (s)	0.01	-0.01	-0.39	-0.23
Departure Headway (s)	4.3	4.4	4.4	4.5
Degree Utilization, x	0.32	0.10	0.02	0.12
Capacity (veh/h)	823	769	746	742
Control Delay (s)	9.2	7.9	7.5	8.1
Approach Delay (s)	9.2	7.9	7.5	8.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
5: Main St N & Nelson St W/Theatre Lane

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	10.0	35.0	25.0	25.0	55.0	55.0	55.0	55.0
Total Split (%)	11.1%	38.9%	27.8%	27.8%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
70th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
50th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	0.0	19.0	19.0	19.0	58.9	58.9	58.9	58.9
10th %ile Term Code	Skip	Hold	Ped	Ped	Dwell	Dwell	Dwell	Dwell

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 90
30th %ile Actuated Cycle: 90
10th %ile Actuated Cycle: 89.9

Queues
5: Main St N & Nelson St W/Theatre Lane

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	102	145	12	100	403	1322
v/c Ratio	0.29	0.29	0.05	0.33	0.23	0.75
Control Delay	22.7	23.2	29.2	21.3	10.5	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.1
Total Delay	22.7	23.2	29.2	21.3	10.5	19.7
Queue Length 50th (m)	11.9	17.0	1.7	7.9	17.7	88.2
Queue Length 95th (m)	23.0	31.6	6.1	21.7	25.6	116.2
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	351	530	238	300	1780	1753
Starvation Cap Reductn	0	0	0	0	0	211
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.27	0.05	0.33	0.23	0.86

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Main St N & Nelson St W/Theatre Lane

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	123	22	12	53	47	8	384	11	72	1095	155
Future Volume (vph)	102	123	22	12	53	47	8	384	11	72	1095	155
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.89			1.00			0.99	
Flpb, ped/bikes	0.89	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.93			1.00			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1502	1623		1613	1256			3390			3425	
Flt Permitted	0.60	1.00		0.66	1.00			0.93			0.90	
Satd. Flow (perm)	946	1623		1128	1256			3139			3077	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	102	123	22	12	53	47	8	384	11	72	1095	155
RTOR Reduction (vph)	0	8	0	0	36	0	0	2	0	0	11	0
Lane Group Flow (vph)	102	137	0	12	64	0	0	401	0	0	1311	0
Confl. Peds. (#/hr)	163		13	13		163	38		39	39		38
Heavy Vehicles (%)	6%	14%	5%	9%	29%	17%	13%	7%	0%	0%	3%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.6	27.6		19.0	19.0			51.0			51.0	
Effective Green, g (s)	27.6	27.6		19.0	19.0			51.0			51.0	
Actuated g/C Ratio	0.30	0.30		0.21	0.21			0.56			0.56	
Clearance Time (s)	3.0	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)	322	494		236	263			1766			1732	
v/s Ratio Prot	c0.02	0.08			0.05							
v/s Ratio Perm	c0.08			0.01				0.13			c0.43	
v/c Ratio	0.32	0.28		0.05	0.25			0.23			0.76	
Uniform Delay, d1	23.6	23.9		28.6	29.8			9.9			15.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.3		0.1	0.5			0.3			3.1	
Delay (s)	24.1	24.2		28.7	30.3			10.2			18.2	
Level of Service	C	C		C	C			B			B	
Approach Delay (s)		24.2			30.1			10.2			18.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Queen St W & Elizabeth St N

05-07-2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	800	416	11	36	6
Future Volume (Veh/h)	8	800	416	11	36	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	800	416	11	36	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	427				838	214
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	427				838	214
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				88	99
cM capacity (veh/h)	1129				303	792

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	275	533	277	150	42
Volume Left	8	0	0	0	36
Volume Right	0	0	0	11	6
cSH	1129	1700	1700	1700	332
Volume to Capacity	0.01	0.31	0.16	0.09	0.13
Queue Length 95th (m)	0.2	0.0	0.0	0.0	3.3
Control Delay (s)	0.3	0.0	0.0	0.0	17.4
Lane LOS	A				C
Approach Delay (s)	0.1		0.0		17.4
Approach LOS					C

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Main St N & Nelson St E

05-07-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	15	468	0	0	1066
Future Volume (Veh/h)	35	15	468	0	0	1066
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	35	15	468	0	0	1066
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.85	0.95			0.95	
vC, conflicting volume	1001	234			468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	418	100			345	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	98			100	
cM capacity (veh/h)	481	893			1154	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	50	312	156	355	711
Volume Left	35	0	0	0	0
Volume Right	15	0	0	0	0
cSH	558	1700	1700	1154	1700
Volume to Capacity	0.09	0.18	0.09	0.00	0.42
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.0
Control Delay (s)	12.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.1	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
8: Main St N & Church St W/Church St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	55.0	45.0	45.0	65.0	65.0	65.0	65.0
Total Split (%)	8.3%	45.8%	37.5%	37.5%	54.2%	54.2%	54.2%	54.2%
Maximum Green (s)	7.0	49.0	39.0	39.0	59.0	59.0	59.0	59.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	None	None
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		12	13	13	35	35	34	34
90th %ile Green (s)	7.0	32.0	22.0	22.0	59.0	59.0	59.0	59.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	Hold	Hold
70th %ile Green (s)	7.0	20.7	10.7	10.7	59.0	59.0	59.0	59.0
70th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
50th %ile Green (s)	7.0	19.2	9.2	9.2	59.0	59.0	59.0	59.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
30th %ile Green (s)	7.0	17.9	7.9	7.9	59.0	59.0	59.0	59.0
30th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
10th %ile Green (s)	12.8	9.8	0.0	0.0	59.0	59.0	59.0	59.0
10th %ile Term Code	Hold	Gap	Skip	Skip	MaxR	MaxR	Hold	Hold

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 90.9
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 103
70th %ile Actuated Cycle: 91.7
50th %ile Actuated Cycle: 90.2
30th %ile Actuated Cycle: 88.9
10th %ile Actuated Cycle: 80.8

Queues
8: Main St N & Church St W/Church St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	121	225	45	84	372	1192
v/c Ratio	0.38	0.57	0.34	0.38	0.20	0.58
Control Delay	30.3	33.5	43.6	37.4	7.5	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	33.5	43.6	37.4	7.5	11.3
Queue Length 50th (m)	17.0	31.1	7.4	12.2	11.6	53.3
Queue Length 95th (m)	30.3	52.0	17.2	25.2	25.3	102.3
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	317	962	478	780	1877	2064
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	0.38	0.23	0.09	0.11	0.20	0.58

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Main St N & Church St W/Church St E

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	150	75	45	69	15	21	331	20	57	1074	61
Future Volume (vph)	121	150	75	45	69	15	21	331	20	57	1074	61
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1774	1757		1712	1797			3326			3466	
Flt Permitted	0.53	1.00		0.62	1.00			0.86			0.91	
Satd. Flow (perm)	997	1757		1114	1797			2874			3164	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	121	150	75	45	69	15	21	331	20	57	1074	61
RTOR Reduction (vph)	0	19	0	0	9	0	0	2	0	0	2	0
Lane Group Flow (vph)	121	206	0	45	75	0	0	370	0	0	1190	0
Confl. Peds. (#/hr)	12		13	13		12	34		35	35		34
Heavy Vehicles (%)	0%	0%	2%	3%	0%	7%	0%	9%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.8	20.8		9.5	9.5			59.4			59.4	
Effective Green, g (s)	20.8	20.8		9.5	9.5			59.4			59.4	
Actuated g/C Ratio	0.23	0.23		0.10	0.10			0.64			0.64	
Clearance Time (s)	3.0	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)	294	396		114	185			1851			2038	
v/s Ratio Prot	0.04	c0.12			0.04							
v/s Ratio Perm	0.06			0.04				0.13			c0.38	
v/c Ratio	0.41	0.52		0.39	0.41			0.20			0.58	
Uniform Delay, d1	29.7	31.3		38.7	38.7			6.7			9.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	1.2		2.2	1.5			0.2			0.4	
Delay (s)	30.7	32.5		40.9	40.2			6.9			9.8	
Level of Service	C	C		D	D			A			A	
Approach Delay (s)		31.8			40.4			6.9			9.8	
Approach LOS		C			D			A			A	

Intersection Summary

HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phasings
9: Chapel St/Theatre Lane & Queen St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.0	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	9.0	72.0	12.0	75.0	75.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	7.5%	60.0%	10.0%	62.5%	62.5%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		4		16	16	11	11		9	9
90th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	18.7	18.7	7.0	28.7	28.7
70th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
50th %ile Green (s)	6.0	66.7	8.3	69.0	69.0	15.6	15.6	7.0	25.6	25.6
50th %ile Term Code	Max	Hold	Gap	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
30th %ile Green (s)	0.0	66.0	7.4	76.4	76.4	12.6	12.6	7.0	22.6	22.6
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	66.0	6.3	75.3	75.3	8.7	8.7	7.0	18.7	18.7
10th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 118.7
50th %ile Actuated Cycle: 115.6
30th %ile Actuated Cycle: 111
10th %ile Actuated Cycle: 106

Queues
9: Chapel St/Theatre Lane & Queen St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	37	844	134	567	150	14	184	129	138	25
v/c Ratio	0.07	0.78	0.44	0.48	0.18	0.09	0.74	0.67	0.34	0.07
Control Delay	6.5	25.9	10.7	14.3	2.3	44.2	54.7	54.5	39.9	1.6
Queue Delay	0.0	28.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	54.6	10.7	14.3	2.3	44.2	54.7	54.5	39.9	1.6
Queue Length 50th (m)	2.3	139.9	8.8	69.6	0.0	2.8	31.6	24.1	26.4	0.0
Queue Length 95th (m)	6.1	216.6	17.0	106.8	8.6	8.9	55.3	#41.9	44.2	1.4
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	500	1080	317	1186	847	215	322	192	494	425
Starvation Cap Reductn	0	272	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	1.04	0.42	0.48	0.18	0.07	0.57	0.67	0.28	0.06

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	834	10	134	567	150	14	87	97	129	138	25
Future Volume (vph)	37	834	10	134	567	150	14	87	97	129	138	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	0.97		1.00	1.00	0.95
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	0.98	1.00		0.99	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1675	1862		1767	1883	1259	1747	1651		1517	1879	1466
Flt Permitted	0.39	1.00		0.15	1.00	1.00	0.67	1.00		0.34	1.00	1.00
Satd. Flow (perm)	684	1862		286	1883	1259	1230	1651		544	1879	1466
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	834	10	134	567	150	14	87	97	129	138	25
RTOR Reduction (vph)	0	0	0	0	0	56	0	35	0	0	0	20
Lane Group Flow (vph)	37	844	0	134	567	94	14	149	0	129	138	5
Confl. Peds. (#/hr)	16		4	4		16	9		11	11		9
Heavy Vehicles (%)	6%	3%	0%	1%	2%	15%	0%	2%	2%	17%	0%	4%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	71.0	67.5		78.5	72.0	72.0	15.0	15.0		25.0	25.0	25.0
Effective Green, g (s)	71.0	67.5		78.5	72.0	72.0	15.0	15.0		25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.58		0.68	0.62	0.62	0.13	0.13		0.22	0.22	0.22
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	450	1088		296	1173	784	159	214		176	406	317
v/s Ratio Prot	0.00	c0.45		c0.03	0.30			0.09		c0.04	0.07	
v/s Ratio Perm	0.05			0.28		0.07	0.01			c0.11		0.00
v/c Ratio	0.08	0.78		0.45	0.48	0.12	0.09	0.70		0.73	0.34	0.02
Uniform Delay, d1	9.2	18.2		14.9	11.7	8.8	44.2	48.1		40.4	38.3	35.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	5.4		1.1	1.4	0.3	0.2	9.5		14.6	0.5	0.0
Delay (s)	9.3	23.7		16.0	13.2	9.2	44.5	57.6		55.0	38.8	35.6
Level of Service	A	C		B	B	A	D	E		D	D	D
Approach Delay (s)		23.1			12.9			56.6			45.7	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phasings

1: Main St S/Main St N & Queen St W/Queen St E

05-07-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	68.0	68.0	68.0	68.0	52.0	52.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%
Maximum Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	125	125	128	128	140	104
90th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 5 (4%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues

1: Main St S/Main St N & Queen St W/Queen St E

05-07-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	647	32	705	23	792	644
v/c Ratio	0.67	0.05	0.72	0.03	0.59	0.49
Control Delay	25.8	6.2	27.5	4.7	31.6	29.0
Queue Delay	51.7	0.0	18.6	0.0	0.0	0.0
Total Delay	77.6	6.2	46.1	4.7	31.6	29.0
Queue Length 50th (m)	108.8	0.6	123.0	0.0	77.0	58.4
Queue Length 95th (m)	150.0	5.5	168.8	3.6	97.1	75.6
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	963	704	982	670	1332	1307
Starvation Cap Reductn	374	0	281	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	1.10	0.05	1.01	0.03	0.59	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Main St S/Main St N & Queen St W/Queen St E

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	647	32	0	705	23	0	752	40	0	561	83
Future Volume (vph)	0	647	32	0	705	23	0	752	40	0	561	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.87		1.00	0.87		0.98			0.97	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.99			0.98	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1865	1339		1902	1273		3468			3385	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1865	1339		1902	1273		3468			3385	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	647	32	0	705	23	0	752	40	0	561	83
RTOR Reduction (vph)	0	0	13	0	0	11	0	3	0	0	10	0
Lane Group Flow (vph)	0	647	19	0	705	12	0	789	0	0	634	0
Confl. Peds. (#/hr)	128		125	125		128	104		140	140		104
Heavy Vehicles (%)	2%	3%	4%	2%	1%	9%	2%	3%	0%	2%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Effective Green, g (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		963	691		982	657		1329			1297	
v/s Ratio Prot		0.35			c0.37			c0.23			0.19	
v/s Ratio Perm			0.01			0.01						
v/c Ratio		0.67	0.03		0.72	0.02		0.59			0.49	
Uniform Delay, d1		21.5	14.2		22.3	14.1		29.5			28.1	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		3.7	0.1		4.5	0.1		2.0			1.3	
Delay (s)		25.2	14.3		26.8	14.2		31.5			29.4	
Level of Service		C	B		C	B		C			C	
Approach Delay (s)		24.7			26.4			31.5			29.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
2: George St S/George St N & Queen St W

05-07-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	25.0	25.0	9.5	25.0	9.5	28.0	28.0	28.0
Total Split (s)	10.0	68.0	68.0	10.0	68.0	10.0	42.0	32.0	32.0
Total Split (%)	8.3%	56.7%	56.7%	8.3%	56.7%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	7.0	62.0	62.0	7.0	62.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		54	54		23		30	39	39
90th %ile Green (s)	7.0	62.5	62.5	6.5	62.0	5.5	33.1	23.1	23.1
90th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Gap	Gap
70th %ile Green (s)	7.0	62.9	62.9	6.1	62.0	5.5	32.0	22.0	22.0
70th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Ped	Ped
50th %ile Green (s)	7.0	72.0	72.0	0.0	62.0	5.5	32.0	22.0	22.0
50th %ile Term Code	Max	Hold	Hold	Skip	MaxR	Max	Hold	Ped	Ped
30th %ile Green (s)	6.7	71.7	71.7	0.0	62.0	5.5	22.5	12.5	12.5
30th %ile Term Code	Gap	Hold	Hold	Skip	MaxR	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	62.0	62.0	0.0	62.0	5.5	18.3	8.3	8.3
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Max	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 109.5
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 117.1
70th %ile Actuated Cycle: 116
50th %ile Actuated Cycle: 116
30th %ile Actuated Cycle: 106.2
10th %ile Actuated Cycle: 92.3

Queues
2: George St S/George St N & Queen St W

05-07-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	552	27	16	754	124	193	37	175
v/c Ratio	0.23	0.48	0.03	0.03	0.70	0.52	0.44	0.23	0.64
Control Delay	9.4	15.5	0.1	7.6	23.1	40.8	35.2	44.0	45.7
Queue Delay	0.0	0.0	0.0	0.0	32.1	0.0	0.0	0.0	0.0
Total Delay	9.4	15.5	0.1	7.6	55.2	40.8	35.2	44.0	45.7
Queue Length 50th (m)	5.1	62.6	0.0	1.2	127.0	21.5	32.8	7.2	28.8
Queue Length 95th (m)	10.5	111.6	0.0	3.7	179.6	37.0	53.7	16.8	51.3
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	289	1146	796	531	1076	239	583	241	397
Starvation Cap Reductn	0	0	0	0	358	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.48	0.03	0.03	1.05	0.52	0.33	0.15	0.44

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: George St S/George St N & Queen St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	552	27	16	726	28	124	142	51	37	92	83
Future Volume (vph)	66	552	27	16	726	28	124	142	51	37	92	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.82	1.00	1.00		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.98	1.00		0.99	1.00		0.94	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1513	1883	1267	1752	1886		1761	1734		1515	1551	
Flt Permitted	0.20	1.00	1.00	0.38	1.00		0.39	1.00		0.64	1.00	
Satd. Flow (perm)	321	1883	1267	700	1886		724	1734		1014	1551	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	66	552	27	16	726	28	124	142	51	37	92	83
RTOR Reduction (vph)	0	0	11	0	1	0	0	11	0	0	30	0
Lane Group Flow (vph)	66	552	16	16	753	0	124	182	0	37	145	0
Confl. Peds. (#/hr)	23		54	54		23	39		30	30		39
Heavy Vehicles (%)	18%	2%	4%	0%	1%	0%	0%	2%	0%	11%	5%	13%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	72.0	66.7	66.7	66.2	63.8		27.3	27.3		17.3	17.3	
Effective Green, g (s)	72.0	66.7	66.7	66.2	63.8		27.3	27.3		17.3	17.3	
Actuated g/C Ratio	0.65	0.60	0.60	0.59	0.57		0.25	0.25		0.16	0.16	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	264	1127	758	438	1080		228	424		157	240	
v/s Ratio Prot	c0.01	0.29		0.00	c0.40		c0.03	0.10			0.09	
v/s Ratio Perm	0.15		0.01	0.02			c0.11			0.04		
v/c Ratio	0.25	0.49	0.02	0.04	0.70		0.54	0.43		0.24	0.61	
Uniform Delay, d1	12.2	12.7	9.1	9.8	16.9		35.5	35.5		41.3	43.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.5	0.1	0.0	3.7		2.6	0.7		0.8	4.3	
Delay (s)	12.7	14.2	9.1	9.8	20.7		38.2	36.2		42.0	48.2	
Level of Service	B	B	A	A	C		D	D		D	D	
Approach Delay (s)		13.8			20.4			37.0			47.1	
Approach LOS		B			C			D			D	

Intersection Summary

HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	111.4	Sum of lost time (s)	19.5
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phasings
3: George St N & Nelson St W

05-07-2022

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	21.4	28.6	22.0	22.0	28.6	22.0	22.0	0.0	0.0
90th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	17.9	32.1	22.0	22.0	32.1	22.0	22.0	0.0	0.0
70th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	15.4	43.8	12.8	12.8	43.8	12.8	12.8	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	12.9	49.0	10.1	10.1	49.0	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	9.2	68.8	0.0	0.0	68.8	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Queues
3: George St N & Nelson St W

05-07-2022

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	215	389	82	172	106
v/c Ratio	0.68	0.47	0.39	0.17	0.56
Control Delay	41.5	21.9	36.9	1.5	39.1
Queue Delay	0.0	0.7	0.0	0.0	0.0
Total Delay	41.5	22.5	36.9	1.5	39.1
Queue Length 50th (m)	31.2	42.3	13.2	0.0	14.8
Queue Length 95th (m)	49.8	#91.5	23.6	6.5	27.8
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	461	825	313	1000	275
Starvation Cap Reductn	0	180	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.60	0.26	0.17	0.39

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	131	61	145	178	35	44	31	158	50	25	23
Future Volume (vph)	6	131	61	145	178	35	44	31	158	50	25	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			0.99			1.00	0.96		0.97	
Flpb, ped/bikes		1.00			1.00			0.94	1.00		0.94	
Frt		0.96			0.99			1.00	0.85		0.97	
Flt Protected		1.00			0.98			0.97	1.00		0.98	
Satd. Flow (prot)		1734			1666			1589	1459		1320	
Flt Permitted		1.00			0.98			0.79	1.00		0.80	
Satd. Flow (perm)		1734			1666			1285	1459		1078	
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)	7	142	66	158	193	38	48	34	172	54	27	25
RTOR Reduction (vph)	0	20	0	0	3	0	0	0	64	0	14	0
Lane Group Flow (vph)	0	195	0	0	386	0	0	82	108	0	92	0
Confl. Peds. (#/hr)	41		44	44		41	59		69	69		59
Heavy Vehicles (%)	0%	0%	0%	12%	1%	26%	0%	20%	5%	0%	0%	92%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		15.4			43.2			13.4	56.6		13.4	
Effective Green, g (s)		15.4			43.2			13.4	56.6		13.4	
Actuated g/C Ratio		0.17			0.48			0.15	0.63		0.15	
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)		296			799			191	1014		160	
v/s Ratio Prot		c0.11			c0.23				0.05			
v/s Ratio Perm								0.06	0.02		c0.09	
v/c Ratio		0.66			0.48			0.43	0.11		0.58	
Uniform Delay, d1		34.8			15.8			34.8	6.6		35.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.2			2.1			1.6	0.0		5.0	
Delay (s)		40.1			17.9			36.4	6.7		40.6	
Level of Service		D			B			D	A		D	
Approach Delay (s)		40.1			17.9			16.3			40.6	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	164	2	10	191	9	6	7	38	13	25	23
Future Volume (vph)	11	164	2	10	191	9	6	7	38	13	25	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	178	2	11	208	10	7	8	41	14	27	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	192	229	56	66
Volume Left (vph)	12	11	7	14
Volume Right (vph)	2	10	41	25
Hadj (s)	0.01	-0.02	-0.41	-0.18
Departure Headway (s)	4.5	4.4	4.5	4.7
Degree Utilization, x	0.24	0.28	0.07	0.09
Capacity (veh/h)	778	785	717	685
Control Delay (s)	8.8	9.1	7.9	8.2
Approach Delay (s)	8.8	9.1	7.9	8.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
5: Main St N & Nelson St W/Theatre Lane

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	13.0	45.0	32.0	32.0	45.0	45.0	45.0	45.0
Total Split (%)	14.4%	50.0%	35.6%	35.6%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
90th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
70th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	10.0	34.7	21.7	21.7	39.0	39.0	39.0	39.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	10.0	32.0	19.0	19.0	39.0	39.0	39.0	39.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	8.6	30.6	19.0	19.0	39.0	39.0	39.0	39.0
10th %ile Term Code	Gap	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 86.1
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 85.7
30th %ile Actuated Cycle: 83
10th %ile Actuated Cycle: 81.6

Queues
5: Main St N & Nelson St W/Theatre Lane

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	224	124	55	312	739	753
v/c Ratio	0.61	0.19	0.18	0.78	0.49	0.59
Control Delay	23.0	14.2	26.1	39.6	18.3	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	14.2	26.1	39.6	18.3	19.2
Queue Length 50th (m)	22.8	10.6	7.1	41.1	42.7	43.7
Queue Length 95th (m)	37.8	21.3	16.2	#71.4	63.4	66.6
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	372	738	366	462	1513	1287
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	0.60	0.17	0.15	0.68	0.49	0.59

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
5: Main St N & Nelson St W/Theatre Lane

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	97	27	55	174	138	10	719	10	51	555	147
Future Volume (vph)	224	97	27	55	174	138	10	719	10	51	555	147
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.86			1.00			0.96	
Flpb, ped/bikes	0.96	1.00		0.95	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.93			1.00			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1659	1604		1703	1426			3530			3280	
Flt Permitted	0.34	1.00		0.68	1.00			0.94			0.85	
Satd. Flow (perm)	588	1604		1215	1426			3329			2789	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	224	97	27	55	174	138	10	719	10	51	555	147
RTOR Reduction (vph)	0	12	0	0	33	0	0	1	0	0	23	0
Lane Group Flow (vph)	224	112	0	55	279	0	0	738	0	0	730	0
Confl. Peds. (#/hr)	228		40	40		228	101		73	73		101
Heavy Vehicles (%)	3%	15%	0%	0%	8%	4%	0%	3%	0%	0%	3%	4%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	35.0	35.0		22.3	22.3			39.1			39.1	
Effective Green, g (s)	35.0	35.0		22.3	22.3			39.1			39.1	
Actuated g/C Ratio	0.41	0.41		0.26	0.26			0.45			0.45	
Clearance Time (s)	3.0	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)	359	652		314	369			1511			1266	
v/s Ratio Prot	c0.07	0.07			c0.20							
v/s Ratio Perm	0.18			0.05				0.22			c0.26	
v/c Ratio	0.62	0.17		0.18	0.76			0.49			0.58	
Uniform Delay, d1	18.3	16.3		24.8	29.4			16.5			17.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.4	0.1		0.3	8.5			1.1			1.9	
Delay (s)	21.7	16.4		25.0	37.9			17.6			19.3	
Level of Service	C	B		C	D			B			B	
Approach Delay (s)		19.8			36.0			17.6			19.3	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	86.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Queen St W & Elizabeth St N

05-07-2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	624	923	43	32	6
Future Volume (Veh/h)	8	624	923	43	32	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	624	923	43	32	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	966				1272	483
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	966				1272	483
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				80	99
cM capacity (veh/h)	709				158	530

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	216	416	615	351	38
Volume Left	8	0	0	0	32
Volume Right	0	0	0	43	6
cSH	709	1700	1700	1700	177
Volume to Capacity	0.01	0.24	0.36	0.21	0.21
Queue Length 95th (m)	0.3	0.0	0.0	0.0	6.0
Control Delay (s)	0.5	0.0	0.0	0.0	30.8
Lane LOS	A				D
Approach Delay (s)	0.2		0.0		30.8
Approach LOS					D

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Main St N & Nelson St E

05-07-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	76	949	0	0	582
Future Volume (Veh/h)	42	76	949	0	0	582
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	42	76	949	0	0	582
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.90	0.86			0.86	
vC, conflicting volume	1240	474			949	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	713	77			626	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	91			100	
cM capacity (veh/h)	328	837			822	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	118	633	316	194	388
Volume Left	42	0	0	0	0
Volume Right	76	0	0	0	0
cSH	540	1700	1700	822	1700
Volume to Capacity	0.22	0.37	0.19	0.00	0.23
Queue Length 95th (m)	6.3	0.0	0.0	0.0	0.0
Control Delay (s)	13.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	13.5	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
8: Main St N & Church St W/Church St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	40.0	30.0	30.0	80.0	80.0	80.0	80.0
Total Split (%)	8.3%	33.3%	25.0%	25.0%	66.7%	66.7%	66.7%	66.7%
Maximum Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		17	22	22	44	44	59	59
90th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
70th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
50th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
30th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
10th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues
8: Main St N & Church St W/Church St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	89	194	66	286	1189	733
v/c Ratio	0.41	0.38	0.28	0.79	0.60	0.41
Control Delay	36.5	33.8	44.6	59.6	15.6	12.3
Queue Delay	0.0	0.0	0.0	0.0	2.2	0.0
Total Delay	36.5	33.8	44.6	59.6	17.7	12.3
Queue Length 50th (m)	15.3	33.2	13.3	61.5	83.8	42.5
Queue Length 95th (m)	28.1	54.1	26.6	#101.1	103.6	54.9
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	216	508	234	364	1967	1770
Starvation Cap Reductn	0	0	0	0	603	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.38	0.28	0.79	0.87	0.41

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
8: Main St N & Church St W/Church St E

05-07-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	135	59	66	210	76	33	1097	59	32	626	75
Future Volume (vph)	89	135	59	66	210	76	33	1097	59	32	626	75
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.99			0.98	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.96			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1727	1750		1747	1768			3494			3380	
Flt Permitted	0.26	1.00		0.64	1.00			0.91			0.84	
Satd. Flow (perm)	467	1750		1169	1768			3185			2860	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	135	59	66	210	76	33	1097	59	32	626	75
RTOR Reduction (vph)	0	13	0	0	11	0	0	3	0	0	7	0
Lane Group Flow (vph)	89	181	0	66	275	0	0	1186	0	0	726	0
Confl. Peds. (#/hr)	22		17	17		22	59		44	44		59
Heavy Vehicles (%)	3%	0%	4%	0%	1%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Effective Green, g (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Actuated g/C Ratio	0.28	0.28		0.20	0.20			0.62			0.62	
Clearance Time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)	205	495		233	353			1964			1763	
v/s Ratio Prot	c0.03	0.10			c0.16							
v/s Ratio Perm	0.10			0.06				c0.37			0.25	
v/c Ratio	0.43	0.37		0.28	0.78			0.60			0.41	
Uniform Delay, d1	33.5	34.4		40.7	45.5			14.0			11.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.6	2.1		3.0	15.5			1.4			0.7	
Delay (s)	40.1	36.5		43.7	61.0			15.4			12.5	
Level of Service	D	D		D	E			B			B	
Approach Delay (s)		37.6			57.8			15.4			12.5	
Approach LOS		D			E			B			B	

Intersection Summary

HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phasings
9: Chapel St/Theatre Lane & Queen St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	10.0	73.0	11.0	74.0	74.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	8.3%	60.8%	9.2%	61.7%	61.7%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		39		35	35	35	35		25	25
90th %ile Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.5	67.0	7.6	68.1	68.1	20.0	20.0	7.0	30.0	30.0
70th %ile Term Code	Gap	MaxR	Gap	Hold	Hold	Max	Max	Max	Hold	Hold
50th %ile Green (s)	6.1	67.1	7.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
50th %ile Term Code	Gap	Hold	Gap	MaxR	MaxR	Ped	Ped	Max	Hold	Hold
30th %ile Green (s)	0.0	67.0	6.3	76.3	76.3	14.5	14.5	7.0	24.5	24.5
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	68.0	0.0	68.0	68.0	9.8	9.8	7.0	19.8	19.8
10th %ile Term Code	Skip	Hold	Skip	MaxR	MaxR	Gap	Gap	Max	Hold	Hold

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 119.6
50th %ile Actuated Cycle: 119.1
30th %ile Actuated Cycle: 112.8
10th %ile Actuated Cycle: 99.8

Queues
9: Chapel St/Theatre Lane & Queen St E

05-07-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	30	665	69	618	422	18	208	158	90	82
v/c Ratio	0.06	0.61	0.16	0.53	0.44	0.10	0.77	0.81	0.21	0.21
Control Delay	6.7	19.2	7.3	16.3	2.7	43.9	57.3	67.3	36.9	9.0
Queue Delay	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	22.3	7.3	16.3	2.7	43.9	57.3	67.3	36.9	9.0
Queue Length 50th (m)	2.1	100.4	5.0	87.1	0.0	3.6	37.3	29.7	16.6	0.0
Queue Length 95th (m)	5.2	141.4	9.8	122.5	13.3	10.4	#64.2	#61.6	30.6	12.3
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	476	1098	437	1165	963	215	317	195	495	434
Starvation Cap Reductn	0	322	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.86	0.16	0.53	0.44	0.08	0.66	0.81	0.18	0.19

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	650	15	69	618	422	18	99	109	158	90	82
Future Volume (vph)	30	650	15	69	618	422	18	99	109	158	90	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.89	1.00	0.94		1.00	1.00	0.91
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	0.94	1.00		0.98	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1772	1855		1785	1902	1311	1671	1623		1569	1879	1424
Flt Permitted	0.33	1.00		0.27	1.00	1.00	0.70	1.00		0.31	1.00	1.00
Satd. Flow (perm)	616	1855		513	1902	1311	1229	1623		516	1879	1424
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	650	15	69	618	422	18	99	109	158	90	82
RTOR Reduction (vph)	0	1	0	0	0	166	0	34	0	0	0	63
Lane Group Flow (vph)	30	664	0	69	618	256	18	174	0	158	90	19
Confl. Peds. (#/hr)	35		39	39		35	25		35	35		25
Heavy Vehicles (%)	0%	3%	0%	0%	1%	5%	0%	0%	0%	12%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Effective Green, g (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Actuated g/C Ratio	0.62	0.59		0.66	0.61	0.61	0.14	0.14		0.23	0.23	0.23
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	420	1094		397	1153	795	177	234		183	434	329
v/s Ratio Prot	0.00	c0.36		c0.01	0.32			0.11		c0.05	0.05	
v/s Ratio Perm	0.04			0.11		0.20	0.01			c0.15		0.01
v/c Ratio	0.07	0.61		0.17	0.54	0.32	0.10	0.74		0.86	0.21	0.06
Uniform Delay, d1	9.5	15.1		9.8	13.2	11.1	42.8	47.3		41.3	35.8	34.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	2.5		0.2	1.8	1.1	0.3	12.0		31.8	0.2	0.1
Delay (s)	9.6	17.6		10.0	15.0	12.2	43.1	59.3		73.1	36.0	34.6
Level of Service	A	B		B	B	B	D	E		E	D	C
Approach Delay (s)		17.3			13.6			58.0			53.4	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	115.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX

C

2041 FB

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	69.0	69.0	69.0	69.0	51.0	51.0
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%
Maximum Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	43	43	85	85	69	62
90th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 28 (23%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	943	33	621	13	497	1288
v/c Ratio	0.94	0.04	0.62	0.02	0.37	0.95
Control Delay	44.0	6.2	23.3	2.0	27.6	51.4
Queue Delay	45.9	0.0	5.6	0.0	0.0	0.0
Total Delay	89.9	6.2	28.9	2.0	27.6	51.4
Queue Length 50th (m)	199.6	0.7	98.9	0.0	43.1	152.9
Queue Length 95th (m)	#290.9	5.6	135.7	1.5	57.3	#198.7
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	1008	807	1008	792	1331	1359
Starvation Cap Reductn	305	0	321	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	1.34	0.04	0.90	0.02	0.37	0.95

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	943	33	0	621	13	0	444	53	0	1251	37
Future Volume (vph)	0	943	33	0	621	13	0	444	53	0	1251	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.95		1.00	0.93		0.98			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			1.00	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1921	1514		1921	1486		3530			3619	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1921	1514		1921	1486		3530			3619	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	943	33	0	621	13	0	444	53	0	1251	37
RTOR Reduction (vph)	0	0	13	0	0	6	0	8	0	0	2	0
Lane Group Flow (vph)	0	943	20	0	621	7	0	490	0	0	1286	0
Confl. Peds. (#/hr)	65		43	43		62	62		69	69		62
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	2%	0%	0%	2%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Effective Green, g (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		1008	794		1008	780		1323			1357	
v/s Ratio Prot		c0.49			0.32			0.14			c0.36	
v/s Ratio Perm			0.01			0.00						
v/c Ratio		0.94	0.03		0.62	0.01		0.37			0.95	
Uniform Delay, d1		26.6	13.7		20.0	13.6		27.2			36.4	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		16.5	0.1		2.8	0.0		0.8			14.8	
Delay (s)		43.1	13.8		22.8	13.6		28.0			51.1	
Level of Service		D	B		C	B		C			D	
Approach Delay (s)		42.1			22.6			28.0			51.1	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	8.0	25.0	25.0	8.0	25.0	9.5	28.0	28.0	28.0
Total Split (s)	8.0	70.0	70.0	8.0	70.0	10.0	42.0	32.0	32.0
Total Split (%)	6.7%	58.3%	58.3%	6.7%	58.3%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		31	31		8		22	25	25
90th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
90th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Max	Max
70th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	35.8	25.8	25.8
70th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Gap	Gap
50th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	32.0	22.0	22.0
50th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Gap	Gap
30th %ile Green (s)	0.0	64.0	64.0	5.0	72.0	5.5	28.3	18.3	18.3
30th %ile Term Code	Skip	MaxR	MaxR	Max	Hold	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	64.0	64.0	0.0	64.0	0.0	12.1	12.1	12.1
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Skip	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 111.2
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 119.8
50th %ile Actuated Cycle: 116
30th %ile Actuated Cycle: 112.3
10th %ile Actuated Cycle: 88.1

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	801	67	61	319	62	76	43	251
v/c Ratio	0.06	0.72	0.08	0.21	0.28	0.32	0.17	0.20	0.80
Control Delay	8.6	24.2	1.4	10.0	13.7	34.6	28.3	41.8	60.7
Queue Delay	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0
Total Delay	8.6	24.2	1.4	10.0	14.6	34.6	28.3	41.8	60.7
Queue Length 50th (m)	2.6	134.5	0.0	4.7	36.8	10.4	11.1	8.3	51.5
Queue Length 95th (m)	6.8	200.5	3.5	10.4	58.6	20.8	23.0	18.6	80.5
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	540	1109	839	285	1126	195	563	270	399
Starvation Cap Reductn	0	0	0	0	533	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.72	0.08	0.21	0.54	0.32	0.13	0.16	0.63

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	801	67	61	302	17	62	60	16	43	181	70
Future Volume (vph)	34	801	67	61	302	17	62	60	16	43	181	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1406	1902	1379	1785	1884		1742	1697		1540	1639	
Flt Permitted	0.54	1.00	1.00	0.18	1.00		0.28	1.00		0.71	1.00	
Satd. Flow (perm)	799	1902	1379	339	1884		506	1697		1147	1639	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	801	67	61	302	17	62	60	16	43	181	70
RTOR Reduction (vph)	0	0	28	0	2	0	0	8	0	0	12	0
Lane Group Flow (vph)	34	801	39	61	317	0	62	68	0	43	239	0
Confl. Peds. (#/hr)	8		31	31		8	25		22	22		25
Heavy Vehicles (%)	26%	1%	3%	0%	1%	0%	2%	7%	0%	10%	3%	22%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	68.3	65.5	65.5	70.3	66.5		29.2	29.2		20.5	20.5	
Effective Green, g (s)	68.3	65.5	65.5	70.3	66.5		29.2	29.2		20.5	20.5	
Actuated g/C Ratio	0.60	0.58	0.58	0.62	0.59		0.26	0.26		0.18	0.18	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	495	1097	795	258	1103		175	436		207	296	
v/s Ratio Prot	0.00	c0.42		c0.01	0.17		c0.01	0.04			c0.15	
v/s Ratio Perm	0.04		0.03	0.14			0.08			0.04		
v/c Ratio	0.07	0.73	0.05	0.24	0.29		0.35	0.16		0.21	0.81	
Uniform Delay, d1	9.3	17.5	10.4	13.9	11.7		33.3	32.6		39.6	44.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	4.3	0.1	0.5	0.7		1.2	0.2		0.5	14.7	
Delay (s)	9.3	21.8	10.6	14.4	12.4		34.6	32.8		40.1	59.3	
Level of Service	A	C	B	B	B		C	C		D	E	
Approach Delay (s)		20.5			12.7			33.6			56.5	
Approach LOS		C			B			C			E	

Intersection Summary

HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	113.5	Sum of lost time (s)	19.5
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	24.2	25.8	22.0	22.0	25.8	22.0	22.0	0.0	0.0
90th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	20.5	29.5	22.0	22.0	29.5	22.0	22.0	0.0	0.0
70th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	17.8	41.7	12.5	12.5	41.7	12.5	12.5	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	15.0	46.9	10.1	10.1	46.9	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	11.0	67.0	0.0	0.0	67.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	263	267	36	64	114
v/c Ratio	0.73	0.36	0.15	0.07	0.53
Control Delay	41.7	21.4	30.4	2.3	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	21.4	30.4	2.3	37.7
Queue Length 50th (m)	38.7	27.7	5.6	0.0	16.8
Queue Length 95th (m)	58.7	63.0	12.3	4.6	29.6
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	467	736	365	894	320
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	0.56	0.36	0.10	0.07	0.36

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	151	78	152	59	35	3	30	59	38	48	19
Future Volume (vph)	13	151	78	152	59	35	3	30	59	38	48	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99			0.99			1.00	0.98		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		0.98	
Frt		0.96			0.98			1.00	0.85		0.98	
Flt Protected		1.00			0.97			1.00	1.00		0.98	
Satd. Flow (prot)		1737			1561			1529	1410		1448	
Flt Permitted		1.00			0.97			0.97	1.00		0.87	
Satd. Flow (perm)		1737			1561			1495	1410		1277	
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)	14	164	85	165	64	38	3	33	64	41	52	21
RTOR Reduction (vph)	0	21	0	0	5	0	0	0	25	0	10	0
Lane Group Flow (vph)	0	242	0	0	262	0	0	36	39	0	104	0
Confl. Peds. (#/hr)	21		9	9		21	22		28	28		22
Heavy Vehicles (%)	0%	3%	0%	15%	2%	26%	0%	24%	11%	48%	7%	0%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		17.7			41.0			13.3	54.3		13.3	
Effective Green, g (s)		17.7			41.0			13.3	54.3		13.3	
Actuated g/C Ratio		0.20			0.46			0.15	0.60		0.15	
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)		341			711			220	944		188	
v/s Ratio Prot		c0.14			c0.17				0.02			
v/s Ratio Perm								0.02	0.01		c0.08	
v/c Ratio		0.71			0.37			0.16	0.04		0.55	
Uniform Delay, d1		33.8			16.0			33.5	7.3		35.6	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		6.8			1.5			0.4	0.0		3.5	
Delay (s)		40.6			17.5			33.8	7.3		39.1	
Level of Service		D			B			C	A		D	
Approach Delay (s)		40.6			17.5			16.8			39.1	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	218	3	4	66	2	2	4	12	15	34	38
Future Volume (vph)	24	218	3	4	66	2	2	4	12	15	34	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	237	3	4	72	2	2	4	13	16	37	41

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	266	78	19	94
Volume Left (vph)	26	4	2	16
Volume Right (vph)	3	2	13	41
Hadj (s)	0.01	-0.01	-0.39	-0.23
Departure Headway (s)	4.3	4.4	4.4	4.5
Degree Utilization, x	0.32	0.10	0.02	0.12
Capacity (veh/h)	823	769	746	742
Control Delay (s)	9.2	7.9	7.5	8.1
Approach Delay (s)	9.2	7.9	7.5	8.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	10.0	35.0	25.0	25.0	55.0	55.0	55.0	55.0
Total Split (%)	11.1%	38.9%	27.8%	27.8%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
70th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
50th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	0.0	19.0	19.0	19.0	58.9	58.9	58.9	58.9
10th %ile Term Code	Skip	Hold	Ped	Ped	Dwell	Dwell	Dwell	Dwell

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 90
30th %ile Actuated Cycle: 90
10th %ile Actuated Cycle: 89.9

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	102	145	12	100	446	1441
v/c Ratio	0.29	0.29	0.05	0.33	0.25	0.82
Control Delay	22.7	23.2	29.2	21.3	10.7	21.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.4
Total Delay	22.7	23.2	29.2	21.3	10.7	23.8
Queue Length 50th (m)	11.9	17.0	1.7	7.9	20.0	103.2
Queue Length 95th (m)	23.0	31.6	6.1	21.7	28.6	136.1
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	351	530	238	300	1778	1757
Starvation Cap Reductn	0	0	0	0	0	198
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.27	0.05	0.33	0.25	0.92

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	123	22	12	53	47	8	427	11	72	1214	155
Future Volume (vph)	102	123	22	12	53	47	8	427	11	72	1214	155
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.89			1.00			0.99	
Flpb, ped/bikes	0.89	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.93			1.00			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1502	1623		1613	1256			3393			3435	
Flt Permitted	0.60	1.00		0.66	1.00			0.92			0.90	
Satd. Flow (perm)	946	1623		1128	1256			3137			3082	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	102	123	22	12	53	47	8	427	11	72	1214	155
RTOR Reduction (vph)	0	8	0	0	36	0	0	2	0	0	10	0
Lane Group Flow (vph)	102	137	0	12	64	0	0	444	0	0	1431	0
Confl. Peds. (#/hr)	163		13	13		163	38		39	39		38
Heavy Vehicles (%)	6%	14%	5%	9%	29%	17%	13%	7%	0%	0%	3%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.6	27.6		19.0	19.0			51.0			51.0	
Effective Green, g (s)	27.6	27.6		19.0	19.0			51.0			51.0	
Actuated g/C Ratio	0.30	0.30		0.21	0.21			0.56			0.56	
Clearance Time (s)	3.0	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)	322	494		236	263			1765			1734	
v/s Ratio Prot	c0.02	0.08			0.05							
v/s Ratio Perm	c0.08			0.01				0.14			c0.46	
v/c Ratio	0.32	0.28		0.05	0.25			0.25			0.83	
Uniform Delay, d1	23.6	23.9		28.6	29.8			10.1			16.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.3		0.1	0.5			0.3			4.6	
Delay (s)	24.1	24.2		28.7	30.3			10.4			20.8	
Level of Service	C	C		C	C			B			C	
Approach Delay (s)		24.2			30.1			10.4			20.8	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	888	460	11	36	6
Future Volume (Veh/h)	8	888	460	11	36	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	888	460	11	36	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	471				926	236
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	471				926	236
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				86	99
cM capacity (veh/h)	1087				266	766

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	304	592	307	164	42
Volume Left	8	0	0	0	36
Volume Right	0	0	0	11	6
cSH	1087	1700	1700	1700	293
Volume to Capacity	0.01	0.35	0.18	0.10	0.14
Queue Length 95th (m)	0.2	0.0	0.0	0.0	3.8
Control Delay (s)	0.3	0.0	0.0	0.0	19.3
Lane LOS	A				C
Approach Delay (s)	0.1		0.0		19.3
Approach LOS					C

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	15	468	0	0	1066
Future Volume (Veh/h)	35	15	468	0	0	1066
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	35	15	468	0	0	1066
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.84	0.95			0.95	
vC, conflicting volume	1001	234			468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	346	90			336	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	98			100	
cM capacity (veh/h)	523	903			1159	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	50	312	156	355	711
Volume Left	35	0	0	0	0
Volume Right	15	0	0	0	0
cSH	598	1700	1700	1159	1700
Volume to Capacity	0.08	0.18	0.09	0.00	0.42
Queue Length 95th (m)	2.1	0.0	0.0	0.0	0.0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	55.0	45.0	45.0	65.0	65.0	65.0	65.0
Total Split (%)	8.3%	45.8%	37.5%	37.5%	54.2%	54.2%	54.2%	54.2%
Maximum Green (s)	7.0	49.0	39.0	39.0	59.0	59.0	59.0	59.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	None	None
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		12	13	13	35	35	34	34
90th %ile Green (s)	7.0	32.0	22.0	22.0	59.0	59.0	59.0	59.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	Hold	Hold
70th %ile Green (s)	7.0	20.7	10.7	10.7	59.0	59.0	59.0	59.0
70th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
50th %ile Green (s)	7.0	19.2	9.2	9.2	59.0	59.0	59.0	59.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
30th %ile Green (s)	7.0	17.9	7.9	7.9	59.0	59.0	59.0	59.0
30th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
10th %ile Green (s)	12.8	9.8	0.0	0.0	59.0	59.0	59.0	59.0
10th %ile Term Code	Hold	Gap	Skip	Skip	MaxR	MaxR	Hold	Hold

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 90.9
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 103
70th %ile Actuated Cycle: 91.7
50th %ile Actuated Cycle: 90.2
30th %ile Actuated Cycle: 88.9
10th %ile Actuated Cycle: 80.8

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	121	225	45	84	407	1310
v/c Ratio	0.38	0.57	0.34	0.38	0.22	0.63
Control Delay	30.3	33.5	43.6	37.4	7.6	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	33.5	43.6	37.4	7.6	12.3
Queue Length 50th (m)	17.0	31.1	7.4	12.2	13.0	62.3
Queue Length 95th (m)	30.3	52.0	17.2	25.2	27.8	119.4
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	317	962	478	780	1870	2067
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	0.38	0.23	0.09	0.11	0.22	0.63

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	150	75	45	69	15	21	366	20	57	1192	61
Future Volume (vph)	121	150	75	45	69	15	21	366	20	57	1192	61
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1774	1757		1712	1797			3328			3470	
Flt Permitted	0.53	1.00		0.62	1.00			0.86			0.91	
Satd. Flow (perm)	997	1757		1114	1797			2862			3168	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	121	150	75	45	69	15	21	366	20	57	1192	61
RTOR Reduction (vph)	0	19	0	0	9	0	0	2	0	0	2	0
Lane Group Flow (vph)	121	206	0	45	75	0	0	405	0	0	1308	0
Confl. Peds. (#/hr)	12		13	13		12	34		35	35		34
Heavy Vehicles (%)	0%	0%	2%	3%	0%	7%	0%	9%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.8	20.8		9.5	9.5			59.4			59.4	
Effective Green, g (s)	20.8	20.8		9.5	9.5			59.4			59.4	
Actuated g/C Ratio	0.23	0.23		0.10	0.10			0.64			0.64	
Clearance Time (s)	3.0	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)	294	396		114	185			1843			2040	
v/s Ratio Prot	0.04	c0.12			0.04							
v/s Ratio Perm	0.06			0.04				0.14			c0.41	
v/c Ratio	0.41	0.52		0.39	0.41			0.22			0.64	
Uniform Delay, d1	29.7	31.3		38.7	38.7			6.8			9.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	1.2		2.2	1.5			0.3			0.7	
Delay (s)	30.7	32.5		40.9	40.2			7.1			10.6	
Level of Service	C	C		D	D			A			B	
Approach Delay (s)		31.8			40.4			7.1			10.6	
Approach LOS		C			D			A			B	

Intersection Summary

HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.0	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	9.0	72.0	12.0	75.0	75.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	7.5%	60.0%	10.0%	62.5%	62.5%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		4		16	16	11	11		9	9
90th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	18.7	18.7	7.0	28.7	28.7
70th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
50th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	15.6	15.6	7.0	25.6	25.6
50th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
30th %ile Green (s)	0.0	66.0	7.6	76.6	76.6	12.6	12.6	7.0	22.6	22.6
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	66.0	6.6	75.6	75.6	8.7	8.7	7.0	18.7	18.7
10th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 114.4
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 118.7
50th %ile Actuated Cycle: 115.6
30th %ile Actuated Cycle: 111.2
10th %ile Actuated Cycle: 106.3

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	37	937	134	630	150	14	184	129	138	25
v/c Ratio	0.08	0.87	0.56	0.53	0.18	0.09	0.74	0.68	0.34	0.07
Control Delay	6.6	32.1	17.9	15.3	2.3	44.2	54.7	54.8	39.9	1.6
Queue Delay	0.0	48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	80.2	17.9	15.3	2.3	44.2	54.7	54.8	39.9	1.6
Queue Length 50th (m)	2.3	173.7	8.8	81.2	0.0	2.8	31.6	24.1	26.4	0.0
Queue Length 95th (m)	6.1	#284.7	23.0	123.8	8.6	8.9	55.3	#42.1	44.2	1.4
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	454	1076	250	1187	848	215	322	191	493	425
Starvation Cap Reductn	0	241	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	1.12	0.54	0.53	0.18	0.07	0.57	0.68	0.28	0.06

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	927	10	134	630	150	14	87	97	129	138	25
Future Volume (vph)	37	927	10	134	630	150	14	87	97	129	138	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	0.97		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.98	1.00		0.99	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1678	1862		1767	1883	1259	1747	1651		1517	1879	1466
Flt Permitted	0.35	1.00		0.10	1.00	1.00	0.67	1.00		0.34	1.00	1.00
Satd. Flow (perm)	610	1862		178	1883	1259	1230	1651		543	1879	1466
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	927	10	134	630	150	14	87	97	129	138	25
RTOR Reduction (vph)	0	0	0	0	0	56	0	35	0	0	0	20
Lane Group Flow (vph)	37	937	0	134	630	94	14	149	0	129	138	5
Confl. Peds. (#/hr)	16		4	4		16	9		11	11		9
Heavy Vehicles (%)	6%	3%	0%	1%	2%	15%	0%	2%	2%	17%	0%	4%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	70.9	67.4		78.6	72.1	72.1	15.0	15.0		25.0	25.0	25.0
Effective Green, g (s)	70.9	67.4		78.6	72.1	72.1	15.0	15.0		25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.58		0.68	0.62	0.62	0.13	0.13		0.22	0.22	0.22
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	406	1085		233	1174	785	159	214		176	406	317
v/s Ratio Prot	0.00	c0.50		c0.04	0.33			0.09		c0.04	0.07	
v/s Ratio Perm	0.05			0.35		0.07	0.01			c0.11		0.00
v/c Ratio	0.09	0.86		0.58	0.54	0.12	0.09	0.70		0.73	0.34	0.02
Uniform Delay, d1	9.6	20.2		20.0	12.3	8.8	44.3	48.1		40.5	38.3	35.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	9.1		3.4	1.8	0.3	0.2	9.5		14.6	0.5	0.0
Delay (s)	9.7	29.3		23.4	14.1	9.2	44.5	57.6		55.1	38.8	35.7
Level of Service	A	C		C	B	A	D	E		E	D	D
Approach Delay (s)		28.6			14.6			56.7			45.7	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	115.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	68.0	68.0	68.0	68.0	52.0	52.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%
Maximum Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	125	125	128	128	140	104
90th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 5 (4%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	719	32	783	23	876	704
v/c Ratio	0.75	0.05	0.80	0.03	0.66	0.54
Control Delay	28.8	6.2	31.4	4.7	33.2	30.0
Queue Delay	51.6	0.0	44.4	0.0	0.0	0.0
Total Delay	80.4	6.2	75.8	4.7	33.2	30.0
Queue Length 50th (m)	128.5	0.6	146.2	0.0	87.9	65.6
Queue Length 95th (m)	177.2	5.5	200.8	3.6	109.8	84.0
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	963	704	982	670	1335	1310
Starvation Cap Reductn	350	0	261	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	1.17	0.05	1.09	0.03	0.66	0.54

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	719	32	0	783	23	0	836	40	0	621	83
Future Volume (vph)	0	719	32	0	783	23	0	836	40	0	621	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.87		1.00	0.87		0.99			0.97	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.99			0.98	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1865	1339		1902	1273		3475			3398	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1865	1339		1902	1273		3475			3398	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	719	32	0	783	23	0	836	40	0	621	83
RTOR Reduction (vph)	0	0	13	0	0	11	0	3	0	0	9	0
Lane Group Flow (vph)	0	719	19	0	783	12	0	873	0	0	695	0
Confl. Peds. (#/hr)	128		125	125		128	104		140	140		104
Heavy Vehicles (%)	2%	3%	4%	2%	1%	9%	2%	3%	0%	2%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Effective Green, g (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		963	691		982	657		1332			1302	
v/s Ratio Prot		0.39			c0.41			c0.25			0.20	
v/s Ratio Perm			0.01			0.01						
v/c Ratio		0.75	0.03		0.80	0.02		0.66			0.53	
Uniform Delay, d1		22.8	14.2		23.8	14.1		30.5			28.7	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		5.3	0.1		6.7	0.1		2.5			1.6	
Delay (s)		28.1	14.3		30.6	14.2		33.0			30.3	
Level of Service		C	B		C	B		C			C	
Approach Delay (s)		27.5			30.1			33.0			30.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	25.0	25.0	9.5	25.0	9.5	28.0	28.0	28.0
Total Split (s)	10.0	68.0	68.0	10.0	68.0	10.0	42.0	32.0	32.0
Total Split (%)	8.3%	56.7%	56.7%	8.3%	56.7%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	7.0	62.0	62.0	7.0	62.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		54	54		23		30	39	39
90th %ile Green (s)	7.0	62.5	62.5	6.5	62.0	5.5	33.1	23.1	23.1
90th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Gap	Gap
70th %ile Green (s)	7.0	62.9	62.9	6.1	62.0	5.5	32.0	22.0	22.0
70th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Ped	Ped
50th %ile Green (s)	7.0	72.0	72.0	0.0	62.0	5.5	32.0	22.0	22.0
50th %ile Term Code	Max	Hold	Hold	Skip	MaxR	Max	Hold	Ped	Ped
30th %ile Green (s)	6.7	71.7	71.7	0.0	62.0	5.5	22.5	12.5	12.5
30th %ile Term Code	Gap	Hold	Hold	Skip	MaxR	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	62.0	62.0	0.0	62.0	5.5	18.3	8.3	8.3
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Max	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 109.5
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 117.1
70th %ile Actuated Cycle: 116
50th %ile Actuated Cycle: 116
30th %ile Actuated Cycle: 106.2
10th %ile Actuated Cycle: 92.3

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	614	27	16	835	124	193	37	175
v/c Ratio	0.28	0.54	0.03	0.03	0.77	0.52	0.44	0.23	0.64
Control Delay	10.5	16.5	0.1	7.6	26.4	40.8	35.2	44.0	45.7
Queue Delay	0.0	0.0	0.0	0.0	50.2	0.0	0.0	0.0	0.0
Total Delay	10.5	16.5	0.1	7.6	76.6	40.8	35.2	44.0	45.7
Queue Length 50th (m)	5.1	73.0	0.0	1.2	151.5	21.5	32.8	7.2	28.8
Queue Length 95th (m)	10.5	129.7	0.0	3.7	214.9	37.0	53.7	16.8	51.3
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	240	1146	796	482	1078	239	583	241	397
Starvation Cap Reductn	0	0	0	0	330	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.54	0.03	0.03	1.12	0.52	0.33	0.15	0.44

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	614	27	16	807	28	124	142	51	37	92	83
Future Volume (vph)	66	614	27	16	807	28	124	142	51	37	92	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.82	1.00	1.00		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		0.99	1.00		0.94	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1513	1883	1267	1762	1888		1761	1734		1515	1551	
Flt Permitted	0.15	1.00	1.00	0.34	1.00		0.39	1.00		0.64	1.00	
Satd. Flow (perm)	240	1883	1267	623	1888		724	1734		1014	1551	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	66	614	27	16	807	28	124	142	51	37	92	83
RTOR Reduction (vph)	0	0	11	0	1	0	0	11	0	0	30	0
Lane Group Flow (vph)	66	614	16	16	834	0	124	182	0	37	145	0
Confl. Peds. (#/hr)	23		54	54		23	39		30	30		39
Heavy Vehicles (%)	18%	2%	4%	0%	1%	0%	0%	2%	0%	11%	5%	13%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	72.0	66.7	66.7	66.2	63.8		27.3	27.3		17.3	17.3	
Effective Green, g (s)	72.0	66.7	66.7	66.2	63.8		27.3	27.3		17.3	17.3	
Actuated g/C Ratio	0.65	0.60	0.60	0.59	0.57		0.25	0.25		0.16	0.16	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	215	1127	758	394	1081		228	424		157	240	
v/s Ratio Prot	c0.01	0.33		0.00	c0.44		c0.03	0.10			0.09	
v/s Ratio Perm	0.18		0.01	0.02			c0.11			0.04		
v/c Ratio	0.31	0.54	0.02	0.04	0.77		0.54	0.43		0.24	0.61	
Uniform Delay, d1	14.7	13.3	9.1	10.2	18.2		35.5	35.5		41.3	43.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.9	0.1	0.0	5.3		2.6	0.7		0.8	4.3	
Delay (s)	15.5	15.2	9.1	10.2	23.6		38.2	36.2		42.0	48.2	
Level of Service	B	B	A	B	C		D	D		D	D	
Approach Delay (s)		15.0			23.3			37.0			47.1	
Approach LOS		B			C			D			D	

Intersection Summary

HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	111.4	Sum of lost time (s)	19.5
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	21.4	28.6	22.0	22.0	28.6	22.0	22.0	0.0	0.0
90th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	17.9	32.1	22.0	22.0	32.1	22.0	22.0	0.0	0.0
70th %ile Term Code	Gap	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	15.4	43.8	12.8	12.8	43.8	12.8	12.8	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	12.9	49.0	10.1	10.1	49.0	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	9.2	68.8	0.0	0.0	68.8	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	215	389	82	172	106
v/c Ratio	0.68	0.47	0.39	0.17	0.56
Control Delay	41.5	21.9	36.9	1.5	39.1
Queue Delay	0.0	0.7	0.0	0.0	0.0
Total Delay	41.5	22.5	36.9	1.5	39.1
Queue Length 50th (m)	31.2	42.3	13.2	0.0	14.8
Queue Length 95th (m)	49.8	#91.5	23.6	6.5	27.8
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	461	825	313	1000	275
Starvation Cap Reductn	0	180	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.60	0.26	0.17	0.39

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	131	61	145	178	35	44	31	158	50	25	23
Future Volume (vph)	6	131	61	145	178	35	44	31	158	50	25	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			0.99			1.00	0.96		0.97	
Flpb, ped/bikes		1.00			1.00			0.94	1.00		0.94	
Frt		0.96			0.99			1.00	0.85		0.97	
Flt Protected		1.00			0.98			0.97	1.00		0.98	
Satd. Flow (prot)		1734			1666			1589	1459		1320	
Flt Permitted		1.00			0.98			0.79	1.00		0.80	
Satd. Flow (perm)		1734			1666			1285	1459		1078	
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)	7	142	66	158	193	38	48	34	172	54	27	25
RTOR Reduction (vph)	0	20	0	0	3	0	0	0	64	0	14	0
Lane Group Flow (vph)	0	195	0	0	386	0	0	82	108	0	92	0
Confl. Peds. (#/hr)	41		44	44		41	59		69	69		59
Heavy Vehicles (%)	0%	0%	0%	12%	1%	26%	0%	20%	5%	0%	0%	92%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		15.4			43.2			13.4	56.6		13.4	
Effective Green, g (s)		15.4			43.2			13.4	56.6		13.4	
Actuated g/C Ratio		0.17			0.48			0.15	0.63		0.15	
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)		296			799			191	1014		160	
v/s Ratio Prot		c0.11			c0.23				0.05			
v/s Ratio Perm								0.06	0.02		c0.09	
v/c Ratio		0.66			0.48			0.43	0.11		0.58	
Uniform Delay, d1		34.8			15.8			34.8	6.6		35.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.2			2.1			1.6	0.0		5.0	
Delay (s)		40.1			17.9			36.4	6.7		40.6	
Level of Service		D			B			D	A		D	
Approach Delay (s)		40.1			17.9			16.3			40.6	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	164	2	10	191	9	6	7	38	13	25	23
Future Volume (vph)	11	164	2	10	191	9	6	7	38	13	25	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	178	2	11	208	10	7	8	41	14	27	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	192	229	56	66
Volume Left (vph)	12	11	7	14
Volume Right (vph)	2	10	41	25
Hadj (s)	0.01	-0.02	-0.41	-0.18
Departure Headway (s)	4.5	4.4	4.5	4.7
Degree Utilization, x	0.24	0.28	0.07	0.09
Capacity (veh/h)	778	785	717	685
Control Delay (s)	8.8	9.1	7.9	8.2
Approach Delay (s)	8.8	9.1	7.9	8.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	13.0	45.0	32.0	32.0	45.0	45.0	45.0	45.0
Total Split (%)	14.4%	50.0%	35.6%	35.6%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
90th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
70th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	10.0	34.7	21.7	21.7	39.0	39.0	39.0	39.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	10.0	32.0	19.0	19.0	39.0	39.0	39.0	39.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	8.6	30.6	19.0	19.0	39.0	39.0	39.0	39.0
10th %ile Term Code	Gap	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 86.1
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 85.7
30th %ile Actuated Cycle: 83
10th %ile Actuated Cycle: 81.6

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	224	124	55	312	819	813
v/c Ratio	0.61	0.19	0.18	0.78	0.54	0.64
Control Delay	23.0	14.2	26.1	39.6	19.1	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	14.2	26.1	39.6	19.1	20.5
Queue Length 50th (m)	22.8	10.6	7.1	41.1	49.0	49.3
Queue Length 95th (m)	37.8	21.3	16.2	#71.4	71.8	75.1
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	372	738	366	462	1513	1274
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	0.60	0.17	0.15	0.68	0.54	0.64

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	97	27	55	174	138	10	799	10	51	615	147
Future Volume (vph)	224	97	27	55	174	138	10	799	10	51	615	147
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.86			1.00			0.96	
Flpb, ped/bikes	0.96	1.00		0.95	1.00			1.00			1.00	
Frt	1.00	0.97		1.00	0.93			1.00			0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1659	1604		1703	1426			3531			3300	
Flt Permitted	0.34	1.00		0.68	1.00			0.94			0.84	
Satd. Flow (perm)	588	1604		1215	1426			3331			2767	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	224	97	27	55	174	138	10	799	10	51	615	147
RTOR Reduction (vph)	0	12	0	0	33	0	0	1	0	0	20	0
Lane Group Flow (vph)	224	112	0	55	279	0	0	818	0	0	793	0
Confl. Peds. (#/hr)	228		40	40		228	101		73	73		101
Heavy Vehicles (%)	3%	15%	0%	0%	8%	4%	0%	3%	0%	0%	3%	4%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	35.0	35.0		22.3	22.3			39.1			39.1	
Effective Green, g (s)	35.0	35.0		22.3	22.3			39.1			39.1	
Actuated g/C Ratio	0.41	0.41		0.26	0.26			0.45			0.45	
Clearance Time (s)	3.0	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)	359	652		314	369			1512			1256	
v/s Ratio Prot	c0.07	0.07			c0.20							
v/s Ratio Perm	0.18			0.05				0.25			c0.29	
v/c Ratio	0.62	0.17		0.18	0.76			0.54			0.63	
Uniform Delay, d1	18.3	16.3		24.8	29.4			17.0			18.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.4	0.1		0.3	8.5			1.4			2.4	
Delay (s)	21.7	16.4		25.0	37.9			18.4			20.4	
Level of Service	C	B		C	D			B			C	
Approach Delay (s)		19.8			36.0			18.4			20.4	
Approach LOS		B			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	86.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	98.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	693	1024	43	32	6
Future Volume (Veh/h)	8	693	1024	43	32	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	693	1024	43	32	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	1067				1408	534
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1067				1408	534
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				75	99
cM capacity (veh/h)	649				128	491

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	239	462	683	384	38
Volume Left	8	0	0	0	32
Volume Right	0	0	0	43	6
cSH	649	1700	1700	1700	145
Volume to Capacity	0.01	0.27	0.40	0.23	0.26
Queue Length 95th (m)	0.3	0.0	0.0	0.0	7.5
Control Delay (s)	0.5	0.0	0.0	0.0	38.4
Lane LOS	A				E
Approach Delay (s)	0.2		0.0		38.4
Approach LOS					E

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	76	949	0	0	582
Future Volume (Veh/h)	42	76	949	0	0	582
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	42	76	949	0	0	582
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.88	0.85			0.85	
vC, conflicting volume	1240	474			949	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	697	20			580	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	91			100	
cM capacity (veh/h)	329	893			839	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	118	633	316	194	388
Volume Left	42	0	0	0	0
Volume Right	76	0	0	0	0
cSH	554	1700	1700	839	1700
Volume to Capacity	0.21	0.37	0.19	0.00	0.23
Queue Length 95th (m)	6.1	0.0	0.0	0.0	0.0
Control Delay (s)	13.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	13.2	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	40.0	30.0	30.0	80.0	80.0	80.0	80.0
Total Split (%)	8.3%	33.3%	25.0%	25.0%	66.7%	66.7%	66.7%	66.7%
Maximum Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		17	22	22	44	44	59	59
90th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
70th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
50th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
30th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
10th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	89	194	66	286	1310	799
v/c Ratio	0.41	0.38	0.28	0.79	0.67	0.45
Control Delay	36.5	33.8	44.6	59.6	17.0	13.0
Queue Delay	0.0	0.0	0.0	0.0	4.2	0.0
Total Delay	36.5	33.8	44.6	59.6	21.1	13.0
Queue Length 50th (m)	15.3	33.2	13.3	61.5	98.4	48.1
Queue Length 95th (m)	28.1	54.1	26.6	#101.1	120.9	62.0
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	216	508	234	364	1968	1760
Starvation Cap Reductn	0	0	0	0	566	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.38	0.28	0.79	0.93	0.45

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	135	59	66	210	76	33	1218	59	32	692	75
Future Volume (vph)	89	135	59	66	210	76	33	1218	59	32	692	75
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.99			0.98	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.96			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1727	1750		1747	1768			3499			3388	
Flt Permitted	0.26	1.00		0.64	1.00			0.91			0.84	
Satd. Flow (perm)	467	1750		1169	1768			3186			2844	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	135	59	66	210	76	33	1218	59	32	692	75
RTOR Reduction (vph)	0	13	0	0	11	0	0	3	0	0	7	0
Lane Group Flow (vph)	89	181	0	66	275	0	0	1307	0	0	792	0
Confl. Peds. (#/hr)	22		17	17		22	59		44	44		59
Heavy Vehicles (%)	3%	0%	4%	0%	1%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Effective Green, g (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Actuated g/C Ratio	0.28	0.28		0.20	0.20			0.62			0.62	
Clearance Time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)	205	495		233	353			1964			1753	
v/s Ratio Prot	c0.03	0.10			c0.16							
v/s Ratio Perm	0.10			0.06				c0.41			0.28	
v/c Ratio	0.43	0.37		0.28	0.78			0.67			0.45	
Uniform Delay, d1	33.5	34.4		40.7	45.5			15.0			12.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.6	2.1		3.0	15.5			1.8			0.8	
Delay (s)	40.1	36.5		43.7	61.0			16.8			13.1	
Level of Service	D	D		D	E			B			B	
Approach Delay (s)		37.6			57.8			16.8			13.1	
Approach LOS		D			E			B			B	

Intersection Summary

HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	10.0	73.0	11.0	74.0	74.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	8.3%	60.8%	9.2%	61.7%	61.7%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		39		35	35	35	35		25	25
90th %ile Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.5	67.0	7.6	68.1	68.1	20.0	20.0	7.0	30.0	30.0
70th %ile Term Code	Gap	MaxR	Gap	Hold	Hold	Max	Max	Max	Hold	Hold
50th %ile Green (s)	6.1	67.1	7.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
50th %ile Term Code	Gap	Hold	Gap	MaxR	MaxR	Ped	Ped	Max	Hold	Hold
30th %ile Green (s)	0.0	67.0	6.3	76.3	76.3	14.5	14.5	7.0	24.5	24.5
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	68.0	0.0	68.0	68.0	9.8	9.8	7.0	19.8	19.8
10th %ile Term Code	Skip	Hold	Skip	MaxR	MaxR	Gap	Gap	Max	Hold	Hold

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 114.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 119.6
50th %ile Actuated Cycle: 119.1
30th %ile Actuated Cycle: 112.8
10th %ile Actuated Cycle: 99.8

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	30	738	69	686	422	18	208	158	90	82
v/c Ratio	0.07	0.67	0.19	0.59	0.44	0.10	0.77	0.81	0.21	0.21
Control Delay	6.8	21.2	7.6	17.6	2.7	43.9	57.3	67.3	36.9	9.0
Queue Delay	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	27.2	7.6	17.6	2.7	43.9	57.3	67.3	36.9	9.0
Queue Length 50th (m)	2.1	118.9	5.0	102.2	0.0	3.6	37.3	29.7	16.6	0.0
Queue Length 95th (m)	5.2	167.8	9.8	143.1	13.3	10.4	#64.2	#61.6	30.6	12.3
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	432	1098	385	1165	963	215	317	195	495	434
Starvation Cap Reductn	0	301	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.93	0.18	0.59	0.44	0.08	0.66	0.81	0.18	0.19

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	723	15	69	686	422	18	99	109	158	90	82
Future Volume (vph)	30	723	15	69	686	422	18	99	109	158	90	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.89	1.00	0.94		1.00	1.00	0.91
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.94	1.00		0.98	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1777	1856		1785	1902	1311	1671	1623		1569	1879	1424
Flt Permitted	0.29	1.00		0.23	1.00	1.00	0.70	1.00		0.31	1.00	1.00
Satd. Flow (perm)	533	1856		426	1902	1311	1229	1623		516	1879	1424
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	723	15	69	686	422	18	99	109	158	90	82
RTOR Reduction (vph)	0	0	0	0	0	166	0	34	0	0	0	63
Lane Group Flow (vph)	30	738	0	69	686	256	18	174	0	158	90	19
Confl. Peds. (#/hr)	35		39	39		35	25		35	35		25
Heavy Vehicles (%)	0%	3%	0%	0%	1%	5%	0%	0%	0%	12%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Effective Green, g (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Actuated g/C Ratio	0.62	0.59		0.66	0.61	0.61	0.14	0.14		0.23	0.23	0.23
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	371	1095		345	1153	795	177	234		183	434	329
v/s Ratio Prot	0.00	c0.40		c0.01	0.36			0.11		c0.05	0.05	
v/s Ratio Perm	0.05			0.12		0.20	0.01			c0.15		0.01
v/c Ratio	0.08	0.67		0.20	0.59	0.32	0.10	0.74		0.86	0.21	0.06
Uniform Delay, d1	10.2	16.1		11.1	14.0	11.1	42.8	47.3		41.3	35.8	34.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	3.3		0.3	2.3	1.1	0.3	12.0		31.8	0.2	0.1
Delay (s)	10.3	19.4		11.4	16.2	12.2	43.1	59.3		73.1	36.0	34.6
Level of Service	B	B		B	B	B	D	E		E	D	C
Approach Delay (s)		19.1			14.5			58.0			53.4	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	115.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX

D

2027 FT

Phasings

1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	69.0	69.0	69.0	69.0	51.0	51.0
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%
Maximum Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	43	43	85	85	69	62
90th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 28 (23%), Referenced to phase 2:NBTL, Start of Green

Control Type: Pretimed

Queues

1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	844	33	560	13	443	1138
v/c Ratio	0.84	0.04	0.56	0.02	0.33	0.84
Control Delay	33.3	6.2	21.8	2.0	26.8	40.9
Queue Delay	50.0	0.0	3.2	0.0	0.0	0.0
Total Delay	83.3	6.2	25.0	2.0	26.8	40.9
Queue Length 50th (m)	162.1	0.7	85.2	0.0	37.5	127.0
Queue Length 95th (m)	222.6	5.6	117.5	1.5	50.7	155.0
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	1008	807	1008	792	1327	1357
Starvation Cap Reductn	341	0	337	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	1.27	0.04	0.83	0.02	0.33	0.84

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	844	33	0	560	13	0	390	53	0	1101	37
Future Volume (vph)	0	844	33	0	560	13	0	390	53	0	1101	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.95		1.00	0.93		0.98			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			1.00	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1921	1514		1921	1486		3516			3615	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1921	1514		1921	1486		3516			3615	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	844	33	0	560	13	0	390	53	0	1101	37
RTOR Reduction (vph)	0	0	13	0	0	6	0	9	0	0	2	0
Lane Group Flow (vph)	0	844	20	0	560	7	0	434	0	0	1136	0
Confl. Peds. (#/hr)	65		43	43		62	62		69	69		62
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	2%	0%	0%	2%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Effective Green, g (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		1008	794		1008	780		1318			1355	
v/s Ratio Prot		c0.44			0.29			0.12			c0.31	
v/s Ratio Perm			0.01			0.00						
v/c Ratio		0.84	0.03		0.56	0.01		0.33			0.84	
Uniform Delay, d1		24.2	13.7		19.1	13.6		26.7			34.2	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		8.3	0.1		2.2	0.0		0.7			6.3	
Delay (s)		32.4	13.8		21.3	13.6		27.4			40.5	
Level of Service		C	B		C	B		C			D	
Approach Delay (s)		31.7			21.1			27.4			40.5	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	8.0	25.0	25.0	8.0	25.0	9.5	28.0	28.0	28.0
Total Split (s)	8.0	70.0	70.0	8.0	70.0	10.0	42.0	32.0	32.0
Total Split (%)	6.7%	58.3%	58.3%	6.7%	58.3%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		31	31		8		22	25	25
90th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
90th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Max	Max
70th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
70th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Max	Max
50th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	33.2	23.2	23.2
50th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Gap	Gap
30th %ile Green (s)	0.0	64.0	64.0	5.0	72.0	5.5	29.5	19.5	19.5
30th %ile Term Code	Skip	MaxR	MaxR	Max	Hold	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	64.0	64.0	0.0	64.0	0.0	12.9	12.9	12.9
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Skip	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 111.9
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 120
50th %ile Actuated Cycle: 117.2
30th %ile Actuated Cycle: 113.5
10th %ile Actuated Cycle: 88.9

Queues
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	681	67	61	308	65	76	86	264
v/c Ratio	0.06	0.62	0.08	0.17	0.28	0.34	0.17	0.40	0.82
Control Delay	8.7	20.9	1.4	9.4	13.9	35.1	28.1	46.6	62.2
Queue Delay	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Total Delay	8.7	20.9	1.4	9.4	14.7	35.1	28.1	46.6	62.2
Queue Length 50th (m)	2.7	105.8	0.0	4.8	36.1	10.9	11.1	17.3	55.2
Queue Length 95th (m)	6.8	153.7	3.5	10.4	56.3	21.6	23.0	32.8	#85.3
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	544	1101	834	368	1119	191	559	269	398
Starvation Cap Reductn	0	0	0	0	534	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.62	0.08	0.17	0.53	0.34	0.14	0.32	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
2: George St S/George St N & Queen St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	681	67	61	291	17	65	60	16	86	194	70
Future Volume (vph)	34	681	67	61	291	17	65	60	16	86	194	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1406	1902	1378	1785	1883		1743	1697		1539	1648	
Flt Permitted	0.55	1.00	1.00	0.26	1.00		0.26	1.00		0.71	1.00	
Satd. Flow (perm)	811	1902	1378	480	1883		478	1697		1147	1648	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	681	67	61	291	17	65	60	16	86	194	70
RTOR Reduction (vph)	0	0	29	0	2	0	0	8	0	0	11	0
Lane Group Flow (vph)	34	681	38	61	306	0	65	68	0	86	253	0
Confl. Peds. (#/hr)	8		31	31		8	25		22	22		25
Heavy Vehicles (%)	26%	1%	3%	0%	1%	0%	2%	7%	0%	10%	3%	22%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	68.2	65.4	65.4	70.2	66.4		29.9	29.9		21.2	21.2	
Effective Green, g (s)	68.2	65.4	65.4	70.2	66.4		29.9	29.9		21.2	21.2	
Actuated g/C Ratio	0.60	0.57	0.57	0.62	0.58		0.26	0.26		0.19	0.19	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	499	1090	789	338	1095		171	444		213	306	
v/s Ratio Prot	0.00	c0.36		c0.01	0.16		c0.01	0.04			c0.15	
v/s Ratio Perm	0.04		0.03	0.10			0.09			0.08		
v/c Ratio	0.07	0.62	0.05	0.18	0.28		0.38	0.15		0.40	0.83	
Uniform Delay, d1	9.5	16.2	10.7	11.6	11.9		33.2	32.4		40.9	44.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.7	0.1	0.3	0.6		1.4	0.2		1.3	16.4	
Delay (s)	9.6	18.9	10.8	11.9	12.5		34.7	32.5		42.1	61.1	
Level of Service	A	B	B	B	B		C	C		D	E	
Approach Delay (s)		17.8			12.4			33.5			56.4	
Approach LOS		B			B			C			E	

Intersection Summary

HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	114.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phasings
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
90th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
70th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	28.3	31.2	12.5	12.5	31.2	12.5	12.5	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	25.6	36.3	10.1	10.1	36.3	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	20.8	57.2	0.0	0.0	57.2	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Queues
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	427	330	36	64	114
v/c Ratio	0.84	0.53	0.15	0.08	0.53
Control Delay	44.8	29.2	30.4	2.7	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	29.2	30.4	2.7	37.7
Queue Length 50th (m)	61.8	45.2	5.6	0.0	16.8
Queue Length 95th (m)	#112.2	#90.1	12.3	4.8	29.6
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	516	622	365	777	320
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	0.83	0.53	0.10	0.08	0.36

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	246	134	152	117	35	3	30	59	38	48	19
Future Volume (vph)	13	246	134	152	117	35	3	30	59	38	48	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99			0.99			1.00	0.98		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		0.98	
Frt		0.95			0.98			1.00	0.85		0.98	
Flt Protected		1.00			0.98			1.00	1.00		0.98	
Satd. Flow (prot)		1732			1610			1529	1405		1448	
Flt Permitted		1.00			0.98			0.97	1.00		0.87	
Satd. Flow (perm)		1732			1610			1495	1405		1277	
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)	14	267	146	165	127	38	3	33	64	41	52	21
RTOR Reduction (vph)	0	20	0	0	4	0	0	0	31	0	10	0
Lane Group Flow (vph)	0	407	0	0	326	0	0	36	33	0	104	0
Confl. Peds. (#/hr)	21		9	9		21	22		28	28		22
Heavy Vehicles (%)	0%	3%	0%	15%	2%	26%	0%	24%	11%	48%	7%	0%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		25.3			33.4			13.3	46.7		13.3	
Effective Green, g (s)		25.3			33.4			13.3	46.7		13.3	
Actuated g/C Ratio		0.28			0.37			0.15	0.52		0.15	
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)		486			597			220	822		188	
v/s Ratio Prot		c0.23			c0.20				0.01			
v/s Ratio Perm								0.02	0.01		c0.08	
v/c Ratio		0.84			0.55			0.16	0.04		0.55	
Uniform Delay, d1		30.4			22.3			33.5	10.6		35.6	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		11.9			3.6			0.4	0.0		3.5	
Delay (s)		42.3			25.9			33.8	10.7		39.1	
Level of Service		D			C			C	B		D	
Approach Delay (s)		42.3			25.9			19.0			39.1	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	218	3	62	66	2	5	4	162	15	34	38
Future Volume (vph)	24	218	3	62	66	2	5	4	162	15	34	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	237	3	67	72	2	5	4	176	16	37	41

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	266	141	185	94
Volume Left (vph)	26	67	5	16
Volume Right (vph)	3	2	176	41
Hadj (s)	0.01	0.09	-0.57	-0.23
Departure Headway (s)	4.8	5.0	4.5	4.9
Degree Utilization, x	0.35	0.20	0.23	0.13
Capacity (veh/h)	708	664	735	654
Control Delay (s)	10.4	9.2	8.8	8.7
Approach Delay (s)	10.4	9.2	8.8	8.7
Approach LOS	B	A	A	A

Intersection Summary			
Delay	9.5		
Level of Service	A		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	10.0	35.0	25.0	25.0	55.0	55.0	55.0	55.0
Total Split (%)	11.1%	38.9%	27.8%	27.8%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
70th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
50th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
10th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 90
30th %ile Actuated Cycle: 90
10th %ile Actuated Cycle: 90

Queues
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	157	186	12	100	394	1299
v/c Ratio	0.42	0.35	0.05	0.33	0.25	0.78
Control Delay	24.8	21.6	29.2	21.3	11.2	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.6
Total Delay	24.8	21.6	29.2	21.3	11.2	21.3
Queue Length 50th (m)	19.0	20.1	1.7	7.9	17.5	85.3
Queue Length 95th (m)	33.5	37.4	6.2	21.7	25.7	112.7
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	370	532	229	300	1556	1675
Starvation Cap Reductn	0	0	0	0	0	205
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.35	0.05	0.33	0.25	0.88

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	123	63	12	53	47	23	360	11	72	1029	198
Future Volume (vph)	157	123	63	12	53	47	23	360	11	72	1029	198
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.89			1.00			0.99	
Flpb, ped/bikes	0.89	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.93			1.00			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1504	1591		1614	1257			3375			3393	
Flt Permitted	0.60	1.00		0.64	1.00			0.84			0.90	
Satd. Flow (perm)	946	1591		1088	1257			2852			3048	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	157	123	63	12	53	47	23	360	11	72	1029	198
RTOR Reduction (vph)	0	20	0	0	36	0	0	2	0	0	16	0
Lane Group Flow (vph)	157	166	0	12	65	0	0	392	0	0	1283	0
Confl. Peds. (#/hr)	163		13	13		163	38		39	39		38
Heavy Vehicles (%)	6%	14%	5%	9%	29%	17%	13%	7%	0%	0%	3%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	29.0	29.0		19.0	19.0			49.0			49.0	
Effective Green, g (s)	29.0	29.0		19.0	19.0			49.0			49.0	
Actuated g/C Ratio	0.32	0.32		0.21	0.21			0.54			0.54	
Clearance Time (s)	3.0	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)	348	512		229	265			1552			1659	
v/s Ratio Prot	c0.04	0.10			0.05							
v/s Ratio Perm	c0.11			0.01				0.14			c0.42	
v/c Ratio	0.45	0.32		0.05	0.24			0.25			0.77	
Uniform Delay, d1	23.2	23.1		28.3	29.5			10.8			16.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	0.4		0.1	0.5			0.4			3.6	
Delay (s)	24.1	23.4		28.4	30.0			11.2			19.7	
Level of Service	C	C		C	C			B			B	
Approach Delay (s)		23.8			29.8			11.2			19.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Queen St W & Elizabeth St N

05-05-2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	750	391	50	41	32
Future Volume (Veh/h)	19	750	391	50	41	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	19	750	391	50	41	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	441				829	220
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	441				829	220
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				86	96
cM capacity (veh/h)	1115				304	783

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	269	500	261	180	73
Volume Left	19	0	0	0	41
Volume Right	0	0	0	50	32
cSH	1115	1700	1700	1700	415
Volume to Capacity	0.02	0.29	0.15	0.11	0.18
Queue Length 95th (m)	0.4	0.0	0.0	0.0	4.8
Control Delay (s)	0.7	0.0	0.0	0.0	15.5
Lane LOS	A				C
Approach Delay (s)	0.3		0.0		15.5
Approach LOS					C

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Main St N & Nelson St E

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	15	468	0	0	1066
Future Volume (Veh/h)	35	15	468	0	0	1066
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	35	15	468	0	0	1066
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.86	0.96			0.96	
vC, conflicting volume	1001	234			468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	454	116			360	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	98			100	
cM capacity (veh/h)	458	877			1147	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	50	312	156	355	711
Volume Left	35	0	0	0	0
Volume Right	15	0	0	0	0
cSH	535	1700	1700	1147	1700
Volume to Capacity	0.09	0.18	0.09	0.00	0.42
Queue Length 95th (m)	2.3	0.0	0.0	0.0	0.0
Control Delay (s)	12.4	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.4	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	55.0	45.0	45.0	65.0	65.0	65.0	65.0
Total Split (%)	8.3%	45.8%	37.5%	37.5%	54.2%	54.2%	54.2%	54.2%
Maximum Green (s)	7.0	49.0	39.0	39.0	59.0	59.0	59.0	59.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	None	None
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		12	13	13	35	35	34	34
90th %ile Green (s)	7.0	32.0	22.0	22.0	59.0	59.0	59.0	59.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	Hold	Hold
70th %ile Green (s)	7.0	22.6	12.6	12.6	59.0	59.0	59.0	59.0
70th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
50th %ile Green (s)	7.0	20.6	10.6	10.6	59.0	59.0	59.0	59.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
30th %ile Green (s)	7.0	18.7	8.7	8.7	59.0	59.0	59.0	59.0
30th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
10th %ile Green (s)	12.8	9.8	0.0	0.0	59.0	59.0	59.0	59.0
10th %ile Term Code	Hold	Gap	Skip	Skip	MaxR	MaxR	Hold	Hold

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 91.7
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 103
70th %ile Actuated Cycle: 93.6
50th %ile Actuated Cycle: 91.6
30th %ile Actuated Cycle: 89.7
10th %ile Actuated Cycle: 80.8

Queues
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	121	227	63	84	409	1150
v/c Ratio	0.37	0.56	0.45	0.36	0.22	0.57
Control Delay	29.8	32.7	47.2	36.3	7.8	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	32.7	47.2	36.3	7.8	11.5
Queue Length 50th (m)	17.0	31.3	10.6	12.2	13.6	53.3
Queue Length 95th (m)	30.3	52.5	22.5	25.2	27.7	97.1
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	326	953	473	774	1827	2033
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	0.24	0.13	0.11	0.22	0.57

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Main St N & Church St W/Church St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	150	77	63	69	15	25	345	39	57	1032	61
Future Volume (vph)	121	150	77	63	69	15	25	345	39	57	1032	61
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1773	1754		1712	1797			3304			3465	
Flt Permitted	0.54	1.00		0.62	1.00			0.85			0.91	
Satd. Flow (perm)	1015	1754		1112	1797			2819			3144	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	121	150	77	63	69	15	25	345	39	57	1032	61
RTOR Reduction (vph)	0	20	0	0	9	0	0	5	0	0	3	0
Lane Group Flow (vph)	121	207	0	63	75	0	0	404	0	0	1147	0
Confl. Peds. (#/hr)	12		13	13		12	34		35	35		34
Heavy Vehicles (%)	0%	0%	2%	3%	0%	7%	0%	9%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	21.7	21.7		10.3	10.3			59.4			59.4	
Effective Green, g (s)	21.7	21.7		10.3	10.3			59.4			59.4	
Actuated g/C Ratio	0.23	0.23		0.11	0.11			0.64			0.64	
Clearance Time (s)	3.0	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)	304	408		123	198			1798			2005	
v/s Ratio Prot	0.04	c0.12			0.04							
v/s Ratio Perm	0.06			0.06				0.14			c0.36	
v/c Ratio	0.40	0.51		0.51	0.38			0.22			0.57	
Uniform Delay, d1	29.4	31.1		39.0	38.4			7.1			9.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	1.0		3.6	1.2			0.3			0.4	
Delay (s)	30.3	32.0		42.6	39.6			7.4			10.0	
Level of Service	C	C		D	D			A			B	
Approach Delay (s)		31.4			40.9			7.4			10.0	
Approach LOS		C			D			A			B	

Intersection Summary

HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	93.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phasings
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.0	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	9.0	72.0	12.0	75.0	75.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	7.5%	60.0%	10.0%	62.5%	62.5%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		4		16	16	11	11		9	9
90th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	18.7	18.7	7.0	28.7	28.7
70th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
50th %ile Green (s)	6.0	66.7	8.3	69.0	69.0	15.6	15.6	7.0	25.6	25.6
50th %ile Term Code	Max	Hold	Gap	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
30th %ile Green (s)	0.0	66.0	7.4	76.4	76.4	12.6	12.6	7.0	22.6	22.6
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	66.0	6.3	75.3	75.3	8.7	8.7	7.0	18.7	18.7
10th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 118.7
50th %ile Actuated Cycle: 115.6
30th %ile Actuated Cycle: 111
10th %ile Actuated Cycle: 106

Queues
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	37	841	134	568	150	14	184	129	138	25
v/c Ratio	0.07	0.78	0.44	0.48	0.17	0.09	0.74	0.67	0.34	0.07
Control Delay	6.5	25.8	10.6	14.3	2.3	44.2	54.7	54.5	39.9	1.6
Queue Delay	0.0	27.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	53.6	10.6	14.3	2.3	44.2	54.7	54.5	39.9	1.6
Queue Length 50th (m)	2.3	138.8	8.8	69.9	0.0	2.8	31.6	24.1	26.4	0.0
Queue Length 95th (m)	6.1	215.1	17.0	107.1	8.6	8.9	55.3	#41.9	44.2	1.4
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	499	1080	320	1186	865	215	322	192	494	425
Starvation Cap Reductn	0	273	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	1.04	0.42	0.48	0.17	0.07	0.57	0.67	0.28	0.06

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	831	10	134	568	150	14	87	97	129	138	25
Future Volume (vph)	37	831	10	134	568	150	14	87	97	129	138	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	0.97		1.00	1.00	0.95
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	0.98	1.00		0.99	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1675	1862		1767	1883	1288	1747	1651		1517	1879	1466
Flt Permitted	0.39	1.00		0.16	1.00	1.00	0.67	1.00		0.34	1.00	1.00
Satd. Flow (perm)	683	1862		290	1883	1288	1230	1651		544	1879	1466
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	831	10	134	568	150	14	87	97	129	138	25
RTOR Reduction (vph)	0	0	0	0	0	56	0	35	0	0	0	20
Lane Group Flow (vph)	37	841	0	134	568	94	14	149	0	129	138	5
Confl. Peds. (#/hr)	16		4	4		16	9		11	11		9
Heavy Vehicles (%)	6%	3%	0%	1%	2%	15%	0%	2%	2%	17%	0%	4%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	71.0	67.5		78.5	72.0	72.0	15.0	15.0		25.0	25.0	25.0
Effective Green, g (s)	71.0	67.5		78.5	72.0	72.0	15.0	15.0		25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.58		0.68	0.62	0.62	0.13	0.13		0.22	0.22	0.22
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	449	1088		299	1173	802	159	214		176	406	317
v/s Ratio Prot	0.00	c0.45		c0.03	0.30			0.09		c0.04	0.07	
v/s Ratio Perm	0.05			0.27		0.07	0.01			c0.11		0.00
v/c Ratio	0.08	0.77		0.45	0.48	0.12	0.09	0.70		0.73	0.34	0.02
Uniform Delay, d1	9.2	18.2		14.7	11.7	8.8	44.2	48.1		40.4	38.3	35.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	5.3		1.1	1.4	0.3	0.2	9.5		14.6	0.5	0.0
Delay (s)	9.3	23.5		15.8	13.2	9.1	44.5	57.6		55.0	38.8	35.6
Level of Service	A	C		B	B	A	D	E		D	D	D
Approach Delay (s)		22.9			12.9			56.6			45.7	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: Elizabeth St N & Site Access

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	31	153	18	49	58	41
Future Volume (Veh/h)	31	153	18	49	58	41
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)	34	166	20	53	63	45
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	218	46			73	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	218	46			73	
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	84			96	
cM capacity (veh/h)	739	1023			1527	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	200	73	108
Volume Left	34	0	63
Volume Right	166	53	0
cSH	960	1700	1527
Volume to Capacity	0.21	0.04	0.04
Queue Length 95th (m)	6.0	0.0	1.0
Control Delay (s)	9.7	0.0	4.5
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	4.5
Approach LOS	A		

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings

1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	68.0	68.0	68.0	68.0	52.0	52.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%
Maximum Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	125	125	128	128	140	104
90th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 5 (4%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues

1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	647	32	735	23	762	641
v/c Ratio	0.67	0.05	0.75	0.03	0.57	0.49
Control Delay	25.8	6.2	28.8	4.7	31.1	28.9
Queue Delay	51.7	0.0	27.7	0.0	0.0	0.0
Total Delay	77.6	6.2	56.5	4.7	31.1	28.9
Queue Length 50th (m)	108.8	0.6	131.7	0.0	73.3	58.1
Queue Length 95th (m)	150.0	5.5	180.3	3.6	92.7	75.1
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	963	704	982	670	1331	1307
Starvation Cap Reductn	374	0	274	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	1.10	0.05	1.04	0.03	0.57	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	647	32	0	735	23	0	722	40	0	558	83
Future Volume (vph)	0	647	32	0	735	23	0	722	40	0	558	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.87		1.00	0.87		0.98			0.97	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.99			0.98	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1865	1339		1902	1273		3465			3384	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1865	1339		1902	1273		3465			3384	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	647	32	0	735	23	0	722	40	0	558	83
RTOR Reduction (vph)	0	0	13	0	0	11	0	3	0	0	10	0
Lane Group Flow (vph)	0	647	19	0	735	12	0	759	0	0	631	0
Confl. Peds. (#/hr)	128		125	125		128	104		140	140		104
Heavy Vehicles (%)	2%	3%	4%	2%	1%	9%	2%	3%	0%	2%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Effective Green, g (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		963	691		982	657		1328			1297	
v/s Ratio Prot		0.35			c0.39			c0.22			0.19	
v/s Ratio Perm			0.01			0.01						
v/c Ratio		0.67	0.03		0.75	0.02		0.57			0.49	
Uniform Delay, d1		21.5	14.2		22.9	14.1		29.2			28.0	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		3.7	0.1		5.2	0.1		1.8			1.3	
Delay (s)		25.2	14.3		28.1	14.2		31.0			29.4	
Level of Service		C	B		C	B		C			C	
Approach Delay (s)		24.7			27.6			31.0			29.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	25.0	25.0	9.5	25.0	9.5	28.0	28.0	28.0
Total Split (s)	10.0	68.0	68.0	10.0	68.0	10.0	42.0	32.0	32.0
Total Split (%)	8.3%	56.7%	56.7%	8.3%	56.7%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	7.0	62.0	62.0	7.0	62.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		54	54		23		30	39	39
90th %ile Green (s)	7.0	62.5	62.5	6.5	62.0	5.5	34.4	24.4	24.4
90th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Gap	Gap
70th %ile Green (s)	7.0	62.9	62.9	6.1	62.0	5.5	32.0	22.0	22.0
70th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Ped	Ped
50th %ile Green (s)	7.0	72.0	72.0	0.0	62.0	5.5	32.0	22.0	22.0
50th %ile Term Code	Max	Hold	Hold	Skip	MaxR	Max	Hold	Ped	Ped
30th %ile Green (s)	6.7	71.7	71.7	0.0	62.0	5.5	23.4	13.4	13.4
30th %ile Term Code	Gap	Hold	Hold	Skip	MaxR	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	62.0	62.0	0.0	62.0	5.5	19.0	9.0	9.0
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Max	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 110.1
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 118.4
70th %ile Actuated Cycle: 116
50th %ile Actuated Cycle: 116
30th %ile Actuated Cycle: 107.1
10th %ile Actuated Cycle: 93

Queues
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	522	27	16	783	128	193	73	185
v/c Ratio	0.25	0.46	0.03	0.03	0.73	0.54	0.43	0.45	0.67
Control Delay	10.0	15.3	0.1	7.8	24.6	41.7	34.9	51.0	48.2
Queue Delay	0.0	0.0	0.0	0.0	43.4	0.0	0.0	0.0	0.0
Total Delay	10.0	15.3	0.1	7.8	68.1	41.7	34.9	51.0	48.2
Queue Length 50th (m)	5.1	57.9	0.0	1.2	135.4	22.3	32.8	14.6	32.0
Queue Length 95th (m)	10.9	106.0	0.0	3.8	196.0	38.0	53.5	29.2	55.1
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	267	1139	792	531	1072	236	580	240	394
Starvation Cap Reductn	0	0	0	0	348	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.46	0.03	0.03	1.08	0.54	0.33	0.30	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: George St S/George St N & Queen St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	522	27	16	755	28	128	142	51	73	102	83
Future Volume (vph)	66	522	27	16	755	28	128	142	51	73	102	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.82	1.00	1.00		1.00	0.97		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.98	1.00		0.99	1.00		0.94	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1513	1883	1265	1747	1887		1763	1734		1514	1563	
Flt Permitted	0.18	1.00	1.00	0.40	1.00		0.38	1.00		0.64	1.00	
Satd. Flow (perm)	288	1883	1265	735	1887		697	1734		1014	1563	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	66	522	27	16	755	28	128	142	51	73	102	83
RTOR Reduction (vph)	0	0	11	0	1	0	0	11	0	0	26	0
Lane Group Flow (vph)	66	522	16	16	782	0	128	182	0	73	159	0
Confl. Peds. (#/hr)	23		54	54		23	39		30	30		39
Heavy Vehicles (%)	18%	2%	4%	0%	1%	0%	0%	2%	0%	11%	5%	13%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	72.0	66.7	66.7	66.2	63.8		27.9	27.9		17.9	17.9	
Effective Green, g (s)	72.0	66.7	66.7	66.2	63.8		27.9	27.9		17.9	17.9	
Actuated g/C Ratio	0.64	0.60	0.60	0.59	0.57		0.25	0.25		0.16	0.16	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	243	1121	753	456	1074		225	431		162	249	
v/s Ratio Prot	c0.01	0.28		0.00	c0.41		c0.03	0.10			0.10	
v/s Ratio Perm	0.16		0.01	0.02			c0.11			0.07		
v/c Ratio	0.27	0.47	0.02	0.04	0.73		0.57	0.42		0.45	0.64	
Uniform Delay, d1	13.3	12.7	9.3	9.9	17.7		35.8	35.3		42.6	44.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.4	0.1	0.0	4.3		3.3	0.7		2.0	5.3	
Delay (s)	13.9	14.1	9.3	9.9	22.1		39.1	35.9		44.6	49.3	
Level of Service	B	B	A	A	C		D	D		D	D	
Approach Delay (s)		13.8			21.8			37.2			48.0	
Approach LOS		B			C			D			D	

Intersection Summary

HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
90th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
70th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	23.5	35.7	12.8	12.8	35.7	12.8	12.8	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	20.4	41.5	10.1	10.1	41.5	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	15.8	62.2	0.0	0.0	62.2	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Queues
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	363	511	82	172	106
v/c Ratio	0.81	0.72	0.39	0.19	0.56
Control Delay	43.9	34.6	36.9	2.0	39.1
Queue Delay	0.0	1.9	0.0	0.0	0.0
Total Delay	43.9	36.5	36.9	2.0	39.1
Queue Length 50th (m)	54.2	73.7	13.2	0.0	14.8
Queue Length 95th (m)	82.5	#161.6	23.6	7.7	27.8
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	485	714	313	895	275
Starvation Cap Reductn	0	92	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.75	0.82	0.26	0.19	0.39

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	222	106	145	290	35	44	31	158	50	25	23
Future Volume (vph)	6	222	106	145	290	35	44	31	158	50	25	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			0.99			1.00	0.95		0.97	
Flpb, ped/bikes		1.00			1.00			0.94	1.00		0.94	
Frt		0.96			0.99			1.00	0.85		0.97	
Flt Protected		1.00			0.98			0.97	1.00		0.98	
Satd. Flow (prot)		1730			1710			1589	1450		1320	
Flt Permitted		1.00			0.98			0.79	1.00		0.80	
Satd. Flow (perm)		1730			1710			1285	1450		1078	
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)	7	241	115	158	315	38	48	34	172	54	27	25
RTOR Reduction (vph)	0	19	0	0	2	0	0	0	77	0	14	0
Lane Group Flow (vph)	0	344	0	0	509	0	0	82	95	0	92	0
Confl. Peds. (#/hr)	41		44	44		41	59		69	69		59
Heavy Vehicles (%)	0%	0%	0%	12%	1%	26%	0%	20%	5%	0%	0%	92%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		22.3			36.3			13.4	49.7		13.4	
Effective Green, g (s)		22.3			36.3			13.4	49.7		13.4	
Actuated g/C Ratio		0.25			0.40			0.15	0.55		0.15	
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)		428			689			191	897		160	
v/s Ratio Prot		c0.20			c0.30				0.04			
v/s Ratio Perm								0.06	0.02		c0.09	
v/c Ratio		0.80			0.74			0.43	0.11		0.58	
Uniform Delay, d1		31.8			22.8			34.8	9.6		35.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		10.5			7.0			1.6	0.1		5.0	
Delay (s)		42.3			29.8			36.4	9.6		40.6	
Level of Service		D			C			D	A		D	
Approach Delay (s)		42.3			29.8			18.3			40.6	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	164	2	122	191	9	8	7	174	13	25	23
Future Volume (vph)	11	164	2	122	191	9	8	7	174	13	25	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	178	2	133	208	10	9	8	189	14	27	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	192	351	206	66
Volume Left (vph)	12	133	9	14
Volume Right (vph)	2	10	189	25
Hadj (s)	0.01	0.06	-0.54	-0.18
Departure Headway (s)	5.1	4.9	4.8	5.4
Degree Utilization, x	0.27	0.48	0.28	0.10
Capacity (veh/h)	653	695	666	573
Control Delay (s)	10.0	12.5	9.7	9.0
Approach Delay (s)	10.0	12.5	9.7	9.0
Approach LOS	B	B	A	A

Intersection Summary			
Delay	10.9		
Level of Service	B		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	13.0	45.0	32.0	32.0	45.0	45.0	45.0	45.0
Total Split (%)	14.4%	50.0%	35.6%	35.6%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
90th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
70th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	10.0	34.7	21.7	21.7	39.0	39.0	39.0	39.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	10.0	32.0	19.0	19.0	39.0	39.0	39.0	39.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	10.0	32.0	19.0	19.0	39.0	39.0	39.0	39.0
10th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 86.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 85.7
30th %ile Actuated Cycle: 83
10th %ile Actuated Cycle: 83

Queues
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	286	154	55	312	712	816
v/c Ratio	0.77	0.23	0.18	0.78	0.50	0.64
Control Delay	32.2	12.8	26.3	39.9	18.6	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	12.8	26.3	39.9	18.6	19.3
Queue Length 50th (m)	30.3	11.6	7.1	41.1	41.4	46.0
Queue Length 95th (m)	#56.8	23.7	16.2	#71.4	61.7	71.4
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	372	737	356	461	1437	1271
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	0.77	0.21	0.15	0.68	0.50	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
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	286	97	57	55	174	138	27	675	10	51	522	243
Future Volume (vph)	286	97	57	55	174	138	27	675	10	51	522	243
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.86			1.00			0.94	
Flpb, ped/bikes	0.96	1.00		0.96	1.00			1.00			1.00	
Frt	1.00	0.94		1.00	0.93			1.00			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1659	1582		1706	1426			3523			3151	
Flt Permitted	0.34	1.00		0.66	1.00			0.90			0.86	
Satd. Flow (perm)	585	1582		1184	1426			3176			2710	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	286	97	57	55	174	138	27	675	10	51	522	243
RTOR Reduction (vph)	0	24	0	0	33	0	0	1	0	0	50	0
Lane Group Flow (vph)	286	130	0	55	279	0	0	711	0	0	766	0
Confl. Peds. (#/hr)	228		40	40		228	101		73	73		101
Heavy Vehicles (%)	3%	15%	0%	0%	8%	4%	0%	3%	0%	0%	3%	4%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	35.3	35.3		22.3	22.3			39.1			39.1	
Effective Green, g (s)	35.3	35.3		22.3	22.3			39.1			39.1	
Actuated g/C Ratio	0.41	0.41		0.26	0.26			0.45			0.45	
Clearance Time (s)	3.0	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)	363	646		305	368			1437			1226	
v/s Ratio Prot	c0.09	0.08			0.20							
v/s Ratio Perm	c0.23			0.05				0.22			c0.28	
v/c Ratio	0.79	0.20		0.18	0.76			0.49			0.62	
Uniform Delay, d1	19.7	16.5		24.9	29.6			16.7			18.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	10.8	0.2		0.3	8.6			1.2			2.4	
Delay (s)	30.5	16.6		25.2	38.2			17.9			20.5	
Level of Service	C	B		C	D			B			C	
Approach Delay (s)		25.6			36.2			17.9			20.5	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	86.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Queen St W & Elizabeth St N

05-05-2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	586	866	120	36	30
Future Volume (Veh/h)	26	586	866	120	36	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	26	586	866	120	36	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	986				1271	493
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	986				1271	493
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				77	94
cM capacity (veh/h)	696				154	522

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	221	391	577	409	66
Volume Left	26	0	0	0	36
Volume Right	0	0	0	120	30
cSH	696	1700	1700	1700	226
Volume to Capacity	0.04	0.23	0.34	0.24	0.29
Queue Length 95th (m)	0.9	0.0	0.0	0.0	8.9
Control Delay (s)	1.6	0.0	0.0	0.0	27.3
Lane LOS	A				D
Approach Delay (s)	0.6		0.0		27.3
Approach LOS					D

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Main St N & Nelson St E

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	76	949	0	0	582
Future Volume (Veh/h)	42	76	949	0	0	582
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	42	76	949	0	0	582
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.90	0.87			0.87	
vC, conflicting volume	1240	474			949	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	806	106			650	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	91			100	
cM capacity (veh/h)	286	810			814	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	118	633	316	194	388
Volume Left	42	0	0	0	0
Volume Right	76	0	0	0	0
cSH	491	1700	1700	814	1700
Volume to Capacity	0.24	0.37	0.19	0.00	0.23
Queue Length 95th (m)	7.1	0.0	0.0	0.0	0.0
Control Delay (s)	14.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	40.0	30.0	30.0	80.0	80.0	80.0	80.0
Total Split (%)	8.3%	33.3%	25.0%	25.0%	66.7%	66.7%	66.7%	66.7%
Maximum Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		17	22	22	44	44	59	59
90th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
70th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
50th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
30th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
10th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	89	199	106	286	1185	747
v/c Ratio	0.41	0.39	0.46	0.79	0.61	0.42
Control Delay	36.5	33.7	49.6	59.6	15.7	12.5
Queue Delay	0.0	0.0	0.0	0.0	2.2	0.0
Total Delay	36.5	33.7	49.6	59.6	17.8	12.5
Queue Length 50th (m)	15.3	33.8	22.2	61.5	83.6	43.6
Queue Length 95th (m)	28.1	55.1	40.2	#101.1	103.7	56.4
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	216	508	232	364	1944	1774
Starvation Cap Reductn	0	0	0	0	586	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.39	0.46	0.79	0.87	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
8: Main St N & Church St W/Church St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	135	64	106	210	76	36	1070	79	32	640	75
Future Volume (vph)	89	135	64	106	210	76	36	1070	79	32	640	75
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.99			0.98	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.96			0.99			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1727	1743		1747	1768			3478			3381	
Flt Permitted	0.26	1.00		0.63	1.00			0.90			0.85	
Satd. Flow (perm)	467	1743		1164	1768			3146			2867	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	135	64	106	210	76	36	1070	79	32	640	75
RTOR Reduction (vph)	0	14	0	0	11	0	0	4	0	0	7	0
Lane Group Flow (vph)	89	185	0	106	275	0	0	1181	0	0	740	0
Confl. Peds. (#/hr)	22		17	17		22	59		44	44		59
Heavy Vehicles (%)	3%	0%	4%	0%	1%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Effective Green, g (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Actuated g/C Ratio	0.28	0.28		0.20	0.20			0.62			0.62	
Clearance Time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)	205	493		232	353			1940			1767	
v/s Ratio Prot	c0.03	0.11			c0.16							
v/s Ratio Perm	0.10			0.09				c0.38			0.26	
v/c Ratio	0.43	0.37		0.46	0.78			0.61			0.42	
Uniform Delay, d1	33.5	34.5		42.3	45.5			14.1			11.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.6	2.2		6.4	15.5			1.4			0.7	
Delay (s)	40.1	36.6		48.6	61.0			15.5			12.6	
Level of Service	D	D		D	E			B			B	
Approach Delay (s)		37.7			57.6			15.5			12.6	
Approach LOS		D			E			B			B	

Intersection Summary

HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phasings
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	10.0	73.0	11.0	74.0	74.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	8.3%	60.8%	9.2%	61.7%	61.7%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		39		35	35	35	35		25	25
90th %ile Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.5	67.0	7.6	68.1	68.1	20.0	20.0	7.0	30.0	30.0
70th %ile Term Code	Gap	MaxR	Gap	Hold	Hold	Max	Max	Max	Hold	Hold
50th %ile Green (s)	6.1	67.1	7.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
50th %ile Term Code	Gap	Hold	Gap	MaxR	MaxR	Ped	Ped	Max	Hold	Hold
30th %ile Green (s)	0.0	67.0	6.3	76.3	76.3	14.5	14.5	7.0	24.5	24.5
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	68.0	0.0	68.0	68.0	9.8	9.8	7.0	19.8	19.8
10th %ile Term Code	Skip	Hold	Skip	MaxR	MaxR	Gap	Gap	Max	Hold	Hold

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 119.6
50th %ile Actuated Cycle: 119.1
30th %ile Actuated Cycle: 112.8
10th %ile Actuated Cycle: 99.8

Queues
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	30	665	69	653	422	18	208	158	90	82
v/c Ratio	0.07	0.61	0.16	0.56	0.44	0.10	0.77	0.81	0.21	0.21
Control Delay	6.8	19.2	7.3	16.9	2.7	43.9	57.3	67.3	36.9	9.0
Queue Delay	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	22.3	7.3	16.9	2.7	43.9	57.3	67.3	36.9	9.0
Queue Length 50th (m)	2.1	100.4	5.0	94.8	0.0	3.6	37.3	29.7	16.6	0.0
Queue Length 95th (m)	5.2	141.4	9.8	132.7	13.3	10.4	#64.2	#61.6	30.6	12.3
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	451	1098	437	1165	963	215	317	195	495	434
Starvation Cap Reductn	0	322	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.86	0.16	0.56	0.44	0.08	0.66	0.81	0.18	0.19

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	650	15	69	653	422	18	99	109	158	90	82
Future Volume (vph)	30	650	15	69	653	422	18	99	109	158	90	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.89	1.00	0.94		1.00	1.00	0.91
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	0.94	1.00		0.98	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1775	1855		1785	1902	1311	1671	1623		1569	1879	1424
Flt Permitted	0.31	1.00		0.27	1.00	1.00	0.70	1.00		0.31	1.00	1.00
Satd. Flow (perm)	573	1855		513	1902	1311	1229	1623		516	1879	1424
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	650	15	69	653	422	18	99	109	158	90	82
RTOR Reduction (vph)	0	1	0	0	0	166	0	34	0	0	0	63
Lane Group Flow (vph)	30	664	0	69	653	256	18	174	0	158	90	19
Confl. Peds. (#/hr)	35		39	39		35	25		35	35		25
Heavy Vehicles (%)	0%	3%	0%	0%	1%	5%	0%	0%	0%	12%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Effective Green, g (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Actuated g/C Ratio	0.62	0.59		0.66	0.61	0.61	0.14	0.14		0.23	0.23	0.23
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	395	1094		397	1153	795	177	234		183	434	329
v/s Ratio Prot	0.00	c0.36		c0.01	0.34			0.11		c0.05	0.05	
v/s Ratio Perm	0.04			0.11		0.20	0.01			c0.15		0.01
v/c Ratio	0.08	0.61		0.17	0.57	0.32	0.10	0.74		0.86	0.21	0.06
Uniform Delay, d1	9.8	15.1		9.8	13.6	11.1	42.8	47.3		41.3	35.8	34.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	2.5		0.2	2.0	1.1	0.3	12.0		31.8	0.2	0.1
Delay (s)	9.9	17.6		10.0	15.6	12.2	43.1	59.3		73.1	36.0	34.6
Level of Service	A	B		B	B	B	D	E		E	D	C
Approach Delay (s)		17.3			14.0			58.0			53.4	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	115.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: Elizabeth St N & Site Access

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	28	138	51	95	112	37
Future Volume (Veh/h)	28	138	51	95	112	37
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	150	55	103	122	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	390	106			158	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	390	106			158	
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	84			91	
cM capacity (veh/h)	561	948			1422	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	180	158	162
Volume Left	30	0	122
Volume Right	150	103	0
cSH	850	1700	1422
Volume to Capacity	0.21	0.09	0.09
Queue Length 95th (m)	6.1	0.0	2.1
Control Delay (s)	10.4	0.0	6.0
Lane LOS	B		A
Approach Delay (s)	10.4	0.0	6.0
Approach LOS	B		

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX

E

2032 FT

Phasings
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	69.0	69.0	69.0	69.0	51.0	51.0
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%
Maximum Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	43	43	85	85	69	62
90th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 28 (23%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	850	33	560	13	468	1166
v/c Ratio	0.84	0.04	0.56	0.02	0.35	0.86
Control Delay	33.8	6.2	21.8	2.0	27.1	42.2
Queue Delay	49.8	0.0	3.2	0.0	0.0	0.0
Total Delay	83.6	6.2	25.0	2.0	27.1	42.2
Queue Length 50th (m)	164.3	0.7	85.2	0.0	40.1	131.6
Queue Length 95th (m)	225.6	5.6	117.5	1.5	53.8	160.5
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	1008	807	1008	792	1329	1357
Starvation Cap Reductn	338	0	337	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	1.27	0.04	0.83	0.02	0.35	0.86

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	850	33	0	560	13	0	415	53	0	1129	37
Future Volume (vph)	0	850	33	0	560	13	0	415	53	0	1129	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.95		1.00	0.93		0.98			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			1.00	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1921	1514		1921	1486		3523			3616	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1921	1514		1921	1486		3523			3616	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	850	33	0	560	13	0	415	53	0	1129	37
RTOR Reduction (vph)	0	0	13	0	0	6	0	8	0	0	2	0
Lane Group Flow (vph)	0	850	20	0	560	7	0	460	0	0	1164	0
Confl. Peds. (#/hr)	65		43	43		62	62		69	69		62
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	2%	0%	0%	2%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Effective Green, g (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		1008	794		1008	780		1321			1356	
v/s Ratio Prot		c0.44			0.29			0.13			c0.32	
v/s Ratio Perm			0.01			0.00						
v/c Ratio		0.84	0.03		0.56	0.01		0.35			0.86	
Uniform Delay, d1		24.3	13.7		19.1	13.6		27.0			34.6	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		8.6	0.1		2.2	0.0		0.7			7.2	
Delay (s)		32.9	13.8		21.3	13.6		27.7			41.8	
Level of Service		C	B		C	B		C			D	
Approach Delay (s)		32.1			21.1			27.7			41.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	8.0	25.0	25.0	8.0	25.0	9.5	28.0	28.0	28.0
Total Split (s)	8.0	70.0	70.0	8.0	70.0	10.0	42.0	32.0	32.0
Total Split (%)	6.7%	58.3%	58.3%	6.7%	58.3%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		31	31		8		22	25	25
90th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
90th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Max	Max
70th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
70th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Max	Max
50th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	33.2	23.2	23.2
50th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Gap	Gap
30th %ile Green (s)	0.0	64.0	64.0	5.0	72.0	5.5	29.5	19.5	19.5
30th %ile Term Code	Skip	MaxR	MaxR	Max	Hold	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	64.0	64.0	0.0	64.0	0.0	12.9	12.9	12.9
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Skip	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 111.9
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 120
50th %ile Actuated Cycle: 117.2
30th %ile Actuated Cycle: 113.5
10th %ile Actuated Cycle: 88.9

Queues
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	725	67	61	325	65	76	86	264
v/c Ratio	0.06	0.66	0.08	0.18	0.29	0.34	0.17	0.40	0.82
Control Delay	8.7	22.1	1.4	9.7	14.0	35.1	28.1	46.6	62.2
Queue Delay	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0
Total Delay	8.7	22.1	1.4	9.7	15.0	35.1	28.1	46.6	62.2
Queue Length 50th (m)	2.7	116.9	0.0	4.8	38.6	10.9	11.1	17.3	55.2
Queue Length 95th (m)	6.8	169.8	3.5	10.4	59.7	21.6	23.0	32.8	#85.3
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	531	1101	834	335	1119	191	559	269	398
Starvation Cap Reductn	0	0	0	0	528	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.66	0.08	0.18	0.55	0.34	0.14	0.32	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
2: George St S/George St N & Queen St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	725	67	61	308	17	65	60	16	86	194	70
Future Volume (vph)	34	725	67	61	308	17	65	60	16	86	194	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1407	1902	1378	1785	1884		1743	1697		1539	1648	
Flt Permitted	0.53	1.00	1.00	0.23	1.00		0.26	1.00		0.71	1.00	
Satd. Flow (perm)	790	1902	1378	425	1884		478	1697		1147	1648	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	725	67	61	308	17	65	60	16	86	194	70
RTOR Reduction (vph)	0	0	29	0	2	0	0	8	0	0	11	0
Lane Group Flow (vph)	34	725	38	61	323	0	65	68	0	86	253	0
Confl. Peds. (#/hr)	8		31	31		8	25		22	22		25
Heavy Vehicles (%)	26%	1%	3%	0%	1%	0%	2%	7%	0%	10%	3%	22%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	68.2	65.4	65.4	70.2	66.4		29.9	29.9		21.2	21.2	
Effective Green, g (s)	68.2	65.4	65.4	70.2	66.4		29.9	29.9		21.2	21.2	
Actuated g/C Ratio	0.60	0.57	0.57	0.62	0.58		0.26	0.26		0.19	0.19	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	487	1090	789	306	1096		171	444		213	306	
v/s Ratio Prot	0.00	c0.38		c0.01	0.17		c0.01	0.04			c0.15	
v/s Ratio Perm	0.04		0.03	0.12			0.09			0.08		
v/c Ratio	0.07	0.67	0.05	0.20	0.30		0.38	0.15		0.40	0.83	
Uniform Delay, d1	9.5	16.8	10.7	12.5	12.0		33.2	32.4		40.9	44.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.2	0.1	0.3	0.7		1.4	0.2		1.3	16.4	
Delay (s)	9.6	20.0	10.8	12.8	12.7		34.7	32.5		42.1	61.1	
Level of Service	A	C	B	B	B		C	C		D	E	
Approach Delay (s)		18.8			12.7			33.5			56.4	
Approach LOS		B			B			C			E	

Intersection Summary

HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	114.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phasings
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
90th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
70th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	28.3	31.2	12.5	12.5	31.2	12.5	12.5	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	25.6	36.3	10.1	10.1	36.3	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	20.8	57.2	0.0	0.0	57.2	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Queues
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	427	330	36	64	114
v/c Ratio	0.84	0.53	0.15	0.08	0.53
Control Delay	44.8	29.2	30.4	2.7	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	29.2	30.4	2.7	37.7
Queue Length 50th (m)	61.8	45.2	5.6	0.0	16.8
Queue Length 95th (m)	#112.2	#90.1	12.3	4.8	29.6
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	516	622	365	777	320
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	0.83	0.53	0.10	0.08	0.36

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	246	134	152	117	35	3	30	59	38	48	19
Future Volume (vph)	13	246	134	152	117	35	3	30	59	38	48	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99			0.99			1.00	0.98		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		0.98	
Frt		0.95			0.98			1.00	0.85		0.98	
Flt Protected		1.00			0.98			1.00	1.00		0.98	
Satd. Flow (prot)		1732			1610			1529	1405		1448	
Flt Permitted		1.00			0.98			0.97	1.00		0.87	
Satd. Flow (perm)		1732			1610			1495	1405		1277	
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)	14	267	146	165	127	38	3	33	64	41	52	21
RTOR Reduction (vph)	0	20	0	0	4	0	0	0	31	0	10	0
Lane Group Flow (vph)	0	407	0	0	326	0	0	36	33	0	104	0
Confl. Peds. (#/hr)	21		9	9		21	22		28	28		22
Heavy Vehicles (%)	0%	3%	0%	15%	2%	26%	0%	24%	11%	48%	7%	0%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		25.3			33.4			13.3	46.7		13.3	
Effective Green, g (s)		25.3			33.4			13.3	46.7		13.3	
Actuated g/C Ratio		0.28			0.37			0.15	0.52		0.15	
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)		486			597			220	822		188	
v/s Ratio Prot		c0.23			c0.20				0.01			
v/s Ratio Perm								0.02	0.01		c0.08	
v/c Ratio		0.84			0.55			0.16	0.04		0.55	
Uniform Delay, d1		30.4			22.3			33.5	10.6		35.6	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		11.9			3.6			0.4	0.0		3.5	
Delay (s)		42.3			25.9			33.8	10.7		39.1	
Level of Service		D			C			C	B		D	
Approach Delay (s)		42.3			25.9			19.0			39.1	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	218	3	62	66	2	5	4	162	15	34	38
Future Volume (vph)	24	218	3	62	66	2	5	4	162	15	34	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	237	3	67	72	2	5	4	176	16	37	41

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	266	141	185	94
Volume Left (vph)	26	67	5	16
Volume Right (vph)	3	2	176	41
Hadj (s)	0.01	0.09	-0.57	-0.23
Departure Headway (s)	4.8	5.0	4.5	4.9
Degree Utilization, x	0.35	0.20	0.23	0.13
Capacity (veh/h)	708	664	735	654
Control Delay (s)	10.4	9.2	8.8	8.7
Approach Delay (s)	10.4	9.2	8.8	8.7
Approach LOS	B	A	A	A

Intersection Summary			
Delay	9.5		
Level of Service	A		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	10.0	35.0	25.0	25.0	55.0	55.0	55.0	55.0
Total Split (%)	11.1%	38.9%	27.8%	27.8%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
70th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
50th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
10th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 90
30th %ile Actuated Cycle: 90
10th %ile Actuated Cycle: 90

Queues
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	157	186	12	100	418	1365
v/c Ratio	0.42	0.35	0.05	0.33	0.27	0.81
Control Delay	24.8	21.6	29.2	21.3	11.4	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.6
Total Delay	24.8	21.6	29.2	21.3	11.4	23.9
Queue Length 50th (m)	19.0	20.1	1.7	7.9	18.7	93.3
Queue Length 95th (m)	33.5	37.4	6.2	21.7	27.3	123.4
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	370	532	229	300	1551	1675
Starvation Cap Reductn	0	0	0	0	0	197
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.35	0.05	0.33	0.27	0.92

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	123	63	12	53	47	23	384	11	72	1095	198
Future Volume (vph)	157	123	63	12	53	47	23	384	11	72	1095	198
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.89			1.00			0.99	
Flpb, ped/bikes	0.89	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.93			1.00			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1504	1591		1614	1257			3378			3400	
Flt Permitted	0.60	1.00		0.64	1.00			0.84			0.90	
Satd. Flow (perm)	946	1591		1088	1257			2844			3053	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	157	123	63	12	53	47	23	384	11	72	1095	198
RTOR Reduction (vph)	0	20	0	0	36	0	0	2	0	0	15	0
Lane Group Flow (vph)	157	166	0	12	65	0	0	416	0	0	1350	0
Confl. Peds. (#/hr)	163		13	13		163	38		39	39		38
Heavy Vehicles (%)	6%	14%	5%	9%	29%	17%	13%	7%	0%	0%	3%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	29.0	29.0		19.0	19.0			49.0			49.0	
Effective Green, g (s)	29.0	29.0		19.0	19.0			49.0			49.0	
Actuated g/C Ratio	0.32	0.32		0.21	0.21			0.54			0.54	
Clearance Time (s)	3.0	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)	348	512		229	265			1548			1662	
v/s Ratio Prot	c0.04	0.10			0.05							
v/s Ratio Perm	c0.11			0.01				0.15			c0.44	
v/c Ratio	0.45	0.32		0.05	0.24			0.27			0.81	
Uniform Delay, d1	23.2	23.1		28.3	29.5			10.9			16.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	0.4		0.1	0.5			0.4			4.5	
Delay (s)	24.1	23.4		28.4	30.0			11.4			21.2	
Level of Service	C	C		C	C			B			C	
Approach Delay (s)		23.8			29.8			11.4			21.2	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Queen St W & Elizabeth St N

05-05-2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	800	416	50	41	32
Future Volume (Veh/h)	19	800	416	50	41	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	19	800	416	50	41	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	466				879	233
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	466				879	233
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				85	96
cM capacity (veh/h)	1092				282	769

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	286	533	277	189	73
Volume Left	19	0	0	0	41
Volume Right	0	0	0	50	32
cSH	1092	1700	1700	1700	390
Volume to Capacity	0.02	0.31	0.16	0.11	0.19
Queue Length 95th (m)	0.4	0.0	0.0	0.0	5.2
Control Delay (s)	0.7	0.0	0.0	0.0	16.3
Lane LOS	A				C
Approach Delay (s)	0.3		0.0		16.3
Approach LOS					C

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Main St N & Nelson St E

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	15	468	0	0	1066
Future Volume (Veh/h)	35	15	468	0	0	1066
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	35	15	468	0	0	1066
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.85	0.96			0.96	
vC, conflicting volume	1001	234			468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	416	111			356	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	98			100	
cM capacity (veh/h)	479	882			1149	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	50	312	156	355	711
Volume Left	35	0	0	0	0
Volume Right	15	0	0	0	0
cSH	555	1700	1700	1149	1700
Volume to Capacity	0.09	0.18	0.09	0.00	0.42
Queue Length 95th (m)	2.2	0.0	0.0	0.0	0.0
Control Delay (s)	12.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.1	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	55.0	45.0	45.0	65.0	65.0	65.0	65.0
Total Split (%)	8.3%	45.8%	37.5%	37.5%	54.2%	54.2%	54.2%	54.2%
Maximum Green (s)	7.0	49.0	39.0	39.0	59.0	59.0	59.0	59.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	None	None
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		12	13	13	35	35	34	34
90th %ile Green (s)	7.0	32.0	22.0	22.0	59.0	59.0	59.0	59.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	Hold	Hold
70th %ile Green (s)	7.0	22.6	12.6	12.6	59.0	59.0	59.0	59.0
70th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
50th %ile Green (s)	7.0	20.6	10.6	10.6	59.0	59.0	59.0	59.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
30th %ile Green (s)	7.0	18.7	8.7	8.7	59.0	59.0	59.0	59.0
30th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
10th %ile Green (s)	12.8	9.8	0.0	0.0	59.0	59.0	59.0	59.0
10th %ile Term Code	Hold	Gap	Skip	Skip	MaxR	MaxR	Hold	Hold

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 91.7
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 103
70th %ile Actuated Cycle: 93.6
50th %ile Actuated Cycle: 91.6
30th %ile Actuated Cycle: 89.7
10th %ile Actuated Cycle: 80.8

Queues
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	121	227	63	84	429	1216
v/c Ratio	0.37	0.56	0.45	0.36	0.24	0.60
Control Delay	29.8	32.7	47.2	36.3	7.9	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	32.7	47.2	36.3	7.9	12.0
Queue Length 50th (m)	17.0	31.3	10.6	12.2	14.4	58.3
Queue Length 95th (m)	30.3	52.5	22.5	25.2	29.2	106.0
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	326	953	473	774	1821	2035
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	0.24	0.13	0.11	0.24	0.60

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Main St N & Church St W/Church St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	150	77	63	69	15	25	365	39	57	1098	61
Future Volume (vph)	121	150	77	63	69	15	25	365	39	57	1098	61
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1773	1754		1712	1797			3307			3467	
Flt Permitted	0.54	1.00		0.62	1.00			0.85			0.91	
Satd. Flow (perm)	1015	1754		1112	1797			2811			3148	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	121	150	77	63	69	15	25	365	39	57	1098	61
RTOR Reduction (vph)	0	20	0	0	9	0	0	4	0	0	2	0
Lane Group Flow (vph)	121	207	0	63	75	0	0	425	0	0	1214	0
Confl. Peds. (#/hr)	12		13	13		12	34		35	35		34
Heavy Vehicles (%)	0%	0%	2%	3%	0%	7%	0%	9%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	21.7	21.7		10.3	10.3			59.4			59.4	
Effective Green, g (s)	21.7	21.7		10.3	10.3			59.4			59.4	
Actuated g/C Ratio	0.23	0.23		0.11	0.11			0.64			0.64	
Clearance Time (s)	3.0	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)	304	408		123	198			1793			2008	
v/s Ratio Prot	0.04	c0.12			0.04							
v/s Ratio Perm	0.06			0.06				0.15			c0.39	
v/c Ratio	0.40	0.51		0.51	0.38			0.24			0.60	
Uniform Delay, d1	29.4	31.1		39.0	38.4			7.2			9.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	1.0		3.6	1.2			0.3			0.5	
Delay (s)	30.3	32.0		42.6	39.6			7.5			10.4	
Level of Service	C	C		D	D			A			B	
Approach Delay (s)		31.4			40.9			7.5			10.4	
Approach LOS		C			D			A			B	

Intersection Summary

HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	93.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phasings
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.0	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	9.0	72.0	12.0	75.0	75.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	7.5%	60.0%	10.0%	62.5%	62.5%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		4		16	16	11	11		9	9
90th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	18.7	18.7	7.0	28.7	28.7
70th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
50th %ile Green (s)	6.0	66.7	8.3	69.0	69.0	15.6	15.6	7.0	25.6	25.6
50th %ile Term Code	Max	Hold	Gap	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
30th %ile Green (s)	0.0	66.0	7.4	76.4	76.4	12.6	12.6	7.0	22.6	22.6
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	66.0	6.3	75.3	75.3	8.7	8.7	7.0	18.7	18.7
10th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 118.7
50th %ile Actuated Cycle: 115.6
30th %ile Actuated Cycle: 111
10th %ile Actuated Cycle: 106

Queues
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	37	892	134	603	150	14	184	129	138	25
v/c Ratio	0.08	0.83	0.50	0.51	0.17	0.09	0.74	0.67	0.34	0.07
Control Delay	6.5	28.6	12.5	14.8	2.3	44.2	54.7	54.5	39.9	1.6
Queue Delay	0.0	43.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	71.7	12.5	14.8	2.3	44.2	54.7	54.5	39.9	1.6
Queue Length 50th (m)	2.3	155.0	8.8	76.1	0.0	2.8	31.6	24.1	26.4	0.0
Queue Length 95th (m)	6.1	#261.2	17.0	116.5	8.6	8.9	55.3	#41.9	44.2	1.4
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	474	1080	284	1186	865	215	322	192	494	425
Starvation Cap Reductn	0	258	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	1.09	0.47	0.51	0.17	0.07	0.57	0.67	0.28	0.06

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	882	10	134	603	150	14	87	97	129	138	25
Future Volume (vph)	37	882	10	134	603	150	14	87	97	129	138	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	0.97		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.98	1.00		0.99	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1677	1862		1767	1883	1288	1747	1651		1517	1879	1466
Flt Permitted	0.36	1.00		0.12	1.00	1.00	0.67	1.00		0.34	1.00	1.00
Satd. Flow (perm)	640	1862		232	1883	1288	1230	1651		544	1879	1466
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	882	10	134	603	150	14	87	97	129	138	25
RTOR Reduction (vph)	0	0	0	0	0	56	0	35	0	0	0	20
Lane Group Flow (vph)	37	892	0	134	603	94	14	149	0	129	138	5
Confl. Peds. (#/hr)	16		4	4		16	9		11	11		9
Heavy Vehicles (%)	6%	3%	0%	1%	2%	15%	0%	2%	2%	17%	0%	4%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	71.0	67.5		78.5	72.0	72.0	15.0	15.0		25.0	25.0	25.0
Effective Green, g (s)	71.0	67.5		78.5	72.0	72.0	15.0	15.0		25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.58		0.68	0.62	0.62	0.13	0.13		0.22	0.22	0.22
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	424	1088		264	1173	802	159	214		176	406	317
v/s Ratio Prot	0.00	c0.48		c0.04	0.32			0.09		c0.04	0.07	
v/s Ratio Perm	0.05			0.31		0.07	0.01			c0.11		0.00
v/c Ratio	0.09	0.82		0.51	0.51	0.12	0.09	0.70		0.73	0.34	0.02
Uniform Delay, d1	9.4	19.1		17.2	12.1	8.8	44.2	48.1		40.4	38.3	35.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	6.9		1.5	1.6	0.3	0.2	9.5		14.6	0.5	0.0
Delay (s)	9.4	26.1		18.7	13.7	9.1	44.5	57.6		55.0	38.8	35.6
Level of Service	A	C		B	B	A	D	E		D	D	D
Approach Delay (s)		25.4			13.7			56.6			45.7	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: Elizabeth St N & Site Access

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	31	153	18	49	58	41
Future Volume (Veh/h)	31	153	18	49	58	41
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)	34	166	20	53	63	45
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	218	46			73	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	218	46			73	
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	84			96	
cM capacity (veh/h)	739	1023			1527	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	200	73	108
Volume Left	34	0	63
Volume Right	166	53	0
cSH	960	1700	1527
Volume to Capacity	0.21	0.04	0.04
Queue Length 95th (m)	6.0	0.0	1.0
Control Delay (s)	9.7	0.0	4.5
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	4.5
Approach LOS	A		

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	68.0	68.0	68.0	68.0	52.0	52.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%
Maximum Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	125	125	128	128	140	104
90th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 5 (4%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	687	32	779	23	809	674
v/c Ratio	0.71	0.05	0.79	0.03	0.61	0.51
Control Delay	27.4	6.2	31.1	4.7	31.9	29.5
Queue Delay	51.9	0.0	42.9	0.0	0.0	0.0
Total Delay	79.3	6.2	74.1	4.7	31.9	29.5
Queue Length 50th (m)	119.4	0.6	145.0	0.0	79.2	62.0
Queue Length 95th (m)	164.6	5.5	198.7	3.6	99.5	79.6
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	963	704	982	670	1333	1309
Starvation Cap Reductn	361	0	262	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	1.14	0.05	1.08	0.03	0.61	0.51

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	687	32	0	779	23	0	769	40	0	591	83
Future Volume (vph)	0	687	32	0	779	23	0	769	40	0	591	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.87		1.00	0.87		0.98			0.97	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.99			0.98	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1865	1339		1902	1273		3470			3392	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1865	1339		1902	1273		3470			3392	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	687	32	0	779	23	0	769	40	0	591	83
RTOR Reduction (vph)	0	0	13	0	0	11	0	3	0	0	9	0
Lane Group Flow (vph)	0	687	19	0	779	12	0	806	0	0	665	0
Confl. Peds. (#/hr)	128		125	125		128	104		140	140		104
Heavy Vehicles (%)	2%	3%	4%	2%	1%	9%	2%	3%	0%	2%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Effective Green, g (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		963	691		982	657		1330			1300	
v/s Ratio Prot		0.37			c0.41			c0.23			0.20	
v/s Ratio Perm			0.01			0.01						
v/c Ratio		0.71	0.03		0.79	0.02		0.61			0.51	
Uniform Delay, d1		22.2	14.2		23.8	14.1		29.7			28.4	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		4.5	0.1		6.6	0.1		2.1			1.4	
Delay (s)		26.7	14.3		30.3	14.2		31.8			29.8	
Level of Service		C	B		C	B		C			C	
Approach Delay (s)		26.1			29.9			31.8			29.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	25.0	25.0	9.5	25.0	9.5	28.0	28.0	28.0
Total Split (s)	10.0	68.0	68.0	10.0	68.0	10.0	42.0	32.0	32.0
Total Split (%)	8.3%	56.7%	56.7%	8.3%	56.7%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	7.0	62.0	62.0	7.0	62.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		54	54		23		30	39	39
90th %ile Green (s)	7.0	62.5	62.5	6.5	62.0	5.5	34.4	24.4	24.4
90th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Gap	Gap
70th %ile Green (s)	7.0	62.9	62.9	6.1	62.0	5.5	32.0	22.0	22.0
70th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Ped	Ped
50th %ile Green (s)	7.0	72.0	72.0	0.0	62.0	5.5	32.0	22.0	22.0
50th %ile Term Code	Max	Hold	Hold	Skip	MaxR	Max	Hold	Ped	Ped
30th %ile Green (s)	6.7	71.7	71.7	0.0	62.0	5.5	23.4	13.4	13.4
30th %ile Term Code	Gap	Hold	Hold	Skip	MaxR	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	62.0	62.0	0.0	62.0	5.5	19.0	9.0	9.0
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Max	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 110.1
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 118.4
70th %ile Actuated Cycle: 116
50th %ile Actuated Cycle: 116
30th %ile Actuated Cycle: 107.1
10th %ile Actuated Cycle: 93

Queues
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	556	27	16	828	128	193	73	185
v/c Ratio	0.28	0.49	0.03	0.03	0.77	0.54	0.43	0.45	0.67
Control Delay	10.6	15.9	0.1	7.8	26.6	41.7	34.9	51.0	48.2
Queue Delay	0.0	0.0	0.0	0.0	50.3	0.0	0.0	0.0	0.0
Total Delay	10.6	15.9	0.1	7.8	76.8	41.7	34.9	51.0	48.2
Queue Length 50th (m)	5.1	63.3	0.0	1.2	149.2	22.3	32.8	14.6	32.0
Queue Length 95th (m)	10.9	115.7	0.0	3.8	216.5	38.0	53.5	29.2	55.1
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	241	1139	792	523	1072	236	580	240	394
Starvation Cap Reductn	0	0	0	0	331	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.49	0.03	0.03	1.12	0.54	0.33	0.30	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: George St S/George St N & Queen St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	556	27	16	800	28	128	142	51	73	102	83
Future Volume (vph)	66	556	27	16	800	28	128	142	51	73	102	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.82	1.00	1.00		1.00	0.97		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.98	1.00		0.99	1.00		0.94	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1513	1883	1265	1753	1888		1763	1734		1514	1563	
Flt Permitted	0.15	1.00	1.00	0.37	1.00		0.38	1.00		0.64	1.00	
Satd. Flow (perm)	243	1883	1265	692	1888		697	1734		1014	1563	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	66	556	27	16	800	28	128	142	51	73	102	83
RTOR Reduction (vph)	0	0	11	0	1	0	0	11	0	0	26	0
Lane Group Flow (vph)	66	556	16	16	827	0	128	182	0	73	159	0
Confl. Peds. (#/hr)	23		54	54		23	39		30	30		39
Heavy Vehicles (%)	18%	2%	4%	0%	1%	0%	0%	2%	0%	11%	5%	13%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	72.0	66.7	66.7	66.2	63.8		27.9	27.9		17.9	17.9	
Effective Green, g (s)	72.0	66.7	66.7	66.2	63.8		27.9	27.9		17.9	17.9	
Actuated g/C Ratio	0.64	0.60	0.60	0.59	0.57		0.25	0.25		0.16	0.16	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	216	1121	753	431	1075		225	431		162	249	
v/s Ratio Prot	c0.01	0.30		0.00	c0.44		c0.03	0.10			0.10	
v/s Ratio Perm	0.18		0.01	0.02			c0.11			0.07		
v/c Ratio	0.31	0.50	0.02	0.04	0.77		0.57	0.42		0.45	0.64	
Uniform Delay, d1	14.8	13.0	9.3	10.0	18.5		35.8	35.3		42.6	44.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.6	0.1	0.0	5.3		3.3	0.7		2.0	5.3	
Delay (s)	15.6	14.6	9.3	10.1	23.8		39.1	35.9		44.6	49.3	
Level of Service	B	B	A	B	C		D	D		D	D	
Approach Delay (s)		14.5			23.5			37.2			48.0	
Approach LOS		B			C			D			D	

Intersection Summary

HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phasings
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
90th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
70th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	23.5	35.7	12.8	12.8	35.7	12.8	12.8	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	20.4	41.5	10.1	10.1	41.5	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	15.8	62.2	0.0	0.0	62.2	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Queues
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	363	511	82	172	106
v/c Ratio	0.81	0.72	0.39	0.19	0.56
Control Delay	43.9	34.6	36.9	2.0	39.1
Queue Delay	0.0	1.9	0.0	0.0	0.0
Total Delay	43.9	36.5	36.9	2.0	39.1
Queue Length 50th (m)	54.2	73.7	13.2	0.0	14.8
Queue Length 95th (m)	82.5	#161.6	23.6	7.7	27.8
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	485	714	313	895	275
Starvation Cap Reductn	0	92	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.75	0.82	0.26	0.19	0.39

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	222	106	145	290	35	44	31	158	50	25	23
Future Volume (vph)	6	222	106	145	290	35	44	31	158	50	25	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			0.99			1.00	0.95		0.97	
Flpb, ped/bikes		1.00			1.00			0.94	1.00		0.94	
Frt		0.96			0.99			1.00	0.85		0.97	
Flt Protected		1.00			0.98			0.97	1.00		0.98	
Satd. Flow (prot)		1730			1710			1589	1450		1320	
Flt Permitted		1.00			0.98			0.79	1.00		0.80	
Satd. Flow (perm)		1730			1710			1285	1450		1078	
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)	7	241	115	158	315	38	48	34	172	54	27	25
RTOR Reduction (vph)	0	19	0	0	2	0	0	0	77	0	14	0
Lane Group Flow (vph)	0	344	0	0	509	0	0	82	95	0	92	0
Confl. Peds. (#/hr)	41		44	44		41	59		69	69		59
Heavy Vehicles (%)	0%	0%	0%	12%	1%	26%	0%	20%	5%	0%	0%	92%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		22.3			36.3			13.4	49.7		13.4	
Effective Green, g (s)		22.3			36.3			13.4	49.7		13.4	
Actuated g/C Ratio		0.25			0.40			0.15	0.55		0.15	
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)		428			689			191	897		160	
v/s Ratio Prot		c0.20			c0.30				0.04			
v/s Ratio Perm								0.06	0.02		c0.09	
v/c Ratio		0.80			0.74			0.43	0.11		0.58	
Uniform Delay, d1		31.8			22.8			34.8	9.6		35.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		10.5			7.0			1.6	0.1		5.0	
Delay (s)		42.3			29.8			36.4	9.6		40.6	
Level of Service		D			C			D	A		D	
Approach Delay (s)		42.3			29.8			18.3			40.6	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	164	2	122	191	9	8	7	174	13	25	23
Future Volume (vph)	11	164	2	122	191	9	8	7	174	13	25	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	178	2	133	208	10	9	8	189	14	27	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	192	351	206	66
Volume Left (vph)	12	133	9	14
Volume Right (vph)	2	10	189	25
Hadj (s)	0.01	0.06	-0.54	-0.18
Departure Headway (s)	5.1	4.9	4.8	5.4
Degree Utilization, x	0.27	0.48	0.28	0.10
Capacity (veh/h)	653	695	666	573
Control Delay (s)	10.0	12.5	9.7	9.0
Approach Delay (s)	10.0	12.5	9.7	9.0
Approach LOS	B	B	A	A

Intersection Summary			
Delay	10.9		
Level of Service	B		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	13.0	45.0	32.0	32.0	45.0	45.0	45.0	45.0
Total Split (%)	14.4%	50.0%	35.6%	35.6%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
90th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
70th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	10.0	34.7	21.7	21.7	39.0	39.0	39.0	39.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	10.0	32.0	19.0	19.0	39.0	39.0	39.0	39.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	10.0	32.0	19.0	19.0	39.0	39.0	39.0	39.0
10th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 86.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 85.7
30th %ile Actuated Cycle: 83
10th %ile Actuated Cycle: 83

Queues
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	286	154	55	312	756	849
v/c Ratio	0.77	0.23	0.18	0.78	0.53	0.67
Control Delay	32.2	12.8	26.3	39.9	19.0	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	12.8	26.3	39.9	19.0	20.2
Queue Length 50th (m)	30.3	11.6	7.1	41.1	44.7	49.6
Queue Length 95th (m)	#56.8	23.7	16.2	#71.4	66.4	76.4
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	372	737	356	461	1438	1269
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	0.77	0.21	0.15	0.68	0.53	0.67

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	286	97	57	55	174	138	27	719	10	51	555	243
Future Volume (vph)	286	97	57	55	174	138	27	719	10	51	555	243
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.86			1.00			0.94	
Flpb, ped/bikes	0.96	1.00		0.96	1.00			1.00			1.00	
Frt	1.00	0.94		1.00	0.93			1.00			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1659	1582		1706	1426			3525			3166	
Flt Permitted	0.34	1.00		0.66	1.00			0.90			0.85	
Satd. Flow (perm)	585	1582		1184	1426			3178			2713	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	286	97	57	55	174	138	27	719	10	51	555	243
RTOR Reduction (vph)	0	24	0	0	33	0	0	1	0	0	46	0
Lane Group Flow (vph)	286	130	0	55	279	0	0	755	0	0	803	0
Confl. Peds. (#/hr)	228		40	40		228	101		73	73		101
Heavy Vehicles (%)	3%	15%	0%	0%	8%	4%	0%	3%	0%	0%	3%	4%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	35.3	35.3		22.3	22.3			39.1			39.1	
Effective Green, g (s)	35.3	35.3		22.3	22.3			39.1			39.1	
Actuated g/C Ratio	0.41	0.41		0.26	0.26			0.45			0.45	
Clearance Time (s)	3.0	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)	363	646		305	368			1438			1227	
v/s Ratio Prot	c0.09	0.08			0.20							
v/s Ratio Perm	c0.23			0.05				0.24			c0.30	
v/c Ratio	0.79	0.20		0.18	0.76			0.52			0.65	
Uniform Delay, d1	19.7	16.5		24.9	29.6			17.0			18.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	10.8	0.2		0.3	8.6			1.4			2.7	
Delay (s)	30.5	16.6		25.2	38.2			18.4			21.1	
Level of Service	C	B		C	D			B			C	
Approach Delay (s)		25.6			36.2			18.4			21.1	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	86.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	102.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Queen St W & Elizabeth St N

05-05-2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	624	923	120	36	30
Future Volume (Veh/h)	26	624	923	120	36	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	26	624	923	120	36	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	1043				1347	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1043				1347	522
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				74	94
cM capacity (veh/h)	663				137	500

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	234	416	615	428	66
Volume Left	26	0	0	0	36
Volume Right	0	0	0	120	30
cSH	663	1700	1700	1700	204
Volume to Capacity	0.04	0.24	0.36	0.25	0.32
Queue Length 95th (m)	0.9	0.0	0.0	0.0	10.1
Control Delay (s)	1.6	0.0	0.0	0.0	30.8
Lane LOS	A				D
Approach Delay (s)	0.6		0.0		30.8
Approach LOS					D

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Main St N & Nelson St E

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	76	949	0	0	582
Future Volume (Veh/h)	42	76	949	0	0	582
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	42	76	949	0	0	582
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.87	0.86			0.86	
vC, conflicting volume	1240	474			949	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	915	76			626	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	91			100	
cM capacity (veh/h)	236	837			822	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	118	633	316	194	388
Volume Left	42	0	0	0	0
Volume Right	76	0	0	0	0
cSH	440	1700	1700	822	1700
Volume to Capacity	0.27	0.37	0.19	0.00	0.23
Queue Length 95th (m)	8.1	0.0	0.0	0.0	0.0
Control Delay (s)	16.2	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	16.2	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	40.0	30.0	30.0	80.0	80.0	80.0	80.0
Total Split (%)	8.3%	33.3%	25.0%	25.0%	66.7%	66.7%	66.7%	66.7%
Maximum Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		17	22	22	44	44	59	59
90th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
70th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
50th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
30th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
10th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	89	199	106	286	1252	784
v/c Ratio	0.41	0.39	0.46	0.79	0.64	0.44
Control Delay	36.5	33.7	49.6	59.6	16.4	12.8
Queue Delay	0.0	0.0	0.0	0.0	3.0	0.0
Total Delay	36.5	33.7	49.6	59.6	19.4	12.8
Queue Length 50th (m)	15.3	33.8	22.2	61.5	91.4	46.8
Queue Length 95th (m)	28.1	55.1	40.2	#101.1	113.1	60.2
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	216	508	232	364	1946	1770
Starvation Cap Reductn	0	0	0	0	565	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.39	0.46	0.79	0.91	0.44

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
8: Main St N & Church St W/Church St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	135	64	106	210	76	36	1137	79	32	677	75
Future Volume (vph)	89	135	64	106	210	76	36	1137	79	32	677	75
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.99			0.98	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.96			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1727	1743		1747	1768			3482			3386	
Flt Permitted	0.26	1.00		0.63	1.00			0.90			0.84	
Satd. Flow (perm)	467	1743		1164	1768			3148			2859	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	135	64	106	210	76	36	1137	79	32	677	75
RTOR Reduction (vph)	0	14	0	0	11	0	0	4	0	0	7	0
Lane Group Flow (vph)	89	185	0	106	275	0	0	1248	0	0	777	0
Confl. Peds. (#/hr)	22		17	17		22	59		44	44		59
Heavy Vehicles (%)	3%	0%	4%	0%	1%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Effective Green, g (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Actuated g/C Ratio	0.28	0.28		0.20	0.20			0.62			0.62	
Clearance Time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)	205	493		232	353			1941			1763	
v/s Ratio Prot	c0.03	0.11			c0.16							
v/s Ratio Perm	0.10			0.09				c0.40			0.27	
v/c Ratio	0.43	0.37		0.46	0.78			0.64			0.44	
Uniform Delay, d1	33.5	34.5		42.3	45.5			14.6			12.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.6	2.2		6.4	15.5			1.7			0.8	
Delay (s)	40.1	36.6		48.6	61.0			16.3			12.9	
Level of Service	D	D		D	E			B			B	
Approach Delay (s)		37.7			57.6			16.3			12.9	
Approach LOS		D			E			B			B	

Intersection Summary

HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phasings
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	10.0	73.0	11.0	74.0	74.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	8.3%	60.8%	9.2%	61.7%	61.7%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		39		35	35	35	35		25	25
90th %ile Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.5	67.0	7.6	68.1	68.1	20.0	20.0	7.0	30.0	30.0
70th %ile Term Code	Gap	MaxR	Gap	Hold	Hold	Max	Max	Max	Hold	Hold
50th %ile Green (s)	6.1	67.1	7.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
50th %ile Term Code	Gap	Hold	Gap	MaxR	MaxR	Ped	Ped	Max	Hold	Hold
30th %ile Green (s)	0.0	67.0	6.3	76.3	76.3	14.5	14.5	7.0	24.5	24.5
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	68.0	0.0	68.0	68.0	9.8	9.8	7.0	19.8	19.8
10th %ile Term Code	Skip	Hold	Skip	MaxR	MaxR	Gap	Gap	Max	Hold	Hold

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 119.6
50th %ile Actuated Cycle: 119.1
30th %ile Actuated Cycle: 112.8
10th %ile Actuated Cycle: 99.8

Queues
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	30	705	69	692	422	18	208	158	90	82
v/c Ratio	0.07	0.64	0.18	0.59	0.44	0.10	0.77	0.81	0.21	0.21
Control Delay	6.8	20.2	7.5	17.7	2.7	43.9	57.3	67.3	36.9	9.0
Queue Delay	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	24.6	7.5	17.7	2.7	43.9	57.3	67.3	36.9	9.0
Queue Length 50th (m)	2.1	110.3	5.0	103.6	0.0	3.6	37.3	29.7	16.6	0.0
Queue Length 95th (m)	5.2	155.6	9.8	145.0	13.3	10.4	#64.2	#61.6	30.6	12.3
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	428	1098	409	1165	963	215	317	195	495	434
Starvation Cap Reductn	0	310	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.89	0.17	0.59	0.44	0.08	0.66	0.81	0.18	0.19

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	690	15	69	692	422	18	99	109	158	90	82
Future Volume (vph)	30	690	15	69	692	422	18	99	109	158	90	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.89	1.00	0.94		1.00	1.00	0.91
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.94	1.00		0.98	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1777	1856		1785	1902	1311	1671	1623		1569	1879	1424
Flt Permitted	0.28	1.00		0.25	1.00	1.00	0.70	1.00		0.31	1.00	1.00
Satd. Flow (perm)	526	1856		465	1902	1311	1229	1623		516	1879	1424
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	690	15	69	692	422	18	99	109	158	90	82
RTOR Reduction (vph)	0	0	0	0	0	166	0	34	0	0	0	63
Lane Group Flow (vph)	30	705	0	69	692	256	18	174	0	158	90	19
Confl. Peds. (#/hr)	35		39	39		35	25		35	35		25
Heavy Vehicles (%)	0%	3%	0%	0%	1%	5%	0%	0%	0%	12%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Effective Green, g (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Actuated g/C Ratio	0.62	0.59		0.66	0.61	0.61	0.14	0.14		0.23	0.23	0.23
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	367	1095		368	1153	795	177	234		183	434	329
v/s Ratio Prot	0.00	c0.38		c0.01	0.36			0.11		c0.05	0.05	
v/s Ratio Perm	0.05			0.11		0.20	0.01			c0.15		0.01
v/c Ratio	0.08	0.64		0.19	0.60	0.32	0.10	0.74		0.86	0.21	0.06
Uniform Delay, d1	10.3	15.6		10.5	14.0	11.1	42.8	47.3		41.3	35.8	34.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	2.9		0.2	2.3	1.1	0.3	12.0		31.8	0.2	0.1
Delay (s)	10.4	18.5		10.7	16.4	12.2	43.1	59.3		73.1	36.0	34.6
Level of Service	B	B		B	B	B	D	E		E	D	C
Approach Delay (s)		18.2			14.5			58.0			53.4	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	115.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: Elizabeth St N & Site Access

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	28	138	51	95	112	37
Future Volume (Veh/h)	28	138	51	95	112	37
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	150	55	103	122	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	390	106			158	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	390	106			158	
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	84			91	
cM capacity (veh/h)	561	948			1422	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	180	158	162
Volume Left	30	0	122
Volume Right	150	103	0
cSH	850	1700	1422
Volume to Capacity	0.21	0.09	0.09
Queue Length 95th (m)	6.1	0.0	2.1
Control Delay (s)	10.4	0.0	6.0
Lane LOS	B		A
Approach Delay (s)	10.4	0.0	6.0
Approach LOS	B		

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX

F

2041 FT

Phasings

1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	69.0	69.0	69.0	69.0	51.0	51.0
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%
Maximum Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	43	43	85	85	69	62
90th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	63.0	63.0	63.0	63.0	45.0	45.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 28 (23%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues

1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	944	33	623	13	512	1288
v/c Ratio	0.94	0.04	0.62	0.02	0.38	0.95
Control Delay	44.2	6.2	23.4	2.0	27.7	51.4
Queue Delay	45.8	0.0	5.7	0.0	0.0	0.0
Total Delay	90.0	6.2	29.2	2.0	27.7	51.4
Queue Length 50th (m)	200.0	0.7	99.2	0.0	44.7	152.9
Queue Length 95th (m)	#291.4	5.6	136.4	1.5	59.2	#198.7
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	1008	807	1008	792	1332	1359
Starvation Cap Reductn	305	0	321	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	1.34	0.04	0.91	0.02	0.38	0.95

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	944	33	0	623	13	0	459	53	0	1251	37
Future Volume (vph)	0	944	33	0	623	13	0	459	53	0	1251	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.95		1.00	0.93		0.98			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			1.00	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1921	1514		1921	1486		3534			3619	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1921	1514		1921	1486		3534			3619	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	944	33	0	623	13	0	459	53	0	1251	37
RTOR Reduction (vph)	0	0	13	0	0	6	0	8	0	0	2	0
Lane Group Flow (vph)	0	944	20	0	623	7	0	505	0	0	1286	0
Confl. Peds. (#/hr)	65		43	43		62	62		69	69		62
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	2%	0%	0%	2%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Effective Green, g (s)		63.0	63.0		63.0	63.0		45.0			45.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		1008	794		1008	780		1325			1357	
v/s Ratio Prot		c0.49			0.32			0.14			c0.36	
v/s Ratio Perm			0.01			0.00						
v/c Ratio		0.94	0.03		0.62	0.01		0.38			0.95	
Uniform Delay, d1		26.6	13.7		20.0	13.6		27.3			36.4	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		16.6	0.1		2.8	0.0		0.8			14.8	
Delay (s)		43.3	13.8		22.9	13.6		28.2			51.1	
Level of Service		D	B		C	B		C			D	
Approach Delay (s)		42.3			22.7			28.2			51.1	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	8.0	25.0	25.0	8.0	25.0	9.5	28.0	28.0	28.0
Total Split (s)	8.0	70.0	70.0	8.0	70.0	10.0	42.0	32.0	32.0
Total Split (%)	6.7%	58.3%	58.3%	6.7%	58.3%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		31	31		8		22	25	25
90th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
90th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Max	Max
70th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	36.0	26.0	26.0
70th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Max	Max
50th %ile Green (s)	5.0	64.0	64.0	5.0	64.0	5.5	33.2	23.2	23.2
50th %ile Term Code	Max	MaxR	MaxR	Max	MaxR	Max	Hold	Gap	Gap
30th %ile Green (s)	0.0	64.0	64.0	5.0	72.0	5.5	29.5	19.5	19.5
30th %ile Term Code	Skip	MaxR	MaxR	Max	Hold	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	64.0	64.0	0.0	64.0	0.0	12.9	12.9	12.9
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Skip	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 111.9
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 120
50th %ile Actuated Cycle: 117.2
30th %ile Actuated Cycle: 113.5
10th %ile Actuated Cycle: 88.9

Queues
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	806	67	61	355	65	76	86	264
v/c Ratio	0.07	0.73	0.08	0.22	0.32	0.34	0.17	0.40	0.82
Control Delay	8.7	24.8	1.4	10.3	14.4	35.1	28.1	46.6	62.2
Queue Delay	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Total Delay	8.7	24.8	1.4	10.3	15.5	35.1	28.1	46.6	62.2
Queue Length 50th (m)	2.7	139.4	0.0	4.8	43.2	10.9	11.1	17.3	55.2
Queue Length 95th (m)	6.8	202.9	3.5	10.4	66.2	21.6	23.0	32.8	#85.3
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	510	1101	834	277	1120	191	559	269	398
Starvation Cap Reductn	0	0	0	0	517	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.73	0.08	0.22	0.59	0.34	0.14	0.32	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
2: George St S/George St N & Queen St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	806	67	61	338	17	65	60	16	86	194	70
Future Volume (vph)	34	806	67	61	338	17	65	60	16	86	194	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1408	1902	1378	1785	1885		1743	1697		1539	1648	
Flt Permitted	0.51	1.00	1.00	0.17	1.00		0.26	1.00		0.71	1.00	
Satd. Flow (perm)	754	1902	1378	326	1885		478	1697		1147	1648	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	806	67	61	338	17	65	60	16	86	194	70
RTOR Reduction (vph)	0	0	29	0	1	0	0	8	0	0	11	0
Lane Group Flow (vph)	34	806	38	61	354	0	65	68	0	86	253	0
Confl. Peds. (#/hr)	8		31	31		8	25		22	22		25
Heavy Vehicles (%)	26%	1%	3%	0%	1%	0%	2%	7%	0%	10%	3%	22%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	68.2	65.4	65.4	70.2	66.4		29.9	29.9		21.2	21.2	
Effective Green, g (s)	68.2	65.4	65.4	70.2	66.4		29.9	29.9		21.2	21.2	
Actuated g/C Ratio	0.60	0.57	0.57	0.62	0.58		0.26	0.26		0.19	0.19	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	466	1090	789	249	1096		171	444		213	306	
v/s Ratio Prot	0.00	c0.42		c0.01	0.19		c0.01	0.04			c0.15	
v/s Ratio Perm	0.04		0.03	0.14			0.09			0.08		
v/c Ratio	0.07	0.74	0.05	0.24	0.32		0.38	0.15		0.40	0.83	
Uniform Delay, d1	9.6	18.0	10.7	14.5	12.3		33.2	32.4		40.9	44.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	4.5	0.1	0.5	0.8		1.4	0.2		1.3	16.4	
Delay (s)	9.6	22.6	10.8	15.0	13.1		34.7	32.5		42.1	61.1	
Level of Service	A	C	B	B	B		C	C		D	E	
Approach Delay (s)		21.2			13.3			33.5			56.4	
Approach LOS		C			B			C			E	

Intersection Summary

HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	114.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phasings
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
90th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
70th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	28.3	31.2	12.5	12.5	31.2	12.5	12.5	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	25.6	36.3	10.1	10.1	36.3	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	20.8	57.2	0.0	0.0	57.2	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Queues
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	427	330	36	64	114
v/c Ratio	0.84	0.53	0.15	0.08	0.53
Control Delay	44.8	29.2	30.4	2.7	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	29.2	30.4	2.7	37.7
Queue Length 50th (m)	61.8	45.2	5.6	0.0	16.8
Queue Length 95th (m)	#112.2	#90.1	12.3	4.8	29.6
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	516	622	365	777	320
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	0.83	0.53	0.10	0.08	0.36

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	246	134	152	117	35	3	30	59	38	48	19
Future Volume (vph)	13	246	134	152	117	35	3	30	59	38	48	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99			0.99			1.00	0.98		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		0.98	
Frt		0.95			0.98			1.00	0.85		0.98	
Flt Protected		1.00			0.98			1.00	1.00		0.98	
Satd. Flow (prot)		1732			1610			1529	1405		1448	
Flt Permitted		1.00			0.98			0.97	1.00		0.87	
Satd. Flow (perm)		1732			1610			1495	1405		1277	
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)	14	267	146	165	127	38	3	33	64	41	52	21
RTOR Reduction (vph)	0	20	0	0	4	0	0	0	31	0	10	0
Lane Group Flow (vph)	0	407	0	0	326	0	0	36	33	0	104	0
Confl. Peds. (#/hr)	21		9	9		21	22		28	28		22
Heavy Vehicles (%)	0%	3%	0%	15%	2%	26%	0%	24%	11%	48%	7%	0%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		25.3			33.4			13.3	46.7		13.3	
Effective Green, g (s)		25.3			33.4			13.3	46.7		13.3	
Actuated g/C Ratio		0.28			0.37			0.15	0.52		0.15	
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)		486			597			220	822		188	
v/s Ratio Prot		c0.23			c0.20				0.01			
v/s Ratio Perm								0.02	0.01		c0.08	
v/c Ratio		0.84			0.55			0.16	0.04		0.55	
Uniform Delay, d1		30.4			22.3			33.5	10.6		35.6	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		11.9			3.6			0.4	0.0		3.5	
Delay (s)		42.3			25.9			33.8	10.7		39.1	
Level of Service		D			C			C	B		D	
Approach Delay (s)		42.3			25.9			19.0			39.1	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	218	3	62	66	2	5	4	162	15	34	38
Future Volume (vph)	24	218	3	62	66	2	5	4	162	15	34	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	237	3	67	72	2	5	4	176	16	37	41

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	266	141	185	94
Volume Left (vph)	26	67	5	16
Volume Right (vph)	3	2	176	41
Hadj (s)	0.01	0.09	-0.57	-0.23
Departure Headway (s)	4.8	5.0	4.5	4.9
Degree Utilization, x	0.35	0.20	0.23	0.13
Capacity (veh/h)	708	664	735	654
Control Delay (s)	10.4	9.2	8.8	8.7
Approach Delay (s)	10.4	9.2	8.8	8.7
Approach LOS	B	A	A	A

Intersection Summary			
Delay	9.5		
Level of Service	A		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	10.0	35.0	25.0	25.0	55.0	55.0	55.0	55.0
Total Split (%)	11.1%	38.9%	27.8%	27.8%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
70th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
50th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	7.0	29.0	19.0	19.0	49.0	49.0	49.0	49.0
10th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 90
30th %ile Actuated Cycle: 90
10th %ile Actuated Cycle: 90

Queues
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	157	186	12	100	461	1484
v/c Ratio	0.42	0.35	0.05	0.33	0.31	0.88
Control Delay	24.8	21.6	29.2	21.3	11.8	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	9.0
Total Delay	24.8	21.6	29.2	21.3	11.8	34.5
Queue Length 50th (m)	19.0	20.1	1.7	7.9	21.3	109.5
Queue Length 95th (m)	33.5	37.4	6.2	21.7	30.6	#149.0
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	370	532	229	300	1496	1680
Starvation Cap Reductn	0	0	0	0	0	186
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.35	0.05	0.33	0.31	0.99

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	123	63	12	53	47	23	427	11	72	1214	198
Future Volume (vph)	157	123	63	12	53	47	23	427	11	72	1214	198
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.89			1.00			0.99	
Flpb, ped/bikes	0.89	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.93			1.00			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1504	1591		1614	1257			3382			3412	
Flt Permitted	0.60	1.00		0.64	1.00			0.81			0.89	
Satd. Flow (perm)	946	1591		1088	1257			2746			3060	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	157	123	63	12	53	47	23	427	11	72	1214	198
RTOR Reduction (vph)	0	20	0	0	36	0	0	2	0	0	14	0
Lane Group Flow (vph)	157	166	0	12	65	0	0	459	0	0	1470	0
Confl. Peds. (#/hr)	163		13	13		163	38		39	39		38
Heavy Vehicles (%)	6%	14%	5%	9%	29%	17%	13%	7%	0%	0%	3%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	29.0	29.0		19.0	19.0			49.0			49.0	
Effective Green, g (s)	29.0	29.0		19.0	19.0			49.0			49.0	
Actuated g/C Ratio	0.32	0.32		0.21	0.21			0.54			0.54	
Clearance Time (s)	3.0	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)	348	512		229	265			1495			1666	
v/s Ratio Prot	c0.04	0.10			0.05							
v/s Ratio Perm	c0.11			0.01				0.17			c0.48	
v/c Ratio	0.45	0.32		0.05	0.24			0.31			0.88	
Uniform Delay, d1	23.2	23.1		28.3	29.5			11.2			18.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	0.4		0.1	0.5			0.5			7.2	
Delay (s)	24.1	23.4		28.4	30.0			11.7			25.1	
Level of Service	C	C		C	C			B			C	
Approach Delay (s)		23.8			29.8			11.7			25.1	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Queen St W & Elizabeth St N

05-05-2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	888	460	50	41	32
Future Volume (Veh/h)	19	888	460	50	41	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	19	888	460	50	41	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	510				967	255
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510				967	255
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				83	96
cM capacity (veh/h)	1051				247	744

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	315	592	307	203	73
Volume Left	19	0	0	0	41
Volume Right	0	0	0	50	32
cSH	1051	1700	1700	1700	350
Volume to Capacity	0.02	0.35	0.18	0.12	0.21
Queue Length 95th (m)	0.4	0.0	0.0	0.0	5.9
Control Delay (s)	0.7	0.0	0.0	0.0	18.0
Lane LOS	A				C
Approach Delay (s)	0.2		0.0		18.0
Approach LOS					C

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Main St N & Nelson St E

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	15	468	0	0	1066
Future Volume (Veh/h)	35	15	468	0	0	1066
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	35	15	468	0	0	1066
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.83	0.96			0.96	
vC, conflicting volume	1001	234			468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	346	106			351	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	98			100	
cM capacity (veh/h)	518	887			1152	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	50	312	156	355	711
Volume Left	35	0	0	0	0
Volume Right	15	0	0	0	0
cSH	591	1700	1700	1152	1700
Volume to Capacity	0.08	0.18	0.09	0.00	0.42
Queue Length 95th (m)	2.1	0.0	0.0	0.0	0.0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	55.0	45.0	45.0	65.0	65.0	65.0	65.0
Total Split (%)	8.3%	45.8%	37.5%	37.5%	54.2%	54.2%	54.2%	54.2%
Maximum Green (s)	7.0	49.0	39.0	39.0	59.0	59.0	59.0	59.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	None	None
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		12	13	13	35	35	34	34
90th %ile Green (s)	7.0	32.0	22.0	22.0	59.0	59.0	59.0	59.0
90th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	Hold	Hold
70th %ile Green (s)	7.0	22.6	12.6	12.6	59.0	59.0	59.0	59.0
70th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
50th %ile Green (s)	7.0	20.6	10.6	10.6	59.0	59.0	59.0	59.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
30th %ile Green (s)	7.0	18.7	8.7	8.7	59.0	59.0	59.0	59.0
30th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	Hold	Hold
10th %ile Green (s)	12.8	9.8	0.0	0.0	59.0	59.0	59.0	59.0
10th %ile Term Code	Hold	Gap	Skip	Skip	MaxR	MaxR	Hold	Hold

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 91.7
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 103
70th %ile Actuated Cycle: 93.6
50th %ile Actuated Cycle: 91.6
30th %ile Actuated Cycle: 89.7
10th %ile Actuated Cycle: 80.8

Queues
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	121	227	63	84	464	1334
v/c Ratio	0.37	0.56	0.45	0.36	0.26	0.65
Control Delay	29.8	32.7	47.2	36.3	8.1	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	32.7	47.2	36.3	8.1	13.1
Queue Length 50th (m)	17.0	31.3	10.6	12.2	16.0	68.0
Queue Length 95th (m)	30.3	52.5	22.5	25.2	32.0	123.7
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	326	953	473	774	1808	2038
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	0.24	0.13	0.11	0.26	0.65

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Main St N & Church St W/Church St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	150	77	63	69	15	25	400	39	57	1216	61
Future Volume (vph)	121	150	77	63	69	15	25	400	39	57	1216	61
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.97			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1773	1754		1712	1797			3310			3471	
Flt Permitted	0.54	1.00		0.62	1.00			0.84			0.91	
Satd. Flow (perm)	1015	1754		1112	1797			2795			3153	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	121	150	77	63	69	15	25	400	39	57	1216	61
RTOR Reduction (vph)	0	20	0	0	9	0	0	4	0	0	2	0
Lane Group Flow (vph)	121	207	0	63	75	0	0	460	0	0	1332	0
Confl. Peds. (#/hr)	12		13	13		12	34		35	35		34
Heavy Vehicles (%)	0%	0%	2%	3%	0%	7%	0%	9%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	21.7	21.7		10.3	10.3			59.4			59.4	
Effective Green, g (s)	21.7	21.7		10.3	10.3			59.4			59.4	
Actuated g/C Ratio	0.23	0.23		0.11	0.11			0.64			0.64	
Clearance Time (s)	3.0	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)	304	408		123	198			1783			2011	
v/s Ratio Prot	0.04	c0.12			0.04							
v/s Ratio Perm	0.06			0.06				0.16			c0.42	
v/c Ratio	0.40	0.51		0.51	0.38			0.26			0.66	
Uniform Delay, d1	29.4	31.1		39.0	38.4			7.3			10.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	1.0		3.6	1.2			0.4			0.8	
Delay (s)	30.3	32.0		42.6	39.6			7.7			11.4	
Level of Service	C	C		D	D			A			B	
Approach Delay (s)		31.4			40.9			7.7			11.4	
Approach LOS		C			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	93.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phasings
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.0	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	9.0	72.0	12.0	75.0	75.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	7.5%	60.0%	10.0%	62.5%	62.5%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		4		16	16	11	11		9	9
90th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	18.7	18.7	7.0	28.7	28.7
70th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
50th %ile Green (s)	6.0	66.0	9.0	69.0	69.0	15.6	15.6	7.0	25.6	25.6
50th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Gap	Gap	Max	Hold	Hold
30th %ile Green (s)	0.0	66.0	7.7	76.7	76.7	12.6	12.6	7.0	22.6	22.6
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	66.0	6.6	75.6	75.6	8.7	8.7	7.0	18.7	18.7
10th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.4
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 118.7
50th %ile Actuated Cycle: 115.6
30th %ile Actuated Cycle: 111.3
10th %ile Actuated Cycle: 106.3

Queues
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	37	985	134	666	150	14	184	129	138	25
v/c Ratio	0.09	0.92	0.66	0.56	0.17	0.09	0.74	0.68	0.34	0.07
Control Delay	6.6	37.0	32.2	15.9	2.3	44.2	54.7	54.8	40.0	1.6
Queue Delay	0.0	46.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	83.3	32.2	15.9	2.3	44.2	54.7	54.8	40.0	1.6
Queue Length 50th (m)	2.3	192.6	10.6	88.5	0.0	2.8	31.6	24.1	26.4	0.0
Queue Length 95th (m)	6.1	#309.1	#35.7	134.8	8.6	8.9	55.3	#42.1	44.2	1.4
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	429	1076	216	1187	865	215	322	191	493	425
Starvation Cap Reductn	0	227	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	1.16	0.62	0.56	0.17	0.07	0.57	0.68	0.28	0.06

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	975	10	134	666	150	14	87	97	129	138	25
Future Volume (vph)	37	975	10	134	666	150	14	87	97	129	138	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.94	1.00	0.97		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.98	1.00		0.99	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1679	1862		1767	1883	1288	1747	1651		1517	1879	1466
Flt Permitted	0.32	1.00		0.07	1.00	1.00	0.67	1.00		0.34	1.00	1.00
Satd. Flow (perm)	567	1862		122	1883	1288	1230	1651		543	1879	1466
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	975	10	134	666	150	14	87	97	129	138	25
RTOR Reduction (vph)	0	0	0	0	0	56	0	35	0	0	0	20
Lane Group Flow (vph)	37	985	0	134	666	94	14	149	0	129	138	5
Confl. Peds. (#/hr)	16		4	4		16	9		11	11		9
Heavy Vehicles (%)	6%	3%	0%	1%	2%	15%	0%	2%	2%	17%	0%	4%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	70.9	67.4		78.6	72.1	72.1	15.0	15.0		25.0	25.0	25.0
Effective Green, g (s)	70.9	67.4		78.6	72.1	72.1	15.0	15.0		25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.58		0.68	0.62	0.62	0.13	0.13		0.22	0.22	0.22
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	381	1085		199	1174	803	159	214		176	406	317
v/s Ratio Prot	0.00	c0.53		c0.05	0.35			0.09		c0.04	0.07	
v/s Ratio Perm	0.06			0.41		0.07	0.01			c0.11		0.00
v/c Ratio	0.10	0.91		0.67	0.57	0.12	0.09	0.70		0.73	0.34	0.02
Uniform Delay, d1	9.8	21.3		25.8	12.7	8.8	44.3	48.1		40.5	38.3	35.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	12.5		8.7	2.0	0.3	0.2	9.5		14.6	0.5	0.0
Delay (s)	10.0	33.8		34.4	14.7	9.1	44.5	57.6		55.1	38.8	35.7
Level of Service	A	C		C	B	A	D	E		E	D	D
Approach Delay (s)		33.0			16.6			56.7			45.7	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	115.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: Elizabeth St N & Site Access

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	31	153	18	49	58	41
Future Volume (Veh/h)	31	153	18	49	58	41
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)	34	166	20	53	63	45
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	218	46			73	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	218	46			73	
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	84			96	
cM capacity (veh/h)	739	1023			1527	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	200	73	108
Volume Left	34	0	63
Volume Right	166	53	0
cSH	960	1700	1527
Volume to Capacity	0.21	0.04	0.04
Queue Length 95th (m)	6.0	0.0	1.0
Control Delay (s)	9.7	0.0	4.5
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	4.5
Approach LOS	A		

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings

1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Protected Phases	8		4		2	6
Permitted Phases		8		4		
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.0	44.0	44.0	44.0	35.0	35.0
Total Split (s)	68.0	68.0	68.0	68.0	52.0	52.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%
Maximum Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
Yellow Time (s)	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
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max
Walk Time (s)	23.0	23.0	23.0	23.0	17.0	17.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0
Pedestrian Calls (#/hr)	125	125	128	128	140	104
90th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
70th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
50th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
30th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord
10th %ile Green (s)	62.0	62.0	62.0	62.0	46.0	46.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 5 (4%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues

1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Lane Group	EBT	EBR	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	721	32	787	23	893	704
v/c Ratio	0.75	0.05	0.80	0.03	0.67	0.54
Control Delay	28.9	6.2	31.6	4.7	33.5	30.0
Queue Delay	51.5	0.0	46.0	0.0	0.0	0.0
Total Delay	80.5	6.2	77.6	4.7	33.5	30.0
Queue Length 50th (m)	129.2	0.6	147.5	0.0	90.3	65.6
Queue Length 95th (m)	178.0	5.5	202.3	3.6	112.6	84.0
Internal Link Dist (m)	97.0		135.7		93.1	177.9
Turn Bay Length (m)		15.0		34.0		
Base Capacity (vph)	963	704	982	670	1335	1310
Starvation Cap Reductn	349	0	260	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	1.17	0.05	1.09	0.03	0.67	0.54

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Main St S/Main St N & Queen St W/Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	721	32	0	787	23	0	853	40	0	621	83
Future Volume (vph)	0	721	32	0	787	23	0	853	40	0	621	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00	0.87		1.00	0.87		0.99			0.97	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.99			0.98	
Flt Protected		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (prot)		1865	1339		1902	1273		3477			3398	
Flt Permitted		1.00	1.00		1.00	1.00		1.00			1.00	
Satd. Flow (perm)		1865	1339		1902	1273		3477			3398	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	721	32	0	787	23	0	853	40	0	621	83
RTOR Reduction (vph)	0	0	13	0	0	11	0	3	0	0	9	0
Lane Group Flow (vph)	0	721	19	0	787	12	0	890	0	0	695	0
Confl. Peds. (#/hr)	128		125	125		128	104		140	140		104
Heavy Vehicles (%)	2%	3%	4%	2%	1%	9%	2%	3%	0%	2%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	2
Turn Type		NA	Perm		NA	Perm		NA			NA	
Protected Phases		8			4			2			6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Effective Green, g (s)		62.0	62.0		62.0	62.0		46.0			46.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52		0.38			0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0			6.0	
Lane Grp Cap (vph)		963	691		982	657		1332			1302	
v/s Ratio Prot		0.39			c0.41			c0.26			0.20	
v/s Ratio Perm			0.01			0.01						
v/c Ratio		0.75	0.03		0.80	0.02		0.67			0.53	
Uniform Delay, d1		22.9	14.2		23.9	14.1		30.7			28.7	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		5.3	0.1		6.9	0.1		2.7			1.6	
Delay (s)		28.2	14.3		30.8	14.2		33.3			30.3	
Level of Service		C	B		C	B		C			C	
Approach Delay (s)		27.6			30.3			33.3			30.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Phasings
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2		1	6	3	8		4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	25.0	25.0	9.5	25.0	9.5	28.0	28.0	28.0
Total Split (s)	10.0	68.0	68.0	10.0	68.0	10.0	42.0	32.0	32.0
Total Split (%)	8.3%	56.7%	56.7%	8.3%	56.7%	8.3%	35.0%	26.7%	26.7%
Maximum Green (s)	7.0	62.0	62.0	7.0	62.0	5.5	36.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	1.0	2.0	2.0	2.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	Max	None	Max	None	None	None	None
Walk Time (s)		8.0	8.0		8.0		8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0		11.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)		54	54		23		30	39	39
90th %ile Green (s)	7.0	62.5	62.5	6.5	62.0	5.5	34.4	24.4	24.4
90th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Gap	Gap
70th %ile Green (s)	7.0	62.9	62.9	6.1	62.0	5.5	32.0	22.0	22.0
70th %ile Term Code	Max	Hold	Hold	Gap	MaxR	Max	Hold	Ped	Ped
50th %ile Green (s)	7.0	72.0	72.0	0.0	62.0	5.5	32.0	22.0	22.0
50th %ile Term Code	Max	Hold	Hold	Skip	MaxR	Max	Hold	Ped	Ped
30th %ile Green (s)	6.7	71.7	71.7	0.0	62.0	5.5	23.4	13.4	13.4
30th %ile Term Code	Gap	Hold	Hold	Skip	MaxR	Max	Hold	Gap	Gap
10th %ile Green (s)	0.0	62.0	62.0	0.0	62.0	5.5	19.0	9.0	9.0
10th %ile Term Code	Skip	MaxR	MaxR	Skip	MaxR	Max	Hold	Gap	Gap

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 110.1
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 118.4
70th %ile Actuated Cycle: 116
50th %ile Actuated Cycle: 116
30th %ile Actuated Cycle: 107.1
10th %ile Actuated Cycle: 93

Queues
2: George St S/George St N & Queen St W

05-05-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	618	27	16	909	128	193	73	185
v/c Ratio	0.35	0.54	0.03	0.03	0.85	0.54	0.43	0.45	0.67
Control Delay	12.9	16.9	0.1	7.8	31.2	41.7	34.9	51.0	48.2
Queue Delay	0.0	0.0	0.0	0.0	49.0	0.0	0.0	0.0	0.0
Total Delay	12.9	16.9	0.1	7.8	80.2	41.7	34.9	51.0	48.2
Queue Length 50th (m)	5.1	73.8	0.0	1.2	177.4	22.3	32.8	14.6	32.0
Queue Length 95th (m)	10.9	134.0	0.0	3.8	#275.4	38.0	53.5	29.2	55.1
Internal Link Dist (m)		91.9			97.0		156.7		172.1
Turn Bay Length (m)	17.0		15.0	12.0		45.0		15.0	
Base Capacity (vph)	192	1139	792	475	1072	236	580	240	394
Starvation Cap Reductn	0	0	0	0	304	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.54	0.03	0.03	1.18	0.54	0.33	0.30	0.47

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
2: George St S/George St N & Queen St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	618	27	16	881	28	128	142	51	73	102	83
Future Volume (vph)	66	618	27	16	881	28	128	142	51	73	102	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0		4.5	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	
Frpb, ped/bikes	1.00	1.00	0.82	1.00	1.00		1.00	0.97		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		0.99	1.00		0.94	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1513	1883	1265	1763	1889		1763	1734		1514	1563	
Flt Permitted	0.10	1.00	1.00	0.33	1.00		0.38	1.00		0.64	1.00	
Satd. Flow (perm)	162	1883	1265	614	1889		697	1734		1014	1563	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	66	618	27	16	881	28	128	142	51	73	102	83
RTOR Reduction (vph)	0	0	11	0	1	0	0	11	0	0	26	0
Lane Group Flow (vph)	66	618	16	16	908	0	128	182	0	73	159	0
Confl. Peds. (#/hr)	23		54	54		23	39		30	30		39
Heavy Vehicles (%)	18%	2%	4%	0%	1%	0%	0%	2%	0%	11%	5%	13%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	72.0	66.7	66.7	66.2	63.8		27.9	27.9		17.9	17.9	
Effective Green, g (s)	72.0	66.7	66.7	66.2	63.8		27.9	27.9		17.9	17.9	
Actuated g/C Ratio	0.64	0.60	0.60	0.59	0.57		0.25	0.25		0.16	0.16	
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0		4.5	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	168	1121	753	387	1076		225	431		162	249	
v/s Ratio Prot	c0.02	0.33		0.00	c0.48		c0.03	0.10			0.10	
v/s Ratio Perm	0.23		0.01	0.02			c0.11			0.07		
v/c Ratio	0.39	0.55	0.02	0.04	0.84		0.57	0.42		0.45	0.64	
Uniform Delay, d1	18.3	13.6	9.3	10.4	20.0		35.8	35.3		42.6	44.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	2.0	0.1	0.0	8.1		3.3	0.7		2.0	5.3	
Delay (s)	19.8	15.6	9.3	10.5	28.1		39.1	35.9		44.6	49.3	
Level of Service	B	B	A	B	C		D	D		D	D	
Approach Delay (s)		15.7			27.8			37.2			48.0	
Approach LOS		B			C			D			D	

Intersection Summary

HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phasings
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	Ø3	Ø7
Protected Phases	1	2		8	2		4	3	7
Permitted Phases			8		8	4			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	26.0	26.0	28.0	28.0	26.0	28.0	28.0	3.0	3.0
Total Split (s)	29.0	30.0	28.0	28.0	30.0	28.0	28.0	3.0	3.0
Total Split (%)	32.2%	33.3%	31.1%	31.1%	33.3%	31.1%	31.1%	3%	3%
Maximum Green (s)	23.0	24.0	22.0	22.0	24.0	22.0	22.0	1.0	1.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None
Walk Time (s)	8.0	8.0	11.0	11.0	8.0	11.0	11.0		
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	12.0	11.0	11.0		
Pedestrian Calls (#/hr)	9	21	28	28	21	22	22		
90th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
90th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
70th %ile Green (s)	26.0	24.0	22.0	22.0	24.0	22.0	22.0	0.0	0.0
70th %ile Term Code	Max	Coord	Ped	Ped	Coord	Ped	Ped	Skip	Skip
50th %ile Green (s)	23.5	35.7	12.8	12.8	35.7	12.8	12.8	0.0	0.0
50th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
30th %ile Green (s)	20.4	41.5	10.1	10.1	41.5	10.1	10.1	0.0	0.0
30th %ile Term Code	Gap	Coord	Hold	Hold	Coord	Gap	Gap	Skip	Skip
10th %ile Green (s)	15.8	62.2	0.0	0.0	62.2	0.0	0.0	0.0	0.0
10th %ile Term Code	Gap	Coord	Skip	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:WBTL and 6:, Start of Green
Control Type: Actuated-Coordinated

Queues
3: George St N & Nelson St W

05-05-2022

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	363	511	82	172	106
v/c Ratio	0.81	0.72	0.39	0.19	0.56
Control Delay	43.9	34.6	36.9	2.0	39.1
Queue Delay	0.0	1.9	0.0	0.0	0.0
Total Delay	43.9	36.5	36.9	2.0	39.1
Queue Length 50th (m)	54.2	73.7	13.2	0.0	14.8
Queue Length 95th (m)	82.5	#161.6	23.6	7.7	27.8
Internal Link Dist (m)	91.5	97.8	172.1		61.8
Turn Bay Length (m)				28.0	
Base Capacity (vph)	485	714	313	895	275
Starvation Cap Reductn	0	92	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.75	0.82	0.26	0.19	0.39

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
3: George St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	222	106	145	290	35	44	31	158	50	25	23
Future Volume (vph)	6	222	106	145	290	35	44	31	158	50	25	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			0.99			1.00	0.95		0.97	
Flpb, ped/bikes		1.00			1.00			0.94	1.00		0.94	
Frt		0.96			0.99			1.00	0.85		0.97	
Flt Protected		1.00			0.98			0.97	1.00		0.98	
Satd. Flow (prot)		1730			1710			1589	1450		1320	
Flt Permitted		1.00			0.98			0.79	1.00		0.80	
Satd. Flow (perm)		1730			1710			1285	1450		1078	
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)	7	241	115	158	315	38	48	34	172	54	27	25
RTOR Reduction (vph)	0	19	0	0	2	0	0	0	77	0	14	0
Lane Group Flow (vph)	0	344	0	0	509	0	0	82	95	0	92	0
Confl. Peds. (#/hr)	41		44	44		41	59		69	69		59
Heavy Vehicles (%)	0%	0%	0%	12%	1%	26%	0%	20%	5%	0%	0%	92%
Turn Type	custom	NA		custom	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	1		2	2			8	2		4	
Permitted Phases	1			2			8		8	4		
Actuated Green, G (s)		22.3			36.3			13.4	49.7		13.4	
Effective Green, g (s)		22.3			36.3			13.4	49.7		13.4	
Actuated g/C Ratio		0.25			0.40			0.15	0.55		0.15	
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)		428			689			191	897		160	
v/s Ratio Prot		c0.20			c0.30				0.04			
v/s Ratio Perm								0.06	0.02		c0.09	
v/c Ratio		0.80			0.74			0.43	0.11		0.58	
Uniform Delay, d1		31.8			22.8			34.8	9.6		35.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		10.5			7.0			1.6	0.1		5.0	
Delay (s)		42.3			29.8			36.4	9.6		40.6	
Level of Service		D			C			D	A		D	
Approach Delay (s)		42.3			29.8			18.3			40.6	
Approach LOS		D			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
4: Elizabeth St N & Nelson St W

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	164	2	122	191	9	8	7	174	13	25	23
Future Volume (vph)	11	164	2	122	191	9	8	7	174	13	25	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	178	2	133	208	10	9	8	189	14	27	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	192	351	206	66
Volume Left (vph)	12	133	9	14
Volume Right (vph)	2	10	189	25
Hadj (s)	0.01	0.06	-0.54	-0.18
Departure Headway (s)	5.1	4.9	4.8	5.4
Degree Utilization, x	0.27	0.48	0.28	0.10
Capacity (veh/h)	653	695	666	573
Control Delay (s)	10.0	12.5	9.7	9.0
Approach Delay (s)	10.0	12.5	9.7	9.0
Approach LOS	B	B	A	A

Intersection Summary			
Delay	10.9		
Level of Service	B		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	25.0	28.0	28.0	28.0	28.0
Total Split (s)	13.0	45.0	32.0	32.0	45.0	45.0	45.0	45.0
Total Split (%)	14.4%	50.0%	35.6%	35.6%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		11.0	11.0	11.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		13	163	163	39	39	38	38
90th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
90th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
70th %ile Green (s)	10.0	39.0	26.0	26.0	39.0	39.0	39.0	39.0
70th %ile Term Code	Max	Hold	Max	Max	MaxR	MaxR	MaxR	MaxR
50th %ile Green (s)	10.0	34.7	21.7	21.7	39.0	39.0	39.0	39.0
50th %ile Term Code	Max	Hold	Gap	Gap	MaxR	MaxR	MaxR	MaxR
30th %ile Green (s)	10.0	32.0	19.0	19.0	39.0	39.0	39.0	39.0
30th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR
10th %ile Green (s)	10.0	32.0	19.0	19.0	39.0	39.0	39.0	39.0
10th %ile Term Code	Max	Hold	Ped	Ped	MaxR	MaxR	MaxR	MaxR

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 86.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 90
70th %ile Actuated Cycle: 90
50th %ile Actuated Cycle: 85.7
30th %ile Actuated Cycle: 83
10th %ile Actuated Cycle: 83

Queues
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	286	154	55	312	836	909
v/c Ratio	0.77	0.23	0.18	0.78	0.58	0.73
Control Delay	32.2	12.8	26.3	39.9	20.0	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	12.8	26.3	39.9	20.0	22.3
Queue Length 50th (m)	30.3	11.6	7.1	41.1	51.2	56.5
Queue Length 95th (m)	#56.8	23.7	16.2	#71.4	75.3	86.6
Internal Link Dist (m)		97.8		239.9	177.9	25.4
Turn Bay Length (m)	10.0		23.0			
Base Capacity (vph)	372	737	356	461	1438	1248
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	0.77	0.21	0.15	0.68	0.58	0.73

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
5: Main St N & Nelson St W/Theatre Lane

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	286	97	57	55	174	138	27	799	10	51	615	243
Future Volume (vph)	286	97	57	55	174	138	27	799	10	51	615	243
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.86			1.00			0.94	
Flpb, ped/bikes	0.96	1.00		0.96	1.00			1.00			1.00	
Frt	1.00	0.94		1.00	0.93			1.00			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1659	1582		1706	1426			3527			3191	
Flt Permitted	0.34	1.00		0.66	1.00			0.90			0.84	
Satd. Flow (perm)	585	1582		1184	1426			3181			2677	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	286	97	57	55	174	138	27	799	10	51	615	243
RTOR Reduction (vph)	0	24	0	0	33	0	0	1	0	0	40	0
Lane Group Flow (vph)	286	130	0	55	279	0	0	835	0	0	869	0
Confl. Peds. (#/hr)	228		40	40		228	101		73	73		101
Heavy Vehicles (%)	3%	15%	0%	0%	8%	4%	0%	3%	0%	0%	3%	4%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	35.3	35.3		22.3	22.3			39.1			39.1	
Effective Green, g (s)	35.3	35.3		22.3	22.3			39.1			39.1	
Actuated g/C Ratio	0.41	0.41		0.26	0.26			0.45			0.45	
Clearance Time (s)	3.0	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)	363	646		305	368			1439			1211	
v/s Ratio Prot	c0.09	0.08			0.20							
v/s Ratio Perm	c0.23			0.05				0.26			c0.32	
v/c Ratio	0.79	0.20		0.18	0.76			0.58			0.72	
Uniform Delay, d1	19.7	16.5		24.9	29.6			17.6			19.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	10.8	0.2		0.3	8.6			1.7			3.7	
Delay (s)	30.5	16.6		25.2	38.2			19.3			22.8	
Level of Service	C	B		C	D			B			C	
Approach Delay (s)		25.6			36.2			19.3			22.8	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	86.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	106.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Queen St W & Elizabeth St N

05-05-2022

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	693	1024	120	36	30
Future Volume (Veh/h)	26	693	1024	120	36	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	26	693	1024	120	36	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			116			
pX, platoon unblocked						
vC, conflicting volume	1144				1482	572
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1144				1482	572
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				68	94
cM capacity (veh/h)	606				111	463

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	257	462	683	461	66
Volume Left	26	0	0	0	36
Volume Right	0	0	0	120	30
cSH	606	1700	1700	1700	169
Volume to Capacity	0.04	0.27	0.40	0.27	0.39
Queue Length 95th (m)	1.0	0.0	0.0	0.0	12.9
Control Delay (s)	1.6	0.0	0.0	0.0	39.2
Lane LOS	A				E
Approach Delay (s)	0.6		0.0		39.2
Approach LOS					E

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Main St N & Nelson St E

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	76	949	0	0	582
Future Volume (Veh/h)	42	76	949	0	0	582
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	42	76	949	0	0	582
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			49			103
pX, platoon unblocked	0.85	0.85			0.85	
vC, conflicting volume	1240	474			949	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	923	19			579	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	91			100	
cM capacity (veh/h)	228	893			839	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	118	633	316	194	388
Volume Left	42	0	0	0	0
Volume Right	76	0	0	0	0
cSH	438	1700	1700	839	1700
Volume to Capacity	0.27	0.37	0.19	0.00	0.23
Queue Length 95th (m)	8.2	0.0	0.0	0.0	0.0
Control Delay (s)	16.2	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	16.2	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Phasings
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	3	8		4		2		6
Permitted Phases	8		4		2		6	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	28.0	28.0	28.0	30.0	30.0	30.0	30.0
Total Split (s)	10.0	40.0	30.0	30.0	80.0	80.0	80.0	80.0
Total Split (%)	8.3%	33.3%	25.0%	25.0%	66.7%	66.7%	66.7%	66.7%
Maximum Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		14.0	14.0	14.0	16.0	16.0	16.0	16.0
Pedestrian Calls (#/hr)		17	22	22	44	44	59	59
90th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
90th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
70th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
70th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
50th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
50th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
30th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
30th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord
10th %ile Green (s)	7.0	34.0	24.0	24.0	74.0	74.0	74.0	74.0
10th %ile Term Code	MaxR	MaxR	MaxR	MaxR	Coord	Coord	Coord	Coord

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Control Type: Pretimed

Queues
8: Main St N & Church St W/Church St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	89	199	106	286	1373	850
v/c Ratio	0.41	0.39	0.46	0.79	0.71	0.49
Control Delay	36.5	33.7	49.6	59.6	18.0	13.5
Queue Delay	0.0	0.0	0.0	0.0	6.9	0.0
Total Delay	36.5	33.7	49.6	59.6	24.9	13.5
Queue Length 50th (m)	15.3	33.8	22.2	61.5	107.4	52.9
Queue Length 95th (m)	28.1	55.1	40.2	#101.1	132.3	67.8
Internal Link Dist (m)		171.2		73.7	78.7	57.8
Turn Bay Length (m)	42.0		35.0			
Base Capacity (vph)	216	508	232	364	1945	1745
Starvation Cap Reductn	0	0	0	0	527	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.39	0.46	0.79	0.97	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
8: Main St N & Church St W/Church St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	135	64	106	210	76	36	1258	79	32	743	75
Future Volume (vph)	89	135	64	106	210	76	36	1258	79	32	743	75
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	3.7	3.7	3.7	3.7	3.7	3.7
Total Lost time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.99			0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.96			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1727	1743		1747	1768			3488			3394	
Flt Permitted	0.26	1.00		0.63	1.00			0.90			0.83	
Satd. Flow (perm)	467	1743		1164	1768			3150			2819	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	135	64	106	210	76	36	1258	79	32	743	75
RTOR Reduction (vph)	0	14	0	0	11	0	0	4	0	0	6	0
Lane Group Flow (vph)	89	185	0	106	275	0	0	1369	0	0	844	0
Confl. Peds. (#/hr)	22		17	17		22	59		44	44		59
Heavy Vehicles (%)	3%	0%	4%	0%	1%	0%	0%	3%	0%	0%	5%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	6	0	0	5
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	3	8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Effective Green, g (s)	34.0	34.0		24.0	24.0			74.0			74.0	
Actuated g/C Ratio	0.28	0.28		0.20	0.20			0.62			0.62	
Clearance Time (s)	3.0	6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)	205	493		232	353			1942			1738	
v/s Ratio Prot	c0.03	0.11			c0.16							
v/s Ratio Perm	0.10			0.09				c0.43			0.30	
v/c Ratio	0.43	0.37		0.46	0.78			0.71			0.49	
Uniform Delay, d1	33.5	34.5		42.3	45.5			15.6			12.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.6	2.2		6.4	15.5			2.2			1.0	
Delay (s)	40.1	36.6		48.6	61.0			17.8			13.6	
Level of Service	D	D		D	E			B			B	
Approach Delay (s)		37.7			57.6			17.8			13.6	
Approach LOS		D			E			B			B	

Intersection Summary

HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Phasings
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2	1	6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	29.0	9.5	29.0	29.0	26.0	26.0	9.5	26.0	26.0
Total Split (s)	10.0	73.0	11.0	74.0	74.0	26.0	26.0	10.0	36.0	36.0
Total Split (%)	8.3%	60.8%	9.2%	61.7%	61.7%	21.7%	21.7%	8.3%	30.0%	30.0%
Maximum Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Max	None	Max	Max	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0		8.0	8.0
Flash Dont Walk (s)		15.0		15.0	15.0	12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)		39		35	35	35	35		25	25
90th %ile Green (s)	7.0	67.0	8.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
90th %ile Term Code	Max	MaxR	Max	MaxR	MaxR	Max	Max	Max	Hold	Hold
70th %ile Green (s)	6.5	67.0	7.6	68.1	68.1	20.0	20.0	7.0	30.0	30.0
70th %ile Term Code	Gap	MaxR	Gap	Hold	Hold	Max	Max	Max	Hold	Hold
50th %ile Green (s)	6.1	67.1	7.0	68.0	68.0	20.0	20.0	7.0	30.0	30.0
50th %ile Term Code	Gap	Hold	Gap	MaxR	MaxR	Ped	Ped	Max	Hold	Hold
30th %ile Green (s)	0.0	67.0	6.3	76.3	76.3	14.5	14.5	7.0	24.5	24.5
30th %ile Term Code	Skip	MaxR	Gap	Hold	Hold	Gap	Gap	Max	Hold	Hold
10th %ile Green (s)	0.0	68.0	0.0	68.0	68.0	9.8	9.8	7.0	19.8	19.8
10th %ile Term Code	Skip	Hold	Skip	MaxR	MaxR	Gap	Gap	Max	Hold	Hold

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.3
Control Type: Semi Act-Uncoord
90th %ile Actuated Cycle: 120
70th %ile Actuated Cycle: 119.6
50th %ile Actuated Cycle: 119.1
30th %ile Actuated Cycle: 112.8
10th %ile Actuated Cycle: 99.8

Queues
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	30	778	69	760	422	18	208	158	90	82
v/c Ratio	0.08	0.71	0.20	0.65	0.44	0.10	0.77	0.81	0.21	0.21
Control Delay	6.9	22.5	7.8	19.3	2.7	43.9	57.3	67.3	36.9	9.0
Queue Delay	0.0	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	31.6	7.8	19.3	2.7	43.9	57.3	67.3	36.9	9.0
Queue Length 50th (m)	2.1	129.9	5.0	120.7	0.0	3.6	37.3	29.7	16.6	0.0
Queue Length 95th (m)	5.2	183.4	9.8	168.6	13.3	10.4	#64.2	#61.6	30.6	12.3
Internal Link Dist (m)		135.7		106.6			74.2		239.9	
Turn Bay Length (m)	14.0		16.0			28.0		18.0		24.0
Base Capacity (vph)	378	1098	356	1165	963	215	317	195	495	434
Starvation Cap Reductn	0	288	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.96	0.19	0.65	0.44	0.08	0.66	0.81	0.18	0.19

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
9: Chapel St/Theatre Lane & Queen St E

05-05-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	763	15	69	760	422	18	99	109	158	90	82
Future Volume (vph)	30	763	15	69	760	422	18	99	109	158	90	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	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
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.89	1.00	0.94		1.00	1.00	0.91
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.94	1.00		0.98	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1785	1857		1785	1902	1311	1671	1623		1569	1879	1424
Flt Permitted	0.24	1.00		0.20	1.00	1.00	0.70	1.00		0.31	1.00	1.00
Satd. Flow (perm)	446	1857		379	1902	1311	1229	1623		516	1879	1424
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	763	15	69	760	422	18	99	109	158	90	82
RTOR Reduction (vph)	0	0	0	0	0	166	0	34	0	0	0	63
Lane Group Flow (vph)	30	778	0	69	760	256	18	174	0	158	90	19
Confl. Peds. (#/hr)	35		39	39		35	25		35	35		25
Heavy Vehicles (%)	0%	3%	0%	0%	1%	5%	0%	0%	0%	12%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	9	0	0	0	0	0	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Effective Green, g (s)	71.8	68.1		75.6	70.0	70.0	16.7	16.7		26.7	26.7	26.7
Actuated g/C Ratio	0.62	0.59		0.66	0.61	0.61	0.14	0.14		0.23	0.23	0.23
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	6.0	6.0		3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	320	1095		316	1153	795	177	234		183	434	329
v/s Ratio Prot	0.00	c0.42		c0.01	0.40			0.11		c0.05	0.05	
v/s Ratio Perm	0.06			0.13		0.20	0.01			c0.15		0.01
v/c Ratio	0.09	0.71		0.22	0.66	0.32	0.10	0.74		0.86	0.21	0.06
Uniform Delay, d1	11.3	16.7		12.0	14.9	11.1	42.8	47.3		41.3	35.8	34.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	3.9		0.3	3.0	1.1	0.3	12.0		31.8	0.2	0.1
Delay (s)	11.4	20.6		12.4	17.8	12.2	43.1	59.3		73.1	36.0	34.6
Level of Service	B	C		B	B	B	D	E		E	D	C
Approach Delay (s)		20.3			15.6			58.0			53.4	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	115.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: Elizabeth St N & Site Access

05-05-2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	28	138	51	95	112	37
Future Volume (Veh/h)	28	138	51	95	112	37
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	150	55	103	122	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	390	106			158	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	390	106			158	
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	84			91	
cM capacity (veh/h)	561	948			1422	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	180	158	162
Volume Left	30	0	122
Volume Right	150	103	0
cSH	850	1700	1422
Volume to Capacity	0.21	0.09	0.09
Queue Length 95th (m)	6.1	0.0	2.1
Control Delay (s)	10.4	0.0	6.0
Lane LOS	B		A
Approach Delay (s)	10.4	0.0	6.0
Approach LOS	B		

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		